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Physical Symptom Reporting in Type A and Type B Children

Lewis Leikin
Children's Hospital of Eastern Ontario and
Department of Epidemiology and Community Medicine, University of Ottawa
Ottawa, Ontario, Canada

Philip Firestone
Child Study Centre, School of Psychology
University of Ottawa
Ottawa, Ontario, Canada

Patrick McGrath
Children's Hospital of Eastern Ontario, University of Ottawa
Ottawa, Ontario, Canada

The study examines the developmental origins of one coronary-prone component of the Type A pattern, the tendency to suppress attention to physical symptoms. The symptom-reporting behavior of 85 male and female children from 5 to 14 years of age was studied in both a laboratory and a clinical context along with associated illness behaviors. The results indicate that Type A children underreport a wide variety of symptoms and that this phenomenon is independent of sex and age. On some types of symptoms, Type A underreporting may increase with age. In addition, there is evidence that Type A children (boys in particular) miss less school following surgery. Interestingly, Type A children tend to be underrepresented in elective surgery populations. The apparent continuities in symptom reporting and illness behaviors among Type A children and coronary adults is discussed.

The Type A behavior pattern has been established as an independent risk factor for the development of coronary heart disease (Cooper, 1981). Recent epidemiological data have suggested that only some aspects of the behavior pattern, rather than the global pattern, may be risk-inducing (Case, Heller, Case, & Moss, 1985; Dembroski, MacDougall, Williams, Haney, & Blumenthal, 1985; MRFIT Group, 1982). One such toxic or coronary-prone component of the Type A pattern hypothesized to mediate the behavior–disease linkage is the tendency for Type A individuals to underreport physical symptoms. The symptom-suppression hypothesis of Type A risk (Carver, Coleman, & Glass, 1976) states that symptom underreporting may lead to inordinate delays in seeking medical attention for cardiac symptoms (Carver et al., 1976; Matthews, Siegel, Kuller, Thompson, & Varat, 1983) and to poorer physiological self-regulation (Matthews & Volkin, 1981; Pennebaker, 1982). Delay, in itself, is a risk factor for heart disease and may exacerbate the atherosclerotic process (Insull, 1973). Moreover, inattention to somatic states may impair cardiac self-regulation (Essau & Jamieson, 1987) and may prevent the use of stress-induced symptoms as cues to modulate behavior (Matthews & Volkin, 1981; Pardine, Napoli, & Callichia, 1984), creating the overexposure to stress that is a major pathway to disease (Pennebaker, 1982).

Abundant laboratory and clinical research has found that Type A adults fail to perceive and, consequently, that they underreport the frequency and intensity of physical symptoms under conditions of moderate environmental challenge (Carver et al., 1976; Matthews & Brunson, 1979), low symptom salience (Gastorf & Suls, 1982), low perceived importance (Pardine et al., 1984; Stern, Harris, & Elverum, 1981), high symptom ambiguity (Matthews et al., 1983), and demanding work environments (Matthews et al., 1983; Schleigel, Wellwood, Coops, Gruchow, & Sharatt, 1980). The underreporting behavior of Type A individuals is apparently due to their ability to focus full attention on external tasks and to ignore internal physical states that might interfere with performance (Matthews & Brunson, 1979; Pardine et al., 1984). Underreporting among Type A adults has been associated with lengthy treatment delays (Matthews et al., 1983), misattribution of cardiac symptoms (Gastorf & Suls, 1982), noncompliance with cardiac rehabilitation (Oldridge, Wicks, & Sutton, 1978; Rejeski, Morley, & Miller, 1984), and underestimation of stress level (Hart, 1983) and cardiac arousal (Essau & Jamieson, 1987), all of which may contribute to the risk of development and recurrence of infarct.

