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Individual Differences Are Accentuated During Periods of Social Change: The Sample Case of Girls at Puberty

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The emergence of new behaviors and the reorganization of psychological structures are often attributed to critical events and crises in the life course. A fundamentally different perspective is offered: Potentially disruptive transitions produce personality continuity, not change. The behavioral responses of adolescent girls to the onset of menarche was studied in a longitudinal study of an unselected birth cohort. Predictions from 3 rival hypotheses about the relation between pubertal change and social psychological change were first tested: the stressful change, off time, and early-timing hypotheses. The results supported the early-timing hypothesis. Whether stressful, early menarche generated new behavioral problems or accentuated premenarcheal dispositions was then tested. The results supported an accentuation model: Stressful transitions accentuated behavioral problems among girls who were predisposed to behavioral problems earlier in childhood. Speculations are offered for a broader theory about the role of individual differences in the life course.

Early personality differences have lawful implications for the course of later behavior and development:

> What is contended is that how experience registers, how environments are selected or modified, and how the stages of life are negotiated depend, importantly and coherently, on what the individual brings to these new encounters—the resources, the premises, the intentions, the awareness, the fears and the hopes, the forethoughts and the afterthoughts that are subsumed by what we call personality. (Block, 1981, pp. 40–41)

But the question remains: *When* in the course of development are dispositional effects most pronounced? When are the manifestations of early personality differences most likely to emerge?

The answer may be paradoxical: Dispositional effects may be most pronounced during periods of personal transitions. In this article, we consider this claim by focusing on the transition to adolescence, with special reference to the behavioral problems that often accompany the onset of menarche.

Personal transitions are characterized by circumstances, often arising from social and biological events, that disrupt previously existing social equilibria. In these times, people must summon their resources to work out ways of handling a new problem.

Transitions are generally thought to constitute an important time for the reappraisal of current assumptions and life goals (West & Graziano, 1989). Moreover, the emergence of new behaviors and the reorganization of psychological structures are often attributed to critical events and crises in the life course. For example, W. I. Thomas, the early American social psychologist, claimed that situations that represent a substantial break from the customary—a disturbance of habit in which customary behavior can no longer be maintained—offer the greatest opportunity for modification and change. In these circumstances, he argued, novel adaptations are formulated to achieve control over the environment (Volkart, 1951). Parallels to this formulation are found in Piaget's (1983) discussion of equilibration as a self-regulating process. When a person is confronted by a discrepancy, an imbalance between the person and the environment, he or she will seek to equilibrate by fitting new elements into existing structures. Existing structures, however, as they attempt to incorporate new information, also become transformed in the process. Discrepant events thus evoke both assimilative and accommodative actions, which eventually lead to more adaptive person–environment interactions.

Indeed, most theoretical perspectives on transition states assume that these are periods of time when major reorganizations or discontinuities occur. Moreover, research on transitions in the life course has been designed to study how people accommodate to new experiences rather than to explain how new stimuli, experiences, and events are assimilated into existing structures.

In this article, we offer a fundamentally different perspective

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on transitions in the life course. Our suggestion is that potentially disruptive transitions produce personality continuity rather than change. In addressing this possibility, we chose to study the behavioral responses of adolescent girls to the onset of menarche. We focused on this biosocial transition because the physiological and morphological changes associated with puberty have important implications for how youngsters view themselves as well as for how others view them (Brooks-Gunn & Petersen, 1983; Grief & Ulman, 1982).

Girls at Puberty

Menarche is a pivotal transition event in the life course. It is a biological event imbued with cultural, social, and personal significance. Menarche heralds new expectations and rights and is also critical in the adolescent girl's reorganization of her body image and sexual identity (Koff, Rierdan, & Silverstone, 1978).

There is, of course, a wide range of variation in the timing of growth and development; girls of the same age vary greatly in their level of pubertal development (Garn, 1980). Indeed, it has been suggested that the psychological and behavioral implications associated with differences in the *timing* of menarche may be more consequential for girls' development than is menarche itself (Brooks-Gunn, Petersen, & Eichorn, 1985).

At least three hypotheses have been proposed about the relation between the timing of pubertal changes and social psychological changes. According to the *stressful change hypothesis,* change is inherently stressful (Simmons & Blyth, 1987). Puberty, with its dramatic physical alterations, is a disruptive experience that may give rise to psychological disturbances. In addition to social stimulus effects, pubertal changes may index direct hormone effects (Petersen & Taylor, 1980), and changes in hormone levels during adolescence may activate novel behavioral problems (Brooks-Gunn & Warren, 1989; Susman et al., 1987; Udry, 1988; Udry & Talbert, 1988; for a review of nonhuman primate research, see Coe, Kayashi, & Levine, 1988). The stressful change hypothesis thus predicts that all girls—whether they develop earlier than most, on time, or later than most—will exhibit some distress. This distress, however, will be greatest during the period of greatest change.

Two alternative hypotheses suggest that the *timing* of pubertal development may be more critical than change per se in the adolescent girl's adjustment (Simmons & Blyth, 1987).

The *off time hypothesis* states that events that occur earlier or later than anticipated may generate particularly high levels of distress. For example, evidence from the Berkeley studies of early- and late-maturing youth suggests that being a numerical minority during the period of adolescent growth is particularly stressful (e.g., Livson & Peskin, 1980). Thus, both early and late developers may exhibit some adjustment difficulties in adolescence. More generally, events that occur at appropriate or expected ages allow people to anticipate, prepare, and learn how to cope with their changing situation whereas events that catch people off time may be associated with adjustment difficulties (Brim & Ryff, 1980; Neugarten, Moore, & Lowe, 1965). Being off time can thus have negative consequences for a girl because she risks negotiating the demands of her new status without the benefit of those social and institutional structures that support and smooth the way for girls who are on time. Moreover, off time events, such as precocious and delayed puberty, may trigger a potentially invidious nexus of social comparisons at a developmental period that is already characterized by heightened vulnerabilities.

In contrast, the *early-timing hypothesis* predicts that early-maturing girls will be particularly vulnerable to adjustment difficulties in adolescence (Stattin & Magnusson, 1990). The difficulties experienced by early-maturing girls may stem, in part, from the tendency of others to attribute greater maturity to them than is warranted by their chronological age. Eichorn (1975) argues that such asynchronies may create difficulties for early maturers because they must confront issues that do not coincide with their cognitive and emotional levels of maturity. Indeed, both peers and adults respond differently to girls of the same age as a function of pubertal status. For example, girls who attain menarche earlier are more likely to begin dating at a younger age and report that adults expect older behavior from them (Simmons & Blyth, 1987).

