Validity of the Risk & Protective Factor Model

Vicki Schmitt, Bruce Frey, Michelle Dunham, and Carol Carmen
School Program Evaluation and Research (SPEaR), University of Kansas

Annual Meeting of the American Evaluation Association National Conference
Toronto, Canada
October 2005

Abstract

Many evaluations of programs such as the *Safe Schools, Healthy Students* initiative discussed here are geared toward identifying the factors most often associated with delinquent behaviors among adolescents. Models such as the one proposed by Hawkins and Catalano (1992) provide a framework for understanding the risk and protective factors most often associated with the use of drugs, alcohol, tobacco and violence among teens. While many states make use of data collected via survey instruments based on such a model, an empirical verification of the theoretical factor structure should also be considered in order to better understand the predictive relationship among factors and behaviors. This study tests the validity of the risk and protective factor model by examining three data sets across different states and years. Findings suggest that while the overall model does indeed appear to be supported, evaluators should consider ways in which factors differ across age groups.

Background

Drug and alcohol use as well as other delinquent behaviors among adolescents remain a focus and area of concern for many communities across the United States (Arthur; Hawkins, Pollard, Catalano, and Baglioni., 2002). Research suggests that one way to target preventive interventions for these problems is to examine the risk and protective factors associated with them, with risk factors defined as those characteristics or behaviors that predict future problem behaviors and protective factors as those indicators associated with reducing or preventing the likelihood of such problems (Hawkins and Catalano, 1992).

Evaluations such as the federally funded *Safe Schools, Healthy Students* initiative specifically target interventions that "increase protective factors and reduce risk factors for alcohol, tobacco, other drug use and violence among pre-school to grade 12 students." Risk factors are defined as those characteristics or behaviors that predict future problem behaviors while protective factors as those indicators associated with reducing or preventing the likelihood of such problems (Hawkins, J.D. & Catalano, R.F., 1992). Often evaluations interested in

examining this risk and protective factor model use state, county and/or district level data generated from a survey which follows the factors developed by Hawkins and Catalano (1992). The risk and protective factor model examined here is categorized into four domains 1) community factors, 2) families factors, 3) peers / individual factors, and 4) school factors. While the development of the model followed a review of several longitudinal studies that identified the theoretical risk factors believed to predict adolescent problem behaviors such as violence, drug and alcohol use, teenage pregnancy, school drop-out, and delinquency; empirical data verifying such a factor structure should also be considered. In addition, it is important for evaluators to test the adequacy of this model and the predictive relationships that exist between the factors to outcomes.

This study presents the combined findings of three data sets across different states and years to test the validity of the Risk and Protective Factor model which include: (1) secondcary analysis of a 1996 study of 41,302 Oregon high school students (2) an unpublished analysis survey responses of 23,000 students from across the state of Florida in 1993 and (3) survey responses in Lawrence, Kansas in 2004 from 8,885 6^{th} through 12^{th} graders.

The development and verification of a risk and protective factor structure is important to evaluators who are interested in measuring indicators of adolescent delinquent behaviors. Understanding these factors provides communities, a set of strategies for ways in which their efforts can more effectively address the issues facing both younger and older adolescents and may provide a method for preventing problem behaviors while promoting healthy ones.

Findings from Studies Presented

Study One

One previous study has used empirical data to explore the validity of the Risk and Protective Factors model. Arthur, Hawkins, Pollard, Catalano and Baglioni (2002) examined results from the *Communities that Care Youth Survey* for children in sixth, eighth and eleventh grades. They conducted a factor analysis on data from about 11,000 students and found that most of the individual subscales representing twenty-nine specific theoretical risk or protective factors demonstrated unidimensionality. Additionally, nearly all subscales produced good to very good internal reliabilities for their sample. Coefficient alphas across the three grade levels ranged from .50 to .93, with most in the high .70s or low .80s.Their analyses did not explore the usefulness of

the four broad factor domains of Community, School, Family and Peer/Individual. Moderate to strong correlations were found between most factor scale scores and self-reported cigarette, alcohol and marijuana use (positive for risk factors and negative for protective factors) providing criterion-related validity evidence. The authors concluded that the *Communities that Care* survey which is structured around the risk and protective factors approach is useful for estimating population levels of risk and for prioritizing "specific risk and protective factors in specific populations as targets for intervention." (pg. 575.)

A secondary analysis of a correlation table provided in Arthur, Hawkins, Pollard, Catalano and Baglioni (2002; pg. 594) was conducted to test the assumption that the *Communities that Care Youth Survey* (and other approaches driven by a risk and protective factor model) is equally useful in estimating drug use *regardless* of the drug. Correlations between factor scale scores and cigarette, alcohol and marijuana use were summarized and compared.

Arthur, Hawkins, Pollard, Catalano and Baglioni (2002) present a table of correlations between twenty-nine risk or protective factor scale scores and six self-reported levels of drug use: cigarettes, alcohol and marijuana, in the last 30 days and lifetime. By using meta-analytic methods and treating these correlations as samples from all correlation coefficients which would be found between any risk or protective factor and measures of use for the three drugs, mean correlation estimates were produced with standard error-defined 95% confidence intervals. Because all correlations on Arthur, et al.'s table were in the expected direction, absolute values were used. These results are presented in Table 1.

