

Adult Physical Health Outcomes of Adolescent Girls With Conduct Disorder, Depression, and Anxiety

ANNA M. BARDONE, M.S., TERRIE E. MOFFITT, PH.D., AVSHALOM CASPI, PH.D., NIGEL DICKSON, M.D.,
WARREN R. STANTON, PH.D., AND PHIL A. SILVA, PH.D.

ABSTRACT

Objective: To examine the young adult physical health outcomes of adolescent girls with behavior problems. **Method:** Girls with conduct disorder, girls with depression, girls with anxiety, and healthy girls ($N = 459$) who had been evaluated at age 15 years were followed up at age 21, when general physical health, substance dependence, and reproductive health were assessed. **Results:** After control for potentially confounding variables including prior health, adolescent conduct disorder predicted more medical problems, poorer self-reported overall health, lower body mass index, alcohol and/or marijuana dependence, tobacco dependence, daily smoking, more lifetime sexual partners, sexually transmitted disease, and early pregnancy. Adolescent depression predicted only adult tobacco dependence and more medical problems; adolescent anxiety predicted more medical problems. **Conclusions:** The robust link between female adolescent conduct disorder and poor physical health in adulthood suggests that intervention with girls who have conduct disorder may be a strategy for preventing subsequent health problems. *J. Am. Acad. Child Adolesc. Psychiatry*, 1998, 37(6):594–601. **Key Words:** conduct disorder, depression, anxiety, physical health.

Adolescent behavior problems have historically been presumed to be a normal and transient part of development. This has especially been the case in the study of female development because the behavior problems of girls tend to be more episodic (e.g., depression) or milder in symptomatology (e.g., nonaggressive rather than aggressive conduct disorder) than the behavior problems of boys, and thus they tend to attract less attention. However, recent findings suggest that some adolescent disorders have long-lasting effects (Bardone et al., 1996; Last et al., 1997; Rao et al., 1995; Robins and Price, 1991). For girls especially, these effects may extend into the next generation (Sameroff and Chandler, 1975). In this longitudinal study we focus on young adult physical

health outcomes of adolescent girls who had depression, anxiety, or conduct disorders. We focused on these disorders because they are the most common adolescent disorders (McGee et al., 1990).

Previous research has suggested a link between childhood and adolescent mental health problems and subsequent physical health concerns. We chose to conceptualize physical health broadly by including measures of both general health problems (e.g., number of medical problems) and specific health problems (e.g., body morphology, substance dependence, reproductive health). With regard to medical problems, Rohde et al. (1994) reported that, after a first episode of major depression, depression-prone adolescents reported a greater number of physical health problems than did adolescents who had never been depressed. Lewinsohn et al. (1996) reported a nonsignificant trend for adolescent depression at time 1 to increase the probability of disease at time 2, one year later. Because adolescent disorder may affect subsequent physical health via, for example, effects on the immune system, we assess the relationship between adolescent disorder and both subsequent medical problems and subjective physical health ratings at age 21.

With regard to body morphology, Pine et al. (1997) report that conduct disorder symptoms in adolescence

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From the University of Wisconsin-Madison (Drs. Moffitt and Caspi and Ms. Bardone; Drs. Moffitt and Caspi are also affiliated with the Institute of Psychiatry, University of London); the University of Otago Medical School, Dunedin, New Zealand (Drs. Dickson and Silva); and the University of Queensland Medical School, Brisbane, Australia (Dr. Stanton).

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Reprint requests to Professor Moffitt, Institute of Psychiatry, SGDP/RC, 111 Denmark Hill, London SE5 8AF, England.

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are positively related to body mass index (BMI, a ratio of weight in kilograms to height in meters squared) in adulthood; adolescents with conduct disorder were heavier (had higher BMIs) in adulthood after taking into account height. Because adolescent disorder may affect subsequent BMI via, for example, a stressful lifestyle, we assess the relationship between adolescent disorder and BMI at age 21.

With regard to substance dependence, studies have documented that girls with conduct disorder are at risk for alcohol and drug abuse/dependence (Robins and Price, 1991; Zoccolillo et al., 1992), while Rohde et al. (1994) identified a trend for depression-prone adolescents to report higher cigarette use. Since adolescent disorder may affect subsequent substance use and abuse via, for example, associated risk-taking or attempts at self-medication, we assess the relationship between adolescent disorder and both substance dependence (alcohol, marijuana, tobacco) and smoking frequency at age 21.

