

### What's in an empirical journal article?

All empirical articles in psychology share the same basic form. The beginning of the introduction describes a problem of interest to psychologists. The authors then articulate a theory (often not their own) that attempts to provide an explanation for the problem. Less frequently two competing theories are submitted and their predictions concerning the problem or issue are contrasted. Next, the authors discuss past research related to the problem introduced at the beginning of the paper. The research presented is generally an almost historical account of recent (generally up to 10 years) work that's been published on the issue under investigation. Most often the researchers' question is the next logical step in this sequence of studies. Sometimes the cited research addressed the same problem exactly, but the current authors feel that methodological problems affected the previous conclusions. In some cases, the previous findings are based on one kind of method (e.g., a naturalistic observation), and the current investigators wish to see if the results generalize when another method is used (e.g., an experiment). In this fashion, scientists gather what is called converging evidence. Another reason for investigating the same problem might be that the investigators wish to see whether some result generalizes to different populations. In the last section of the introduction the authors present the reader with a specific list of hypotheses (if a theory allows them to be specified) or, less commonly, simply research questions (This is the case when researchers have little theoretical guidance in making specific predictions. This happens most often when the issue being considered is new and the research is exploratory).

After the problem has been introduced (after they tell you WHY they're doing what they're doing), the researchers provide the reader with a detailed account of the methods they used to study the problem (here the authors tell you HOW they investigated the problem). This includes information about who the participants were, the measures, tests, or stimuli that provided data, and the conditions under which their testing was conducted. This enables other scientists to evaluate the appropriateness of the methods and replicate them on their own if they wish (scientists rarely take anyone's word for anything, and tend not to believe a research finding until more than one group has reported similar results - skepticism is our nature).

The next sections presents an analysis of the data that were collected using the method described in the methods section. Here, the data are condensed and statistics are generated. Often descriptive statistics are presented (e.g., means and standard deviations) as well as statistics that test the hypotheses presented in the introduction (e.g., t-tests and regressions). Here we get to evaluate whether the statistical techniques were appropriate to the kinds of data collected and the kinds of questions the researchers hope to answer.

Finally, the researchers put the results of their analyses in context. That is, they explain what their findings mean and how their findings relate to the theory (or theories) they hoped to either support or refute. Often only some of a researchers' hypotheses have been supported. At this point they argue why this happened and how this partial success (or failure) affects the theory mentioned in the introduction. The latter parts of the discussion generally include a description of the current study's shortcomings, caveats about over-generalizing the results, and the next steps to be taken.

Biological Transitions Reading

Directions: Answer the following questions for the journal article below.

1. What was the purpose of this study?
2. List all of the independent variables.
3. How were these variables measured? (i.e., what test, method, or equipment was used?)
4. List all of the dependent variables.
5. How were these variables measured? (i.e., what test, method, or equipment was used?)
6. Which research method(s) was/were used? (i.e., experiment, naturalistic observation)
7. What developmental approach (e.g., longitudinal, cross-sectional, sequential) was used, if any?
8. What were the study's major results?
9. What were the study's methodological limitations?

## Interactive Effects of Menarcheal Status and Dating on Dieting and Disordered Eating Among Adolescent Girls

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The effects of menarcheal status and opposite-sex socializing (mixed-sex social activity, dating, and noncoital sexual involvement with boyfriends) on dieting and disordered eating among early adolescent girls are examined. In all, 89 12- and 13-year-old girls reported their menarcheal status, dieting behaviors and attitudes, and involvement in dating and other heterosocial activities. Girls who are more involved in mixed-sex social activities are more likely to exhibit disordered eating tendencies, and this effect is stronger among girls who have experienced menarche. Also, girls who are dating and are more physically involved with boyfriends are more likely to report dieting and disordered eating than are their peers. An interaction between dating and menarcheal status was observed in the prediction of dieting and disordered eating, with dating more strongly linked to dieting and disordered eating among girls who have recently experienced menarche.