Table 1. Risk and Protective Factors' Mean Relationship with Levels of Drug Use

Criterion	Mean Correlation	95% Confidence Interval
Use in Last 30 Days		
Cigarettes	.29	.25 to .34
Alcohol	.30	.25 to .35
Marijuana	.27	.22 to .31
Lifetime Use		
Cigarettes	.32	.28 to .37
Alcohol	.27	.23 to .31
Marijuana	.32	.28 to .38

Note. The mean correlations between risk and protective factor scale scores and the level of use for all three drug-types are statistically similar.

Study Two

In 1995, Florida administered an 85-item drug use and attitude survey to about twenty-three thousand 6th through 12th grade students across fifteen school districts. The survey was produced with the guidance of a framework of risk factors consistent with the work of Hawkins and Catalano (1992) and a set of resiliency factors derived from a review of the literature (Frey, 1995). The instrument produced data which demonstrated good reliability and criterion-based evidence of validity (Frey, 1995). To gauge the utility of a risk and resiliency model for identifying population levels of risk, a structural equation analysis was conducted with the goal of producing a "best" model for accounting for the variance in drug involvement. A visual display of that model was provided in a conference paper (Frey, 1996), but the concept of *drug involvement* (the criterion latent variable central to the model) was not discussed. In this study, that model is summarized and the concept of drug involvement is presented. Additionally, a multiple regression analysis was conducted to account for the variance in drug involvement using scores from risk and resiliency factor scales.

Frey (1996) presented a structural equation model which used seven measured variables (risk and resiliency scale scores from the 1995 Florida drug use survey) to substantially account for a latent variable labeled "Drug Involvement". Drug Involvement was treated as the conceptual underlying commonality of four measured drug use variables often found to correlate strongly together: having friends who use drugs, attitude towards drug use, age of first use, and drug use at high levels (drug abuse). That model showed good fit (CFI = .93) and is reproduced here.

The Drug Involvement structural equation model provided a guide for our multiple regression analysis using the Florida data. The final regression model contained five predictor variables and a criterion variable which was a balanced composite of the four drug use variables identified as *drug involvement* in the structural equation model. The predictor variables are factor scale scores (balanced summing across scale items).The regression analysis resulted in a model which accounted for 56% of the variance in drug involvement ($R = .75$, $R^2 = .56$, $p = .001$). Table 2 presents the standardized weights.