The symptom-suppression hypothesis has been less extensively studied among children. As the Type A pattern appears to originate during childhood (Matthews & Angulo, 1980) and remain stable into adulthood (Bergman & Magnusson, 1986), it would be useful to learn more about how these individuals actually become symptom underreporters. Developmental data may add to our knowledge of how and when risk components emerge and may help to construct effective and economical prevention and early intervention strategies for coronary heart disease (Coates, Derry, Killen, & Slinkard, 1981). In the only known study to date, Matthews and Volkin (1981) found that Grade 6 Type A boys underreported subjective fatigue relative to their Type B peers and relative to the effort they expended

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Correspondence concerning this article should be addressed to Lewis Leikin, Department of Psychology, Children's Hospital of Eastern Ontario, 401 Smyth Road, Ottawa, Ontario, Canada K1H 8L1.

on a laboratory task. It remains unclear, however, whether this symptom underreporting extends to other age groups and to Type A girls and, more important, whether it occurs with real-life clinical symptoms as well as laboratory-induced symptoms.

The present study sought to replicate and extend previous developmental research by examining the symptom reporting behavior of Type A and Type B boys and girls over a wide age range in both a laboratory and a clinical context. In so doing, questions regarding sex and age differences in Type A and Type B symptom reporting could be addressed, as could the critical question of whether Type A underreporting extends to clinical as well as laboratory symptoms. The study secondarily examined whether symptom salience affected clinical symptom-reporting behavior because this variable has been implicated in previous research (Gastorf & Suls, 1982).

Method

Subjects

A cohort of 127 subjects was studied. Subjects were selected from the population of children who underwent tonsil and adenoid (TA) surgery during 1985 at the Children's Hospital of Eastern Ontario, Ottawa, Canada, if (a) they were between 5–14 years old as of September 1984; (b) they had attended elementary or preschool as of September 1984; (c) they had received TA surgery between January 1985 and January 1986 at the participating hospital from a member of the Department of Otorhinolaryngology; and (d) they were in good health and had received a general anaesthetic for surgery. Children were excluded from the study (a) if they had been hospitalized or if their parents had been separated or divorced in the 6 months prior to surgery; (b) if they had a psychiatric history, postsurgical complications, or concurrent medical treatment for another disorder; or (c) if they lived outside the metropolitan Ottawa region.

The sample size was based on Cohen's (1977) statistical power analysis in order to obtain a medium effect size. Two eligible subjects refused to participate, and 5 subjects failed to complete the study.

Measures

Assessment of children's Type A behavior. The Matthews Youth Test for Health (MYTH; Matthews & Angulo, 1980) was used to assess Type A behavior in the sample. The MYTH is a 17-item teacher rating scale that assesses, on a 5-point scale, the degree to which behaviors of aggressiveness (e.g., "This child gets into fights"), competitive-achievement striving (e.g., "This child is competitive"), and impatience (e.g., "This child does things in a hurry") characterize the child. Reliability and validation data have indicated that the MYTH has satisfactory psychometric properties and is related to laboratory and field criteria (Matthews & Angulo, 1980). The MYTH was completed by the child's main classroom teacher prior to surgery. Children were defined as Type A in this study if their MYTH score was above the upper tertile (48) of the sample MYTH distribution and were defined as Type B if their score fell below the lower tertile (38) of the sample distribution. The use of tertile cutting scores is consistent with recent trends in the literature and with the conceptual basis of the Type A pattern as a typology (Matthews, 1982). In addition, it permits comparison with previous research.

Assessment of children's clinical symptom reporting. Children's clinical symptom reporting was assessed using a 50-item symptom checklist known as the Symptom Inventory Rating Scale (SIRS; Leikin, Firestone, McGrath, & Bernard, 1987), which requires the child to rate the presence and severity of each symptom on a 1 (*not at all*) to 5 (*really bad*) scale. Symptoms consist of both postsurgical (ear, nose, and throat) and general (e.g., "Do you feel like throwing up? Do you have a sore throat?") medical symptomatology. The scale has shown good test–retest and interrater reliabilities. Construct and criterion-related validity data on children from 5 to 16 years old have revealed that the SIRS is sensitive to changes in symptom severity and that it correlates with subjective distress ratings, postsurgical school absenteeism, medication use, and a laboratory measure of symptom reporting. The SIRS score reflects both the number and the severity of symptoms reported.

