

Psychopathology and Social Competencies of Adolescents Who Were Extremely Low Birth Weight

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ABSTRACT. *Background.* We have previously shown that infants who were extremely low birth weight (ELBW) are particularly vulnerable to problems related to inattention and hyperactivity at school age. It is not known whether these problems persist to adolescence.

Objective. To explore and compare the levels of psychopathology in a regional cohort of ELBW infants and sociodemographically matched term controls as reported by teens and their parents.

Design/Methods. Cross-sectional cohort study/geographically defined region.

Participants. Teens: ELBW 141/169 (83%) and control 122/145 (84%), aged 12 to 16 years. Parents: ELBW 143/169 (85%) and control 123/145 (85%). Both cohorts and their parents completed the Ontario Child Health Study-Revised questionnaire with 6 behavioral subscales: conduct disorder, oppositional defiant disorder, attention-deficit/hyperactivity disorder (ADHD), overanxious, separation anxiety, and depression.

Results. By teen self-report, there were no significant differences between ELBW and control teens on any of the 6 subscale scores. However, parents of ELBW teens reported significantly higher scores than parents of control for depression and ADHD based on 2-way analysis of variance (group \times gender). Comparison within teen/parent dyads showed that both cohorts of teens reported significantly higher scores than their parents. Multivariable analyses on behavioral subscale scores demonstrated a number of variables that were significant predictors by parent report: group (ELBW vs control), gender, family function, developmental quotient, maternal mood, and socioeconomic status; no predictors were significant by teen report. There were no statistically significant interaction effects for any of the models. These models explained a greater percent of the variance in behavioral scores for parents than for teens (12.5%–22.0% vs 3.4%–8.2%). Results were similar when teens with neurosensory impairment were excluded.

Conclusions. This study is unique in the inclusion of both parent and teen self-report of behaviors. Significant differences were apparent only by parent report for ADHD and depression among ELBW teens. Significant predictors of behavioral scores for parents include group, gender, family function, developmental quotient, mater-

nal mood, and socioeconomic status. *Pediatrics* 2003;111:969–975; *extremely low birth weight, attention deficit hyperactivity disorder, psychopathology, social competence, prematurity, controls.*

ABBREVIATIONS. ELBW, extremely low birth weight; VLBW, very low birth weight; ADHD, attention-deficit/hyperactivity disorder; SES, socioeconomic status; SD, standard deviation; DQ, developmental quotient; OCHS-R, Ontario Child Health Study-Revised; DSM-III-R, *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised*; SES, socioeconomic status; NSI, neurosensory impairment; ODD, oppositional defiant disorder.

Extremely low birth weight (ELBW) survivors from the early postneonatal intensive care era are now adolescents and young adults. With increasing age of the subjects, the investigation of their outcomes has evolved from a narrow focus of neurodevelopmental impairments to broader considerations of the overall morbidity.^{1–7} As more information emerges, it is apparent that the pattern of disabilities has changed over time. Although there is some resolution of the earlier neurodevelopmental difficulties and problems caused by ill health at adolescence, newer concerns such as learning difficulties,^{8–9} behavioral problems,^{10–14} and growth deficits¹⁵ have surfaced that are no less challenging.

The extensive research into the psychopathology of disorders in infants who were very low birth weight (VLBW) reveals that they are particularly vulnerable to problems related to inattention and hyperactivity at school age.^{4–7,10–14,16–22} Indeed, an international study of 408 8- to 10-year-old ELBW children from 4 different countries (including our cohort)²³ revealed that despite cross-cultural differences, the types of behavioral problems were strikingly similar; the mean scores for social, thought, and attentional difficulty scales were 0.5 to 1.2 standard deviations (SDs) higher than the country-specific norms.²³ Conduct disorders appear to be less frequent, at least in midchildhood.^{5,10} Follow-up studies of children with attention-deficit/hyperactivity disorder (ADHD) in the general pediatric population have found continued psychopathology with subsequent development of conduct and oppositional defiant disorders (ODD).²⁴ Others have reported that preterm children considered to have hyperactivity also have significantly worse performance on cognitive tasks and a greater rate of school failure.^{1,16,25,27} There is also some evidence to suggest that VLBW adolescents suffer from a higher prevalence of anxi-

