

# Pubertal Status in Early-Adolescent Girls: Relations to Moods, Energy, and Restlessness

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*This study examined perceived pubertal change in relation to characteristics of early-adolescent girls' moods, energy, and restlessness. Fifty-two girls aged 9.1 to 10.8 years reported their moods, energy, and restlessness on 12 days over the course of 1 month. Average levels, variability, and intensity of these constructs were calculated. Measures of certainty about self and perceived pubertal status and timing were also obtained. Girls who felt they were experiencing pubertal changes reported more negative moods and nervousness, and more variable negative moods, nervousness, energy, and restlessness over the month than did prepubertal girls. They also experienced more intense negative moods, nervousness, and restlessness relative to the average levels of these constructs for the sample. The hypothesis that associations between pubertal status and moods were due to heightened feelings of uncertainty about self was not supported. Mechanisms by which pubertal development may be linked to moods and energy are discussed.*

One of the most persistent beliefs about adolescents—in both popular and scientific thinking—is that they experience variable and intense moods (e.g., Bell, 1987; Campbell & Cooper, 1975; Finkelstein, 1980; “Teen Rage,” 1987). Mood changes are often linked with the physical changes of puberty. One recent book written for adolescents opens a discussion of pubertal changes

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by saying, "You may feel full of energy or lie around and sleep a lot. Your moods may shift quickly, uncontrollably, surprising you" (Bell, 1987, p. 5).

Why might puberty be associated with increased variability and intensity of moods? Traditional psychoanalytic theories claimed that the hormonal and morphological changes of puberty awaken sexual feelings that are new, confusing, and difficult to deal with, resulting in erratic moods and behavior (see Lerner, 1987, for a review). More recent psychoanalytic and non-psychoanalytic approaches put less emphasis on the role of sexual feelings *per se*, suggesting that the physical changes of puberty necessitate a new understanding of self on several dimensions (e.g., Brooks-Gunn, 1984; Erikson, 1950; Lerner, 1987). Uncertainty about self prompted by physical changes might, in turn, be reflected in unstable moods and behavior. Further, pubertal changes signaling a more adult status most likely elicit increased expectations for adultlike behavior on the part of significant others in the preadolescent's or early adolescent's life (Conger & Petersen, 1984; Petersen, 1985; Richards & Petersen, 1987). Differing standards, expectations, and reactions on the part of parents, peers and others toward an individual who is experiencing pubertal change might in turn affect that individual's perception of self and behavior. Initially, such changes may be contradictory and confusing; in the initial stages of puberty, one's moods and feelings may reflect this.

An individual's perception of pubertal timing may also influence moods. Neugarten (1969, 1970) argued that in adulthood events occurring at unexpected times are more stressful than those that are expected. Research on puberty and behavior has also demonstrated the importance of self-perceived pubertal timing; in many cases it is a more salient and important predictor of behavior than is pubertal status (e.g., Duncan, Ritter, Dornbusch, Gross, & Carlsmith, 1985; Magnusson, Stattin, & Allen, 1985; Rierdan & Koff, 1985a, 1985b; Savin-Williams & Small, 1986; Simmons, Blyth, & McKinney, 1983; Steinberg, 1987; Tobin-Richards, Boxer & Petersen, 1983). Thus development that is off-time may be unsettling and associated with unstable or extreme moods.

Although the "storm and stress" stereotype of adolescence has been challenged in recent years (see Hill, 1980; Offer, 1969; Offer & Offer, 1975; Petersen, 1985), that challenge has been based primarily on research examining adolescent behavior (i.e., conflict with parents, deviance) rather than on research examining moods. Little is known about how the emotions of adolescents compare to those of other individuals, and even less is known about the association between moods and pubertal development. It is quite possible that moods become temporarily more unstable or intense at puberty

without precipitating mental or behavioral crises in the adolescents who experience them.