Children's Illness Behaviors

Data were obtained on the number of previous hospitalizations and the amount of pain medication used postsurgically from parental reports and on the number of school days missed prior to and after surgery from school attendance records.

Procedure

The symptom-reporting behavior of Type A and Type B children was assessed under two symptom-induction conditions: a laboratory procedure designed to induce fatigue and a clinical condition in which subjects who had received TA surgery were prospectively followed. For the purposes of this study, TA surgery symptoms were ideally suited because they are unambiguous and have an identifiable onset and a brief duration. In addition, subjects' presurgery baseline levels of symptomatology were considered to be equivalent because surgery is only performed when the physician deems the child to be healthy (i.e., symptom free). Hence, any differences found in children's postsurgical symptom reports were assumed to be due to either postsurgical status or reporting biases. Children with postsurgical complications were excluded from the study.

Clinical Condition

Children completed the SIRS at three times: immediately (5–8 hr), 1 day (29–32 hr) and 1 week postsurgery. In all cases, ratings were made in the evening just before the child went to bed. Parental assistance was restricted to reading items for the younger children and recording responses without censorship. Parent ratings of the child's symptom reporting were also obtained (SIRS–P) prior to any assistance they provided to the child in order to prevent response contamination. Parent ratings were made 1 day and 1 week postsurgery. All questionnaires were predated (to remind subjects when they were to be completed) and were returned to the hospital in prestamped, self-addressed envelopes.

The study secondarily examined whether symptom salience affected Type A and Type B symptom reporting. Immediately after surgery, symptoms are highly salient: That is, they are painful and constant, of recent origin, and highly prominent. One week after surgery, TA symptoms have typically subsided in severity and are much less prominent (Paradise, 1983), hence their salience may be considered low. Thus, the natural history of post TA symptoms provided a naturalistic manipulation of symptom salience effects.

Laboratory Condition

Approximately 1 month after surgery when subjects returned to the hospital for the postsurgical follow-up, they received the laboratory symptom-induction task. The laboratory procedure was identical to that used in the Matthews and Volkin (1981) study, to which the reader is referred for details. The procedure used a dual-task paradigm in which fatigue symptoms are induced when subjects hold a weight (matched to handstrength) while simultaneously completing a visual rating task. Subjects were informed that they would be told when to stop holding the weight by the experimenter but that they would be permitted to put the weight down if unable to continue. In fact, subjects were not told when to stop in order to create an ambiguous set of performance standards and to permit self-termination of the procedure. Fatigue ratings were taken during baseline (before weight holding) and at minute intervals during weight holding using a 7-point scale ranging from 7 (*very energetic, not at all tired*) to 1 (*very tired, not at all energetic*). While they held the weight, subjects rated the attractiveness of a series of science fiction slides. These ratings were made at each half-minute interval. After the procedure, children were fully debriefed; were thanked for their participation with a certificate; and were asked how hard they had tried, how well they thought they did, and whether they believed they could have done better at some other time.

Data Analysis

The study was based on a 2 × 2 × 2 (Type × Sex × Age) factorial design. Clinical (postsurgical) data were analyzed using a 2 × 2 × 2 analysis of variance (ANOVA) with repeated measures. Geisser-Greenhouse corrections were applied to all analyses to protect against Type 1 error risk. This correction assumes maximum heterogeneity and therefore provides a highly conservative evaluation of *F* ratios. Laboratory data were analyzed using a 2 × 2 × 2 ANOVA, and post-hoc analyses were conducted on significant interactions.