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ety and depression compared with controls.^{9,10-12} However, there is scant information on the extent to which early attentional difficulties in VLBW infants are associated with subsequent psychopathology and academic difficulties at adolescence.⁹

In this report, our objectives are to determine the levels of psychopathology at adolescence in a regional cohort of infants who were ELBW in comparison to matched full-term controls; whether these differences, if any, can be partially explained by sociodemographics and measures of cognition and school abilities; and lastly, if the correlates of psychopathology are different for ELBW versus controls. Based on the available literature, we hypothesized that ELBW children will suffer from continued psychopathology with persistence of ADHD, and possibly higher rates of anxiety and depression than controls; the relationship between ELBW and psychopathology will not be explained by confounding psychosocial risk factors, but would likely be related to child characteristics.

METHODS

Participants

ELBW Cohort

A consecutive cohort of 397 ELBW infants, 501 to 1000 g birth weight born between 1977 and 1982 to residents of a geographically defined region in central-west Ontario were recruited at birth. Of these, 179 (45%) survived to hospital discharge; 10 infants died postdischarge. Thus, 169 survivors were followed longitudinally from birth.²⁸ The mean birth weight of the ELBW survivors was 838 SD 123 g and the mean gestational age was 27 SD 2.4 weeks. The term group weighed a mean of 3391 SD 480 g at birth (Table 1). The proportion of males for ELBW was 47% versus 46% among controls. The mean age at assessment was 14.1 SD 1.5 years for ELBW and 14.4 SD 1.2 years for controls. The behavioral outcome of this cohort was last reported at ages 5⁴ and 8 years.⁵

TABLE 1. Demographic Variables on ELBW and Control Participants

	ELBW (N = 141)	Control (N = 122)
Gestation (wk), mean (SD)	27 (2.4)	Term
Birth weight (g), mean (SD)	838 (123)	3391 (480)*
Gender: male (%)	47	46
NSI, %		
Single NSI	17	2*
2 or more NSI	7	0*
WISC-R DQ	92 (16)	102 (16)*
Family status (2 parents, %)	89	89
Social class ³⁵		
I, II (%)	30	23
III (%)	27	36
IV, V (%)	43	41
Family income		
<\$29 999	14	14
\$30 000-\$49 999	24	25
\$50 000-\$79 000	44	45
>\$90 000	18	16
Maternal educational (%)		
<high school	28	21
Completed high school	30	26
Some or completed college	25	33
Some or completed university	17	20
Age assessed (y), mean (SD)	14.1 (1.5)	14.4 (1.2)

WISC-R indicates *Wechsler Intelligence Scale for Children-Revised*.

* $P < .0001$.

Term Controls

The controls were recruited at 8 years of age from a random list of children obtained through the Directors of the Hamilton Public and Roman Catholic Separate School Boards, and matched for age, sex, and social class to each index child.³ At the time of the present assessment, both cohorts of children ranged between 12 and 16 years unadjusted age.

Parents

The parents (primarily the mothers) of both cohorts of children also participated in completion of the study questionnaires.