Indeed, the little research that exists has suggested that adolescents may experience more variable and intense moods than do older or younger individuals (see Larson, in press, for another review). In one study, adolescents' moods were more short-lived and more extreme than those of adults (Larson, Csikszentmihalyi, & Graef, 1980). Diener, Sandvik, and Larsen (1985) also documented declines in reports of emotional intensity from late adolescence through adulthood. Whereas two studies have failed to find differences in mood intensity or variability among 5th through 11th graders (Larson & Lampman-Petratis, 1989; Stapley & Haviland, 1988), a study by Bence (1990) suggested that *rates* of mood change may be greater in early adolescence than in later adolescence.

In terms of puberty and moodiness, Crockett and Petersen (1987) found no evidence of an association when adolescents were asked directly about mood changes. Susman, Nottelmann, and Blue (1983) found evidence for an association between puberty and moodiness but only for boys; males who were pubertally advanced reported a greater range of moods over 5 days than did other boys.

The present study was designed to investigate self-perceptions of pubertal development in relation to the moods of early-adolescent girls. In addition to moods per se, measures of energy and restlessness were examined. The beliefs and theories discussed for moods often apply to activity levels as well, as demonstrated in the quote from the opening paragraph. Certainly moods and activity level are often related. As with moodiness, there is a small amount of evidence linking levels of, and changes in, energy and restlessness to the changes of adolescence. In Larson et al. (1980), adolescents reported more extreme swings in alertness/drowsiness and activity/passivity, and lower levels of activation, than did adults. These authors also found that adolescents tended to daydream more, and concentrate for shorter periods of time, than did adults.

There is no research on pubertal development and changes in, or extremes of, energy or restlessness over time. The data that do exist suggest that energy might be lower, and restlessness higher, in individuals who are more pubertally advanced. For example, Sonis et al. (1985) found that parents of girls with true precocious puberty (TPP) were more likely to report overtiredness in their daughters than were parents of developmentally on-time girls of the same age. Similarly, in Susman et al. (1983), both boys and girls were more likely to rate themselves as tired (rather than energetic) if they were in the later stages of puberty. In a now very old study, Stone and Barker (1939)

documented more self-reported daydreaming in postmenarcheal girls (aged 11 to 15.5 years) when they compared pre- and postmenarcheal girls of the same ages. Girls with TPP in Sonis et al. (1985) were reported to daydream more than did other girls.

Thus, the present study examined hypotheses linking early pubertal development to moods, energy, and restlessness. Self-reports of puberty were used to explore relations between perceived changes in one's own body and psychological outcomes. The sample was composed of very young adolescent girls (9 and 10 years of age). A focus on such young girls seemed necessary if it is the case that the *initial* changes of puberty are most likely to be unsettling, either hormonally or psychologically. Characteristics of moods, energy, and restlessness were assessed by repeatedly measuring subjects' levels of these variables across time.

The following hypotheses were examined:

1. Girls who were entering puberty would be more uncertain about self than would prepubertal girls.
2. Girls who were entering puberty would experience more variable and more intense moods than would girls who were prepubertal.
3. Girls who were entering puberty would experience lower levels of energy, higher levels of restlessness, and more variable and intense energy and restlessness, than would prepubertal girls.
4. Girls who perceived themselves as developing early in comparison to their peers would experience more variable and intense moods, energy, and restlessness than would girls who perceived themselves as on time. Because the sample was so young, very few girls could truly be considered late developers; at this age, early development is the most "off-time" event.

## METHOD

### Sample

The sample consisted of 52 early-adolescent girls, recruited through pediatricians' offices in a Midwestern suburban community. Although 53 girls participated in all, one girl did not report on pubertal development, so she could not be included in the analyses presented here. The girls ranged in age from 9.1 to 10.8 years, and were in the third, fourth, or fifth grade. Seventy percent of the sample came from families with annual incomes over \$30,000; 29% from families with incomes between \$10,000 and \$30,000.<sup>1</sup> Most girls (85%) had parents in intact first marriages; 11% had divorced or

separated parents; 4% had remarried parents. The sample was 81% White, 6% Black, 4% Asian, and 9% other.

## Design

Data were collected over a 1-month period. Three evenings a week for 4 weeks the subjects filled out brief questionnaires assessing moods, energy, and restlessness during the day. At the beginning of each week, the girls received a telephone call reminding them to complete the questionnaires for that week. Each girl also participated in an extensive interview once at the end of the 4 weeks. This interview was conducted in the subject's home, and a variety of psychosocial information was collected, as well as information about pubertal development.