The prevalence of disordered eating among young U.S. women has increased markedly over the past several decades. At any one time, between one half and two thirds of all high school girls in the United States are on a diet, many of them unnecessarily (Rosen & Gross, 1987; Rosen, Tracey, & Howell, 1990). Stereotypical standards of beauty and social success transmitted through advertising and other mass media are often blamed for the prevalence of dieting and disordered eating among young U.S. women (Striegel-Moore, Silberstein, & Rodin, 1986). This account, however, does not explain why some young women develop eating disorders, whereas others, exposed to the same mass media, do not. The present study investigates the joint importance of two developmental factors believed to affect dieting and disordered eating in adolescence—pubertal maturation and socializing with members of the opposite sex—in a population of young adolescent girls.

According to Attie and Brooks-Gunn (1989), a developmental perspective considers eating problems during adolescence by placing them in the "context of challenges confronting individuals during this life phase" (p. 70). These challenges include pubertal development, the psychological and social changes that accompany it, and the process of moving into adulthood through increasing psychological autonomy from parents. A developmental framework may better explain why many eating problems generally arise during adolescence, because this is the

phase of life in which so many physical and psychosocial challenges converge (Attie, Brooks-Gunn, & Petersen, 1990).

The present study begins from the premise that eating problems in young girls develop as a result of interactions between two distinct aspects of adolescent development: the specific challenges of puberty and the psychological and social challenges of early adolescence. Understanding the ways in which social factors and biological factors can interact in determining developmental outcomes is an issue of great importance to researchers and clinicians alike.

During puberty, girls undergo numerous physiological changes, predominant among them is a significant increase in body fat. This increase, which averages 24 lb (11kg; Young, Sipin, & Roe, 1968), leads many adolescent girls to become concerned about their body image, as they see it departing from what they perceive as ideal (Striegel-Moore et al., 1986). Consequently, girls become likely to diet in an attempt to return to a thinner, prepubertal physique (Brooks-Gunn, 1987; Dornbusch et al., 1984; Gralen, Levine, Smolak, & Murnen, 1990; Simmons & Blyth, 1987). It is interesting that although psychosocial influences play a dominant role in the onset of eating disorders late in adolescence, physical variables are more predictive of eating problems during early adolescence (Attie & Brooks-Gunn, 1989). The timing of puberty is also an important consideration: Girls who mature early are at relatively greater risk of developing eating problems (Graber, Brooks-Gunn, Paikoff, & Warren, 1994), in part because their weight gain tends to be a larger fraction of their total body weight (Attie & Brooks-Gunn, 1989) and in part because they are heavier and more dissatisfied with their figures than are late maturers (Simmons & Blyth, 1987). In any case, however, one would hypothesize that dieting is more prevalent among girls who are still adjusting to the pubertal gain in body fat than among those who either are prepubertal or who have had sufficient time to adapt to the bodily changes of puberty.

Although pubertal maturation has been implicated in the onset of girls' eating problems, the relation between pubertal mat-

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uration and disordered eating may be due not to puberty per se but to other developmental changes that coincide with physical maturation. One such developmental change that generally accompanies puberty is the onset of heterosocial activity, including participation in mixed-sex social activities, the beginning of formal dating, and initial experimentation with sex. In the contemporary United States, girls typically begin to date between the ages of 12 and 13, which is also the average age of menarche in this country. Further evidence for the co-occurrence of dating and pubertal maturation is research indicating that the onset of dating occurs earlier among early versus late maturers (McCabe, 1984; Simmons & Blyth, 1987).

It is important to consider the effects of dating and other types of heterosocial activity on the eating behavior of early adolescent girls, for two reasons. First, there is a strong relation between girls' interest in opposite-sex popularity and their concern with appearance, body weight, and body shape (Simmons & Blyth, 1987). Contemporary U.S. society values thinness among women, and many adolescent girls view dieting as an important part of maintaining or enhancing their attractiveness to adolescent boys. Second, dating may increase young adolescents' vulnerability to depressed affect, which may in turn increase their risk for developing eating problems (Graber et al., 1994). Although one might assume that dating would increase girls' self-esteem, studies have found the reverse, at least among young adolescents: Junior high school girls who date have lower self-esteem than other girls (Simmons & Blyth, 1987). Barnett, Biener, and Baruch (1987) hypothesized that success in dating may actually signal movement from a focus on self and autonomy to a focus on pleasing others and, consequently, to a loss of autonomy and of one's sense of personal control.