Evidence from several studies also points to increased conflict and distance between adolescents and their parents around the time of puberty (Steinberg, 1988). If pubertal maturation distances youngsters from their parents, it may also shift the bulk of socialization to peers. Early maturers, in particular, may begin to spend more time with older peers. Indeed, Magnusson (1988; Magnusson, Stattin, & Allen, 1986) has shown that the relation between early maturation and a variety of norm-breaking behaviors is mediated by the tendency of early-maturing girls to associate with older peers. Social networks comprising older peers serve as guides for norm formation and create a new set of environmental opportunities with which early-maturing girls may be ill-prepared to cope.

In general, then, previous research suggests that the menarcheal experience of early-maturing girls is very different from that of later maturing girls. In particular, early puberty appears to have important implications for body image disturbance and social deviance (Brooks-Gunn et al., 1985; Magnusson, 1988; Ruble & Brooks-Gunn, 1982; Simmons & Blyth, 1987; Stattin & Magnusson, 1990).

In the first section of this article, we test the various predictions offered by these three rival hypotheses with data from a longitudinal study of an unselected birth cohort.

Change or Accentuation? Individual Differences in Times of Transition

The aforementioned hypotheses share the assumption that differences in the timing of biological maturation will *generate* behavioral differences between girls. The changes may be episodic, affecting the organization of behavior during a circumscribed period of time, or persistent, wherein emergent differences contribute to enduring differences between people (Magnusson et al., 1986). Regardless of the specific form that the change is expected to take, these hypotheses assume that major reorganizations in behavior will occur during periods of discontinuity.

Alternatively, we believe that preexisting differences between people will be magnified and accentuated during times of life course discontinuities. In fact, we propose that dispositional

factors should be most influential when people assume new statuses (Caspi & Bem, 1990; Caspi, Bem, & Elder, 1989).

Although individual differences interact with situational demands at numerous points in the life course, situations differ from one another in the degree to which they permit individual differences to manifest themselves. Some situations are weak, permitting a variety of responses and, hence, a variety of individual differences to flourish; other situations are strong, constraining behavioral choices and eliciting similar responses from most people (Mischel, 1977). In general, the influence of dispositional factors on behavior appears to be most pronounced in situations that are unstructured (Snyder & Ickes, 1985).

For example, individual differences in introversion–extraversion predict behavior better in situations that encourage neither one nor the other (Monson, Hesley, & Chernick, 1982). Likewise, marked dispositional influences on social behaviors emerge more strongly from unstructured dyadic interactions than from more traditional, structured experimental paradigms (Ickes, 1982). Similar findings emerge from research in behavior genetics in which twin studies have shown that genetic effects are most pronounced in unstructured situations and in response to novel social encounters. For example, differences between monozygotic (MZ) and dizygotic (DZ) twin pairs are stronger in playroom settings, in which the range of behavior reactions is less restricted, than in test room settings, which are highly structured (Matheny & Dolan, 1975). MZ–DZ differences are also stronger when children are confronted by unfamiliar rather than by familiar people (Plomin & Rowe, 1979).

In addition, research demonstrates that individual differences emerge strongly in settings that require people to master and negotiate new demands and tasks. For example, Wright and Mischel (1987) showed that the social behaviors of children diverged as the competency requirements of the situations in which they were engaged increased. More generally, they suggested that demanding and stressful situations are likely to increase response variability between people and may also elicit stable individual differences.

These findings remind us that unstructured situations are frequently characterized by uncertainty, ambiguity, and novelty. We suggest that these several situational characteristics are precisely those that characterize many transition events in the life course, especially if stressful. Accordingly, we propose that individual differences should be accentuated when people experience profound discontinuities.

In the second section of this article, we examine the accentuation phenomenon in greater detail. Specifically, we test the prediction that the social psychological experience of menarche is influenced by the behavioral dispositions of the premenarcheal girls. Stressful pubertal transitions may not generate uniform reactions among girls; they may, rather, accentuate pretransition differences between them.

Our analysis is thus divided into two interrelated parts. In the first part of this article, we examine three alternative hypotheses about the relation between the timing of puberty and behavior problems. Here we wish to ascertain if and when the onset of menarche is stressful. In the second part of this article, we examine systematic interactions between premenarcheal personality and the timing of puberty. Here we wish to test the proposition that individual differences are accentuated during stressful transition periods.

Method

Subjects

Subjects were adolescent girls involved in the Dunedin (New Zealand) Multidisciplinary Health and Development Study. The cohort's history has been described by Silva (1990). Briefly, the study is a longitudinal investigation of the health, development, and behavior of a complete cohort of consecutive births between April 1, 1972, and March 31, 1973, in Dunedin, New Zealand. Perinatal data were obtained, and when the children were traced for follow-up at 3 years of age, 1,139 children were deemed eligible for inclusion in the longitudinal study by residence in the province. Of these, 1,037 (91%) were assessed. Girls constituted 501 of the 3-year-olds who were enrolled in the longitudinal study.

The sample has been reassessed with a diverse battery of psychological, medical, and sociological measures every 2 years since the children were age 3. Data were collected for 991 subjects at age 5, 954 at age 7, 955 at age 9, 925 at age 11, 850 at age 13, and 976 at age 15. When compared with the New Zealand general population, the cohort is slightly biased toward higher social class levels; on a six-level social class scale (Elley & Irving, 1972), 7% of New Zealand men but 11.7% of cohort fathers were rated in the highest level. Members of the sample are predominately of European ancestry (less than 2% Polynesian); the sample is therefore comparable to similar White samples from other English-speaking Western cultures.

Measures

Menarche. Because of the practical difficulties in assessing body hair and breast growth in young girls, behavioral scientists have commonly used self-reports of menarche to measure pubertal development (Brooks-Gunn, Warren, Rosso, & Gargiulo, 1987). Age at menarche is an indicator of the more advanced stages of pubertal development; in most healthy girls, menarche follows 6 to 12 months after the height spurt and after breasts and pubic hair have developed to Tanner's fourth stage (Tanner, 1978).

At age 15, each girl in the cohort was asked to recall the age when she experienced her first menstrual period, in years and months. The girls were also asked if their estimates were "very accurate" or "approximate only." Fifty-six percent felt that their reports were very accurate. Previous studies of retrospective self-reports of menarche have reported good accuracy over lengthy time spans (Brooks-Gunn et al., 1987). For example, in one study, 77% of women's retrospective reports were within 1 year of their own concurrent reports taken 19 years earlier (Damon, Damon, Reed, & Valadian, 1969). In another study, 90% of 33-year retrospective reports fell within 1 year of medical records of menarche from repeated physical examinations in adolescence (Bean, Leeper, Wallace, Sherman, & Jagger, 1979).