## Measures

**Puberty.** Self-perceptions of pubertal status were measured using the Pubertal Development Scale (Petersen, Crockett, Richards, & Boxer, 1988). Girls answered whether development had "not begun," "barely begun," "definitely begun," or "been completed" on the following indices: growth spurt in height, breast growth, body hair growth, and skin changes. Although derived "Tanner" stages can be calculated as described by the authors using questions about breast development, body hair growth, and whether or not menarche had begun, our concern about rating pubertal development in this very young sample was based only on these three indices. Because none of the girls in the sample had started menstruating, a "Tanner" classification could be based only on the indices of breast development and body hair growth. Yet other signs of puberty such as growth in height occur early in pubertal development and may be important both psychologically and as indicators of hormonal changes (Buchanan, Eccles, & Becker, 1990). Thus a cluster analysis was used to identify groups of girls who were most similar to one another on all of the assessed dimensions of pubertal development. One cluster of girls was clearly prepubertal, with little development on any of the four indices ( $n = 32$ ). A second cluster reported development of body hair and skin changes with little breast development and moderate growth in height ( $n = 14$ ). The third cluster was experiencing growth in height and breast development, but little growth of body hair or of skin changes ( $n = 6$ ). Because of the small number of cases in the two pubertal groups, analyses were carried out using the three groups separately and also collapsing the

pubertal groups ( $n = 20$ ) into one "pubertal" category and comparing them to the prepubertal girls ( $n = 32$ ). The results were similar whether using two or three categories; thus only analyses collapsing the two groups of pubertal girls will be presented.<sup>2</sup>

Perceived pubertal timing was measured by one question asking: "Compared to other kids your age, do you think your body is changing: *before most kids* (1), *the same as most kids* (2), or *later than most kids* (3)." A "1" response was classified as early ( $n = 10$ ), "2" as on-time ( $n = 33$ ), and "3" as late ( $n = 9$ ).

*Certainty about self.* Items adapted from the Rosenberg Stability of Self scale (Rosenberg, 1979), and some new items created for this study, were used to measure certainty about self at the in-home interview at the end of the month of participation. All items were ranked on a 1 to 5 scale indicating how often a subject felt a certain way or how much the subject thought the statement described her. Factor analysis of these items indicated two factors. The first (KNOWSELF) had a Cronbach's alpha equal to .71. It consisted of the following items: (a) "I am sure of myself with friends." (b) "I am sure of what kind of person I am." (c) "I know what I am like. I am sure of it." (d) "When I have an idea or opinion I say it no matter what." The second (MIXED-UP) had a Cronbach's alpha of .53. Higher scores on this factor indicated more feelings of being confused about self. The following items loaded on the second factor: (a) "How often do you feel mixed-up about yourself?" (b) "I am afraid to disagree with friends." (c) "How often do your feelings change about the kind of person you are?" These composites were correlated .05.

*Levels, variability, and intensity of moods, energy, and restlessness.* The daily questionnaire asked about a variety of moods and feelings over the course of the day. Girls indicated how much they experienced each mood that day on 5-point Likert-type scales—from *not at all* (1) to *very much* (5) for each mood. The meaning of each mood was not defined for the subject; thus subjects responded according to their own interpretations of the meanings of these words. Factor analysis was used to identify the following composites: "happiness" (right now I am happy, today I felt happy, today I felt friendly, today I felt excited); "esteem" (today I felt proud, today I felt confident, today I liked myself); "negative mood" (today I felt sad, today I felt ashamed, today I felt frustrated, today I felt angry, and today I felt impatient); and "nervousness" (right now I am nervous, today I was nervous). Cronbach's alphas for the composites were .70 for happiness, .65 for esteem, .63 for negative mood, and .79 for nervousness. Although *esteem*

is not traditionally thought of as a mood, the term is used here to refer to positive affect specifically about the self.