Within a population of early adolescent girls who have begun socializing with boys, there is wide variability in the types and degree of heterosocial involvement observed, ranging from participating in mixed-sex group activities to having a "steady" boyfriend with whom one has a sexual relationship. The present study examines the effects on dieting of three different aspects of heterosocial activity. First, we consider social involvement in mixed-sex activities (e.g., going to parties where boys are present, going out in groups with boys). Second, we consider dating, as indexed by going out as a member of a couple. Finally, we consider physical involvement with boys (e.g., holding hands, kissing, petting). We predict that higher levels of involvement in all three respects will be associated with increased dieting behavior and, moreover, that these effects will be greater among girls in pubertal transition (i.e., those who have recently undergone menarche).

## Method

### Sample

The sample consisted of 7th- ( $N = 58$ ,  $M$  age = 12.2 years,  $SD = 0.5$ ) and 8th- ( $N = 31$ ,  $M$  age = 13.1 years,  $SD = 0.4$ ) grade girls. Fifty-seven (7th grade  $N = 38$ , 8th grade  $N = 19$ ) attended a public junior high school in suburban New Jersey, and 32 (7th grade  $N = 20$ , 8th grade  $N = 12$ ) attended a private school in a suburban area of California. The majority of the participants were White (85%), whereas the rest of our sample consisted of Asian Americans (8%), African Americans (1%), and adolescents from other ethnic groups (6%). On the basis of parent

education level, the majority of our sample came from middle-class backgrounds (65% of fathers and 58% of mothers had obtained a college degree or better), whereas only a small portion were from lower-class families (6% of fathers and 2% of mothers had not completed high school). Of our sample, 76% came from two-parent, nondivorced families, whereas 24% were from divorced or separated families.

### Procedure

The data for the present study come from questionnaires administered as part of a larger research program on adolescent attitudes and behaviors. A letter explaining the purpose and procedures of the study was mailed to the parents of all potential participants. Parents could withhold consent by returning a form enclosed with the letter to either the researchers or the school. Students were informed that their participation in the study was voluntary and that they could withdraw at any time. Of the potential participants, 5% were withdrawn from the study by their parents, and 7% were absent on the day of the study. The questionnaire was administered during regular class periods; two members of the research team were present to distribute questionnaires and ensure that all answers were voluntary and confidential.

### Measures

The questionnaire contained a wide array of items concerning family background (including parent education, a proxy for socioeconomic status), psychosocial functioning, family and peer relations, and problem behavior. Of particular interest for the present analyses are our measures of menarcheal status, dieting, social involvement, dating, and physical involvement.

**Menarcheal status.** Participants were asked three questions specifically related to their menarcheal status. The first was a forced-choice question: "Have you had your period yet?" The next two questions concerned duration and regularity of menstruation, asking girls how long ago their first period occurred (less than 6 months ago, 6–12 months ago, or more than 12 months ago) and asking them to describe their monthly cycle (one period only, not every month, or every month). On the basis of their responses, participants were categorized as either (a) premenarcheal (have not yet had their first period), (b) menarcheal (had their first period less than a year ago), or (c) postmenarcheal (had their first period over a year ago). A number of researchers have verified that adolescent girls report their age at menarche accurately (Bean, Leeper, Wallace, Sherman, & Jagger, 1979; Brooks-Gunn, Warren, Rosso, & Gargiulo, 1987; Caspi, Lynam, Moffitt, & Silva, 1993; Petersen, 1983). For purposes of the analyses performed below, menarcheal status was dummy coded into two variables describing whether a subject is premenarcheal and whether a subject is menarcheal.

**Dieting and disordered eating.** Participants were asked if they were currently trying to lose weight (yes or no) and were categorized as either dieters or nondieters on the basis of their response to this question. The external validity of this question was established by Rosen and Gross (1987); who used parents, siblings, and friends to corroborate adolescents' dieting behaviors. Parents agreed with adolescents' self-report 82% of the time, and siblings and friends agreed 76% of the time.