The self-reports of menarche from our sample were taken within 1 to 5 years of menarche. Nonetheless, concern about the reliability of these retrospective reports is appropriate. Fortunately, at the age 13 assessment wave, the mothers of the girls were asked about their daughter's menarche. By age 13, 164 girls had menstruated, according to their mothers. In a comparison of the 164 mothers' reports from the age 13 assessment and their daughters' reports from the age 15 assessment, discrepancies of more than 1 year occurred in only 3 cases (2%). The correlation between the mother and daughter reports (in months) was .66 ($p < .001$). We have no criterion against which to evaluate the reports of the girls who first menstruated after age 13. We assume that these reports were more accurate, because the girls reported about a

more recent event. We were able to supplement missing menarche data for 13 girls with their mothers' report.

The distribution of age at menarche for this sample of girls is shown in Figure 1. Reported age at menarche (in months) ranges from 102 to 180 (M = 155.28, SD = 12.12, median = 156, or 13.0 years of age). This distribution is consistent with data reported by Tanner (1978) for seven Western nations. The mean menarche ages in those countries ranged from 13.0 to 13.5 between 1960 and 1970. A secular trend favoring earlier menarche (about 0.3 years per decade) suggests that a projected mean between 12.4 and 13 might have been expected for Western nations in 1985, when the modal girls in our sample began menstruating.

For this research design, girls were assigned by their age at menarche to one of four menarcheal groups: early (12:0 years or younger; n = 68), early/middle (12:1 to 13:0; n = 100), late/middle (13:1 to 14:0; n = 119), and late (14:1 to 15:0; n = 61). The early and late groups constituted the extreme 20% tails of the distribution in menarcheal age. This categorization has been used in previous psychosocial studies of puberty (see Simmons & Blyth, 1987).

Revised Behavior Problem Checklist (RBPC). The RBPC (Quay, 1983; Quay & Petersen, 1983) is a parent and teacher rating instrument that taps symptoms of childhood and adolescent psychopathology. In content, the checklist assesses antisocial behavior (e.g., steals, is truant, uses drugs, runs away), aggression (e.g., tries to dominate others, bullies, threatens), anxiety and withdrawal (e.g., is shy, is hypersensitive, feels inferior), attention problems (e.g., short attention span, impulsive, absentminded), odd behavior (e.g., incoherent speech, unable to tell real from imagined), and motor tension (e.g., nervous, jittery, tense, restless). Extreme scores on subscales of the checklist have been shown to be related to diagnostic categories of childhood behavior disorders (see Quay & Petersen, 1983, for bibliography).

The girls' parents completed the RBPC when their daughters were 13 and 15 years old. The instrument contains 89 items, which are rated on a scale ranging from *does not apply* (0) to *applies somewhat* (1) to *certainly applies* (2). The items were summed to provide a rating of total behavior problems at ages 13 and 15. At age 13, the girls' RPBC ranged from 0 to 60 (M = 14.02, SD = 12.15); at age 15, the range was 1 to 102 (M = 17.59, SD = 14.80).

Rutter Child Scale A (RCSA). The RCSA (Rutter, Tizard, & Whitmore, 1970) is a 26-item questionnaire that was filled out by parents when the girls were 7 and 9 years old. The items inquire about the major areas of a child's behavioral and emotional functioning during the past year (antisocial and anxious–withdrawn behavior) and are rated *does not apply* (0), *applies somewhat* (1), or *certainly applies* (2). At the age 9 assessment, the RCSA was supplemented with 16 items concerning inattention, impulsivity, and hyperactivity (see McGee, Williams, & Silva, 1985). These additional items were derived from the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-III*) diagnostic criteria for Attention Deficit Disorder. The RCSA items were summed to provide rating scales of total behavior problems at age 7 and 9. At age 7, the girls' RCSA ranged from 0 to 31 (M = 8.7, SD = 5.43); at age 9, the range was 0 to 57 (M = 14.39, SD = 9.2).

Delinquency. The Self-Reported Early Delinquency Inventory (SRED; described fully in Moffitt & Silva, 1988; see Moffitt, 1989) was administered to the girls at age 13. This 58-item measure was designed specifically for use in New Zealand. It inquires about a variety of antisocial behaviors, including minor norm violations as well as thefts, aggression, vandalism, and substance use. Responses are coded as *never* (0) versus *at least once* (1), and each item is multiplied by an empirically derived seriousness weighting before the scale is summed.

One-month test–retest reliability (r = .85), internal consistency (Kuder-Richardson Formula 20, r = .90), and concurrent validity (with parental report of subjects' socialized aggressive behaviors, r = .43, $p <$

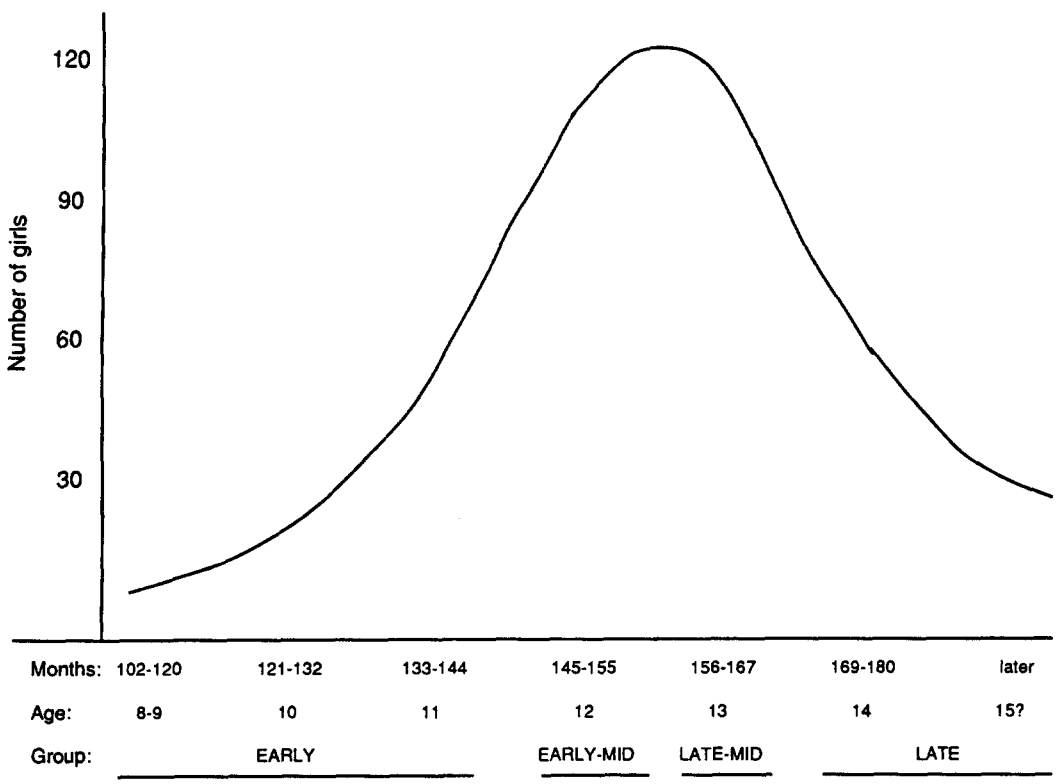

Figure 1. Sample distribution of age at menarche.