With regard to reproductive health, Robins and Price (1991) and Zoccolillo and Rogers (1991) found that adolescent conduct disorder predicts early pregnancy. Serbin et al. (1991) observed that social aggression in girls predicted subsequent treatment for sexually transmitted diseases (STDs), gynecological problems, and teenage pregnancy. Since adolescent disorder may affect subsequent reproductive health via, for example, associated risk-taking, we assess the relationship between adolescent disorder and three reproductive health outcomes: the number of sexual partners by age 21, contraction of an STD by age 21, and early pregnancy.

On the basis of the above-reviewed literature, we hypothesize that, compared with healthy controls, depressed girls will report more medical problems by age 21; girls with conduct disorder will have higher BMIs in young adulthood; girls with conduct disorder will have more problems with substance dependence at age 21; and girls with conduct disorder will have poorer reproductive health by age 21 in terms of STDs and early pregnancy.

More globally, what is the rationale for studying the relationship between adolescent disorder and subsequent physical health problems? First, subsequent physical health problems may hinder an adolescent's recovery from her behavior disorder in both its diagnosed and heterotypic continuity forms. In this light, understanding the adolescent disorder-adult physical health link is important for developmental theory. For

example, poor health may contribute to or help maintain relationship and parenting difficulties associated with behavioral and emotional disorders (Anastopoulos et al., 1992; Downey and Coyne, 1990). Second, elaboration of the connection between adolescent disorders and subsequent physical health can guide intervention efforts. If adolescent disorder contributes to the matrix of causal influences on adult physical health, treating behavior problems of adolescent girls may be a critical strategy for preventing subsequent physical health problems in adulthood.

This study offers several methodological strengths for testing the links between disorder and health problems. First, it is an investigation of a complete birth cohort; individuals are included whether or not they sought treatment. Such a sampling frame avoids biases inherent in clinical samples, which limit generalizability (Cohen and Cohen, 1984). Second, we analyzed simultaneously the three most prevalent psychiatric disorders of adolescence. This is especially important given the high comorbidity among these adolescent disorders (Clark et al., 1994). With this analytic strategy, we can identify which of these disorders pose risk for poor adult health, while controlling for the effects of comorbid diagnoses. Third, our longitudinal design establishes temporality since measures of adolescent behavior problems precede measures of adult physical health. Fourth, because preadolescent risk factors could cause both adolescent behavior problems and adult poor health, we controlled for potentially confounding factors to rule out artifactual links between adolescent mental health and adult physical health problems. For example, not having a father figure may reduce parental supervision, which, in turn, contributes both to adolescent conduct disorder problems and use of substances that can lead to dependence by adulthood (Chassin et al., 1993; Ensminger, 1990). By including such "third variables," we could determine whether adolescent disorder has an effect on adult physical health above and beyond preadolescent risk factors.

METHOD

Sample

Subjects were members of the Dunedin Multidisciplinary Health and Development Study, an investigation of a complete cohort of children born between April 1, 1972, and March 31, 1973, in Dunedin, New Zealand, a city of approximately 120,000 (Silva and McCann, 1996). A total of 1,037 children (52% males and 48%

females, 91% of the eligible births) participated in the age 3 assessment, forming the base sample for the longitudinal study. The Dunedin cohort has been reassessed at ages 5, 7, 9, 11, 13, 15, 18, and 21. Our study used data from ages 15 (diagnoses of mental disorder) and 21 (physical health). At age 15 (1987–1988), mental health data were collected for 461 girls (92% of the original cohort of girls). At age 21 (1993–1994), data were collected for 470 women (94% of the original female cohort).