Figure 1. Drug Involvement Model

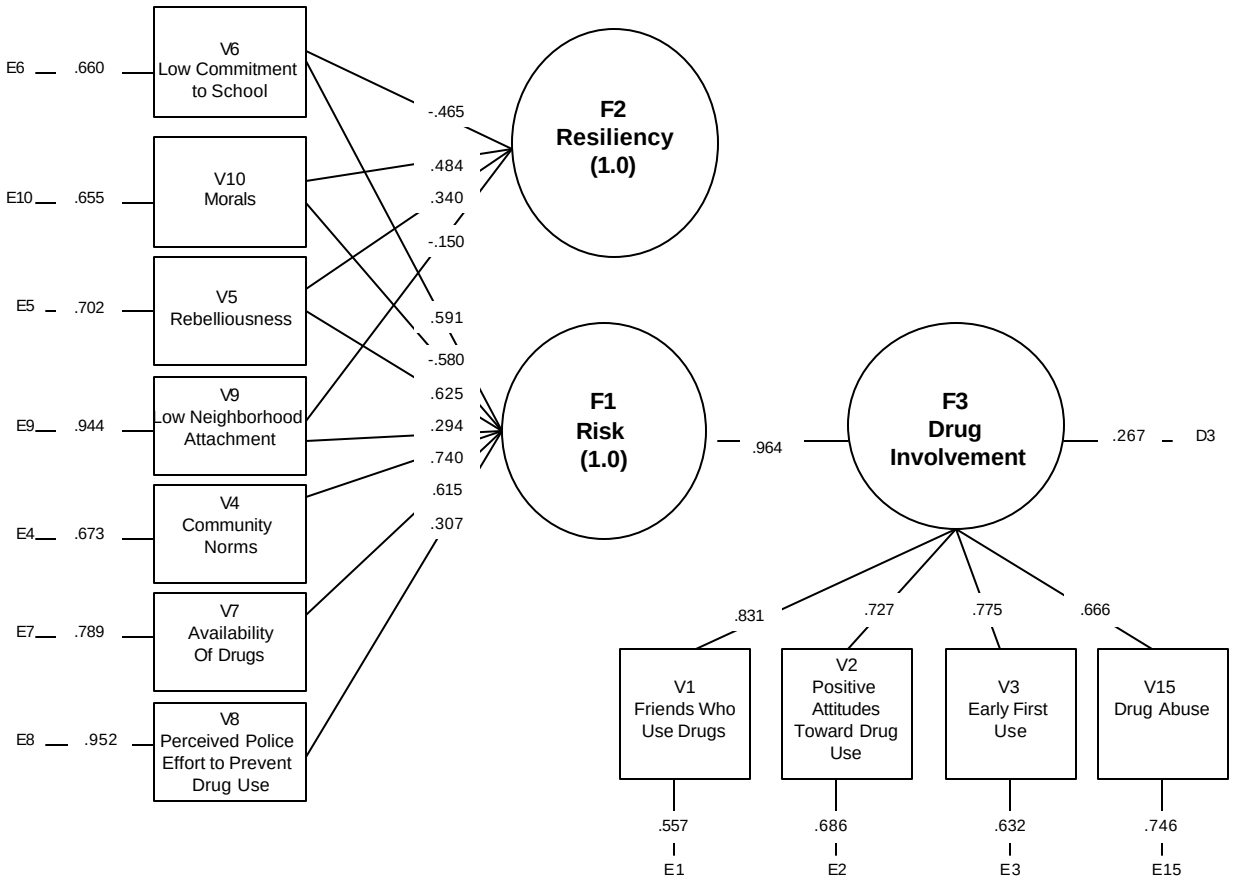


Table 2. Drug Involvement Predictors from 1995 Florida Survey Data

Predictor	*Weight*
Community Norms	.29
Individual Rebelliousness	.18
Drug Availability	.19
Morality	-.21
Low Commitment to Education	.13

Note. All weights are significant at the $p = .001$ level.

The regression analysis results suggest that a risk and protective framework is useful for accounting for drug involvement. With the Florida student data, five factors (community norms, rebelliousness, drug availability, morality and commitment to education) were found to account for more than half of the variance in student drug involvement.

Study Three

Data provided by the Regional Prevention Center HP (2004), the first time use of alcohol and drugs among adolescents in Kansas is surprising with tobacco = 12.2 years, alcohol = 12.5; and marijuana = 13.6. In an effort to address the prevention needs associated with alcohol and drug use among Kansas adolescents, the Social and Rehabilitation Services, Alcohol and Drug Abuse Services Division adopted the *Communities that Care* model and has been collecting the data now for approximately six years. While the model has identified several risk and protective factors under the four domains (i.e. community, families, peer/individual, and school), it should not be viewed as "one size fits all" (RPCFH, 2004) approach to prevention. The CTC model allows communities to target the risks specific to their community. As such, the risk/protective factors selected by public school districts in Kansas may be different from districts/communities.

Two major components of the Lawrence, Kansas Public Schools USD 497 Safe Schools, Healthy Students (SSHS) initiative are to 1) "increase protective factors and reduce risk factors for alcohol, tobacco, other drug use and violence among pre-school to grade 12 students" (SSHS, Element #2) and 2) "increasing positive behaviors of students by promoting connectivity with school and a positive school climate" (Element #5, SSHS). One way in which the SSHS evaluation team at the University of Kansas has addressed these elements is to examine data from the Kansas *Communities That Care (CTC) Survey*, which seeks to examine the risk and protective factors couched under four specific domains 1) community, 2) families, 3) peers/individual, and 4) school. The CTC survey used by USD 497 targets students in grades 6, 8, 10, 12 and is based on a model developed by Hawkins and Catalano (1992). In addition, the model also encompasses protective factors identified to promote positive youth development and pro-social skills (Arthur, M.W, et al, 2002). The development of these risk and protective factors provides communities, a set of strategies for understanding ways in which their efforts can more effectively address the issues facing both younger and older adolescents in their areas and may provide a method for preventing problem behaviors while promoting healthy ones.

While the four domains are specified in the CTC framework, USD 497 students do not respond to questions pertaining to the family domain. These data are not available and thus will not be discussed as a part of this paper. In addition to the items specific to each domain's risk and protective framework, items associated with three outcomes of 1) Life time usage of drugs, 2) Positive Behaviors and 3) Positive feedback are also examined.

The analyses for this third study includes the following research questions: (1) Does the factor structure of each domain examined proposed by the Risk & Protective model (i.e. , community, peer/individual, and school) fit the USD 497 dataset? (2) Does the factor structure of the outcomes selected (i.e. lifetime usage, positive behaviors, positive feedback) fit the USD 497 dataset? (3) Within each domain, is the factor structure the same between younger and older adolescents? (4) What is the predictive nature of each domain for each of the outcomes selected?

In order to answer the research questions stated above, the following analytic procedures were conducted. First, an initial confirmatory model for the outcome factors selected as well as each of the three domains (i.e. school, community, and peer/individual) was examined as proposed by the CTC model. The χ^2 and relative fit statistics (i.e. NNFI, CFI, RMSEA) were examined to determine model fit. Upon analysis of the initial CFA, parceling procedures were implemented in order to increase model fit. Once parceled models were determined for both the outcomes and each domain, a multiple group analysis was utilized to examine the differences that exist between young adolescents (i.e. 6^{th} and 8^{th} grade students) and older adolescents (i.e. 10^{th} and 12^{th} grade students). After establishing strong metric invariance, a latent variable regression technique allowed for examination of the predictive relationship between each domain and the outcomes specified.