.001) were assessed and are considered to be adequate for research. The subjects who had police records averaged twice as many self-reported acts as subjects not known to police, thereby demonstrating good criterion validity. Thefts (especially shoplifting) accounted for 41.2% of acts reported by the subjects. The girls' SRED scores ranged from 0 to 32.02 (M = 3.50, SD = 5.63).

Diagnostic Interview Schedule for Children-Child Version (DISC-C). The DISC-C (Costello, Edelbrock, Kalas, Kessler, & Klaric, 1982) is a structured diagnostic interview for children's self-reports. It is based on the *DSM-III* criteria for the various disorders of childhood and adolescence. All items refer to the child's functioning over the previous year and are structured so as to elicit responses of *no* (0), *sometimes* (1), or *yes* (2). Although the full DISC-C was used for an assessment of this cohort at age 11, an abbreviated version was developed for later assessments because of time constraints. The abbreviated version contains 110 items, or approximately three fourths of the questions found in the original interview. The items that were omitted include 6 questions about the undersocialized–socialized distinction in Conduct Disorder (a distinction that has been omitted from the *DSM-III-R*), 5 questions about separation anxiety that were deemed inappropriate for adolescents, and approximately 20 questions that had low item–diagnosis correlations at the age 11 assessment (J. Anderson, Williams, McGee, & Silva, 1987). For this study, items that tap symptoms of dysthymia, depression, and anxiety disorders were summed to form a single scale. Girls' scores on this scale ranged from 3 to 77 (M = 26.08, SD = 12.52).

Procedure

The subjects were seen with approximately 1 month of their 7th, 9th, 13th, and 15th birthdays for a full day of medical, psychological, sociological, and anthropometric testing at the Dunedin Multidisciplinary Health and Development Research Unit. The menarche, SRED, and DISC-C measures used in the present study (which was only one of several studies being conducted) were administered in the morning, in four 50-min sessions that were counterbalanced in order and separated by 10-min breaks. Each interviewer was carefully trained and was blind to the subjects' performance on the other measures. The parent rating scales (RBPC and RCSA) were mailed out before the laboratory assessments.

Results and Discussion

Attrition Analysis

For this study, data were needed for menarche and behavior problems. Of the 501 girls in the cohort, 85 were missing information about the onset of menarche. The behavior ratings taken at ages 9, 13, and 15 were missing for 53, 97, and 35 of the girls, respectively. In all, 367 girls had complete data for all four central measures in the study. Nineteen of these girls were excluded from study because they had not menstruated by the age 15 assessment and their age of onset thus remained uncertain. In summary, our study sample included 348 girls (69% of the original sample). As we note later, excluding these 19 girls from the analysis did not change the results in any way.

Because many girls with missing data for one measure did have present data on the other measures, it was possible to test statistically for attrition effects. The 348 studied girls were compared with the unstudied girls separately on age of menarche (in months) and on the behavior problem ratings at ages 9, 13, and 15. No t value exceeded 1.88 ($ps > .05$). Multiple regression analysis was used to determine whether a linear combination of the central measures in this study was affected by girls' present versus missing status. Predictor variables were age at menarche in months and the behavior problem ratings from age 9, 13, and 15. A pairwise correlation matrix of these variables was analyzed. The outcome variable was a dichotomous dummy variable representing the 348 studied girls versus the remainder. Missing status accounted for 1% of the variance in study measures. These analyses suggest that it is unlikely that the findings were compromised by attrition bias.

Girls at Puberty: Are Biological Changes Accompanied by Behavioral Changes?

Our analysis began with an exploration of the general proposition that during adolescence, individual differences in behavioral problems and adjustment difficulties are associated with individual differences in biological maturation.

As a preliminary step, we carried out a 4 (time of menarche) × 2 (test age) repeated measures analysis of variance using, on both occasions (ages 13 and 15), the total score from the RBPC as the outcome variable. The results revealed a significant main effect for time of menarche, $F(3, 344) = 4.08$, $p < .007$, a significant main effect for age, $F(1, 344) = 26.44$, $p < .001$, and a significant interaction effect, $F(3, 344) = 2.97$, $p < .03$. As shown in Figure 2, girls who matured early were rated by their parents as having the most behavior problems. In general, girls were also rated as having more behavior problems at age 15 than at age 13. Finally, Figure 2 shows that with the exception of the late-maturing girls, girls were rated as having increased in their behavior problems across the period of middle adolescence.

As we noted in the introduction, three hypotheses have been proposed concerning the relation between biological and behavioral changes during puberty. If the stressful change hypothesis is correct, the social psychological consequences of pubertal changes, regardless of timing of onset, should be immediate and most likely episodic. If the off time hypothesis is correct, groups that deviate from the normative age of onset in either

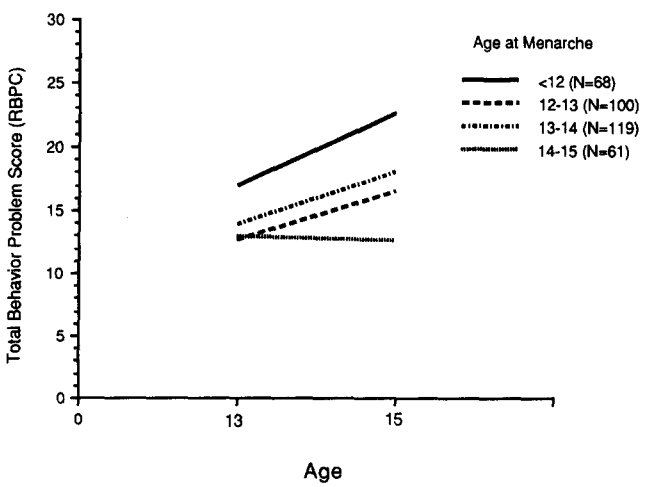

Figure 2. Behavior problems in adolescence as a function of age at menarche. (RBPC = Revised Behavior Problem Checklist.)

direction should exhibit negative reactions. If the early-timing hypothesis is correct, early maturers should display the most negative effects of pubertal change.