Measures of Mental Health at Age 15

Mental health data at age 15 were collected in private interviews using a modified version of the Diagnostic Interview Schedule for Children (DISC-C) (Costello et al., 1982) to assess *DSM-III* disorders with a reporting period of the previous year. The modifications, diagnostic procedures, prevalence, and comorbidity patterns of the DISC-C diagnoses in this sample at age 15 are described by McGee et al. (1990), as is the adequate intratester reliability ($\kappa = 0.87$) using the modified DISC-C. The conduct disorder group ($n = 44$) included all cases of conduct disorder or oppositional disorder. (We included oppositional disorder in the conduct disorder group because of evidence that these disorders are part of the same spectrum (Schachar and Wachsmuth, 1990). Furthermore, since oppositional disorder appears to be a less severe "form" of conduct disorder, the inclusion of oppositional disorder would exert a conservative effect on our ability to detect group differences.) The depression disorder group ($n = 25$) included all cases of major depressive episode or dysthymia. The anxiety disorder group ($n = 67$) included all cases of anxiety or phobia. The three diagnostic groups were not mutually exclusive (e.g., girls with both conduct disorder and depression were retained in both groups). As a healthy control group we used the 341 girls who had no disorder at age 15. In all, 459 girls with either no disorder, a conduct disorder, a depression disorder, or an anxiety disorder were included in our analyses. Two girls with attention deficit disorder as their sole diagnosis were dropped from analyses. (In an earlier publication [Bardone et al., 1996] groups differed slightly from the present groups because we had excluded comorbid cases, whereas in these analyses we handled comorbidity statistically.) Overall, 15% of the sample members with one of the three disorders studied had a comorbid disorder. This was true for 25% of the girls who had anxiety (most had comorbid depression), 52% of the girls with depression (most had comorbid anxiety), and 14% of the girls with conduct disorder. Even with a sample of 459 girls, the number of comorbid cases precluded analyses of specific combinations of comorbidity, but comorbidity was taken into account statistically because we report the unique effects of each disorder after controlling for other disorders.

Measures of Physical Health at Age 21

To assess medical problems, women completed a standard medical intake questionnaire in which they indicated which of 13 medical problems they had experienced since age 15: anemia, arthritis, cancer, hepatitis, diabetes, serious back trouble, heart trouble, kidney/bladder infections, epilepsy, acne, colitis, menstrual problems, and migraines. While this list of medical problems is incomplete, it provides an index for group comparisons. To get a subjective measure of overall health, women rated their health on a scale from 1 (very poor) to 5 (very good). A measure of BMI (kg/m^2) at age 21 was computed from each woman's measured weight and height.

Substance dependence data at age 21 were collected using the Diagnostic Interview Schedule (DIS) (Robins et al., 1989). The modifications, psychometric properties, and epidemiology of the

DIS in this sample are described in detail by Newman et al. (1996); κ coefficients for substance use disorders were all greater than 0.85. *DSM-III-R* substance dependence disorders were assessed using a reporting period of the previous year. Women with diagnosed alcohol dependence and/or marijuana dependence made up the substance dependence group; the interview also identified a tobacco dependence group. Smoking status came from women's self-report of their age 21 smoking pattern. Daily smokers were coded as 1 and nonsmokers and less frequent smokers were coded as 0. (Bardone et al., 1996, reported polydrug use in adulthood for girls with conduct disorder, girls with depression, and healthy girls.)

Questions about reproductive health were drawn from the British National Survey of Sexual Attitudes and Lifestyles (Johnson et al., 1994) and were self-administered via computer. An interviewer helped poor readers when requested, but sat out of view of the women's responses. We report on lifetime number of sexual partners, age at first STD (17 or younger, 18, 19, 20, or 21), and age at first pregnancy (17 or younger, 18, 19, 20, or 21).

Measures of Potentially Confounding Conditions Present Before Age 15

Analyses of medical problems, health self-rating, BMI, substance dependence, and smoking status controlled for seven variables (socioeconomic status, age at menarche, absence of a father figure, parental smoking, childhood health, maternal health, and maternal BMI). Analyses of multiple sexual partners, STD, and early pregnancy controlled for five variables (socioeconomic status, age at menarche, absence of a father figure, religiosity, and being a daughter of a teenage mother). Except where noted, covariates were collected at the age 11 assessment.