The Eating Attitudes Test-26 (EAT-26), which is an abbreviated version of the 40-item EAT, was used to measure disordered eating (Garner & Garfinkel, 1979; Garner, Olmsted, Bohr, & Garfinkel, 1982). The format requires participants to respond on a 6-point scale (ranging from *always to never*) to how often they agree with a series of 26 statements. The most symptomatic response receives a score of 3, the second most symptomatic response receives a 2, the third a 1, and the rest are scored as zeroes. Although it is possible to use the EAT-26 scale to identify individuals who suffer from a clinical eating disorder, in a community sample of early adolescents, the prevalence of eating disorders that

meet standard diagnostic criteria is quite low. In the present study, therefore, we use the EAT-26 scale simply as a continuous measure of disordered eating tendencies, with higher scores indicating more disturbed dieting behaviors.

The items of the EAT-26 cluster into three factor analytic subscales that assess a broad range of symptoms of anorexia nervosa and bulimia nervosa. The first factor, Diet, includes items indicative of dieting behavior and a drive for thinness (e.g., "I am on a diet much of the time" and "I am preoccupied with the desire to be thinner"). The second factor, Bulimia and Food Preoccupation, contains items related to bingeing and vomiting (e.g., "I have the impulse to throw up after meals" and "I have gone on eating binges where I feel that I may not be able to stop eating"). The third factor, Oral Control, reflects perceived social pressure to gain weight (e.g., "I feel that others pressure me to eat" and "I take longer than others to eat meals"). For the present analyses, total EAT-26 scores were used (in our sample,  $\alpha = .88$ ).

**Heterosocial activity.** Three aspects of heterosocial activity were assessed. A modified version of the Silverberg and Steinberg (1990) heterosocial scale was used to measure social involvement. Participants were asked how often during the past year they had engaged in various activities, including going out in groups to the mall or to the movies, going to school dances, and going to parties where boys and girls were present. Participants could respond to each item with four choices: 0 (*never*), 1 (*once or twice*), 2 (*three to seven times*), or 3 (*eight or more times*). Responses to six such items ( $\alpha = .87$ ) were summed to create a scale of social involvement ranging from 0 (*not involved*) to 18 (*very involved*).

Dating was defined in the questionnaire as "going out with a boy either alone or with other couples." Participants were asked, "If you have ever had a date, how old were you on your first date?" Participants could respond that they have never had a date (these participants were classified as nondaters) or with the age at which they began dating (these participants were classified as daters).

In addition to the activities mentioned above, participants were asked how often they had had a special boyfriend, held hands with a boyfriend, kissed a boyfriend, and "gone farther" than kissing with a boyfriend. Responses to these items ( $\alpha = .93$ ) were used to index physical involvement. Adolescents were categorized into one of four physical involvement groups, defined as (a) nondaters (have never dated), (b) innocent daters (have dated, but not held hands, kissed, or gone farther than kissing), (c) experimenting daters (have dated, and held hands or kissed, but not gone farther than kissing), and (d) serious daters (have dated, held hands, kissed, and gone farther than kissing).

## Results

### Plan of Analyses

Hierarchical logistic regression analyses were used to assess the effects of various factors on the dichotomous dieting variable, and standard hierarchical regression analyses were used to assess effects on the continuous EAT-26 variable. We controlled for the effects of chronological age by entering age as the first independent variable in each analysis. (This ensures that any observed differences among participants in different menarcheal or heterosocial categories are not simply a reflection of differences in age.) Analyses initially were performed for each school individually to check for school effects. In all cases, the results of individual school analyses were consistent with analyses of the entire sample. We therefore report only the results of analyses of the entire sample. For each of our three heterosocial activity variables (social involvement, dating, and physical involvement), analyses were performed using the following independent variables: (a) age, (b) menarcheal status (coded as a

Table 1  
*Characteristics of the Study Sample*

Variable	n	% dieting	EAT	
			M	SD
Dating				
Yes	40	60	13.22	9.90
No	48	29	7.85	6.93
Menarcheal status				
Premenarcheal	40	33	9.37	6.86
Menarcheal	19	63	12.37	9.80
Postmenarcheal	24	50	10.96	10.24

Note. EAT = Eating Attitudes Test.

three-level categorical variable, premenarcheal, menarcheal, or postmenarcheal), (c) heterosocial activity, and, finally, (d) the menarche-heterosocial activity interaction. Table 1 provides general descriptive statistics for the sample.