Outcome Factors

Initially, three constructs, Lifetime Use, Positive Behaviors, and Positive Feedback, represented by seventeen indicators were included in the problem-behavior model. An initial CFA showed poor model fit χ^2 (118) = 4083.878, p <.001, RMSEA = .139, CFI = .827 and NNFI = .800. Modification indices for this initial model suggested the specification of a fourth construct, "Not So Bad" Drug Use, on which the Lifetime Use indicators of alcohol, cigarette, and marijuana use were specified to load. The resulting model yielded an improved fit over the initial theoretical model, χ^2 (113) = 1262.041, p <.001, RMSEA = .0670, CFI = .948 and NNFI = .937. Finally, the indicators were combined to create three balanced parcels representing each

construct, χ^2 (129) = 651.885, p <.001, RMSEA = .0736, CFI = .959 and NNFI = .943. The loadings, residuals, and communalities for each of the resulting parcels are included in Appendix B. The final model with four constructs and twelve indicators was used in subsequent analyses of the community, peer/individual, and school domains.

School Risk and Protective Factors

The initial CFA with four constructs (1. academic failure, 2. commitment to school, 3. opportunities for involvement, and 4. recognition) with eighteen indicators followed the theoretical model proposed by the CTC survey produced a χ^2 (129) = 1238.883, p <.001, RMSEA = .0597, CFI = .951 and NNFI = .942, indicating good model fit. However, in order to reduce sources of sampling error at the item level and to also reduce the number of parameters to be estimated, the eighteen items were parceled into six indicators. The constructs couched under the "risk" factor within the school domain (academic failure and commitment to school) were combined into one overall risk factor with three parceled indicators. The same procedure was followed for the two original constructs associated with school "protective" factor (opportunities for involvement and recognition) producing one protective factor with three parceled indicators. While the RMSEA increased for this parceled model (.0745), the remaining relative fit statistics saw in increase in overall model fit with CFI = .978 and NNFI = .958. The parceled school model was then combined with the parceled outcomes model and fit again examined [χ^2 (120) = 717.755, p <.001, RMSEA = .0461, CFI = .961 and NNFI = .942]. This final model with six factors was then tested for strong metric invariance. Table 3 contains the relative fit statistics pertaining to each of the models examined.

In order to determine if the two school domain constructs (i.e. school risk and school protective) and the four outcome constructs operating similarly for both young adolescents (6th and 8th grade) and older adolescents (10th and 12 grade) a multiple group confirmatory analysis was conducted to test for measurement invariance. Table 2 outlines the steps followed in the process of establishing strong metric invariance. The first step included separating the two groups and confirming the factors structure. The fit indices reported for young adolescents [χ^2 (120) = 272.401, p <.001, RMSEA = .0325, CFI = .985 and NNFI = .981] and older adolescents [χ^2 (120) = 511.875, p <.001, RMSEA = .0531, CFI = .957 and NNFI = .946] indicate good model fit for both groups when examined independent of each other. Step two included testing the two groups for configural invariance, which is similar to step one but now both groups are

compared simultaneously [χ^2 (240) = 784.276, p <.001, RMSEA = .0439, CFI = .972 and NNFI = .964]. Once configural invariance was established, equality constraints were specified for the lambda matrix in order to test the invariance of the loadings. While the χ^2 difference and RMSEA confidence interval test indicate variance between the two groups, the overall model fit [χ^2 (252) = 836.550, p <.001, RMSEA = .0446, CFI = .970 and NNFI = .963] was still strong enough to warrant moving forward and testing the invariance of the intercepts. This is the last step that must be reached in order to establish strong metric invariance, equating loadings and intercepts in both groups. Again, the χ^2 difference test and examination of RMSEA confidence intervals indicate intercept variance between the two groups. However, in order to test the latent means, strong metric invariance was forced at this point based on the overall goodness of fit [χ^2 (264) = 1120.022, p <.001, RMSEA = .0531, CFI = .956 and NNFI = .949]. Following enforcement of strong metric invariance, alphas were freed one at a time to examine the differences in latent means between the two groups. Significant differences between young and older adolescents were identified for five of the six latent means of interest. The latent mean for the "school protective" factor did not differ between groups (see Table 2). In addition to the test of the latent means, variances were tested for equality and the homogeneity of variance/covariances were examined. Again, while these constraints are weakly supported and perhaps warrant further investigation of the item level data in order to detect the source of invariance, the overall fit for both models is good (see Table 4).

By forcing strong metric invariance, examination of the predictive relationship of the school risk and protective factors to the four specified outcomes factors was addressed in a two group model with equality constraints placed on the beta matrix. The process followed a stepwise procedure where the least significant beta path was removed and model fit re-examined until a final regression model with only significant paths remaining was established. The initial latent regression model yielded fit statistics, χ^2 (278) = 1296.343, p <.001, RMSEA = .0565, CFI = .942 and NNFI = .947. As each beta path was removed, model fit statistics were examined to ensure non-significant increase in χ^2. The final model, with only three regression paths remaining yielded fit statistics, χ^2 (283) = 1303.414, p <.001, RMSEA = .0560, CFI = .943 and NNFI = .947. This final regression model indicates that the factor termed "school protective" does not produce a significant predictive relationship to any of the four outcome factors examined and the "school risk" factor predicts only three of the four outcome constructs.

The outcome construct, "positive behaviors" is not predicted by either the school risk or school protective factor. Overall, the regression analyses appears to support the idea that students who do well in school, have good grades, view school as meaningful, are interested in the coursework and do their best in school are less likely to endorse the use of drugs and are more likely to perceive that others see them as "cool" if they work hard in school, defend someone, volunteer and make a commitment to stay drug free. The final regression model is displayed in Figure 2.

