Psychosocial resources, adolescent risk behaviour and young adult adjustment: is risk taking more dangerous for some than others?

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Longitudinal analyses examined the extent to which adolescent alcohol use, illegal drug use, and antisocial behaviour predicted adjustment and risk behaviour during young adulthood, and whether psychosocial resources buffered any impact of risk-taking. American adolescents completed questionnaires in Grade 12 and 2 years later (n=694). Personal and social resources predicted success in occupational, relational, and health domains. High school risk behaviours predicted decreased success in relational domains, and alcohol use predicted higher educational attainment, independent of the relations with psychosocial resources. Interactions of resources with risk behaviours predicting adjustment were inconsistent, but resources predicted decreased risk behaviours in young adulthood among adolescent risk-takers. Discussion focuses on the value of, and challenges to, research on consequences of adolescent risk taking.
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Introduction

A major motivation for the intense public and scientific interest in adolescent risk behaviours is the firmly held belief that behaviours such as substance use and delinquency have ubiquitous, catastrophic consequences (Newcomb and Bentler, 1987; Maggs and Hurrelmann, 1996). However, in contrast to a well-established research tradition examining biopsychosocial antecedents of adolescent risk-taking (for reviews see Hawkins et al., 1986; Arnett, 1992; Moffitt, 1993; Petraitis et al., 1995), relatively little theory or empirical work has focused on the short- and long-term psychosocial consequences of such behaviours (Kandel et al., 1986; Newcomb and Bentler, 1988a, b). This leads to the question of what the consequences of so-called risk behaviours really are, and who is most likely to suffer from them.

Dryfoos (1990) catalogues a wide range of possible negative consequences of substance abuse and delinquency, including short- and long-term impairments in the domains of physical and psychological well-being, relationships, achievement, and employment. In contrast, developmental scientists have also argued that risk behaviours serve constructive functions in adolescents' lives, such as fostering bonds with friends, exploring personal identity, and expressing autonomy (e.g. Jessor, 1987; Silbereisen and Noack, 1988; Chassin et al., 1989; Maggs, 1997). Prevalence rates compound this paradox: the majority of adolescents engage in some minor delinquency and experiment with alcohol and binge

drinking, but most do not die, get arrested, or become drug addicts (Baumrind, 1985; Elliott *et al.*, 1989; Shelder and Block, 1990; Maggs *et al.*, 1995). Rather, most grow up to be healthy, adjusted adults. Neither logical probabilities of what *might* happen nor retrospective data concerning the earlier misconduct of drug-addicts, felons, or accident victims provide reliable information about the *actual* consequences of various risky behaviours in the absence of data from individuals who also misbehaved, but were fortunate enough to not suffer any harmful effects (Newcomb and Bentler, 1988*b*).

How risky is adolescent risk behaviour? And how do some adolescents avoid potential ill effects? The present study uses longitudinal data to address this issue. We assess the extent to which adolescent risk behaviours predict adjustment and continued risk-taking in young adulthood, as well as whether psychosocial resources buffer any impact of earlier risk behaviour. Before reviewing research addressing consequences of adolescent risk behaviour, we first discuss normative developmental transitions of young adulthood as well as potential personal and social resources that may serve as protective, health-enhancing factors during these transitions.

Young adult development

The passage from adolescence to adulthood involves major transitions in many domains of life, during which diversity in life pathways greatly increases (Sherrod *et al.*, 1993). The sociocultural context shapes the normative tasks of adolescence and early adulthood, but there is also great interindividual variability in the timing, sequence, and even existence of these experiences (Havighurst, 1972; Marini, 1985; Hogan and Astone, 1986; Arnett and Taber, 1994). In Western societies, developmental transitions of this period include finishing or pursuing higher-level formal education, developing enduring romantic attachments, and forming adult relationships with family and peers (Havighurst, 1972; Schulenberg *et al.*, 1996). Decisions, experiences, and accomplishments during these years point individuals in many different directions, making this period a powerful prism through which life trajectories reflect and re-direct (Eccles and Barber, 1990, 1995; Schulenberg *et al.*, 1997). In the present study, we examine adjustment during the transition to young adulthood in three domains: education, relationships, and well-being. We examine the extent to which risk behaviours during late adolescence predict subsequent adjustment in these domains as individuals begin the young adult years. In other words, does adolescent risk behaviour jeopardise development?