The measure of socioeconomic status was based on the girl's father's job and is represented on a 6-point scale designed for New Zealand occupations (Elley and Irving, 1972), ranging from 1 (professional) to 6 (unskilled labor). For girls without fathers at home, their mother's socioeconomic status was recorded. We controlled for social class because of its association with health (Macintyre and West, 1991) and coital experience (Wu, 1996). Age at menarche was assessed at age 15, when the girls were asked how old they were (in years and months) when they had their first menstrual period. Only 18 girls reported not having had their period yet; they were assigned age 16 as their age at menarche. We controlled for age at menarche because of its relationship with age at first intercourse (Wellings et al., 1994) and BMI (Burke et al., 1992). Absence of a father figure was determined from the parent questionnaire. Girls were coded 1 if they had a father figure (natural father, adoptive father, stepfather, foster father, grandfather, or elder brother), and 0 otherwise. We controlled for not having a father figure because girls with low levels of parental monitoring (e.g., from single-parent homes) are more likely to be sexually active (Luster and Small, 1994) and to use substances (Ensminger, 1990). The parental smoking measure came from parental self-report. Girls whose mother or father smoked were coded 1; girls with non-smoking parents were coded 0. We controlled for parental smoking because it models smoking for adolescents (Flay et al., 1994). The childhood health measure was the parent's response to the question "How do you think your child's health is?" on a scale from 0 (very good) to 3 (poor). (This question came from the age 9 assessment; the question was not asked at age 11.) We controlled for poor childhood health because chronic medical problems may have continuity into adulthood. The maternal health measure was the mother's rating of her overall health on the same 0 to 3 scale. We

TABLE 1

β Weights for General Health and Reproductive Health Outcomes by Age 21 for the Adolescent Girls With Behavior Disorders Relative to Their Healthy Counterparts, Before and After Controlling for Covariates

Age 21 Outcome	Conduct Disorder at Age 15		Depression at Age 15		Anxiety at Age 15		Significant Covariates ^a
	Unadjusted β	Adjusted β	Unadjusted β	Adjusted β	Unadjusted β	Adjusted β	
Medical problems since age 15	.10*	.10*	.09†	.09†	.16**	.15**	4, 7
Overall health self-rating	-.20***	-.22***	-.03	-.03	-.02	-.01	3, 4, 6
Body mass index	-.12*	-.11*	.06	.05	.002	-.01	6, 7
Lifetime no. of sexual partners	.17***	.16**	.02	.04	-.01	-.03	3, 6, 9

^a Covariates significantly correlated with the outcome variables at $p < .10$. 1 = parental socioeconomic status; 2 = parental smoking; 3 = no father figure; 4 = childhood health; 5 = maternal health; 6 = maternal body mass index; 7 = age at menarche; 8 = religiosity; 9 = daughter of teenage mother.

† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

controlled for maternal health because of its genetic influence on the child's health and because it may affect mothers' ability to monitor their daughters (Anastopoulos et al., 1992). The maternal BMI was computed from each mother's measured weight and height. We controlled for maternal BMI because it is related to offspring's BMI. (Measures of fathers' health and body mass were unavailable.) The measure of religiosity was derived from the parent's report of the organized groups or activities their child attended at least once per week. Girls who attended weekly religious activity (e.g., Sunday school, church) were coded 1; other girls were coded 0. We controlled for religiosity because of its inverse relationship with adolescent sexual behavior and attitudes (DiBlasio and Benda, 1990). A study member who was the daughter of a teenage mother (i.e., whose mother was a teenager at the birth of her oldest biological child) was coded 1; other girls were coded 0. We controlled for being the daughter of a teenage mother because of its role as a risk factor for early sexual intercourse (Ensminger, 1990).

Data Analysis

We used ordinary least-squares multiple regression to examine hypotheses about continuously distributed outcome variables (e.g., BMI), logistic regression for dichotomous outcome variables (e.g., smoking status), and survival analysis for the timing of reproductive health outcomes (e.g., age at first pregnancy). Regardless of the analytical technique, the process involved two steps. First, we estimated a regression model: health outcome = $a + b_1$ (conduct disorder) + b_2 (depression) + b_3 (anxiety), where b_1 , b_2 , and b_3 represented the effects of dummy-coded age 15 *DSM-III* diagnoses. The reference category represented the healthy controls. Since the diagnostic groups were not mutually exclusive, this model, in which all diagnostic groups are entered in the same step, provides information about the unique effects of each adolescent disorder on young adult health outcomes. Next, we introduced a set of control variables to the equations in order to test whether the effects of adolescent disorders on health outcomes are independent of potentially confounding conditions. A comparison between the unadjusted and adjusted regression coefficients provides information about whether there are long-term health effects associated with adolescent behavior disorder independent of potentially confounding childhood and background variables. Because the diagnostic groups were not of equal size, we show the coefficients for each group to allow assessment of group differences independent of concerns about

differential power. While these inferential statistics controlled for comorbidity, the means and percentages presented in the text allow comparisons between groups without comorbidity controlled.