Instruments and Measures

Measurement of Psychopathology

Both cohorts of adolescents and their parents were asked to complete the Ontario Child Health Study-Revised (OCHS-R) questionnaires.²⁹ The OCHS-R Scales are comprised of a psychiatric symptom checklist which measures conduct disorder, ODD, ADHD, overanxious disorder, separation anxiety, and depression, based on the criteria of the *Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised (DSM-III-R)*.³⁰ The externalizing problems subscale is formed by summing the first 3 scales, and the internalizing problems subscale by summing the last 3 scales. The Child Behavior Checklist³¹ and the original OCHS scales³²⁻³⁴ provided the basic pool of items, and additional items were added by consensus, when necessary, to describe a particular disorder. Each item has 3 response categories "never or not true," or "somewhat or sometimes true," and "very or often true," with scores of 0, 1, and 2 assigned, respectively. Respondents were asked to base their answers on the preceding 6 months. Total scores for a given disorder were calculated by summing scores from items that map onto *DSM-III-R* categories. The OCHS-R has undergone extensive evaluation on a general population sample ($N = 1751$) of parents and teachers of children aged 6 to 16, youths aged 12 to 16, and a mental health clinic sample ($N = 1027$); it was found to have adequate psychometric properties, and provides an efficient means to measure childhood psychiatric disorders.²⁹

Measurement of Adaptive Functioning and Social Competence

Both parents and adolescents provided responses for the following items from the OCHS-R: general activities, which measure the amount and quality of the child's participation in sports, hobbies, music, and organized activities; social activities, which measure the number of friends and frequency of contacts with friends, how well the child gets along with parents, teachers, and other children, and whether the child is withdrawn; and school activities, which indicate the child's school performance and whether the child repeated a grade and/or required special educational assistance.

Demographic

Maternal education (9 levels) and total family income (9 levels) were assessed by parental responses to the OCHS self-administered questionnaire.³² Socioeconomic status (SES) was measured using the Hollingshead 4-factor index of social status (unpublished observations).

Family Risk

Information on the following family factors was obtained from the parents through the OCHS self-completed questionnaire: a) marital relationship was assessed on a 4-item scale; b) maternal mood was measured by a 10-item scale derived from the Bradburn Scale of positive and negative affect.³⁵ This scale is comprised of 5 items which measure positive effect and 5 items which measure negative effect; c) family function was measured by the 12-item general functioning scale derived from the McMaster Family Assessment Device.³⁶ This instrument assesses family functioning on 6 dimensions: problem solving, communication, roles, affective responsiveness, affective involvement, and behavior control.

Adolescent Risky Behaviors

Both cohorts of adolescents completed the OCHS-R questionnaires which inquired about their use of alcohol, drugs, and cigarette smoking.

Psychometric Measures

An abridged version of the *Wechsler Intelligence Scale for Children-Revised*³⁷ was administered to all children. The following subscales were included: verbal tests: similarities, mental arithmetic, and vocabulary; and performance tests: picture arrangement and block design. These items provide a developmental quotient (DQ; mean 100, SD 15).⁸ Information on grade repetition and special educational assistance was obtained from the parents through a validated structured OCHS questionnaire. School difficulty was defined as the child repeating a grade and/or using special educational resources.⁸ Children were considered to have neurosensory impairments (NSI) if they had cerebral palsy, microcephaly, hydrocephalus, blindness, and/or mental retardation identified at previous assessments.²⁸

Informed Consent

The study was approved by the Ethics Committee of Hamilton Health Sciences, and written informed consent was obtained from the parents of all subjects.

Statistical Analysis

Behavioral Assessments of Adolescent Subjects by Parent and Teen Self-Report

For the demographic data, χ^2 analyses was performed for categorical data and independent Student's *t* tests for continuous variables between cohorts. Comparisons between cohorts to determine differences in levels of psychopathology were made using analysis of variance, unless otherwise indicated. Corrections to the level of significance were made for multiple comparisons using Bonferroni's method. χ^2 analysis (2 variables) and log linear analysis (3 variables) were used to compare the cohorts on categorical variables.

Multivariable regression analyses were performed to determine the role of a number of demographic and family variables in predicting behavioral scores. Individual models were constructed for each subscale score for parent and teen reports separately. The following variables were included in each model: DQ, gender, group (ELBW vs control), SES, total family income, maternal educational levels, maternal mood, and family function. Using a backward elimination method, the following interactions were tested for statistical significance: group \times gender, group \times DQ, group \times maternal education, group by SES, group by maternal mood, and group \times family function. Marital relationship was excluded from these analyses because of its significant correlation with family function.