Consequences of adolescent risk behaviours

A growing amount of literature is beginning to use prospective data following adolescents into young adulthood to examine consequences of substance use. Adolescent substance use in general, as well as the specific use of cigarettes, marijuana, and other illegal drugs, is predictive of engagement in young adult roles and living arrangements. For example Newcomb and Bentler (1985) observed that adolescents who used these substances (but not alcohol) tended to make earlier transitions to adult social roles (e.g. marriage, employment) and were less likely to attend post-secondary education or join the military. Adolescent alcohol use was *not* predictive of role involvement with one exception: those who drank

earlier were more likely to be cohabiting as young adults (Newcomb and Bentler, 1985). Kandel and colleagues observed similar effects, with adolescents who used illegal drugs having a greater likelihood of dropping out of high school (Mensch and Kandel, 1988), cohabiting (Yamaguchi and Kandel, 1988), and divorcing (Kandel et al., 1986). Newcomb and Bentler (1987, 1988b) argued that these earlier transitions to adult roles represent precocious development, which may have costs later in life. For example, individuals who begin working immediately after high school forego the educational and other benefits of a university education (W. T. Grant, 1988). Chassin et al. (1992) demonstrated that the effect of adolescent smoking on transitions to and success in young adult social roles was influenced by adoption of the transitional student role.

Adolescent risk behaviour may also affect adjustment and well-being. Longitudinal studies have shown that adolescent substance use predicts increased physical health problems, higher levels of emotional distress, increased family problems, and, among women, an increased risk for divorce in young adulthood (Newcomb and Bentler, 1988a; Hansell and White, 1991; Newcomb, 1994). Kandel and Yamaguchi (1987) demonstrated that drug use predicted high job turnover during young adulthood, although this effect was explained largely by selection. Cigarettes, marijuana, and other illegal substances appear to have similar effects, predicting increased health problems, health service utilisation, breathing difficulties, emotional distress, psychosomatic complaints, and depression (Brunswick and Messeri, 1985; Kandel et al., 1986; Newcomb and Bentler, 1987, 1988c; Hansell and White, 1991), as well as increased problems with interpersonal relationships and decreases in social relations (Newcomb and Bentler, 1988a, c). Moderate alcohol use, on the other hand, seems to have little adverse effect on physical, psychological, or social adjustment (Kandel et al., 1986; Hansell and White, 1991; Jessor et al., 1991). On the contrary, several studies have observed beneficial impacts of alcohol use: specifically, decreases in health restrictions on work activities (Kandel et al., 1986), family problems, loneliness, and self-derogation (Newcomb and Bentler, 1988a).

It should be noted that all the relationships reported, both beneficial and deleterious, were relatively small in size (e.g. less than 3% explained variance). Other studies have found no reliable consequences, whether negative or positive, of adolescent substance use on young adult outcomes, except that individuals who engaged in more risk behaviour during their adolescence were more likely to use illegal drugs and drive after drinking during young adulthood (Miranne, 1979; Kandel et al., 1987; Power and Estaugh, 1990; Jessor et al., 1991). Jessor et al. (1991) concluded that in their samples, followed for more than a decade, "problem behaviour in adolescence/youth appear[ed] not to have 'spilled over' into other areas of young adult life, or to have compromised attainment and satisfaction, or to have mortgaged the futures of the young people" (p. 268). Given the firm belief of behavioural scientists, public policy-makers, educators, parents, and the media alike that risk-taking represents a major threat to adolescents' healthy development (e.g. Dryfoos, 1990), the relative lack of strong results apart from continued risk-taking is startling.

Social and personal resources

What is the justification for the intense scientific and public concern about adolescent risk-taking, if there are relatively few negative consequences? It is possible that serious consequences exist, but are hidden. Risk behaviours may be more dangerous for some than

for others. As Michael Rutter argued, "vulnerability and protective factors may serve as catalysts in increasing or decreasing the likelihood of a maladaptive outcome" (1983, p. 34). Without taking these moderating protective factors into account, studies may fail to observe effects of risk behaviours on young adult outcomes.   -

Parents who are particularly supportive or who have extensive social and employment networks represent social resources that may buffer some of the costs of adolescent risk behaviour. During adolescence, parental warmth and encouragement are predictive of psychosocial well-being, school achievement, adjustment to school transitions, and fewer problem behaviours (e.g. Lamborn *et al.*, 1991; Lord, 1994; Steinberg *et al.*, 1994; Eccles *et al.*, 1997). The benefits of positive, supportive relationships with parents may furnish developmental advantages directly, by furnishing a secure base from which adolescents may launch themselves into adult roles, and indirectly, through their prior and current effects on adolescents' adjustment and competence (Eccles and Barber, 1990; Aseltine and Gore, 1993). Parents also provide instrumental assistance to their young adult children, for example through financial assistance or help finding employment. Parents with higher levels of education and greater incomes may be more able to provide such tangible forms of support (e.g. college tuition), giving their children more life options (W. T. Grant, 1988). To address the question of whether social resources may facilitate the transition to adulthood, the present study assessed adolescents' socio-economic background, mothers' education, and parent psychological support.