Energy was measured using the following items: "*Today I was mostly tired* (1) / *energetic*" (5); "*Today I felt mostly like doing something very quiet/relaxing* (1) / *very active*" (5); and "*Today I had less energy* (1) / *more energy* (5) *than usual.*" Cronbach's alpha for the three items was .82. Restlessness was a composite of four items, all on 5-point scales — from *never* (1) to *almost always* (5): (a) "How often today did your mind wander from what you were supposed to be paying attention to?" (b) "Today, how often was it hard to sit still?" (c) "Today it was easy to pay attention to what we were learning in school" (with scores reversed for the composite measure), and (d) "Today I had a hard time trying to concentrate." Cronbach's alpha for restlessness was .53.

To provide a context for discussion of mood variability and intensity, and to test hypotheses about levels of energy and restlessness, average levels of these constructs were examined. The mean *levels* for each mood composite, and for energy and restlessness, were calculated by averaging each girl's daily reports for the month. *Variability* of each mood was defined as the variance of each girl's daily mood composite over the month. Similarly, the variance of each girl's energy and restlessness composites over the month was used to indicate variability on these measures.

The variance indicates how much movement there is from each girl's own average during the month. In this sense, it also captures an element of intensity, because it reflects how extreme are the changes in each girl's mood. In addition, however, mood intensity can be defined by more "objective" standards (i.e., not one's own moods). For example, imagine an individual who is always very happy and whose level of happiness never fluctuates. Her own mood swings are not extreme, although she might be characterized as extreme on some objective scale of "amount of happiness," or in comparison to the typical level of happiness in the population. Thus one way to define intensity based on a more objective standard is to simply examine absolute levels of affect (i.e., do pubertal girls more often say they are "very happy" or "very angry" than do prepubertal girls?). A possible confound with this approach, however, is the frequency with which certain moods are experienced (see Diener, Larsen, Levine, & Emmons, 1985). For example, if pubertal girls are more likely to experience negative moods than positive moods, they may say they are "not at all" or "a little" happy more often than other girls simply because they are usually sad or angry. Thus Diener, Larsen, Levine, and Emmons (1985) argued that one must examine the absolute level of whichever mood is predominant on a given day to assess an individual's

average emotional intensity. A second possible standard is the level of "typical" emotion in some population of people (i.e., are the moods of pubertal girls more extreme *relative to* what one might consider "normal" than are the moods of prepubertal girls?).

Based on these two approaches, *intensity* of mood was examined in two ways. First, the "happy" and "negative mood" composites were used to look at intensity of affect in a way analogous to Diener, Larsen, Levine, and Emmons (1985). For each day, whichever mood was strongest was taken as the measure of the predominant affect for that day. The absolute level of predominant affect for each day was then averaged over the month. This measure will be referred to as "absolute mood intensity." In this sample, happiness was usually stronger than negative mood. As a result, this first method of measuring intense mood was highly correlated with the happiness composite itself ( $r = .62$ ).

Secondly, a relative intensity measure was created for each of the four mood composites. By standardizing the average monthly scores for each mood and then taking the absolute value of each standard score, how much a girl's average mood over the month deviated from the average for that mood in the sample was calculated. Similarly, the relative intensity of each girl's energy and restlessness was also calculated. Thus the relative intensity scores represented intensity only in the sense of deviation from what was "typical" for this sample. Admittedly, using the sample itself as the standard is less than ideal because typical moods for this sample may differ from typical moods for other age or gender groups. Given this caveat, such a measure addresses the question of whether girls who are more pubertally advanced experience moods that are, on average, more divergent from the average moods for a sample of 9- and 10-year-old girls than do prepubertal girls. A summary of the measures of mood, energy, and restlessness is presented in Table 1.

The correlations among levels, variability, and intensity of the same mood, energy, and restlessness constructs ranged in absolute value from .01 to .77; although over two thirds of the correlations were less than .40 and only two were above .60 (the correlation between average and variable negative mood was .62 and the correlation between average and variable nervousness was .77).