RESULTS

Participants

ELBW

A total of 141/169 (83%) ELBW survivors participated in the study. NSI were identified in 24% of the participants. Nonparticipants included 8 who were lost, 5 refused, 5 lived too far away, 1 incomplete questionnaire, and 9 severely impaired teens were unable to complete the self-reports. The key difference between participants and nonparticipants was that untestable children could not participate in self-reports of behavior.

Controls

A total of 122/145 (84%) of controls participated in the study. Of these, 2 children had mild single NSI. Nonparticipants included 10 who were lost, 9 refusals, and 2 lived too far away. The mean age of the subjects was 14.4 years.

Parents

A total of 143/169 (85%) parents of ELBW teens, and 123/145 (85%) parents of control teens participated in the study.

Demographics

Table 1 shows demographic data on both ELBW and control children and their parents. The total incidence of NSI was higher in the ELBW group compared with the control group: 24% versus 2%, respectively ($\chi^2(2) = 29.67; P < .0001$). Mean age at assessment was similar for both groups. There were no statistically significant differences between the ELBW and control cohorts in 2-parent family status, parental education, low maternal mood, social class, or marital status.

Levels of Psychopathology by Group and by Parent and Teen Report

Behavioral Scores by Parent Report

Two-way analysis of variance (group \times gender) revealed statistically significant differences between ELBW and control cohorts in the ADHD subscale ($F_{1,262} = 7.98; P = .005$) and in the depression subscale ($F_{1,261} = 4.08; P = .04$; Table 2). In both instances, parents of ELBW teens reported higher scores than parents of control teens. There were no statistically significant group \times gender interactions. No differences were found between cohorts when summing externalizing or internalizing problems.

Behavioral Scores by Teen Report

There were no statistically significant differences by teen report between ELBW and control cohorts in levels of problem behavior for either combined or gender-specific comparisons. Again, no significant differences were found between cohort groups on externalizing or internalizing problems by teen report (data not shown).

Behavioral Scores Comparing Parent and Teen Reports by Group

For both cohorts, all behavioral scores were statistically different between parent and teen reports

TABLE 2. Comparison of Behavioral Subscales by Group and by Source: Parent and Teen Report

	ELBW Mean (SD)	Control Mean (SD)
Parent report	(N = 143)	(N = 123)
Conduct	1.0 (1.9)	1.2 (2.0)
ODD	4.3 (3.6)	4.2 (3.7)
ADHD	7.2 (5.4)	5.3 (5.1)*
Overanxious	5.2 (2.9)	4.6 (2.9)
Separation anxiety	2.5 (2.3)	2.2 (2.5)
Depression	5.7 (4.2)	4.6 (4.2)**
Teen report	(N = 141)	(N = 122)
Conduct	1.5 (2.5)	1.7 (2.1)
ODD	4.5 (3.3)	5.3 (3.5)**
ADHD	7.3 (4.9)	7.3 (4.5)
Overanxious	5.9 (3.3)	6.2 (3.1)
Separation anxiety	3.7 (2.9)	4.1 (2.5)
Depression	6.7 (5.2)	6.6 (4.2)**

* $P < .05$.

** $P < .005$.

(data not shown). In all comparisons, teens reported significantly higher scores than parents for all subscales (ELBW: $P \leq .003$; controls: $P < .0001$), based on paired t test analyses.

Psychometric Analyses

A high level of reliability was demonstrated in the analyses of behavioral subscale scores by parent and teen reports, $\alpha = .855$ and $.870$, respectively. The correlations among the behavioral subscale scores ranged from $r = .04$ to $.73$. Most of the subscales were moderately correlated with one another with r values between $.3$ to $.5$.