Similarly, adolescents' personal characteristics may serve as resources during the transition to young adulthood (Aseltine and Gore, 1993; see also Rutter, 1983). Individuals who are personally, socially, and academically well-adjusted in adolescence adapt better to critical school transitions (Lord, 1994; Eccles *et al.*, 1997). Similarly, they may be better equipped to cope with the multiple challenges of finding their place in the adult worlds of work and family life (Eccles and Barber, 1990). Academic achievement and competence in high school increase the likelihood of attending and doing well in post-secondary education, which has a significant positive impact on lifetime occupational opportunities, success, and income (Hogan, 1980; W. T. Grant, 1988). It is possible that personal characteristics such as competence and adjustment may also minimise some of the inherent dangers of risk-taking. For example, socially competent adolescents might be more successful finding a safe ride home after drinking, or those with excellent grades might receive positive teacher recommendations for college despite occasionally skipping class. In the present study, adolescent grade point average (GPA), and well-being were used as indicators of individual characteristics likely to serve as personal resources during the transition to young adulthood.

Domains of risk behaviour

Consequences of adolescent risk-taking may also be hidden for methodological reasons. Some risk behaviours may be more hazardous than others, and some may have benefits in addition to potential costs. There is significant covariation among domains of risk behaviour (Donovan and Jessor, 1985; Osgood *et al.*, 1988) and, to a certain degree, different types of risky activities share similar antecedents and serve comparable psychosocial functions (Elliott *et al.*, 1985; Jessor *et al.*, 1991; but see Kandel *et al.*, 1987). However, it is important to distinguish multiple domains because there are also substantial

differences between various risk behaviours (Osgood et al., 1988; Maggs and Hurrelmann, 1996). For example, as discussed above, alcohol use appears to have some positive effects on social relations, whereas the use of cigarettes and illegal drugs appears more harmful for health and for relationships. Measuring substance use as a unitary construct may obscure both positive and negative consequences of specific drugs (Newcomb, 1994). The present study addressed this issue by focusing on alcohol use, illegal drug use, and antisocial behaviour.

Research questions

Given the relative paucity of evidence documenting consistent or sizeable consequences of adolescent risk behaviour for young adult adjustment, the present study examined whether social and personal resources predicted adjustment, both as a main effect and in interaction with risk behaviour. The analyses were guided by the following research questions: (1) Do social and personal resources predict young adult adjustment? (2) Do adolescent risk behaviours independently predict adjustment (Additive effects)? (3) Are risk behaviours more dangerous for some than for others? In other words, do personal and social resources buffer any impact of risk behaviours (Interactive/Moderating effects)? (4) Do these relationships differ by domain of risk behaviour?

Method

Sample and procedure
The data presented in this paper were drawn from the Michigan Study of Adolescent Life Transitions (MSALT; Eccles and Barber, 1990). MSALT began in 1983, when participants were attending the sixth grade of school in ten school districts in southeastern Michigan, U.S.A. The sample represents a broad range of socio-economic and educational levels, drawn from generally middle- and working-class, White, small urban/suburban communities (see Eccles et al., 1989, 1993). Data presented in the present paper were collected at the end of adolescents' twelfth year of school (last year of secondary school; Time 1; mean age= 17.79 years, S.D.=0.46) and 2 years after the end of secondary school (Time 2). Personal resources, social resources, and adolescent risk behaviours were assessed at Time 1; young adult adjustment and risk behaviours were measured at Time 2. At Time 1, adolescents completed self-administered questionnaires in their school auditorium or cafeteria. Students who had left school (dropped out) or were absent completed questionnaires by post. At Time 2, all questionnaires were distributed and returned by post. Complete data for the present analyses were obtained for a core sample of 693 participants.[1] Because the sample was relatively homogeneous with respect to ethnicity (79% European–American, 3% African–American, 4% other, and 14% missing), ethnic differences were not examined.

[1] The issue of differential attrition was examined by comparing adolescents for whom we had data at both Time 1 and 2 with those for whom only data at Time 1 were available. T-tests contrasting these two groups' scores on all the predictor variables showed that individuals who also completed surveys at the Time 2 follow-up had higher SEI and mother education scores, achieved a higher high school GPA, were more likely to be female, and reported lower psychological well-being at Time 1. They did not differ in levels of parental support. In terms of their levels of risk behaviour, those who remained in the study had higher high school alcohol use scores and lower antisocial behaviour, but did not differ in their levels of drug use.

Measures

The self-report measures represent five domains: (a) social resources; (b) personal resources; (c) high school risk behaviour; (d) young adult adjustment; and (e) young adult risk behaviour.

Social resources. Socio-economic index. The Nakao and Treas (1992; cited in Entwistle and Astone, 1994) index of occupational prestige was used to indicate the socio-economic status of the adolescents' families. Status scores can range from 0 to 100. Because many adolescents do not co-reside with their fathers, and because fathers tend to have higher socio-economic status than mothers (making scores from parents difficult to equate), mothers' jobs were coded and used as a proxy for the family status. The mean SEI score was 48·69 (s.d.=17·28; range=21·21 to 92·30). Sample occupations and scores are legal assistant (57·12) and secretary (38·40).