The predictions anticipated by these rival hypotheses are plotted in the first three panels of Figure 3. Table 1 shows the set of planned contrasts used to compare these hypotheses, as well as their associated t ratios (Rosenthal & Rosnow, 1985).

Our data did not support the stressful change hypothesis, which predicted that (a) girls who reached menarche between 12–13 years of age would manifest the most problems during the age 13 assessment, $t = -1.28$, *ns*, whereas (b) girls who reached menarche between 14–15 years of age would manifest the most problems during the age 15 assessment. On the contrary, girls who reached menarche between the age of 14–15 were characterized by significantly *fewer* behavior problems than their peers, $t = -3.11$, $p < .01$. Although neither of the predictions offered by the stressful change hypothesis was borne out by the data, note that we have assessed only behavior problems. It may be that stressful changes may be registered in less obvious and less pathological forms. In addition, we must recognize that a conclusive test of this hypothesis awaits greater temporal precision in coordinating the collection of behavioral and biological data during adolescence.

The data also failed to support the off time hypothesis, which predicted that (a) early-maturing girls would show signs of adjustment problems in the early years when they were in the minority whereas (b) late-maturing girls would show signs of adjustment problems in the later years when they were in the minority. The former part of this hypothesis was supported by the data, $t = 2.31$, $p < .02$, but not the latter part. As we have already seen, late maturers had significantly fewer behavioral problems, $t = -3.11$, $p < .01$. Moreover, the off time hypothesis suggested that girls who mature on time would exhibit the fewest behavioral problems at both ages. As shown in Figure 3, this suggestion received no empirical support.

Our earlier decision to exclude from study those girls who had not menstruated by the age 15 assessment might have biased our test of the off time hypothesis. However, the results remained unaltered when we included these 19 girls among the late maturers. Also, the difficulties encountered by late maturers might not emerge until a later age. This possibility will be examined with data from the next assessment wave, which is scheduled in 1991.

The data were most consistent with the early-timing hypothesis (see Figure 3). Early-maturing girls exhibited the most adjustment difficulties at age 13, $t = 2.31$, $p < .02$, and again at age 15, $t = 3.44$, $p < .001$.

To ascertain with greater confidence that we were observing behavioral changes associated with the early onset of menarche, we turned to the parents' ratings of their children's behavioral problems in childhood, when they were ages 7 and 9. As noted earlier, these childhood ratings were completed using a different instrument, the RCSA. This use of different instruments in childhood and adolescence precluded a formal change analysis. However, as shown in Table 2, the correlations between the total scores on the RCSA and the RBPC suggest that these two scales are tapping similar problem domains.

When they were age 7, a one-way analysis of variance revealed no significant differences between the girls, who were later subdivided into four menarcheal groups, $F(3, 321) = .88$, *ns*. The four groups scored within ¼ of a standard deviation unit of each other; no two groups were significantly different at the .05 level of significance. When the girls were age 9, a similar one-way analysis of variance revealed no significant differences between the four menarcheal groups, $F(3, 344) = .87$, *ns*. The four groups scored within approximately ¼ of a standard deviation unit of each other (.27); no two groups were significantly different at the .05 level. These results suggest that the adolescent group differences that we have assumed are a consequence of differential maturation were not present before the onset of menarche. Moreover, the early onset of menarche apparently was associated with the most disruptive and troubling social psychological reactions. This can be readily seen in Panel D of Figure 3, which summarizes the results from our analyses of problem-behavior data collected in childhood, early adolescence, and mid-adolescence, standardized to a common metric.

Are these findings confined to parent reports of behavioral problems? Some researchers note that parental reports of family interactions are significantly correlated with indexes of pubertal maturation, whereas adolescent reports of the same variables bear no significant relation to these indexes (e.g., Savin-Williams & Small, 1986). Girls' self-reports of behavior problems were taken at the age 13 assessment; it may prove instructive to reexamine our findings from the adolescents' perspective as well as from their parents' perspective.

In general, the girls' self-report data provided moderate support for the early-timing hypothesis. Early-developing girls reported more symptoms of internalizing disorders during the age 13 diagnostic interview than did their later maturing peers ($M = 28.7$ vs. 25.5), $t(304) = 1.79$, $p = .07$; they had also engaged in more delinquent activities by this age than had their later maturing peers ($M = 4.8$ vs. 3.2), $t(302) = 1.94$, $p < .05$.

Do Transitions in the Life Course Alter the Course of Personality and Social Development, or Does a Change in State Accentuate Earlier Behavioral Dispositions?

Thus far the results support the idea that stressful transitions are associated with the emergence of behavioral differences. But, as we proposed in the introduction, stressful transitions may actually accentuate pretransition differences. Although variations in behavioral problems were clearly related to variations in girls' physical maturation, these behavioral responses may be confined to girls who were already characterized by behavioral problems in childhood. In this section, we turn to examine this hypothesized interaction.

We derived four specific predictions from the accentuation hypothesis: (a) Early maturers with childhood behavior problems would show significantly more adjustment difficulties than the remaining girls in the sample at both 13 and 15 years of age, (b) early maturers with childhood behavior problems would have more behavior problems than both their early-maturing peers who did not have behavior problems in childhood and their on-time-maturing peers who did have behavior problems in childhood, (c) early maturers with no history of childhood behavior problems would have significantly fewer adjustment difficulties than (or at least would not differ from) on time