## Analyses

A series of analyses of covariance (ANCOVAs) was used to examine the effects of pubertal status or pubertal timing on the composites of mood, energy, restlessness, and certainty about self. Although the design of the study



**TABLE 1: Summary of Measures of Moods, Energy, and Restlessness**


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|  |
|--|
| Levels—average over month  |
| Moods—happiness, esteem, negative mood, and nervousness  |
| Energy   |
| Restlessness   |
| Variability—variance over month  |
| Moods—happiness, esteem, negative mood, and nervousness  |
| Energy   |
| Restlessness   |
| Intensity  |
| Absolute intensity—absolute level of happiness or negative mood, whichever was stronger for each day, averaged over month. |
| Relative intensity—deviation from the average for the sample (i.e., absolute value of standardized score)                  |
| Moods—happiness, esteem, negative mood, and nervousness  |
| Energy   |
| Restlessness   |

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minimized variation in age, age was still related significantly to some of the mood measures; thus age was used as a covariate in all analyses.

## RESULTS

### Certainty About Self

Perceived pubertal timing was significantly related to feelings of knowing oneself ( $\bar{X}_{\text{early}} = 4.16$ ,  $SD_{\text{early}} = .98$ ,  $\bar{X}_{\text{on-time}} = 3.42$ ,  $SD_{\text{on-time}} = .97$ ;  $\bar{X}_{\text{late}} = 2.66$ ,  $SD_{\text{late}} = .56$ ;  $F(2, 48) = 6.08$ ,  $p < .01$ ;  $R^2 = .21$ ). Girls who perceived themselves as early developers felt that they knew themselves better than did girls who perceived themselves as on-time; in turn, girls who perceived themselves as on-time felt more like they knew themselves well than did girls who perceived themselves as being late. Neither pubertal status nor pubertal timing were related to feeling mixed-up about self.

### Levels of Mood, Energy, and Restlessness

Prepubertal girls reported fewer negative moods ( $F(1, 49) = 4.07$ ,  $p = .049$ ,  $\bar{X}_{\text{pre}} = 1.59$ ,  $SD_{\text{pre}} = .32$ ,  $\bar{X}_{\text{early}} = 1.84$ ,  $SD_{\text{early}} = .54$ ) and slightly less nervousness ( $F(1, 49) = 3.18$ ,  $p = .081$ ,  $\bar{X}_{\text{pre}} = 1.42$ ,  $SD_{\text{pre}} = .38$ ,  $\bar{X}_{\text{early}} = 1.66$ ,  $SD_{\text{early}} = .58$ )

**TABLE 2: Pubertal Status and Variability of Moods, Energy, and Restlessness**

| Construct              | Pubertal Status      |     |                   |      | F      | R <sup>2</sup> |
|------------------------|----------------------|-----|-------------------|------|--------|----------------|
|                        | Prepubertal (n = 32) |     | Pubertal (n = 20) |      |        |                |
|                        | $\bar{X}$            | SD  | $\bar{X}$         | SD   |        |                |
| Variable happiness     | .38                  | .42 | .42               | .40  | .11    | .00            |
| Variable esteem        | .51                  | .41 | .53               | .39  | .04    | .01            |
| Variable negative mood | .17                  | .15 | .42               | .61  | 4.67*  | .10            |
| Variable nervousness   | .30                  | .39 | .70               | .89  | 4.59*  | .09            |
| Variable energy        | .94                  | .76 | 1.43              | 1.05 | 3.65** | .08            |
| Variable restlessness  | .32                  | .27 | .56               | .44  | 6.01*  | .21            |

\* $p \leq .05$ ; \*\* $p \leq .10$ .

than did pubertal girls. Pubertal status was not related to levels of happiness, esteem, energy, or restlessness. There were also no significant differences by pubertal timing.

### Variability of Moods, Energy, and Restlessness

Relations between perceived pubertal status and mood variability are shown in Table 2. Girls who perceived themselves as experiencing some kind of pubertal development were more variable across the month in negative mood and nervousness than were other girls. In addition, pubertal girls indicated more variable restlessness and slightly more variable energy levels than did prepubertal girls. Pubertal status was not related to variability of happiness or esteem.

There was only one marginally significant relation between pubertal timing and mood variability across the month: early- and late-developing girls had more variable esteem across the month than did on-time girls ( $F(2, 48) = 3.16, p = .051, \bar{X}_{\text{early}} = .74, SD_{\text{early}} = .58, \bar{X}_{\text{on-time}} = .42, SD_{\text{on-time}} = .29, \bar{X}_{\text{early}} = .65, SD_{\text{early}} = .41$ ).