Results

Sample Characteristics

Of the 127 subjects in the surgical sample, 43 were defined as Type A and 42 were defined as Type B. All analyses refer to these 85 subjects. Data from the remaining 42 subjects were excluded from current analyses. Table 1 summarizes the MYTH scores and the Type A and Type B distributions of the surgical sample. There were no sex differences in children's MYTH scores, $F(1, 83) = 2.74, p > .05$, nor was there a difference in the distribution of boys and girls in the Type A and Type B groups, $\chi^2(1, N = 85) = 2.79, p > .05$. There was also no difference in the MYTH scores of young (5–8 years) and old (9–14 years) children, $F(1, 83) = .37, p > .05$, or in the distribution of young and old subjects in the Type A and Type B groups, $\chi^2(1, N = 85) = .01, p > .05$. Further comparisons of the Type A and Type B children revealed no differences in family income, parental education, birth order, number of siblings, or number of previous hospitalizations.

To compare the Type A and Type B scores of this sample with those of a nonsurgical group of children, the MYTH was administered to an age- and sex-matched sample of 109 healthy children from the general population. Participating teachers were requested to complete the MYTH on the same sex and age child whose name followed that of the patient on the class roster. Control subjects remained anonymous to the experimenter. Data were unavailable on 18 control subjects due to teacher noncompliance. Comparison of the mean MYTH score of the surgical sample ($M = 42.9$, $SD = 11.4$) and the matched nonsurgical sample ($M = 47.5$, $SD = 12.2$) revealed a significant difference, $t(224) = 2.81, p < .01$.

Clinical Symptom Reports

It was expected that Type A children would report fewer postsurgical symptoms, as measured by the SIRS, than Type B children. Examination of SIRS scores revealed that Type A children did report less clinical symptomatology than their Type B peers, $F(1, 83) = 10.68, p < .01$ (see Figure 1). There was no Sex × Type interaction, which revealed that this underreporting effect was consistent across Type A boys and girls. Parent ratings of children's symptom reports paralleled the self-report data. Parents rated Type A children as reporting less clinical symptomatology than Type B children, $F(1, 82) = 7.52, p < .01$. Once again, these Type A/Type B differences were independent of the sex of the child. As there were no significant main or interaction effects due to sex on clinical symptom reports or on Type A/Type B scores, this variable was dropped from further analyses.

An analysis of age effects on clinical symptom reports revealed no Age × Type interaction, $F(1, 83) = .08, p > .05$, indicating that Type A and Type B reporting differences were consistent across ages. It was hypothesized that, within the Type A sample, older children would be more motivated and more capable than younger children to underreport symptoms. There was no clinical support for this hypothesis. Parents rated that older and younger Type A children reported about the same number of TA symptoms, $F(1, 41) = 2.08, p > .05$, and older Type A children self-reported more clinical symptoms than younger Type A children, $F(1, 41) = 5.27, p < .05$. The latter result was consistent with the age effect in the overall sample, indicating that older children in general reported more clinical symptoms than younger children, $F(1, 83) = 5.58, p < .05$.

To examine the effects of symptom salience on Type A/Type B symptom reporting, a Salience × Type analysis was conducted. It was expected that reporting differences would be greater under conditions of high rather than low salience. For reasons outlined earlier, Day 1 symptoms were designated as high salience and Day 7 as low salience. There was no significant interaction between salience and Type A/Type B behavior, $F(1, 78) = .02, p > .05$, providing no statistical support for the effects of salience on Type A and Type B symptom reporting. The results did indicate, as illustrated in Figure 1, that Type A/Type B reporting differences were consistent over time.