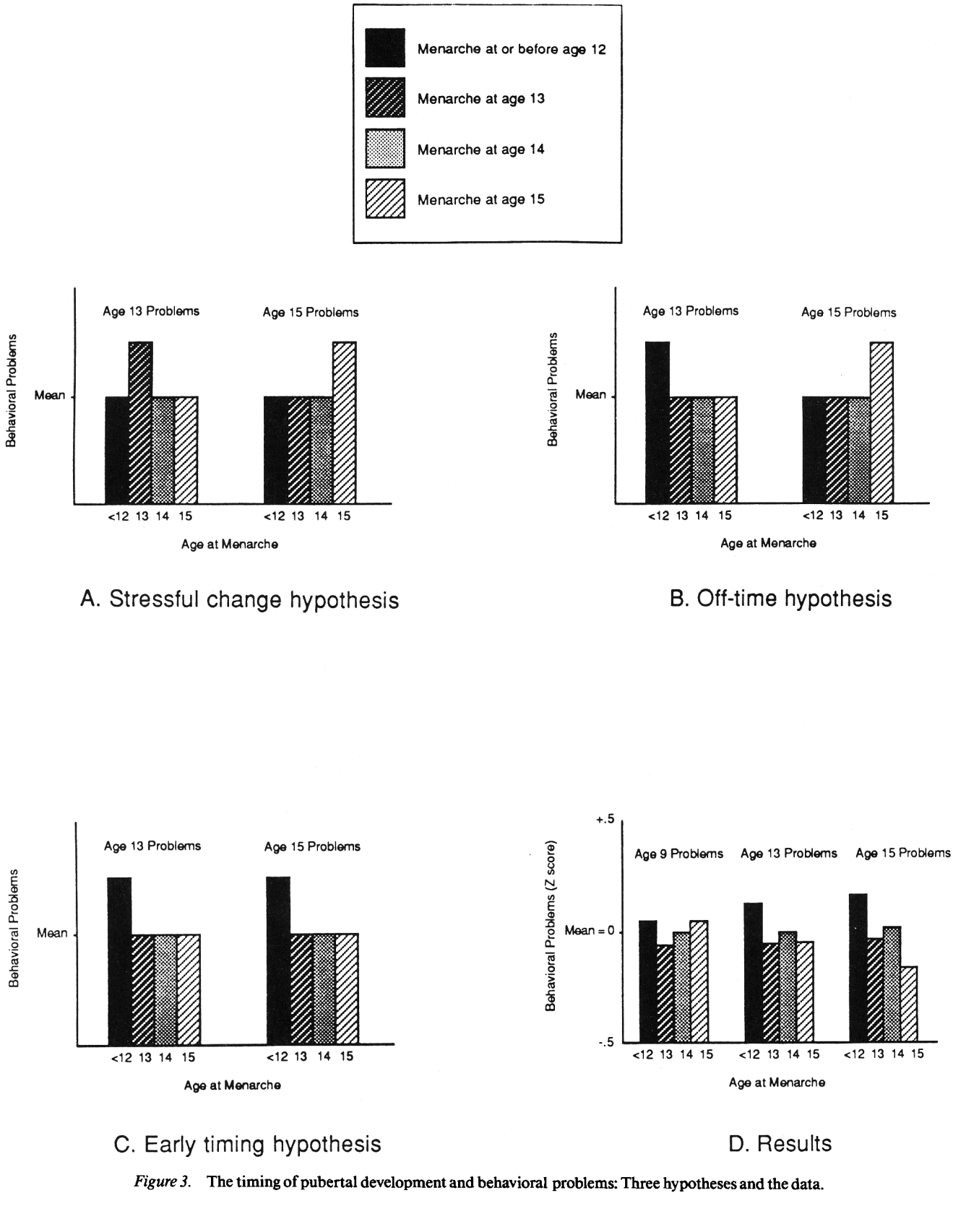

Figure 3. The timing of pubertal development and behavioral problems: Three hypotheses and the data.

Table 1
Planned Contrasts Used in Testing Rival Hypotheses About the Relation Between Pubertal Development and Behavioral Problems

Hypothesis	Contrast weights: Early	Early/middle	Early/late	Late	*t* ratio
Stressful change					
Age 13	−1	3	−1	−1	−1.28
Age 15	−1	−1	−1	3	−3.11**
Off time					
Age 13	3	−1	−1	−1	2.31*
Age 15	−1	−1	−1	3	−3.11**
Early-timing					
Age 13	3	−1	−1	−1	2.31*
Age 15	3	−1	−1	−1	3.44***
n	68	100	119	61	

* $p < .05$. ** $p < .01$. *** $p < .001$.

girls with a history of behavior problems, (d) early maturers with childhood behavior problems would continue, in relation to the remaining girls in the sample, to experience more behavior problems across adolescence.

To address these specific predictions, we stratified the menarcheal groups by their childhood histories of behavior problems. Children who scored above the sample median on the RCSA from the age 9 assessment were designated as having had a history of childhood behavioral problems.[1] In addition, we combined those girls who began menstruating between 12 and 14 years of age (60% of the sample) into a single on time group because the earlier distinction between early/middle and late/middle revealed no significant differences between the two groups. In summary, this procedure produced six distinct groups: early, on time, and late developers, with and without a history of behavioral problems in late childhood.

The means of the six groups on the RBPC are shown in Table 3, along with the results of the aforementioned planned comparisons.

The first set of predictions was clearly borne out. Early-maturing girls with a history of behavioral problems in childhood experienced more adjustment difficulties than the remaining girls in the sample at age 13, $t = 4.91$, $p < .001$, and again at age 15, $t = 6.13$, $p < .001$.

The second set of predictions was also supported by the data. Early-maturing girls with a history of behavioral problems in childhood experienced more adjustment difficulties than their early-maturing peers who had no previous history of behavioral problems, $t = 4.39$, $p < .001$, and $t = 4.72$, $p < .001$, at 13 and 15 years of age, respectively. In addition, early-maturing girls with a history of behavioral problems in childhood experienced more behavior problems than their on time peers who were also problematic in late childhood. This difference was only a trend at age 13, $t = 1.78$, $p = .075$, but by age 15 the two groups differed significantly from each other, $t = 2.49$, $p < .01$.

The third prediction received support as well. Early-maturing girls who had no previous history of behavioral problems experienced fewer difficulties in adolescence than girls with a history of behavior problems who matured on time, $t = -3.64$, $p < .001$, and $t = -3.33$, $p < .001$, at 13 and 15 years of age, respectively. This suggests that a history of childhood behavioral problems outweighs the early onset of menarche in foreshadowing a problematic adolescence.

The fourth prediction was also supported. Between age 13 and age 15, early-maturing girls with a history of behavioral problems in childhood developed progressively more problematic behavior than did the remaining girls in the sample, $t = 2.34$, $p < .02$. The change scores of the six groups are illustrated in Figure 4.

Turning to the girls' self-report data, we found corroboration of the patterns in the parents' reports. Early-developing girls with a history of behavioral problems reported more symptoms of internalizing disorder during the age 13 diagnostic interview than did their peers ($M = 32.6$ vs. 25.4), $t(298) = 2.89$, $p < .01$; they had also engaged in more delinquent activities by this age than had their peers ($M = 5.9$ vs. 3.2), $t(298) = 2.61$, $p < .01$.