RESULTS

Medical Problems

Healthy controls reported on average one medical problem (SD = 1.2) out of the 13 assessed; in contrast, girls with conduct disorder, depression, or anxiety all reported, on average, two medical problems (SDs = 1.2, 1.3, and 1.5, respectively). Table 1 shows that adolescent conduct disorder, depression (marginally), and anxiety each uniquely predicted more medical problems relative to healthy controls, even after we controlled for seven potentially confounding variables (covariates): socioeconomic status, age at menarche, absence of a father figure, parental smoking, childhood health, maternal health, and maternal BMI.

Overall Health Self-Rating

Using a 5-point scale (where 1 = very poor), healthy controls (mean = 4.2, SD = 0.83), depressed girls (mean = 4.0, SD = 0.84), and anxious girls (mean = 4.0, SD = 1.01) self-reported fairly good health, but girls with conduct disorder self-reported poorer overall health (mean = 3.5, SD = 0.76). Table 1 shows that only adolescent conduct disorder uniquely predicted poorer self-reported overall health relative to healthy controls, even with control for covariates.

Body Mass Index

Healthy controls averaged 24.0 kg/m² (SD = 3.7); girls with depression, 24.9 kg/m² (SD = 5.2); girls with

anxiety, 24.0 kg/m² (SD = 4.6); and girls with conduct disorder, 22.4 kg/m² (SD = 2.6). Table 1 shows that only adolescent conduct disorder predicted a lower BMI relative to healthy controls, even with control for covariates.

Substance Dependence

More girls with conduct disorder (25.6%) met criteria for a substance dependence disorder (alcohol or marijuana) at age 21 than did healthy (7%), depressed (9.1%), or anxious (11.1%) girls. Table 2 shows that only adolescent conduct disorder significantly increased the risk of young adult substance dependence, even with control for covariates.

Tobacco Dependence

More girls with depression (36.4%) and girls with conduct disorder (27.9%) met criteria for tobacco dependence at age 21 than did healthy girls (16.7%) or girls with anxiety (17.5%). Table 2 shows that only adolescent depression and conduct disorder significantly increased the risk of young adult tobacco dependence, even after we controlled for covariates.

Smoking Status

More girls with conduct disorder (74.4%) were daily smokers at age 21 compared with healthy (31.5%), depressed (40.9%), or anxious (41.3%) girls. Table 2 shows that only adolescent conduct disorder significantly increased the risk of young adult daily smoking, even after we controlled for covariates.

Lifetime Number of Sexual Partners

Because of a highly skewed distribution with extreme outliers, we recoded the lifetime number of sexual partners according to a six-category scale used in the

British National Survey of Sexual Attitudes and Lifestyles (Wellings et al., 1994), where 0 = no sexual partners; 1 = 1 partner; 2 = 2 partners; 3 = 3 to 4 partners; 4 = 5 to 9 partners; and 5 = 10 or more partners. Healthy controls, depressed girls, and anxious girls all reported having intercourse with an average of three to four different partners by age 21 (SDs = 1.6, 2.1, and 1.6, respectively). Girls with conduct disorder, however, reported an average of five to nine sexual partners (SD = 1.3). Table 1 shows that only girls with conduct disorder were significantly more likely to have had more lifetime sexual partners, even after we controlled for the five covariates: socioeconomic status, age at menarche, absence of a father figure, religiosity, and being a daughter of a teenage mother.

Sexually Transmitted Diseases

More of the girls with conduct disorder (26.2%) had contracted an STD than had the healthy (15.6%), depressed (9.5%), or anxious (16.4%) girls. Since the outcome (STD) included censored cases for whom the outcome had not occurred by the age 21 assessment, the survival analytic technique of Cox regression was used to test differences between adolescent groups in their age at first STD. Both with and without covariates, analyses revealed that the relative risk of an STD in girls with conduct disorder was marginally greater than that of healthy controls (unadjusted relative risk 1.9; 95% confidence interval [CI]: 1.0 to 3.5; relative risk adjusted for covariates 1.7; CI: 0.9 to 3.3). Depressed girls' relative risk (both unadjusted, 0.6, and adjusted, 0.6) and anxious girls' relative risk (both unadjusted, 1.1, and adjusted, 1.0) of contracting an STD were not significantly different from healthy controls' risk.