### Intensity of Moods, Energy, and Restlessness

Not surprisingly, given the high correlation of the absolute measure of mood intensity and levels of happiness, neither pubertal status nor pubertal timing was related to intensity using this approach. Pubertal status was, however, related to intensity of negative mood, nervousness, and restlessness

**TABLE 3: Pubertal Status and Intensity of Moods, Energy, and Restlessness**

| Construct             | Pubertal Status      |     |                   |     | F      | R <sup>2</sup> |
|-----------------------|----------------------|-----|-------------------|-----|--------|----------------|
|                       | Prepubertal (n = 32) |     | Pubertal (n = 20) |     |        |                |
|                       | $\bar{X}$            | SD  | $\bar{X}$         | SD  |        |                |
| Intense happiness     | .73                  | .54 | .93               | .68 | 1.30   | .03            |
| Intense esteem        | .80                  | .48 | .85               | .86 | .08    | .01            |
| Intense negative mood | .59                  | .49 | 1.05              | .78 | 6.48*  | .12            |
| Intense nervousness   | .70                  | .40 | 1.05              | .71 | 4.80*  | .12            |
| Intense energy        | .78                  | .60 | .86               | .56 | .20    | .01            |
| Intense restlessness  | .73                  | .57 | 1.02              | .51 | 3.32** | .08            |

\* $p \leq .05$ ; \*\* $p \leq .10$ .

when using relative measures of intensity (see Table 3). Perceived pubertal girls experienced more extreme negative moods and nervousness than did prepubertal girls, and slightly more extreme restlessness. Perceived pubertal timing was not related to relative intensity of any of the measures.

### Uncertainty About Self and Moods, Energy, and Restlessness

Given that pubertal status was unrelated to feelings of knowing oneself or being mixed-up about oneself, a model predicting that pubertal development leads to uncertainty about self, which in turn leads to unstable moods, was not supported. Further, feelings of "knowing self" were not related to variability or intensity of moods. Feeling "mixed-up," however, was related to several measures of mood, energy, and restlessness. Girls who were more mixed-up about self experienced higher average negative moods ( $r = .52$ ) and restlessness ( $r = .38$ ), and more variable happiness ( $r = .36$ ), esteem ( $r = .45$ ), negative moods ( $r = .46$ ), nervousness ( $r = .53$ ), and restlessness ( $r = .34$ ). These associations suggest a model different than the one that was hypothesized (i.e., rather than pubertal change  $\rightarrow$  feelings about self  $\rightarrow$  mood, the model could be pubertal change  $\rightarrow$  mood  $\rightarrow$  feelings about self). Regressions predicting mixed-up feelings with age, pubertal status, and each of these mood characteristics separately, confirmed that the mood characteristics were related to feeling mixed-up and pubertal status was not. Together with the finding that pubertal status was related to characteristics of mood and energy, these results suggest that pubertal changes may first affect moods, energy, and restlessness, which in turn influence feelings about oneself.

## DISCUSSION

### **Pubertal Status and Early-Adolescent Girls' Moods, Energy, Restlessness, and Certainty About Self**

In this study, girls' perceptions of pubertal status were related to characteristics of their moods, energy, and restlessness. Pubertal girls experienced more negative moods and somewhat more nervousness than did prepubertal girls. Girls experiencing pubertal changes were also more likely to report more variable nervousness and negative mood states than were perceived prepubertal girls. Pubertal status was not related to mood intensity defined as strong, absolute levels of affect. Pubertal girls did, however, experience more extreme negative moods and nervousness relative to the average or typical levels of these characteristics in this sample of girls than did prepubertal girls.

None of the measures of positive affect were associated with pubertal status; thus the picture that emerges is one of occasional increases in negative mood states with puberty, resulting in higher and more variable negative mood states over the course of a month. Even the differences in relative intensity of negative mood states—although theoretically indicating extremes in either a positive or negative direction—could be attributed to this tendency toward more negative affect in pubertal girls. This is because typical levels of negative affect in the “population” of the 9 through 10 year old girls sampled were toward the positive end (e.g., not angry, not nervous). In addition, although levels of energy and restlessness did not differ by pubertal status as predicted, variability of energy and restlessness was higher in pubertal girls than in prepubertal girls, and pubertal girls had somewhat more intense or extreme restlessness relative to the average for girls in this study.