Consistent with their tendency to underreport clinical symptoms, Type A children also missed less school ($M = 6.5$ days) postsurgery than their Type B peers ($M = 7.75$ days). There were no differences in presurgical school attendance. Although boys and girls did not differ overall in postsurgical school absences, $F(1, 78) = .01, p > .05$, there was a significant interaction between Type A/Type B behavior and sex, $F(1, 78) = 4.69, p < .05$. A post hoc Duncan's multiple range test (critical range =

Table 1
MYTH Scores and Type A/Type B Distribution for the Surgical Sample

Group	Score		Type A		Type B	
	M	*SD*	%	*n*	%	*n*
Boys	46.3	12.1	29	25	18	15
Girls	40.7	12.9	21	18	32	27
Young (5–8 years)	41.9	11.8	35	30	30	25
Old (9–14 years)	44.8	10.6	15	13	20	17

Note. MYTH = Matthews Youth Test for Health.

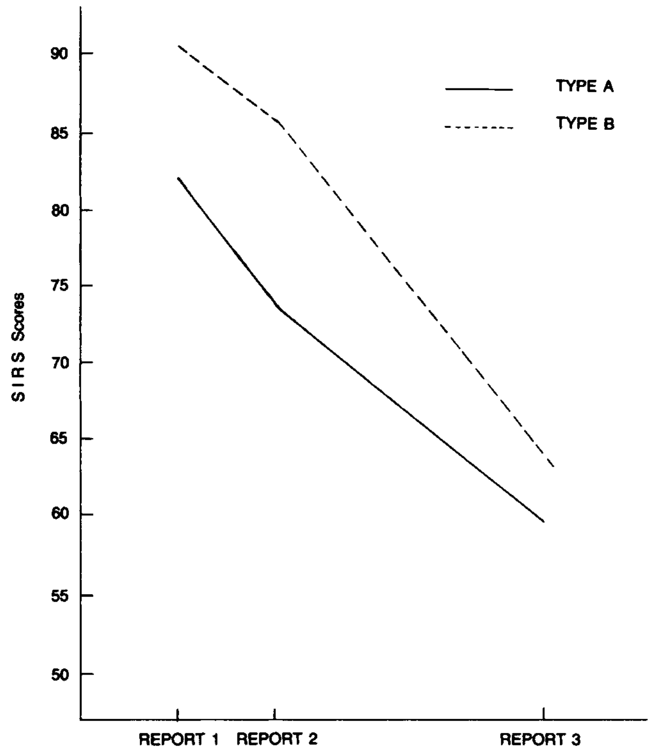

Figure 1. Clinical symptom reports immediately (Report 1), 1 day (Report 2), and 1 week (Report 3) postsurgery. (SIRS = Symptom Inventory Rating Scale.)

1.57) revealed that Type A boys missed significantly less school postsurgically than other children.

Laboratory Fatigue Reports

Table 2 presents the laboratory fatigue reports of Type A and Type B subjects. Two fatigue scores were calculated in order to build on previous research. The average of the last three fatigue ratings made by the child prior to self-termination of the procedure was used by Matthews and Volkin (1981). This average rating permits comparison of subjects over equivalent time intervals and effort levels because they are presumed to be the most tired just before quitting the task. Higher average scores actually indicate lower fatigue ratings. An analysis of this score indicated that Type A children reported significantly less fatigue over the last three rating intervals than Type B children, $F(1, 83) = 12.49, p < .001$. This difference was not due to task factors because Type A and Type B children did not differ in the amount of weight held during the task, $F(1, 83) = .17, p > .05$, or in the amount of time they spent holding the weight, $F(1, 83) = .73, p > .05$. In addition, as with clinical symptom reports, there were no main or interaction effects due to sex of the child on fatigue scores and, hence, this variable was dropped from further analyses.

The second fatigue score (Time to 1) calculated the time taken by subjects to report the maximum fatigue rating of 1 (*very tired, not at all energetic*). This score is considered a more sensitive fatigue measure because it takes into account intensity as well as severity, or rate of fatigue. It was found that Type A children took significantly longer (an average of 3 min more) than Type B children to report the same level of maximum fatigue $F(1, 83) = 5.43, p < .05$. There was significant concordance between the two fatigue scores $r(85) = .75, p < .001$, and together they suggest that Type A children are not only more reticent to report symptoms but also that, when they do, they report with less intensity than Type B children. There was also good concordance between the Time to 1 rating and the SIRS–P, $r(85) = .34, p < .01$.