Although the early onset of puberty may be stressful, it did not generate uniform behavioral reactions and adjustment difficulties. Rather, it appears to have accentuated the premenarcheal behavioral problems of girls.

As we noted in the introduction, accentuation describes the

Table 2
Cross-Age Correlations of Behavioral Problems in Girls

Age	1	2	3	4	*n*
1. 7[a]	—	.61	.52	.42	325
2. 9[a]		—	.62	.52	348
3. 13[b]			—	.64	348
4. 15[b]				—	348

Note. All correlations are significant at the .001 level of significance. [a] Rutter Child Scale A (Rutter, Tizard, & Whitmore, 1970). [b] Revised Behavior Problem Checklist (Quay & Petersen, 1983).

[1] We performed the same analysis using the RCSA from the age 7 assessment. The results were very similar. We chose to use the age 9 assessment because we lost fewer subjects using this wave.

Table 3
Behavior Problems of Early-, On-Time-, and Late-Maturing Adolescent Girls Stratified by Their Premenarcheal Behavior Problems (High and Low at Age 9)

	Means						Planned comparisons between groups: *t* ratios			
	Early maturers		On-time maturers		Late maturers					
	High (1)	Low (2)	High (3)	Low (4)	High (5)	Low (6)	1 vs. all	1 vs. 2	1 vs. 3	2 vs. 3
Age 13	22.97	11.40	19.11	7.94	17.42	9.09	4.91**	4.39**	1.78	−3.64**
Age 15	30.36	15.29	23.83	11.25	17.39	8.69	6.13**	4.72**	2.49*	−3.33**
n	33	35	107	112	28	33				

* $p < .01$. ** $p < .001$.

phenomenon of increasing differences between types of people across critical transitions. In their methodological treatise on accentuation effects, Feldman and Weiler (1976) suggested several analytic procedures that we have adopted as supplementary steps to determine whether the behavioral differences between the six groups were accentuated across adolescence.

First, we compared the six groups of girls at age 13 and again at age 15 in terms of their total scores on the RBPC. On both occasions, the statistical dependence of these scores on group membership was determined by a one-way analysis of variance. In addition, we calculated omega-square, an estimate of the proportion of variation in the RBPC scores that is accounted for by these groups. Statistically significant differences between the groups at both ages are a necessary condition for accentuation.

Next, we performed an analysis of covariance of the girls at age 15 with the age 13 scores as the covariate. This test was critical: If the *F* ratio for the adjusted means was not significant, then the differences between the groups at age 15 would be attributable simply to earlier differences among the girls as classified into the various groups. If, however, the *F* ratio for the adjusted means was statistically significant, then the group-related variance at age 15 would have increased beyond that explained at age 13.

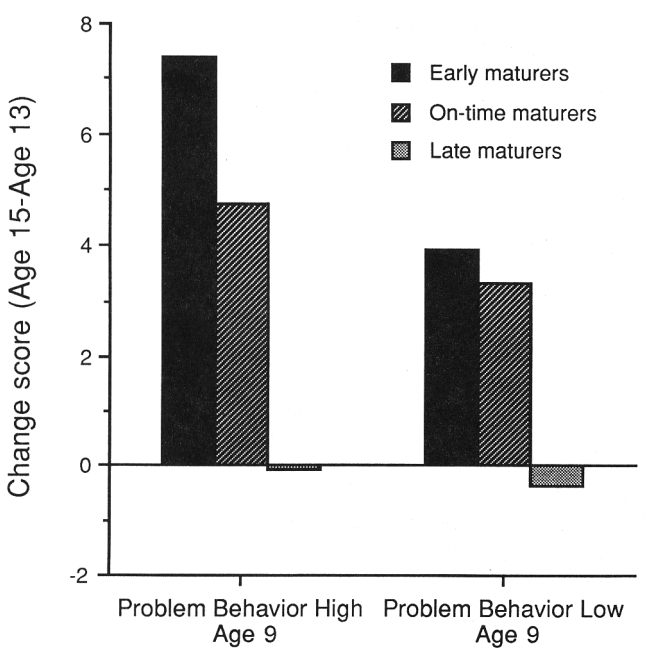

Figure 4. Changes in behavioral problems from age 13 to age 15 among early-, on-time-, and late-maturing girls stratified by their premenarcheal behavior problems (high and low at age 9).

Finally, to interpret the results of the foregoing steps, we calculated two product-moment correlations: one between the age 13 and age 15 mean scores of the groups and the other between the age 13 scores and the mean gain scores of the groups. A positive correlation between the mean scores from the two time periods would indicate that the relative positions of the group means had changed little; a positive correlation between the age 13 mean scores and the mean gain scores would indicate that the means of the groups had diverged over time.

In summary, a clear case of accentuation would be indicated if (a) the one-way analysis of variance *F* ratios for both waves were statistically significant and increased in magnitude over time, (b) the *F* ratio for the adjusted age 15 means was statistically significant, and (c) the correlation between the groups' mean scores at age 13 and their mean gain scores ($M_{15} - M_{13}$) was positive (Feldman & Weiler, 1976).

The results from these various analyses are summarized in Table 4. Columns 1 and 2 show the *F* ratio and omega-square estimate from a one-way analysis of variance at age 13. Columns 3 and 4 show the same from the age 15 analysis. The *F* ratios were significant on both occasions, (Fs(5, 342) = 18.50 and 19.46, respectively, ps $< .001$, and the change in omega-square was in the predicted direction: positive. In addition, Column 5 shows the *F* ratio from the analysis of covariance. The differences among the groups at age 15 were significant even when adjusted for the age 13 scores, $F(5, 341) = 5.90$, $p < .001$. Table 4 also shows that the relative ordering of the six group means remained about the same over time: The correlation between the age 13 means and age 15 means was .95 (Column 6). Finally, the results show that the group means diverged over time. The correlation between the age 13 scores and the mean gain scores was .55 (Column 7). The groups characterized by the most behavioral problems at age 13 increased the most in their behavioral problems across adolescence. Altogether, the tabulated evidence from the various indicants points to the accentuation of group differences in adolescence.

Table 4
Testing the Accentuation Model in Adolescence: Changes in Initial Differences Among Predisposition Groups

(1)	(2)	(3)	(4)	(5)	(6)	(7)
F ratio age 13 (ANOVA)[a]	Omega-square estimate ($100 \times \omega^2$)	*F* ratio age 15 (ANOVA)[a]	Omega-square estimate ($100 \times \omega^2$)	*F* ratio (ANCOVA)[b]	Correlation of mean age 13 score with mean age 15 score	Correlation of mean age 13 score with mean gain (age 15 − age 13) score
18.50*	21	19.46*	22	5.90*	.95	.55

Note. ANOVA = analysis of variance; ANCOVA = analysis of covariance.
[a] $df = 5, 342$. [b] $df = 5, 341$.
* $p < .001$.