Why, then, might these relations exist? Do swings in, and intensity of, moods, energy, and restlessness emerge at puberty because of psychological adaptation required by the individual to a changing body? Contrary to predictions, perceived pubertal stage was not related to consciously experienced feelings of knowing oneself or being mixed-up about oneself. Thus the hypothesis that pubertal status leads to uncertainty about self, which in turn leads to unstable moods, was not supported. It is possible, however, that uncertainty aroused by physical change is more subtle, or unconscious, than is the uncertainty that would be expressed in response to direct questioning about self. On the surface girls experiencing puberty may feel pleased or proud that it is occurring (Brooks-Gunn, 1984; Rosenbaum, 1979); they may

be anxious for pubertal events to occur (Rosenbaum, 1979). The finding that perceived early developers (in timing) reported feeling that they knew themselves more than did other girls suggests that, in fact, the experience of puberty is positive in some ways. At a subconscious level, however, these girls may still be adjusting to a changing body and what that means for their own identity within the family and peer group; this more subconscious adjustment may, in turn, be reflected in mood states.

Alternatively, pubertal status may reflect hormonal activity. Pubertal girls may experience more variable hormonal activity than do prepubertal girls, because early in pubertal development hormone rhythms and cycles are not consistent (Grumbach, 1980; Katchadourian, 1977; Yen & Jaffe, 1978). Irregular hormone activity may be reflected in variable moods, energy, or restlessness. Moreover, findings that characteristics of moods, energy, and restlessness—especially variability of these constructs—predicted feeling mixed-up about oneself suggest that pubertal change may affect moods and/or energy, perhaps through hormonal change, and that moods and/or energy may then influence feelings of certainty about self.

### **Effects of Pubertal Timing**

Perceived pubertal timing was almost never related to intensity or variability of moods, energy, or restlessness. One significant finding regarding timing of puberty indicated that off-time girls (both early and late developers) experienced more variable esteem than did on-time girls. Given the literature that has suggested that off-time events in general, and off-time puberty in particular, are stressful and more likely to precipitate crises than are on-time events, why were there not more effects of self-reported pubertal timing on mood intensity and variability? It seems that fluctuation in mood is not necessarily a result of consciously feeling different (different in comparison to one's own child body or different in comparison to peers). Conscious feelings of timeliness seem, rather, to have their effect on more conscious psychological constructs: in this case, certainty about self. At a conscious level, the early experience of puberty appears to be positive: Girls who perceived themselves as early developers were most sure of themselves; girls who perceived themselves as late were least sure of themselves.

### **Summary**

The findings of this study suggest that perceived bodily changes are related to characteristics of moods, energy, and restlessness, although not

necessarily because of consciously experienced uncertainty about self. These data must be considered exploratory in nature, however, given the small numbers of girls in each pubertal category. Further research that examines girls in the early stages of puberty will be critical for understanding the impact of this transition on daily mood states. Ideally, this research would follow girls over time as they experience new bodily changes rather than comparing different girls at different pubertal stages.

To the extent that moods and energy do become more unstable at puberty, the potential impact of such changes on family interactions becomes interesting. For instance, several studies have indicated that family relationships become more tense and conflictual when children are in the early and transitional phases of puberty (e.g., Hill, Holmbeck, Marlow, Green, & Lynch, 1985a, 1985b; Steinberg & Hill, 1978). Increased strain among family members may result from difficulty in dealing with a moody and unpredictable early adolescent. On the other hand, the way in which family members and others react to pubertal changes may influence adolescents' moods. The current study indicates that the causes and consequences of mood changes at puberty are worth further exploration.

## NOTES

1. One percent of income data were missing.
2. All analyses presented predicting moods, energy, and restlessness with pubertal status also were performed using a derived Tanner stage measure; pubertal status as defined in this manner was not related to the outcome measures.

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