Multivariable Analyses of Behavioral Scores for Both Cohorts by Parent and Teen Report

By Parent Report:

Multivariable regression analyses demonstrated a number of variables that were significant predictors of behavioral scores. Table 3 shows findings for each of the subscale scores by parent report. There were no statistically significant interaction effects for any of the models. The covariates explained from 12.5% (separation anxiety) to 22.0% (ODD) of the variance in the dependent variables. Group status (ELBW vs control) exhibited a statistically significant association with ADHD, overanxious disorder, and depression. Family function was associated with all disorders except separation anxiety, gender (conduct disorder, ADHD, and ODD), DQ (ADHD and separation anxiety), maternal mood (overanxious disorder), and SES (ODD) were the other covariates significantly associated with the outcomes.

By Teen Report:

None of the behavioral subscales were statistically significant for any of the predictor variables or interactions (data not shown).

Regression analyses were also used to explore the variables that were significant predictors of behavioral scores, excluding teens with NSI. No major differences were found between the analyses, with or

without teens with NSI, for either parent or teen reports.

Adaptive Functioning and Social Competence

Comparisons between the ELBW and control cohorts were made on a number of items that reflect adaptive functioning and social competence (Table 4). By parent report, there was a linear association between group and competence in sports ratings with ELBW teens rated lower. Significantly more ELBW teens were rated by their parents as clumsy ($\chi^2(1) = 26.98$; $P < .0001$), and a higher proportion were rated as below average in sports ($\chi^2(1) = 24.23$; $P < .001$). A significantly higher proportion of ELBW teens had failed a grade ($\chi^2(1) = 18.27$; $P < .0001$) and had school difficulties compared with the control cohort ($\chi^2(1) = 53.06$; $P < .0001$). However, no differences were reported in the proportion who participated in school or social activities.

There were no statistically significant interactions between group and gender on these variables.

When comparing the cohorts by teen self-report, no statistically significant differences were demonstrated between groups (data not shown). There were no significant differences when comparisons were made excluding teens with NSI. Further regression analysis revealed that ADHD was a significant predictor of school difficulties by both parent (Wald $\chi^2(1) = 30.45$; $P < .0001$) and teen reports (Wald $\chi^2(1) = 7.35$; $P < .007$), and remained significant when teens with NSI were excluded from the analyses.

Teen Self-Report of High-Risk Behaviors

A number of questions were asked of the teens about their involvement with the police, and in smoking, drinking alcohol, and taking street drugs. The only significant difference between groups related to alcohol consumption with more teens in the control cohort consuming 3 or more drinks of alcohol at 1 time (25% vs 8%, $P < .0001$). With respect to reports of consumption of street drugs or glue/fume

TABLE 3. Multivariable Analyses of Behavioral Scores by Parent Report for ELBW and Control Cohorts (Entries Are Standardized Coefficients)

Predictors	Conduct Disorder	ADHD	Overanxious	ODD	Separation Anxiety	Depression
Group	-0.062	0.136*	0.132*	0.260	0.001	0.145*
Gender	0.162**	0.180**	-0.083	0.212**	-0.108	0.013
Family dysfunction	0.350***	0.195**	0.226**	0.331**	0.125	0.280***
DQ	-0.108	-0.185**	0.001	-0.017	-0.148*	-0.097
Maternal mood	0.078	0.162	0.191**	0.071	0.135	0.129
SES	0.074	0.024	0.030	0.229**	0.062	0.067
Family income	0.001	-0.003	-0.034	0.080	0.064	0.035
Maternal education	-0.042	-0.020	-0.037	0.045	-0.165*	-0.060
Group* gender						
Group* family function						
Group* DQ						
Group* maternal mood						
Group* SES						
Group* family income						
Group* maternal education						
% of variation explained	20.4	19.3	16.2	22.0	12.5	17.5

* .05 > $P \geq .01$.