In view of the theoretical importance of Type A children's efforts to excel in the context of symptom-reporting behavior, an index of how hard they tried (i.e., their actual work) was calculated. It was felt that the work term must reflect both the weight and the time it was held because time alone could be confounded by weight, and weight alone could be confounded by initial effort during handstrength testing. Work was measured in *joules*, as defined by the following term: Mass × $(\text{Distance})^2/(\text{Time})^2$ (Stevenson & Moore, 1967). Because all subjects kept the weight stationary, the distance travelled was constant. Hence, the distance term was given the value of 1 for all subjects, reducing the work equation to: Work = Weight × (1)/$(\text{Total Time Held})^2$. Table 2 indicates that work differences between Type A and Type B subjects were in the expected direction but failed to reach statistical significance, $F(1, 83) = 1.2, p > .05$.

As with clinical symptom reporting, it was expected that Type A underreporting of fatigue would increase with age. An initial examination of age effects revealed that older Type A children actually reported more fatigue than younger children on the Time to 1 measure, $F(1, 41) = 8.27, p < .01$. However, this finding was confounded by the significantly greater amount of weight held by older Type A children, $F(1, 41) = 4.65, p < .05$. Although no age differences in fatigue ratings were suggested when weight effects were partialled out using an analysis of covariance (ANCOVA), the ANCOVA procedure may have failed to capture the full relation between age and Type A symptom reporting. That is, older Type A children may have held

Table 2
Laboratory Fatigue Reports of Type A and Type B Children

Measure	*M*	*SD*	*F*
Average fatigue[a]			12.49*
Type A	27.06	7.0	
Type B	12.66	6.4	
Time to 1 (min)			5.43**
Type A	8.8	5.1	
Type B	5.5	4.1	
Weight held (gm)			.17
Type A	171	85	
Type B	159	90	
Time held (min)			.73
Type A	9.58	5.0	
Type B	10.56	4.1	
Work output (joules)			1.20
Type A	.60	.12	
Type B	.42	.09	

[a] Higher scores indicate lower fatigue ratings.
* $p < .001$. ** $p < .05$.

Table 3
Work Output and Work-Related Fatigue of Type A Subjects

Group	*n*	*M*	*SD*	*F*
Total work (joules)				16.97*
Young	30	.29	.08	
Old	13	1.28	.15	
Work-related fatigue (min/joule)				3.62**
Young	30	1.78	.17	
Old	13	3.36	.25	

* $p < .001$. ** $p < .10$.

more weight not simply because they were older and presumably stronger but also because they actually tried harder and underreported fatigue during initial hand strength testing, which resulted in greater weight loads. An examination of the fatigue ratings of young and old Type A children in the context of how hard they tried (i.e., their work output) seemed to provide a more sensitive analysis. Using the work term defined earlier, a transformed fatigue score was calculated that multiplied the Time to 1 measure by the amount of work expended and provided a measure of fatigue experienced due to actual work. As seen in Table 3, older Type A children made greater efforts to excel than did younger children by working 4 times as hard, $F(1, 41) = 16.97, p < .001$. Moreover, for the amount of work expended, there was a statistical trend for older Type A children to take markedly longer (almost 3 times as long) to report maximum fatigue than younger children, $F(1, 41) = 3.62, p = .06$. Hence, on some types of symptoms, there may be a tendency for Type A underreporting to increase with age.