Age alone showed no significant relation to current dieting behavior but showed a marginally significant relation to EAT-26 scores,  $\beta = .214$ ,  $t(1, 81) = 1.98$ ,  $p < .06$ , with older girls exhibiting higher scores. With age in the equation, menarcheal status was not a significant predictor of EAT-26 scores. There was a borderline relation between menarcheal status and dieting behavior, however: Menarcheal girls tended to be more likely to be dieting than their pre- or postmenarcheal peers ( $b = .98$ ,  $\chi^2 = 3.26$ ,  $p = .071$ ).

### Social Involvement, Dieting, and Disordered Eating

With age and menarcheal status already accounted for, logistic regression analyses revealed no significant effect of social involvement on current dieting behavior. Social involvement did, however, predict higher EAT-26 scores, with disordered eating more common among girls who are more socially involved than among those who are not active socially,  $\beta = .274$ ,  $t(4, 78) = 2.521$ ,  $p < .05$ . In addition, a significant interaction between social involvement and menarcheal status (specifically, whether the participant is premenarcheal) was also observed,  $\beta = -.863$ ,  $t(6, 76) = -2.11$ ,  $p < .05$ , with the effect of social involvement on EAT-26 scores stronger among menarcheal and postmenarcheal girls than among premenarcheal girls.

### Dating, Dieting, and Disordered Eating

Girls who date are significantly more likely to be dieting, even after taking into account the effects of age and pubertal status ( $b = 1.37$ ,  $\chi^2 = 7.39$ ,  $p < .01$ ). An interaction between dating and menarche was also observed, with dating being most predictive of current dieting status among menarcheal girls ( $b = 3.45$ ,  $\chi^2 = 4.61$ ,  $p < .05$ ). As expected, girls who were both dating and in the midst of menarche were the most likely to be dieting.

Regression analyses indicate that girls who date are more likely to exhibit disordered eating tendencies than girls who do not date,  $\beta = .272$ ,  $t(4, 78) = 2.41$ ,  $p < .05$ . A significant interaction between puberty and dating was also observed,  $\beta = 1.25$ ,  $t(6, 76) = 2.00$ ,  $p < .05$ , with the effect of dating on disor-

dered eating being stronger among menarcheal girls than among premenarcheal or postmenarcheal girls.

### *Physical Involvement, Dieting, and Disordered Eating*

Logistic regression analyses indicate that girls who are more physically involved with boyfriends are significantly more likely to be dieting, even after taking into account the effects of age and menarcheal status ( $b = .570$ ,  $\chi^2 = 5.82$ ,  $p < .05$ ).

\* Physical involvement also predicted higher EAT-26 scores, indicating that disordered eating is more likely among girls who are physically involved with their boyfriends than among those who are not,  $\beta = .435$ ,  $t(4, 69) = 3.65$ ,  $p < .001$ . The interaction between physical involvement and menarcheal status in the prediction of dieting and EAT-26 scores was not significant, however, indicating that physical involvement and dieting behavior are similarly associated among girls at different stages of puberty.

### Discussion

Previous studies have suggested that girls who are in the midst of the pubertal changes accompanying menarche are more likely to engage in dieting behaviors than are premenarcheal or postmenarcheal girls (Attie & Brooks-Gunn, 1989; Gralen et al., 1990). The present study, however, indicates that although menarcheal status may, indeed, affect dieting and disordered eating, it does so mainly as a moderator of the dependence of dieting and disordered eating on girls' heterosocial activity. More specifically, dating is most strongly correlated with dieting and disordered eating tendencies among girls who have recently experienced menarche. These findings are consistent with those of Levine and Smolak (1992) and Smolak, Levine, and Gralen (1993), who reported that girls for whom puberty is synchronous with the onset of dating are at risk of developing abnormal eating behaviors.

Although previous studies also have identified links between dieting and dating, this study is the first to examine the particular role of physical involvement with a boyfriend as a predictor of dieting behavior. Our findings indicate that physical involvement with a boyfriend, in particular, increases the likelihood of dieting and disordered eating among adolescent girls. It is interesting that the association between physical involvement and dieting behavior is not moderated by menarcheal status. We suspect that girls who are sexually active with their boyfriends (even at these early stages of sexual activity and even among premenarcheal girls) are especially likely to be concerned about their physical appearance, particularly when such sexual activity is relatively new, as is likely among suburban 7th and 8th graders.