Mother's education. An eight-level ordinal item measured adolescents' mothers' level of education as reported by mothers during a previous wave of data collection. Possible levels were grade school, some high school, high school graduate, some college or technical school, college graduate, some graduate school, masters degree, and Ph.D. or professional degree (coded 1 through 8, respectively). The average was 3·23 (s.d.=1·28). Parental education has been described as human capital, which refers to the nonmaterial resources that parents provide for their children, such as helping them with their homework or instilling them with high educational aspirations (Entwistle and Astone, 1994). Mothers' responses were used due to more complete data and greater variability relative to fathers', as well as high correlations between parents' levels of education.

Parental support. A 22-item scale measured parental supportiveness. Possible responses to items such as "My parents praise me for doing well" and "Family members are supportive of each other during difficult times" ranged from 1=strongly disagree to 7=strongly agree. The instrument demonstrated high internal consistency, Cronbach's alpha (α)=0·93.

Personal resources. Well-being. Adolescents' psychological adjustment was measured by a seven-item scale $(\alpha$=0·80). Sample items were "How often do you feel unhappy, sad, or depressed?" (reverse coded) and "How often do you feel satisfied with yourself the way you are?". Possible responses ranged from 1=never to 7=very often, with higher scores indicating greater well-being.

Grade point average (GPA). Adolescents' school performance was measured as their cumulative high school grade point average as of Grade 12, averaged across all school subjects, obtained from official school records. (In general, a 4·0 is awarded for the highest level of performance, down to 1·0 for the lowest acceptable [passing] level of performance.)

Adolescent risk behaviours. Respondents indicated how often they had engaged in 10 potentially risky activities in the previous 6 months, with possible responses ranging from 1=never to 7=more than 20 times. These were computed into three scales: alcohol use, illegal drug use, and antisocial behaviour.

Alcohol use. Drinking behaviour was measured by the mean of two activities: "get drunk" and "drink alcohol", α=0·94.

Illegal drug use. The mean of two items assessed adolescents' use of illegal drugs: "use chemicals or drugs other than marijuana or alcohol" and "use marijuana or hash", α=0·61.

Antisocial behaviour. Adolescents' level of antisocial behaviour was assessed by six items

(e.g. "damage public or private property"; "take something from a store without paying for it"), α=0·70.

Young adult adjustment. Education level. Respondents indicated the highest level of education they had attained by Time 2 using a six-level ordinal measure: 1=ninth grade, 2=tenth grade, 3=eleventh grade, 4=high school graduate; 5=one year college/post-high school vocational training, 6=two years college/post-high school vocational training. At the second time of measurement, 458 participants had completed 2 years of post-secondary education, 136 had completed 1 year post-secondary, 95 had graduated from secondary school or completed an equivalency diploma, and four had not finished secondary school.

Romantic relationship satisfaction. Participants indicated how satisfied they were with their romantic relationships by responding to three questions such as "How satisfied are you with your relationship in general/your dating life?". The response formats ranged from 1= not at all satisfied to 7=very satisfied (α=0·66). Scores were missing for the 110 participants who were not dating or in a romantic partnership.

Negative romantic relationships. A seven-item scale assessed the extent to which participants were involved in romantic relationships that were abusive or very negative. Sample items included "During the past month how often did your dates/partner shout or yell at you because s/he was mad at you?" (with possible responses 1=never to 7=always) and "How many times in the past 12 months did your dates/partner throw something at you?", with possible responses 1=never to 7=more than 20 times (α=0·78). Scores were missing for individuals who were not dating or in partnerships.

Friend support satisfaction. A four-item scale assessed the extent to which participants were satisfied or happy with the level of support they received from their friends, e.g. "How satisfied are you with how supportive your friends are?" Response options ranged from 1= not at all satisfied to 7=very satisfied, α=0·71.

Well-being. This seven-item scale was identical to the well-being measure used at Time 1 (α=0·82).

Physical health. Participants rated their subsequent physical health by responding to the question, "How would you rate your overall health?" (responses 1=poor to 5=excellent).

Young adult risk behaviours. Participants' involvement in risk behaviours during young adulthood was measured using the same items as in adolescence. Alphas were 0·89 for alcohol use, 0·59 for illegal drug use, and 0·54 for antisocial behaviour.

Results

Plan of analysis
The research questions were addressed using correlation/multiple regression analysis. First, correlations were computed to examine the gross relations of high school social and personal resources and risk behaviours with young adult adjustment and risk behaviour. Second, hierarchical multiple regression analyses were used to assess the net relations of these predictor variables as well as their interactions predicting the young adult variables. In these regression analyses, the first step contained two blocks of predictors entered simultaneously: (a) social resources (SEI, mothers' education, parental support); and (b) personal resources (GPA, well-being, gender). The risk variable was entered on the second

step. Analyses were conducted separately for alcohol use, illegal drug use, and antisocial behaviour. Finally, on each third step, interactions of the risk behaviours with the social and personal resources were added in two blocks as in Step 1. Deviation scores were used to reduce multicollinearity (Aiken and West, 1991).