Conclusion

The life course is punctuated by numerous social and biological events that require people to organize their experience and behavior around newly defined tasks. Do such personal transitions alter the course of social development, or can they, rather, accentuate and magnify pretransition differences between people?

To address this issue, we studied the transition to adolescence and the onset of menarche. Puberty is a critical maturational process that profoundly affects the social and psychological life of youths.

With data from a longitudinal study of an unselected birth cohort, we attempted to answer two related questions.

Are Pubertal Changes Associated With Behavioral Problems and Adjustment Difficulties?

Our data showed that variations in behavioral problems during adolescence are related to variations in girls' age at physical maturation. Furthermore, we were able to test predictions from three rival hypotheses about pubertal development and social psychological change. The data offered support for one hypothesis: the early-timing hypothesis. The relatively early onset of menarche, coupled perhaps with changing social roles and peer pressures, apparently contributes to behavioral problems and adjustment difficulties during the adolescent years.

Previous studies provide additional support for this conclusion. Simmons and Blyth (1987) found several problems among early-maturing girls: body image disturbances, lower academic success, and conduct problems in school. Similarly, Magnusson and Stattin (Magnusson, 1988; Stattin & Magnusson, 1990) report more norm violations, as well as sexually precocious behavior, among early-maturing girls. Data from the National Health Examination Survey, however, have not pointed to a consistent pattern of behavioral problems among early-maturing girls (Duncan, Ritter, Dornbusch, Gross, & Carlsmith, 1985). These differences may be attributable to differences in the operational definition of puberty or to differences in the adequacy of the outcome measures. The Simmons-Blyth and Magnusson studies relied, as we have, on age at menarche to assess the timing of puberty whereas Duncan et al. used ratings of breast growth and pubic hair. In addition, we used an especially reliable and valid measure of behavior problems. This permits us to invest greater confidence in the conclusion that pubertal changes have negative effects only if they occur in very early adolescence.

Does the Early Onset of Menarche Generate Behavioral Problems, or Does It Accentuate Premenarcheal Dispositions?

In addition to examining the "main effects" of the timing of puberty, we examined systematic interactions between premenarcheal personality and age of onset of menarche.

To examine the accentuation of individual differences, we derived a series of predictions from the accentuation model and then sought to falsify those predictions. The data showed that the early onset of menarche magnifies and accentuates behavioral problems among girls who were predisposed to behavioral problems earlier in childhood. In fact, no other group experienced more adjustment difficulties throughout adolescence than early maturers with a history of behavioral problems earlier in childhood.

Stressful transition events, such as the early onset of menarche, do not generate uniform reactions among people; they appear, rather, to accentuate pretransition differences between them. Although most theoretical perspectives on life discontinuities suggest that transitions are times when people are most likely to change, our data suggest that they may actually be times when preexisting individual differences are most likely to be accentuated.

We selected the phenomenon of postpubertal behavior problems as a test of our hypothesis about the accentuation of individual differences at transition points for two reasons. First, menarche is a life course transition experienced by almost all girls that is relatively easily measured. Second, several reports had already attested to the existence of postpubertal behavior problems in girls (e.g. Brooks-Gunn et al., 1985; Magnusson et al., 1986; Simmons & Blyth, 1987; Stattin & Magnusson, 1990). The data were quite consistent with our predictions, yet our faith in the accentuation effect will be bolstered by replications of this study with other individual differences at other life transitions. In particular, we look for similar research with (a) individual-difference variables that are less pathological than be-

havior problems, (b) transitions that do not involve hormonal changes, and (c) older subjects, whose personality structure may have already stabilized.

In fact, some research on other transitions in the life course already indicates that differences between people are likely to be magnified when they move into new situations. For example, the accentuation of preexisting individual differences has been observed in children going off to school for the first time (Alexander & Entwistle, 1988) as well as in students entering college (Feldman & Newcomb, 1969). The accentuation of individual differences is especially apparent during stressful crises. For example, irritable and explosive men tend to become even more so during periods of severe economic setbacks (Elder & Caspi, 1988). The same point is highlighted in studies of community disasters. For example, the coping styles of entrepreneurs whose businesses suffered extensive damage during a natural disaster were accentuated during the recovery period (C. R. Anderson, 1977). A similar account is provided by Allport, Bruner, and Jandorf (1941), who analyzed the experiences of people during the Nazi revolution. They concluded that "very rarely does catastrophic. . . change produce catastrophic alterations in personality. . . . When change does take place, it seems invariably to accentuate trends clearly present in the pre-[crisis] personality" (p. 7–8).

Indeed, we believe that this study, coupled with the aforementioned research as well as the earlier cited experimental evidence, suggests a more general point about personality in the life course. Dispositional factors may be most pronounced when people experience profound discontinuities in their life—that is, during transition events in the life course. Transition events that are characterized by ambiguity, novelty, and uncertainty (e.g., the early onset of menarche) are weak situations to the extent that they allow each person to encode and experience the discontinuity in a nonuniform and idiosyncratic way (Mischel, 1977). And, as we have already noted, research has shown that it is precisely in weak situations that people are forced to rely on their own internal traits to guide their behavior (Snyder & Ickes, 1985).

More generally, following Block (1982), we believe that individual differences are likely to be magnified and accentuated during periods of discontinuity as each person, in an effort to regain control over the changing situation, actively attempts to assimilate discrepant events into existing cognitive and action structures. We hasten to add that the implied assimilative expression of dispositional attributes is by itself neither positive nor negative. In the course of adapting to changing circumstances, assimilative trait manifestations may be adaptive as well as maladaptive, veridical as well as unrealistic (Tellegen, in press). (We have emphasized behavioral problems in this research only because of our mutual interest in developmental difficulties, not because these difficulties are indigenous to the more general model proposed.)

Indeed, our emphasis on behavioral problems should not vitiate the broader provocation to study individual differences during transition points in the life course. During these periods of discontinuity, the disparity between personal dispositions and situations may be heightened, and in turn dynamic processes in the course of adaptation may be magnified. Periods of social discontinuity thus provide a unique opportunity for discerning principles that govern the functions and processes of personality. What should be most predictable across the life course are the characteristic ways that people negotiate changes in their environment.

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