TABLE 2
Odds Ratios for Substance Use Outcomes at Age 21 for the Adolescent Girls With Behavior Disorders Relative to Their Healthy Counterparts, Before and After Controlling for Covariates

Age 21 Outcome	Conduct Disorder at Age 15		Depression at Age 15		Anxiety at Age 15		Significant Covariates ^a
	Unadjusted Odds Ratio	Adjusted Odds Ratio	Unadjusted Odds Ratio	Adjusted Odds Ratio	Unadjusted Odds Ratio	Adjusted Odds Ratio	
Substance dependence	4.6***	5.8***	1.1	1.0	1.4	1.3	3
Tobacco dependence	1.9†	2.2*	3.1*	3.6*	0.8	0.8	1, 3, 6
Daily smoker	6.1***	8.1***	1.2	1.3	1.3	1.3	1, 2, 3, 6

^a Covariates significantly correlated with the outcome variables at *p* < .10. 1 = parental socioeconomic status; 2 = parental smoking; 3 = no father figure; 4 = childhood health; 5 = maternal health; 6 = maternal body mass index; 7 = age at menarche.

† *p* < .10; * *p* < .05; *** *p* < .001.

Pregnancy

More of the girls with conduct disorder (46.3%) had been pregnant by age 21 than had the healthy (18.1%), depressed (30%), or anxious (23.0%) girls. Cox regression analyses revealed that unadjusted relative risk of pregnancy before age 21 was 3.0 times greater in girls with conduct disorder (CI: 1.8 to 5.0) than healthy controls. In analyses controlled for the covariates, girls with conduct disorder had an adjusted relative risk that was 3.1 times greater (CI: 1.8 to 5.3) than that of healthy controls. Depressed girls' relative risk (both unadjusted, 1.5, and adjusted, 1.6) and anxious girls' relative risk (both unadjusted, 1.1, and adjusted, 1.0) of being pregnant by age 21 were not significantly different from healthy controls' risk.

DISCUSSION

This study highlights a robust link between female adolescent conduct disorder and poor physical health problems in young adulthood. Girls with conduct disorder grew up to have more medical problems, poorer overall health, lower BMI, and more substance problems; they were also at risk for reproductive health problems. Although we did not measure injury as a health outcome, other studies suggest that injury should be added to the list of health outcomes associated with conduct disorder (Farrington and Junger, 1995; Nataraja et al., 1997). The results do not support a similarly broad link between female adolescent anxiety or depression and the adult physical health outcomes assessed. Both depressed and anxious girls reported elevated medical problems between ages 15 and 21. However, except for a link between depression and tobacco dependence, neither group appeared to have substance use problems or adverse reproductive health outcomes in young adulthood.

Although the correlational nature of this study cannot determine whether adolescent disorders *caused* subsequent health problems, we were able to document several criteria necessary for a causal relationship. First, the disorder diagnoses prospectively antedated the health problems by up to 6 years. Second, we controlled for childhood health problems to show that disorders were linked to emerging health problems. Third, by controlling for potentially confounding third variables we took into account alternative explanations for the link between adolescent disorders and adult health problems.

How can a psychological disorder in adolescence influence subsequent physical health? Given the results of this study, the question should be narrowed to the following: How might conduct disorder in adolescent girls influence poor physical and reproductive health in young adulthood?

Psychological and physical health may be linked via biological, behavioral, cognitive, and social pathways (Cohen and Rodriguez, 1995). For substance abuse and sexual behavior, behavioral and social mechanisms may explain the connection. Because girls with conduct disorder are, by definition, rule violators, they may respond oppositionally to admonishments from authority figures against having sex or using alcohol, marijuana, and tobacco. Girls with conduct disorder affiliate with rule-violating older males who initiate them into sexual activity, putting them at risk for STDs and pregnancy (Magnusson, 1988). Furthermore, such early sexual activity usually occurs without condoms for STD protection (Luster and Small, 1994). Likewise, continuity of substance use (which increases likelihood of dependence) may be fostered because girls with conduct disorder socialize with peers who abuse substances, too; in this way, substance use can become an integral and mutually reinforcing part of the social interactions of girls with conduct disorder (Cairns et al., 1988).