Levels of adolescent risk behaviour

Although the primary focus of the paper was not on average levels of risk behaviour or adjustment, it is important to document that the adolescent participants did engage in normative levels of these behaviours to permit an adequate test of the research questions. The mean levels (on seven-point scales) of these behaviours at Time 1 were as follows: (a) alcohol use, mean=3·87, S.D.=2·25; (b) drug use, mean=1·39, S.D.=0·82; and (c) antisocial behaviour, mean=1·41, S.D.=0·61. To describe these behaviours more concretely, more than three-quarters of participants reported getting drunk at least once in the preceding 6 months, one-third had contact with the police for something they had done, one-quarter shoplifted and/or damaged other people's property, almost one-quarter reported using marijuana or hash, and one-eighth carried a weapon.

Correlations of adolescent resources and risk behaviours with young adult adjustment and risk behaviour

Table 1 presents the intercorrelations of the high school predictor variables with young adult adjustment and risk behaviour. To summarise briefly, adolescents who had higher high school grades and well-being and who came from higher socio-economic and more educated families had completed more years of education by age 20. Those with more supportive parents reported higher friend support, romantic relationship satisfaction, and well-being. Psychological adjustment in adolescence was predictive of all the young adult variables with the exception of alcohol use. With respect to the high school risk behaviours, alcohol use predicted an increased likelihood of being involved in a negative relationship, and illegal drug use and antisocial behaviour predicted less positive relationships with friends and romantic partners.

Predicting young adult adjustment

Table 2 presents the results of the multiple regression analyses predicting young adult adjustment. As mentioned above, Step 1 entered social and personal resources as two blocks of predictors simultaneously, thus the R^2 associated with each block in Table 2 represents the percentage of variance explained by the unique contribution of that block of predictors, independent of the other block. Social resources made a significant unique contribution to the prediction of education level, friend support, and physical health. Individuals whose parents were more supportive had completed more years of education by age 20 (β=0·07, p<0·05) and had higher friend support (β=0·13, p<0·001), independent of the relationships of the other resource variables with these outcomes. Mothers' education was a positive predictor of physical health (β=0·10, p<0·05). Personal resources were independently related to all six young adult adjustment variables. Independent of the other predictors, females (coded 1) relative to males (coded 2) had completed more years of education (β=−0·12, p<0·001), were more satisfied with their romantic relationships (β=−0·22, p<0·001), had less negative romantic relationships (β=0·14, p<0·01), and reported higher friend support (β=−0·23, p<0·001). Males reported higher levels of physical health

Table 1 Correlations: high school social and personal resources and risk behaviour with young adult adjustment and risk behaviour

Adolescent predictors	Education level	Young adult adjustment and risk behaviour							
		Relational roles			Health		Risk behaviour		
		Rel. sat.	Negative rom. rel.	Friend support	Well-being	Physical health	Alcohol use	Drug use	Antisocial behaviour
SEI	0·24***	-0·01	-0·06	0·07	0·05	0·07	0·06	0·06	0·06
Mother's education	0·17***	-0·06	-0·01	0·02	0·01	0·13***	0·11**	0·09*	0·14***
Family support	0·03	0·09*	0·02	0·16***	0·08*	0·06	-0·07	-0·11**	-0·07
Gender	0·07	-0·18***	0·10**	-0·23***	0·16***	0·23***	0·19***	0·10**	0·28***
GPA	0·47***	-0·03	-0·11**	0·15***	0·12**	0·12**	0·00	-0·11**	-0·12**
Well-being	0·11**	0·12**	-0·13***	0·09*	0·59***	0·31***	-0·01	-0·11**	-0·08*
Alcohol use	0·06	0·01	0·16***	-0·07	-0·02	-0·02	0·58***	0·31***	0·27***
Illegal drug use	-0·08*	-0·12**	0·12**	-0·05	-0·07	0·02	0·28***	0·48***	0·34***
Antisocial behaviour	-0·04	-0·13**	0·21***	-0·18***	-0·03	0·01	0·23***	0·23***	0·47***

n=540–693.
Rel. sat.=Relationship satisfaction; Negative rom. rel.=negative romantic relationship.
SEI=socio-economic index. GPA=grade-point average.
Gender code: 1=female, 2=male.
*p<0·05; **p<0·01; ***p<0·001.

(β=0.19, p<0.001). High school GPA was related to having completed more years of education (β=0.45, p<0.001), greater friend support (β=0.11, p<0.01), higher well-being (β=0.07, p<0.05), and greater physical health (β=0.11, p<0.01). Adolescents with higher psychological well-being at the end of high school were more satisfied with their romantic relationships (β=0.17, p<0.001), were involved in less negative relationships (β=−0.16, p<0.001), had more friend support (β=0.11, p<0.01), had higher well-being (β=0.58, p<0.001), and reported greater physical health (β=0.25, p<0.001) in young adulthood.

At Step 2, five significant effects each explained an additional 1% to 2% of the variance in the young adult adjustment outcomes. Above and beyond the impact of social and personal resources, individuals who drank more alcohol during high school had completed more years of education by age 20 (β=0.15, p<0.001). In addition, higher levels of adolescent alcohol use (β=0.13, p<0.001), drug use (β=0.09, p<0.05), and antisocial behaviour (β=0.17, p<0.001) predicted being involved in more negative romantic relationships, and high school drugs use predicted being less satisfied with romantic relationships (β=−0.10, p<0.05).