Table 3. Initial CFA and parceled model fit statistics for the school domain risk and protective factors with outcomes specified.

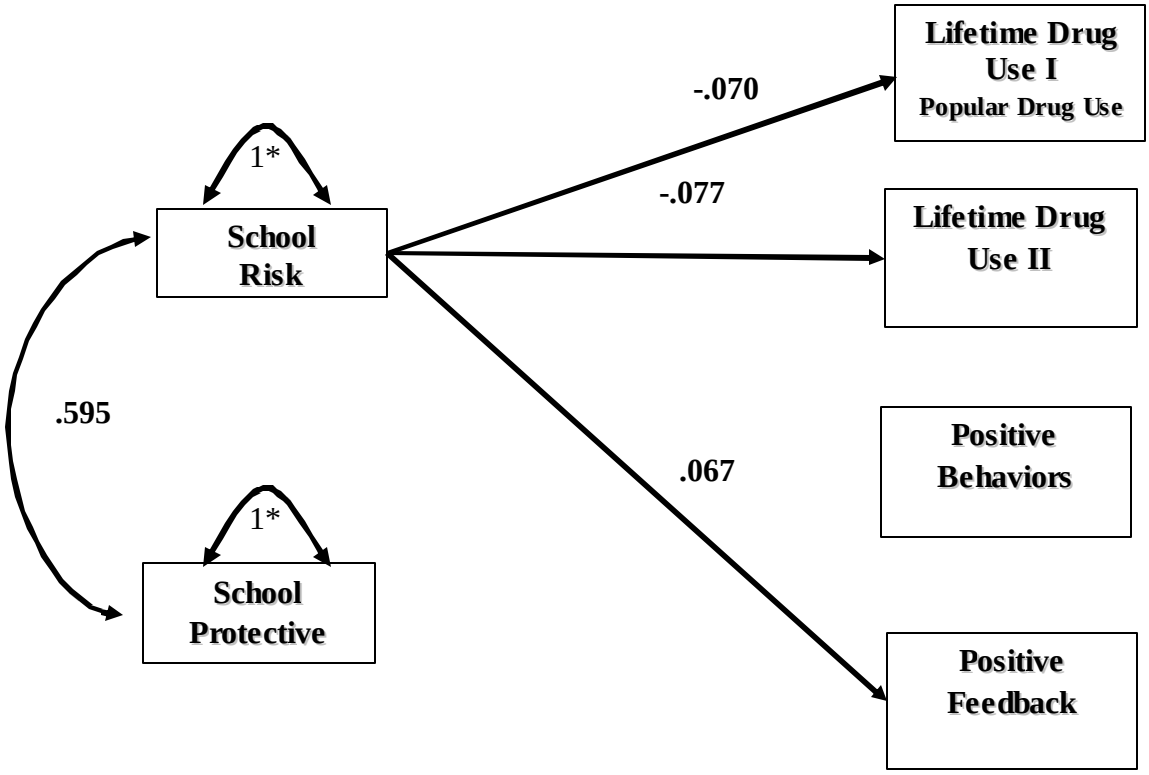
Model	***RMSEA***	***CFI***	***NNFI***	c^2	***df***	***p value***
Theoretical School Risk/Protective Model	0.0597	0.951	0.942	1238.883	(129)	<.001
Parceled School Risk/Protective Model	0.0745	0.978	0.958	126.393	(8)	<.001
Theoretical Outcomes Model	0.0670	0.948	0.937	1262.041	(113)	<.001
Parceled Outcomes Model	0.0736	0.959	0.943	651.885	(48)	<.001
Parceled School with Outcomes Model	0.0461	0.969	0.961	717.755	(120)	<.001

Table 4. Multiple confirmatory factor analysis testing for strong metric invariance between young adolescents and older adolescents.

	Model	*RMSEA*	*CFI*	*NNFI*	c^2	*df*	c^{2D}	*df*	*p value*
Step 1	Young Adolescents (single group)	0.0325	0.985	0.981	272.401	(120)			
	Older Adolescents (single group)	0.0531	0.957	0.946	511.875	(120)			
Step 2	Testing Configural Invariance	0.0439 *(.0405 - .0473)	0.972	0.964	784.276	(240)			
Step 3	Testing Loading Invariance (equal λ)	0.0446 *(.0413 - .0479)	0.970	0.963	836.550	(252)	52.274	(12)	<.001
Step 4	Testing Invariance of Intercepts	0.0531 *(.0499 - .0562)	0.956	0.949	1120.022	(264)	283.472	(12)	<.001
Step 5a.	Testing Variances for Equality	0.0499 *(.0467 - .0531)	0.962	0.955	997.173	(258)	160.623	(6)	<.001
Step 5b.	Homogeneity of Variance/Covariances	0.0495 *(.0464 - .0527)	0.961	0.956	1037.292	(273)	200.742	(21)	<.001
Step 6a.	Testing Latent Means School Risk	0.0554 *(.0523 - .0585)	0.952	0.945	1194.938	(265)	74.916	(1)	<.001
Step 6b.	Testing Latent Means School Protective	0.0529 *(.0498 - .0561)	0.956	0.949	1120.474	(265)	0.452	(1)	>.05
Step 6c.	Testing Latent Means Popular Use	0.0605 *(.0575 - .0637)	0.942	0.933	1395.675	(265)	275.653	(1)	<.001
Step 6d.	Testing Latent Means Lifetime Use	0.0532 *(.0501 - .0564)	0.955	0.948	1137.767	(265)	17.745	(1)	<.001
Step 6e.	Testing Latent Means Positive Behaviors	0.0565 *(.0534 - .0596)	0.951	0.944	1210.966	(265)	90.944	(1)	<.001
Step 6f.	Testing Latent Means Positive Feedback	0.0532 *(.0501 - .0564)	0.955	0.948	1130.056	(265)	10.034	(1)	<.001
Step 7a.	Regression Model (Initial)	.0565	.942	.947	1296.343	(278)			
Step 7b.	Regression Model (Final)	.0560	.943	.947	1303.414	(283)	7.071	(5)	>.05