Girls with conduct disorder also reported more medical problems, poorer overall health, and a lower BMI on average. These associations may be explained behaviorally and cognitively. Behaviors that increase risk for poor physical health often characterize girls with conduct disorder: poor diet, lack of sleep, smoking, excessive use of alcohol, and poor adherence to medical regimens (Cohen and Rodriguez, 1995). Most girls who have conduct disorder are daily smokers who would be prone to coughing and shortness of breath, which they may perceive as subpar health. The thinness of young adult women with conduct disorder may be partially explained through the behavioral pathway of daily smoking, poor nutrition, and stress (U.S. Department of Health and Human Services, 1988). Girls with conduct disorder had a lower mean BMI than the other girls studied, but it was still within a healthy range. Our finding is in contrast to that of Pine et al. (1997), who found that adolescent conduct disorder symptoms were positively related to BMI in young adulthood.

This study also identified a connection between adolescent depression and adult tobacco dependence

and medical problems. Depressed girls may depend on tobacco to self-medicate their depressed mood (Gilbert and Gilbert, 1995). Symptoms of depression such as insomnia, lack of exercise, and weight loss may contribute to medical problems (Cohen and Rodriguez, 1995). Depression interferes with normative social functioning, thus disrupting the social networks important in promoting physical health (Cohen, 1988). The effects of depression on the immune system may also increase susceptibility to health problems (Herbert and Cohen, 1993).

We found a link between adolescent anxiety and medical problems that may be partially explained biologically. For example, panic attacks involve hyperactivation of the sympathetic nervous system, which has been implicated in the etiology of several medical disorders (Rogers et al., 1994). Alternatively, this link may be artifactual if anxious girls' fears encourage them to seek medical attention (Rogers et al., 1994). Arguing against this interpretation is the finding that the anxious girls in our sample did not self-report poorer global health.

Clinical Implications for Girls With Conduct Disorder in the Transition to Adulthood

The robust link between female adolescent conduct disorder (in particular via associated risk-taking behavior) and poor physical health has clinical implications (Caspi et al., 1997). While the poor health outcomes are problematic on their own, they become more so when viewed in the context of the matrix of other difficulties faced by girls with conduct disorder as they enter adulthood. In our study of the economic and social outcomes of adolescent disorder, girls with conduct disorder had minimal education, which will likely preclude their attainment of higher-status and better-paying jobs, and in turn limit their economic resources for establishing a healthy lifestyle (Bardone et al., 1996). The already-limited financial resources of these young women may also be siphoned off into alcohol, marijuana, and cigarettes. We also found that girls with conduct disorder were more likely to be young mothers, to cohabit serially with more men, and to be in physically violent partner relationships (Bardone et al., 1996). The results of our study suggest that the pairing of early motherhood and physical violence may be additionally compounded by the young mother's health problems, which may further divert attention and energy away from parenting and increase maternal stress. These

sequelae of female adolescent conduct disorder underscore the need for early and intensive intervention at many levels to prevent the accumulation of psychological, socioeconomic, and physical health problems. Prevention programs that seek to minimize harm among risk takers could improve not only women's mental health but also their socioeconomic and physical well-being.

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Eating Patterns, Physical Activity, and Attempts to Change Weight Among Adolescents. Amy B. Middleman, MD, MPH, MSED, Isabel Vazquez, MS, RD, Robert H. Durant, PhD

Objective: To determine eating patterns and demographic and dietary factors associated with adolescents' attempts to change weight. **Methods:** Data from students participating in the Massachusetts Youth Risk Behavior Survey (YRBS) were analyzed. Race, age, school grade, academic achievement, gender, body image, eating patterns, level of exercise, participation in team sports, cigarette use, diet pill use, and vomiting were examined. The weighted sample included 3055 students: 49% female and 78% white. Mean age was 16 years (± 1.2 years). Associations were measured using Spearman's r , Chi-square, Mantel-Haenszel test for trend, and logistic regression analyses. **Results:** A total of 61.5% of females and 21.5% of males reported trying to lose weight; 6.8% of females and 36.3% of males were trying to gain weight. There was a strong correlation ($r = 0.62$, $p < 0.0001$) between attempting to gain weight and self-perception of underweight for both genders. Females reporting having changed their intake of several foods if attempting to change weight; males changed their intake of dessert foods. Hard exercise, stretching, and toning were associated with trying to lose weight among females and with trying to gain weight among males. **Conclusions:** High-calorie food consumption and exercise were associated with attempts at weight change. Unhealthy eating to change weight highlights the need for effective nutrition and weight counseling among adolescents. *J Adolesc Health* 1998;22:37-42

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