The third steps added the interactions of the social and personal resource variables with each of the three risk behaviours. Across 36 blocks each entering three interactions, only four significant interactions were obtained (parent support × alcohol use predicted friend support (β=0.14, p<0.001) and health (β=−0.11, p<0.01); SEI × alcohol use predicted well-being (β=0.07, p<0.05); parent support × illegal drug use predicted health (β=−0.09, p<0.05). Because this was less than would be expected by chance (4/108=3.7%), and

Table 2 *Multiple regression results: predicting young adult adjustment by high school social and personal resources and risk behaviour*

Step	Predictors	Young adult adjustment					
		Education level R^{2a}	Relational roles			Health	
			Relationship satisfaction R^2	Negative rom. rel. R^2	Friend support R^2	Well-being R^2	Physical health R^2
1	Social resources	0.03***	0.00	0.00	0.02**	0.00	0.01*
	Personal resources	0.20***	0.06***	0.04***	0.07***	0.35***	0.13***
2	Alcohol use	0.02***	0.00	0.02**	0.00	0.00	0.00
	Total R^2	0.29***	0.08***	0.07***	0.13***	0.37***	0.17***
2	Illegal drug use	0.00	0.01*	0.01*	0.00	0.00	0.00
	Total R^2	0.27***	0.08***	0.07***	0.12***	0.36***	0.17***
2	Antisocial behaviour	0.00	0.00	0.02***	0.00	0.00	0.00
	Total R^2	0.28***	0.08***	0.08***	0.11***	0.37***	0.17***

n=540–693.
Negative Rom. Rel.=Negative romantic relationship.
[a]The R^2 for Steps 1 and 2 represents the unique variance explained by each block of predictors.
*p<0.05; **p<0.01; ***p<0.001.

because none of these interactions was interpretable according either to logic or to developmental theory, these interactions are not presented further.[2,3]

Predicting young adult risk behaviour

Previous research has shown a certain degree of stability in risk behaviour during late adolescence and young adulthood (e.g. Jessor et al., 1991). Because continued substance use or antisocial behaviour increases individuals' exposure to potential risks, we examined whether personal and social resources altered the likelihood of risk behaviour during young adulthood, either as a main effect or in interaction with prior levels of risk-taking. To address this question, a final set of hierarchical multiple regression analyses was performed predicting young adult alcohol use, illegal drug use, and antisocial behaviour (see Table 3). Social resources significantly predicted all three young adult risk behaviours: independent of the other predictors, adolescents whose mothers had higher levels of education reported higher levels of young adult alcohol use ($\beta=0.09$, $p<0.05$), illegal drug use ($\beta=0.09$, $p<0.05$), and antisocial behaviour ($\beta=0.13$, $p<0.01$). In addition, individuals with more supportive parents were less likely to use illegal drugs as young adults ($\beta=-0.12$, $p<0.01$). Personal resources also significantly predicted young adult risk behaviour: males were more likely to drink alcohol ($\beta=0.17$, $p<0.001$), use illegal drugs ($\beta=0.09$, $p<0.05$), and engage in antisocial behaviour ($\beta=0.27$, $p<0.001$). Adolescents with a lower high school GPA were more likely as young adults to use drugs ($\beta=-0.13$, $p<0.01$) and engage in antisocial behaviour ($\beta=0.12$, $p<0.01$), and those with lower well-being as adolescents were more likely as young adults to use drugs ($\beta=0.13$, $p<0.01$) and engage in antisocial behaviour ($\beta=-0.11$, $p<0.01$). As would be expected, high school levels of the three risk behaviours were significantly positively related to young adult levels of these same activities ($\beta=0.58$, $p<0.001$ for alcohol; $\beta=0.45$, $p<0.001$ for illegal drug use; and $\beta=0.42$, $p<0.001$ for antisocial behaviour).

With respect to the interactions, social resources interacted significantly with adolescent illegal drug use to predict young adult illegal drug use, with the parental support × illegal drug use interaction making a marginally significant unique contribution ($\beta=-0.07$, $p<0.07$). Among individuals who had low illegal drug use in adolescence, parental support made no difference in levels of young adult drug use (it remained low). However, among individuals who engaged in some illegal drug use, having high parental support was associated with a smaller probability of young adult drug use. In the case of antisocial behaviour, both personal and social resources interacted significantly with adolescent antisocial behaviour. In particular, there were significant interactions of SEI × antisocial behaviour ($\beta=-0.13$, $p<0.001$), mother education × antisocial behaviour ($\beta=0.12$, $p<0.001$), and GPA × antisocial behaviour ($\beta=-0.08$, $p<0.05$). To describe these interactions, levels of personal and social resources made little difference to young adult risk behaviours

[2]For the outcomes friend support and well-being, among individuals who had low parental support and low SEI, it was better not to drink alcohol, but among those who had high parental support and high SEI, it was better to drink alcohol. For the subjective health outcome, the reverse was true: individuals with low parental support reported greater physical health if they drank or used illegal drugs, and those with high parental support reported greater physical health if they did not.