The fact that sexual activity (however innocent) is correlated with more symptoms of disordered eating is especially interesting, inasmuch as adults with eating disorders tend to be less sexually active (e.g., Brumberg, 1989; Johnson & Pure, 1986; Strober, 1986). It thus appears that physical involvement in early adolescence leads to increased concern about appearance and attractiveness, but that when this concern becomes so great that it leads to disordered eating, the end result may be a diminution of the very activities that may have contributed to the

disorder in the first place. The details of when and how this shift in emphasis from interest in sexual activity to feelings of sexual inadequacy occurs among women with clinical eating disorders remain to be determined, but establishing the point at which this shift occurs may be critical in understanding the developmental antecedents, course, and consequences of disturbed eating.

Involvement in mixed-sex social activities increase girls' likelihood of exhibiting disordered eating tendencies, and this effect is stronger among girls who have experienced menarche than among those who have not. The weight gains of puberty may make girls more susceptible to social pressures to appear attractive; alternatively, a more mature appearance itself may lead more mature girls to feel pressures to be "sexy" more strongly than those who are less physically mature.

Although this study breaks new ground by considering the effects of early, noncoital sexual involvement on adolescent dieting behavior, it is limited by its small sample size, predominantly White middle-class population, and cross-sectional design. We do not know if dieting or disordered eating precede, accompany, or follow girls' involvement in dating, although given the clinical literature on sexual activity among women with an eating disturbance, we think it more likely that social and physical involvement with boyfriends increase dieting, rather than the reverse. The use of menarcheal status as a measure of pubertal development, although certainly appropriate, nevertheless provides a somewhat incomplete account of participants' overall physical status. In addition, although self-report measures of menarche, dieting, and dating are generally accepted as valid and reliable, they are based on participants' interpretations of the questions asked; interpretations of the terms *dating* or *going steady*, in particular, may be different in different ethnic and cultural groups. Also, the narrow range of ages sampled in this study (typically, 12–13 years old) causes measures of menarcheal status and pubertal timing to be essentially equivalent (a postmenarcheal girl who is the same age as a premenarcheal girl is by definition an earlier maturer). To a certain extent, our premenarcheal participants are comparatively late maturers, whereas our postmenarcheal participants are comparatively early maturers. One might thus conclude that menarcheal timing, rather than menarcheal status, moderates the effect of social activity on EAT-26 scores, with late maturers being least affected. On the other hand, our finding that membership in the middle category of menarcheal status produces the strongest dating–dieting link suggests that this effect is not due simply to differences in timing, but is in fact a result of recent menarche. (Otherwise, one is led to the nonsensical conclusion that dating leads to dieting among girls with average pubertal timing, but not among those who are early or late maturers.) A longitudinal, multimethod study on the developmental course of dieting that included repeated, detailed measures of girls' heterosocial activities as well as their physical development, in a diverse population of young adolescents, would provide much-needed information about the processes through which weight-reducing behaviors are incorporated into some adolescents' behavioral repertoire.

Only recently have studies begun to consider the roles of multiple factors concurrently in the prediction of dieting and disordered eating. Through such studies, including the present

one, it has become increasingly apparent that factors such as dating and menarcheal status are not simply additive in their effects on dieting behaviors, but that the importance of one factor is moderated by the other. Although dating increases the likelihood that girls will diet and show signs of disordered eating, dieting is related to dating most strongly among girls who have recently experienced menarche; at the same time, menarche is a strong predictor of dieting among girls who are socially active or dating, but not among those who have not begun mixed-sex social activities. Although the presence of an interaction does not, itself, answer the question of which variable is moderating which, it is our contention that dieting and disordered eating tendencies are determined primarily by social pressures, such as social activity, dating, and physical involvement with boyfriends, whereas pubertal development moderates the effects of these pressures by affecting an individual's susceptibility to them. The fact that our results are largely consistent with such a picture (in which social factors are moderated by physical ones) demonstrates the value of considering multiple convergent factors as predictors of dieting and disordered eating in early adolescence.

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