***90% CI RMSEA**

Figure 2. Latent variable regression examining the predictive relationship of school risk/protective factors to the outcomes specified.



Community Risk and Protective Factors

For this analysis, three risk and two protective factors from the Community domain of the CTC survey were chosen (1. Laws and Norms Favorable to Drug Use, 2. Low Neighborhood Attachment, 3. Community Disorganization, 4. Opportunities for Positive Involvement, and 5. Rewards for Conventional Involvement). These five indicators were originally represented by twenty-seven indicators. For the first factor, three parcels were created to represent three facets of the Laws and Norms construct: Police, Perceptions of Adult Approval, and Adult Activities. Three balanced parcels were created representing each of the remaining indicators. This model of the Community domain was combined with the four outcome constructs previously specified to create the model used for a multiple-group comparison of two groups of students, younger adolescents (6^{th} and 8^{th} graders) and older adolescents (10^{th} and 12^{th} graders).

This model was fit separately to each of the groups, and adequate fit was obtained in both groups (Table 5 provides fit indices for all analyses). Subsequently, both groups were combined and the model was tested for configural invariance. This model also had adequate model fit (RMSEA=.0474), supporting configural invariance of the constructs across both groups. Next, loadings of indicators on constructs in both groups were constrained to be equal, testing the invariance of the loadings. This constraint was not tenable according to the RMSEA confidence interval criterion, but overall model fit as indicated by the RMSEA, CFI, and NNFI was still good; accordingly, invariance of the loadings was forced and analysis continued with testing for invariance of the intercepts. Similarly, invariance of the intercepts was not upheld by the RMSEA confidence interval criterion, but was forced for following analysis due to continued good model fit. Next, constraining the variances to be equal provided a significant change in the chi-square value, as did the test for homogeneity of covariances. However, as in preceding analyses, the overall model fit remained good, and the equality of each of the above parameters was forced for testing of the latent means. Each of the latent means was constrained to be equal in the two groups one at a time, and the resulting change in chi-square was examined for each. Only the equality constraint for the mean of the Community Disorganization construct in both groups was supported by a non-significant change in the criterion value.

A latent variable regression analysis was conducted to determine the nature of the relationship between the five selected Community risk and protective factors and the outcome constructs of interest. Initially, all possible regression paths were estimated in the younger

adolescent group and constrained to be equal in the older adolescent group, making possible a comparison of the two groups. Regression paths found to be non-significant were removed one at a time until all remaining paths were significant. Table 5 gives the correlations among constructs and the significant regression paths for the final model, while Figure 3 shows the resulting paths.

Table 5. Correlations and regression paths for Community risk and protective factors

	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**	**9.**
1. Laws and Norms	1.00								
2. Low Neigh. Att.	0.470	1.00							
3. Comm. Disorg.	-0.563	-0.435	1.00						
4. Opp. for Pos. Inv.	-0.235	-0.257	0.152	1.00					
5. Rewards	0.516	0.631	-0.213	-0.275	1.00				
6. Lifetime Use I	**-2.775**	**n.s.**	**-0.708**	**n.s.**	**0.545**	1.00			
7. Lifetime Use II	**-0.703**	**n.s.**	**n.s.**	**0.124**	**0.176**	0.534	1.00		
8. Pos. Behaviors	**n.s.**	**-0.169**	**-0.187**	**-0.292**	**0.347**	-0.137	0.019	1.00	
9. Pos. Feedback	**0.089**	**n.s.**	**-0.089**	**-0.064**	**0.340**	0.127	-0.040	0.279	1.00