[3]We also conducted a supplementary analysis involving all participants which examined whether being involved in any romantic relationship in young adulthood was predicted by adolescent risk behaviour. The outcome variable was coded 0=Not involved in any dating relationships, 1=Dating one or more partners, in a steady relationship, or living together/married. None of the risk behaviours predicted this dichotomous variable, either alone or in interaction with the psychosocial resource variables.

among adolescents who had low risk behaviour in high school, perhaps due to a floor effect. Among those with higher risk behaviour in high school, personal and social resources reduced the likelihood of engaging in risk behaviour in young adulthood.

Discussion

Individuals who began the transition to young adulthood from a position of strength evidenced greater adjustment. As predicted, social and personal resources consistently predicted young adult adjustment (Question 1), with individual well-being, GPA, gender, and parental support being the most common predictors. Adolescents who were psychologically well-adjusted, had higher academic achievement, or had parents who were particularly supportive tended to experience more success in occupational, relational, and health domains (see also Meschke *et al.*, 1995).

The results also provided limited support for the second research question, namely that adolescent risk-taking would have an impact on development during young adulthood. Alcohol use, illegal drug use, and antisocial behaviour predicted an increased likelihood of being involved in romantic relationships characterised by psychological and physical negativity. In addition, illegal drug use predicted lower relationship satisfaction and antisocial behaviour predicted lower friend support. Whereas some previous research has demonstrated a social facilitating function of substance use (particularly alcohol) on social relationships (e.g. Newcomb and Bentler, 1988a; Newcomb, 1994; Maggs *et al.*, 1995; Maggs and Hurrelmann, 1996), the current results suggest the opposite. These apparently contradictory results could be explained by selection: individuals who have high levels of extroversion, openness to experience, or sensation seeking may participate boldly in all available social opportunities, including experimenting with substances and becoming involved less discriminately with available partners. Such confident, non-cautious behaviour will have benefits (e.g. more friends, more popularity) but may also have costs (e.g. not all partners have equally positive qualities). In addition, socialisation might also play a role: different social groups (e.g. substance users *vs.* non-users) might have different

Table 3 *Multiple regression results: predicting young adult risk behaviour by high school personal and social resources and corresponding high school risk behaviour*

Step	Adolescent predictors	Young adult risk behaviours		
		Alcohol use R^{2a}	Drug use R^2	Antisocial behaviour R^2
1	Social resources	0·01	0·02**	0·02**
	Personal resources	0·03***	0·04***	0·10***
2	Corresponding risk behaviour	0·32***	0·19***	0·14***
	Risk behaviour × social	0·01	0·01*	0·04***
	Risk behaviour × personal	0·00	0·01	0·01*
	Total R^2	0·39***	0·27***	0·31***

n=693.
[a] R^2 for Steps 1, 2 and 3 represents the unique variance explained by each block of predictors.
*p<0·05; **p<0·01; ***p<0·001.

standards for acceptable behaviours within relationships, thus influencing individuals' likelihood of remaining in a negative relationship. In contrast to these negative outcomes predicted by prior risk-taking, net of the effects of the psychosocial resource variables, adolescents who drank more alcohol during high school also tended to pursue more years of higher education (see also Eccles and Barber, 1995). This is clearly an attainment most educators and researchers would interpret as positive and healthy. Finally, none of the risk behaviours appeared to have a direct impact on young adults' subjective physical health or psychological well-being.

Social and personal resources did not appear to moderate the effects of risk behaviour on young adult adjustment (Question 3). In other words, although individuals who had higher status socio-economic backgrounds, parental support, adjustment, and GPAs tended to experience greater adjustment in young adulthood (main effects), these individuals did not differ in the consequences they experienced as a result of their adolescent risk-taking behaviours compared to individuals with fewer resources (interactions). However, when young adult risk behaviour was the outcome of interest, adolescents with greater social and personal resources significantly (negatively) predicted young adult levels of illegal drug use and antisocial behaviour *only* for those adolescents who had engaged in those behaviours previously. In other words, adolescents who were low in these risk behaviours in high school remained low, and those who were previously high in these activities were less likely to continue if they had greater personal and social resources.

With respect to the fourth research question, the present results provide some support for the argument that it is important to consider multiple domains in the study of consequences of risk-taking (Newcomb and Bentler, 1988a; Maggs and Hurrelmann, 1996). In the few cases where illegal drug use and antisocial behaviour predicted young adjustment, the relationships were in the direction that higher risk behaviour predicted lower subsequent adjustment. However, drinking in high school was associated with completing more years of education than expected according to the other background variables. This finding is consistent with the fact that post-secondary students drink more than their same-aged peers not attending college or university, and can be interpreted as anticipatory socialisation.