** .01 > $P \geq .001$.

*** .001 > P .

TABLE 4. Parent Report of Adaptive Functioning and Social Competencies by Group

Items	ELBW (<i>N</i> = 143)		Control (<i>N</i> = 122)	
	<i>N</i>	%	<i>N</i>	(%)
Few friends	7	5	2	2
Impaired teacher relationships	6	4	5	4
Impaired family relationships	11	8	9	7
Participation in coached sports	72	50	76	62
Competence in sports:				
below average	56	39	15	12*
average	66	46	59	48
above average	21	15	49	40*
Participation in arts/music/hobbies	43	30	41	33
Competence in arts/music/hobbies				
below average	29	20	17	14
average	83	58	71	58
above average	31	22	34	28
Belong to a club	50	35	26	21
Clumsiness	31	22	1	1*
Repeated/failed a grade	34	24	6	5*
School difficulties	79	55	15	12*

* $P < .0001$.

inhalation, the incidence was very low in both groups (1%–4%). Cigarette smoking was more common among control teens who smoked everyday for a month or longer compared with ELBW teens (14% vs 5%), but this difference was not statistically significant. However, there was a statistically significant group \times gender interaction, with smoking elevated among females in the control group.

DISCUSSION

In this population-based study, by parent report, the ELBW cohort demonstrated statistically significantly higher scores in ADHD and in the depression subscales compared with controls. Interestingly, by teen self-report there were no statistically significant differences in behavioral disorders. Furthermore, there were no differences found in externalizing or internalizing problems by either parent or teen report.

At the earlier assessments of the same cohort at ages 5 and 8 years,^{4,5} parents of ELBW children were more likely than parents of the reference group to report problems of ADHD. These differences were not noted by teacher report at 8 years of age.⁵ The measured prevalence of ADHD in the above studies was based on threshold scores according to the diagnostic criteria of the *DSM-III*.³² In the current study, we used a continuous scale as it is more sensitive and relevant for such comparisons. Also, we were unable to report the prevalence of ADHD as threshold scores are not available for the OCHS-R Scales.

To date, there are only a few studies on behavioral difficulties related to prematurity at adolescence.^{10–14} Levy-Schiff et al¹¹ found that by parent and teacher reports, 13- to 14-year-old VLBW children manifested a wide array of emotional problems and more behavioral disturbances, such as anxiety, depression, and aggression compared with controls.

Similarly, Stevenson et al¹³ found that both parents and teachers of VLBW adolescents reported a higher prevalence of conduct and emotional disorders, but not hyperactivity. Botting et al¹² found that by parent

report, one quarter of VLBW children showed a psychiatric disorder of some type at 12 years of age compared with 9% of control children. The main psychiatric problem was ADHD, with 23% of VLBW children meeting the clinical criteria compared with 6% of children born at term. Rickards et al¹⁴ reported that significantly more VLBW adolescents were rated by their teachers as socially rejected; by parent report, no differences were found in internalizing or externalizing problems. There are limited studies on self-reported behaviors at adolescence. Both Levy-Schiff et al¹¹ and Botting et al¹² found that VLBW adolescents reported a higher prevalence of anxiety disorders and depression compared with control subjects, although ADHD, per se, was not addressed. Similar to our findings, Hack et al³⁸ found no group differences between VLBW and control young adults in total problem score, externalizing or internalizing scales based on self-report using the Child Behavior Checklist.³¹

Discrepancies between different respondents, such as parent or teacher, are well-recognized, and may be a valid reflection of the child's behavior under different contexts.^{13,39,40} Less is known about parent-child discrepancies.^{41–43} In both the degree and in the nature of the symptoms, parents appeared to underreport the problems in this study. Cantwell et al⁴¹ found poor agreement between adolescent-parent dyads for major depression, anxiety disorders, and alcohol abuse, but good to excellent concordance in conduct disorders, attentional problems, and ODD. They concluded that there are clear advantages to combining parent and adolescent reports for externalizing disorders. However, they suggest that if forced to choose a single informant, assessing the adolescent will yield more information on the overall psychopathology. Our findings are consistent with previous research in that the agreement between matched adolescents and parents was not impressive. In both the control and ELBW cohorts, teens consistently reported higher levels of psychopathology than parents for all subscales.