Figure 2. Community Risk and Protective factors: Latent variable regression

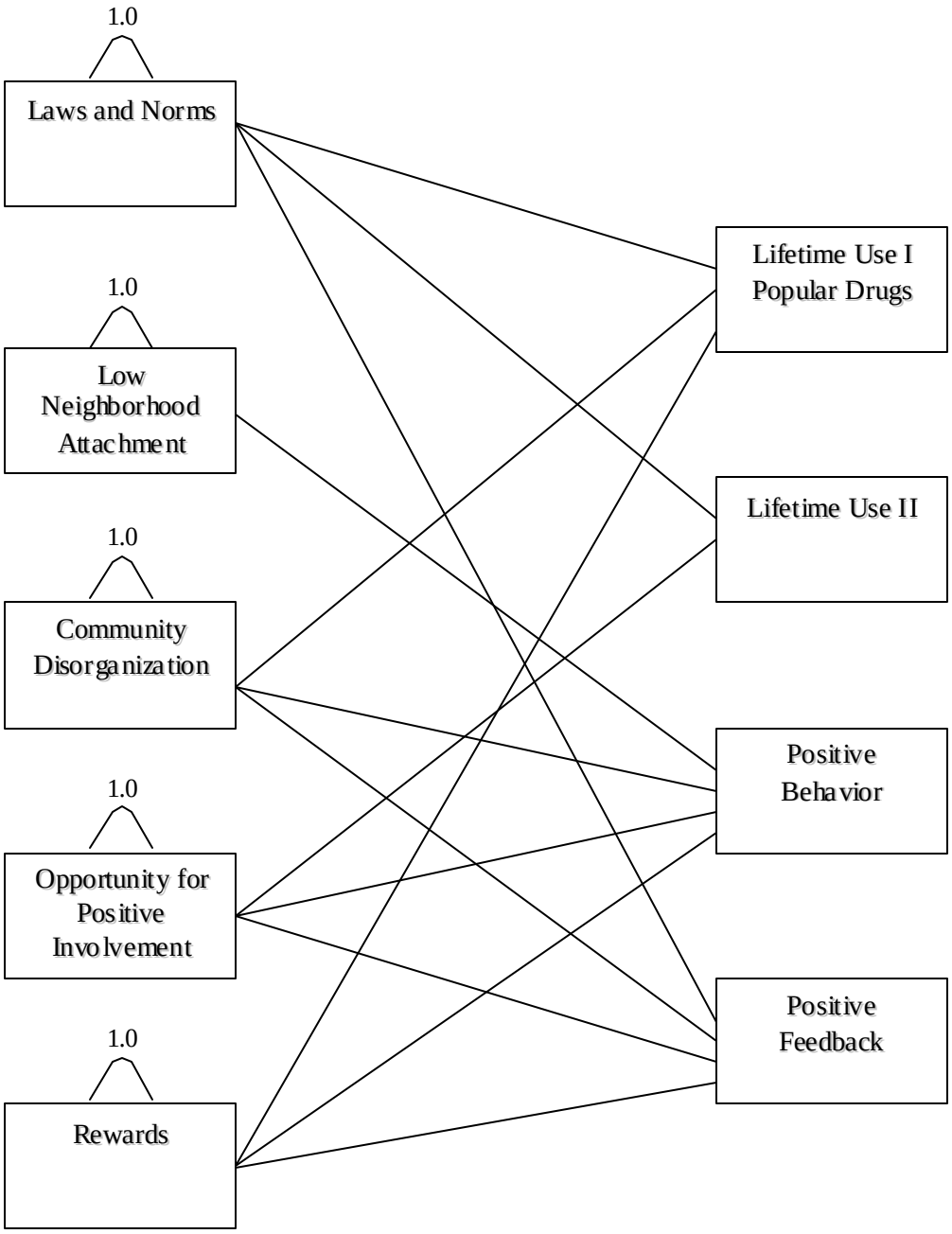


Table 6. Community domain: Multiple-group analyses testing comparing young adolescents and older adolescents.

	Model	*RMSEA*	*CFI*	*NNFI*	c^2	*df*	c^{2D}	*df*	*p value*
Step 1	Young Adolescents (single group)	0.0452	0.973	0.967	905.043	(288)			
	Older Adolescents (single group)	0.0495	0.967	0.959	1058.041	(288)			
Step 2	Testing Configural Invariance	0.0474 *(.0452 - .0497)	0.970	0.963	1963.084	(576)			
Step 3	Testing Loading Invariance (equal λ)	0.0501 *(.0479-.0524)	0.966	0.954	2153.453	(594)	190.369	(18)	<.001
Step 4	Testing Invariance of Intercepts	0.0551 *(.0537 - .0580)	0.957	0.951	2571.553	(612)	418.100	(18)	<.001
Step 5a.	Testing Variances for Equality	0.0525 *(.0503 - .0547)	0.962	0.956	2327.070	(603)	173.617	(9)	<.001
Step 5b.	Homogeneity of Variance/Covariances	0.0520 *(.0499 - .0542)	0.961	0.958	2415.164	(639)	261.711	(45)	<.001
Step 6a.	Testing Latent Means Laws and Norms	0.0594	0.952	0.945	2823.362	(613)	251.795	(1)	<.001
Step 6b.	Testing Latent Means Low Neighbor. Att.	0.0564	0.957	0.950	2601.476	(613)	29.909	(1)	<.001
Step 6c.	Testing Latent Means Community Disorg.	0.0557	0.957	0.951	2572.552	(613)	0.985	(1)	>.05
Step 6d.	Testing Latent Means Positive Opportunities	0.0561	0.957	0.951	2581.285	(613)	9.718	(1)	<.001
Step 6e.	Testing Latent Means Rewards for Involve.	0.0564	0.957	0.950	2604.380	(613)	32.813	(1)	<.001
Step 6f.	Testing Latent Means Popular Drugs	0.0590	0.951	0.944	2846.527	(613)	274.96	(1)	<.001
Step 6g.	Testing Latent Means Lifetime Use	0.0558	0.957	0.951	2593.846	(613)	22.279	(1)	<.001
Step 6h.	Testing Latent Means Positive Behaviors	0.0576	0.956	0.949	2655.135	(613)	83.568	(1)	<.001
Step 6i.	Testing Latent Means Positive Feedback	0.0560	0.957	0.951	2581.573	(613)	10.006	(1)	<.001
Step 7a.	Regression Model (Initial)	0.0497	0.969	0.962	1757.180	(288)			
Step 7b.	Regression Model (Final)	0.0493	0.969	0.962	1763.564	(293)	6.384	(5)	<.05