Despite this set of significant findings, it is important to note that the majority of tests did not evidence significant predictive relationships from high school risk behaviour to young adult adjustment. This pattern of results is generally consistent with those observed by other researchers, who have typically either found small deleterious effects of drug use and general risk behaviour and small positive effects of alcohol use (e.g. Kandel *et al.*, 1986; Kandel and Yamaguchi, 1987; Newcomb and Bentler, 1988a; Hansell and White, 1991; Newcomb, 1994), or observed no apparent effects at all (e.g. Kandel *et al.*, 1987; Power and Estaugh, 1990; Jessor *et al.*, 1991). The predictive relationships observed were small in size and inconsistent, as has been the case in past research.

The results should be interpreted in light of several characteristics of the sample and measures. Participants in this longitudinal study were recruited from small urban and suburban communities in the American midwest. Although a wide range of socio-economic levels were represented, the sample was relatively homogeneous with respect to ethnicity and cultural background; future studies should examine these research questions further in samples differing both sub- and cross-culturally. The results may also have differed if other adolescent resources or young adult adjustment constructs were assessed, such as success in employment settings or popularity in college. A particular weakness in the present study is the use of a single item to assess participants' subjective rating of their overall physical

health. The use of a standardised multi-item physical symptoms checklist might have yielded more conclusive findings.

Challenges to consequences research

Which risk behaviours are most likely to have devastating effects on adolescents' healthy development and success? Common sense and logical deduction would suggest that adolescents who frequently use "hard" drugs, drive while drunk, and get into trouble with authorities risk damaging their health and their future success. Anecdotal evidence for devastating effects of sowing one's wild oats are not difficult to obtain. However, longitudinal empirical evidence for these rational beliefs is weak. Given our shared cultural conviction that "risk" behaviours indeed are very risky, coupled with alarming statistics on alcohol-related fatalities, increasing drug overdose rates, and so on, the continued failure to find compelling evidence of serious negative consequences is disturbing.

Why is evidence for negative consequences of adolescent risk-taking so elusive? Compelling evidence for consequences of adolescent risk-taking is difficult to obtain for several methodological reasons. Many serious consequences are rare, making statistically significant results difficult to obtain. Some are so catastrophic, however, that they are important even if they occur to a tiny proportion of a sample. For example, it is a tragedy if even one student from a sample dies as a result of drinking and driving. Common analytic strategies based on the percentage of variance accounted for would not detect this effect as statistically significant, even if the data were available. A related issue is that individuals who experience negative consequences may be much less likely to be included in longitudinal samples of adolescent development. Individuals who are involved in high levels of problematic behaviour are much more likely to be absent from school when data are collected, and may be more likely to be lost to attrition at subsequent data collections. Thus, it is very difficult to obtain the complete data required in order to document the rare yet potentially important negative consequences of particular behaviours.

The ideal research design for examining consequences of risk behaviour would have a population sample, with adequate representation of those at-risk for difficulties making the transition to adulthood (e.g. adolescents living in poverty or in communities with high unemployment) as well as those privileged by family income. Data would be collected longer into adulthood, to provide more opportunity for consequences and permit an examination of cumulative effects. Attaining zero or minimal attrition would circumvent the problem of those who suffer the few negative consequences failing to provide data at subsequent occasions of measurement. More practically, extensive efforts to minimise attrition as well as statistical techniques for imputing missing data and weighting for differential attrition would represent a significant advance in this domain of research. For example, the magnitude of attrition effects could be estimated by obtaining prior permission to collect related corollary data from alternative sources on research participants who drop out of the primary study. For example, credit histories, driving records, or criminal offences could be compared between those who remain and those who drop out, to evaluate the extent to which available outcome data underestimate potential negative consequences. Another potentially fruitful analytic strategy comes from the related field of epidemiology. Cooke (1987) argued for the use of alternative measures of association (other than variance explained) to assess causal impact. Brown and Harris (1989) illustrate this point with the case of cigarette smoking, which explains less than 1% of the variance in lung cancer,

despite the fact that most people suffering from lung cancer are heavy smokers. The index of population attributable risk frequently used in epidemiological research might be usefully applied in studies attempting to document consequences of adolescent risk behaviour.

It is clear that important challenges remain to the study of consequences of risk-taking. Answers to the question of what the dangers of specific behaviours actually consist of are very important, both theoretically and practically. Theoretically, the meaning and functions of risk behaviours in adolescent and young adult development are central to conceptualisations of the nature of this developmental transition in Western cultures (Schulenberg et al., 1997; Maggs et al., 1997). Why does risk-taking peak in the middle to late adolescent years? What developmentally normative goals do behaviours such as substance use and sexual exploration help adolescents to accomplish (Maggs, 1997)? Documenting consequences of risk behaviours is also of great practical importance. Health promotion programmes aim to enhance the well-being and healthy development of all adolescents. Accurate knowledge about what activities pose the greatest threats to adolescents is essential so that appropriate priorities can be established and scarce resources can be distributed wisely.

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