The literature on psychiatric disorders in children

with physical disabilities is conflicting. Breslau⁴⁴ has shown that although children with physical disabilities were at increased risk for psychiatric disturbances, those conditions involving the brain had greater psychopathology than other chronic physical conditions. Most investigators reporting on psychopathology among VLBW children generally exclude subjects with physical disabilities.^{10–13} However, in our study and that of Rickards et al¹⁴ and Levy-Schiff et al,¹¹ differences in behavioral disturbances persisted whether or not children with significant neurologic impairments were excluded. Recently, ischemic white matter injury on ultrasound was shown to be related to increased risk of ADHD at 6 years of age.²² Others have shown a relationship between magnetic resonance imaging and behavioral difficulties, but not with neuropsychological impairments.^{45,46}

Several investigators have shown that the increased risk for developing antisocial behavior, poor self-esteem, and depression as children with ADHD grow older may compound the negative repercussions on academic functioning.⁴⁷ A substantial proportion of adolescents who had hyperactivity are reported to have poorer academic performance, a greater rate of school failure and expulsions, lower grades at school,^{9,16,25–27,48} and higher rates of antisocial behaviors.⁴⁸ Our results are consistent with previous studies that report a higher proportion of school failure in ELBW teens than in controls. Furthermore, ADHD was a significant predictor of school difficulties by both parent and teen reports.

Elgen et al¹⁰ reported no interaction between birth weight and parental risk factors. Levy-Schiff et al¹¹ determined that birth weight and psychosocial-environmental variables were significant in predicting later emotional adjustment. Gender was only significant in predicting aggression. In our study, gender was a significant factor in predicting a number of behavioral disorders including conduct, ADHD, and ODD. Group status (ELBW vs control) was a significant predictor for ADHD, overanxious disorder, and depression. Although not measuring exactly the same constructs, our findings are similar to Levy-Schiff et al¹¹ with respect to the importance of family environment and maternal emotional status in predicting the adolescents' behavioral adjustment.

In terms of adaptive functioning by parent report, the ELBW group in our study continued to show significantly lower competence in the areas identified at the earlier ages, namely competence in sports, clumsiness, and school difficulties.^{4,5} However, this did not hinder the adolescents in their participation in coached activities, whether it was sports, arts, music, or other hobbies; nor did it impact on friends or teacher/family relationships. Again, the ELBW adolescents did not perceive themselves to be different from controls on any of these activities. The findings of no differences in self-perception in behavioral problems or adaptive functioning is consistent with our previous reports of high ratings for self-esteem⁴⁹ and health-related quality of life⁵⁰ provided by the ELBW cohort for themselves. It is not known what factors contribute to this positive self-

perception. Whether it is denial,⁵¹ a recalibration of their expectations,⁵⁰ or other undetermined factors is not entirely clear. Regardless, the ELBW cohort appear to be adjusting fairly well in their life; risky behaviors such as alcohol consumption and cigarette smoking were lower compared with the control group, as was also reported in VLBW young adults by Hack et al.⁵²

Overall, the findings of this study are reassuring. Although there are still a few mild residual behavioral problems and some concerns with adaptive functioning as reported by parents, the adolescents seem to view themselves positively in all aspects and are engaging in fewer risk-seeking behaviors. It is generally considered that adolescence is a developmental period during which some degree of behavioral problems and turmoil can be expected. However, there is concern that such problems, particularly anxiety, depression, and somatic complaints among adolescents, may lead to continued psychopathology.⁵³ We believe that knowledge of the course of psychopathology from childhood to adolescence and beyond is important for determining the need for intervention and prevention strategies. Further follow-up of our cohort at young adulthood is in progress.

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