***90% CI RMSEA**

Peer/Individual Risk and Protective Factors

There are 61 peer risk/protective factors questions on the Communities That Care Survey used in the Lawrence Public School District. All 61 questions were used in the data analyses. Principal components factor analysis was run on several of the major sections of the questionnaire to determine the optimal facet-representative parcels. After undergoing parceling, 28 indicators remained to be used in the CFA. Because of community and social issues involved in the participating school district, many of the questions were heavily positively skewed. Power transformations were used to correct for the skew. Due to difficulties in running the CFA, it was decided to standardize the indicators. All indicators were transformed to z-scores.

Once the data had been transformed, the CFA was able to run without problems. Once a CFA had been achieved with good fit indicators (RMSEA, NNFI, CFI), a two-group (older vs. younger adolescents) comparative SEM analysis was undertaken. Issues were encountered during the stages of the two-group analysis. At the second step of this process, equating the lambdas, LISREL began to have difficulty running the code, and returned a "matrix is non-positive definite". It was determined that inputting the raw data file worked better than providing means, standard deviations, and a correlation matrix. Providing the raw data solved that problem. Once the two-group comparison was completed, the latent variable regression was started.

After running into difficulty running the regression as two separate files, one for each age group, it was suggested that the regression should be run as one file with two groups, based on the intercept invariance model. At this stage multiple problems were encountered, including issues with start values, LISREL syntax, iterations, and specifying symmetric vs. diagonal matrices. Completing the latent variable regression has yet to occur, and is a goal for completion in the near future.

The failure to find strict metric invariance between younger and older adolescents for most domains using the standard criteria suggests a need for further analysis. Future analysis should examine item-level data to determine the source of apparent differences between groups. Mean level differences between groups for most of the examined indicators suggest that there may be some substantive issues related to some constructs of interest that may bear further examination.

Discussion

Overall, results from the three studies examined here suggest some empirical verification of the theoretical factor structure originally proposed by Hawkins and Catalano. The secondary analysis of the Arthur, et al., data found support for an implicit assumption of the risk and protective factors approach: that the factors account for drug use equally well regardless of the drug. Mean correlations between the predictive factors and the use levels of three drugs (cigarettes, alcohol and marijuana) were close to equal. For estimating current marijuana use, the factors are slightly less useful than for estimating other drug use, though not significantly so. For estimating lifetime use, alcohol use is associated less with the factors than other drugs; though, again, this was not a statistically significant difference so it may be true only for Arthur, et al's, sample.

The Florida model found that two broad categories of risk and resiliency without the use of the four domains were adequate to account for a large proportion of drug involvement. In addition, while the model is sufficiently supported across both younger and older adolescents, mean level differences between younger and older adolescents for most of the examined indicators suggest some risk and protective factors may operate differently based on the age of adolescents. Such findings warrant a need for further analysis of item-level data to determine the source of apparent differences between groups.

Analysis of the *Communities that Care* survey data for the USD 497 school district allowed the empirical verification of the theoretical factor structure. In the main, the research-based factor structure held, with one notable exception; the emergence of the "Not So Bad" drugs factor allows the differentiation of the "Lifetime Use" factor and should be subjected to replication in additional samples. While the community and school domains seem to exist, not all risk and protective factors appear to have a predictive relationship to outcomes. School factors, for example, were not associated with drug use. Model specification problems in the Peer/Individual domain make comparative statements about the nature of the predictive relationship between the domain-specific indicators and the common outcomes difficult at this point. It is interesting to note that the school protective factors appear not to predict the outcomes, where the community protective factors do have significant predictive relationship with the outcomes. Future analyses should combine the predictive constructs in each domain to more thoroughly investigate the potentially more complex relationships among the factors.

References

Arthur, M. W., Hawkins, J. D., Pollard, J. A., Catalano, R. F., & Baglioni, A. J. (2002). Measuring risk and protective factors for substance use, delinquency, and other adolescent problem behaviors: The Communities That Care Youth Survey. *Evaluation Review, 26*(6), 575-601.

Frey, B. (1995, September). *Florida's Drug Involvement Model*. Paper presented at the Annual Meeting of the National Prevention Network, Stevenson, WA.

Frey, B. (1996, May). *Issues of risk, resiliency and drug involvement.* Paper presented at the Annual Meeting of the Center for Substance Abuse Prevention, Bethesda, MD.

Hawkins, J. D., & Catalano, R. F. (1992). *Communities that care: Action for drug abuse prevention*. San Francisco: Jossey-Bass.