Discussion

The major result of the study is that Type A children tend to underreport the intensity and frequency of physical symptoms relative to their Type B peers. A critical concern of this study was whether Type A children would underreport important clinical as well as laboratory-induced symptoms. The data clearly suggest that underreporting in Type A children extends outside the laboratory to real-life situations. Hence, as with their adult counterparts, Type A children appear to demonstrate a generalized tendency to underreport a wide variety of physical symptoms. The study also demonstrates that Type A underreporting extends to girls as well as boys and to young as well as old, suggesting that the phenomenon is independent of sex and age.

Our findings of reporting consistency across time, setting, and type of symptom suggest that children, like adults, may have characteristic symptom-reporting styles (Pennebaker, 1982) that may begin early in the life of the Type A individual (Mechanic, 1980). Symptom underreporting among both young and old Type A children provides cross-sectional evidence for the persistence of some Type A behaviors. Findings of Type A underreporting across age and clinical samples, including children and adolescents (Matthews & Volkin, 1981), healthy adults (Hart, 1983), and coronary patients (Matthews et al., 1983; Schleigel et al., 1980), leads to speculation of a developmental continuity in the phenomenon. A longitudinal research design may shed further light on this notion. In any case, the present data do confirm that the Type A underreporting risk emerges early in life and may persist across the lifespan. In addition, there is suggestive evidence that, on some types of symptoms such as fatigue, Type A underreporting may increase with age.

Type A children and adults may share other illness behaviors in addition to underreporting symptoms. Both appear to demonstrate less observable distress and pain behavior and may underutilize medical services. For example, parent reports of Type A children's underreporting were based primarily on observations of their spontaneous verbal and nonverbal behavior, suggesting that these children may actually emit fewer pain behaviors, similar to their adult counterparts (Castell & Blumenthal, 1984). One implication of this illness behavior is that Type A children may be incorrectly perceived by others as less symptomatic and therefore healthier than Type B children. To the extent that parents must rely on child symptom reports and behavior in order to initiate or maintain medical care, they may inadvertantly delay or underutilize medical services for their Type A underreporting children. For example, Type A children were permitted by their parents to return to school earlier after surgery than Type B children. This is consistent with other research revealing that Type A children and adolescents tend not to miss school even when they are ill (Eagleston et al., 1986; Siegel & Leitch, 1981). Added to this is the unexpected finding that the surgical sample had a significantly lower Type A score than a matched nonsurgical sample. The underrepresention of Type A children in the surgical sample relative to the general population may reflect an underutilization of medical services. Similar findings have been noted in other Type A children (Eagleston et al., 1986) and in adult cardiac patients (Oldridge et al., 1978; Rejeski et al., 1984). However, although the convergence of these data are intriguing, one recent study failed to find Type A underutilization of child-initiated medical care (Matthews, Stoney, Rakaczky, & Jamison, 1986). Further prospective study of self- versus parent-initiated care is required.

The study failed to find support for the effects of symptom salience on Type A/Type B reporting differences. One possibility is that salience is simply not important in children's symptom reporting, although this seems unlikely given previous research findings (Pennebaker, 1982). Alternatively, floor effects may have restricted any further underreporting by Type A children (50 is the lowest possible SIRS score). More likely, the study design was not sensitive enough to assess salience effects, and perhaps a fourth rating when all children were back at school would have been more effective.

In summary, the data suggest that one aspect of what contributes to the coronary-proneness of Type A adults, symptom suppression, emerges early in life and may be reliably identified in children. The apparent continuity of symptom underreporting and illness behaviors in Type A children and coronary adults may suggest one developmental pathway between Type A behavior in childhood and adult-onset heart disease, namely, a pattern of subordinating subjective physical states and adopting abnormal health-related behaviors. In any case, the data provide conceptual support for initiating behavioral interventions to alter the toxic components of the Type A patterns early in the life span. Continued investigation of the origins of other coronary risk factors in order to plan a comprehensive, multiple-risk-factor primary prevention program should be encouraged. At a broader level, it is possible that the pattern of illness behavior seen in Type A children may elevate their risk for poorer general health and underutilization of medical services. A controlled, prospective investigation of this issue is needed.

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