The Role of Self-Assessed Health in the Relationship Between Gender and Depressive Symptoms Among Adolescents

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Objective: To examine the concurrent and longitudinal relations between gender, self-assessed health (SAH), and depressive symptoms among adolescents.

Method: Two measures of SAH (physical symptom reports and global health ratings) and a measure of depression were completed on two occasions over two years by 232 adolescent boys and girls.

Results: Physical symptom reports were related to depressive symptoms both concurrently and longitudinally. Longitudinal path analysis revealed a significant path from gender to physical symptom reports (Wave 1) to depressive symptoms (Wave 2). Although global health ratings were related to depressive symptoms concurrently, the prospective relation was not significant in the cross-lagged path model.

Conclusions: These findings suggest that the development of poorer SAH, particularly the perception of physical symptoms, may place adolescent girls at risk for subsequent depressive symptoms. Potential mechanisms for the SAH-depression relationship are discussed.

Key words: adolescence; gender; physical symptoms; self-assessed health; depression.

Adolescence is typically considered a period of development characterized by excellent health. Hence, we often assume that physical illness and its sequelae do not pose significant problems for adolescents. Perhaps because of this assumption, there has been a relative lack of research on the effects of physical illness in this age group (Williams, Holmbeck, & Greenley, in press) or on the mechanisms by which individual differences (e.g., gender; Sweeting, 1995) influence self-assessed health (SAH) among adolescents. Recently, however, Lewinsohn and colleagues (Lewinsohn et al., 1994; Lewinsohn, Seeley, Hibbard, Rohde, & Sack, 1996) identified self-reported physical illness and functional disability due to illness as risk factors for depression in adolescents. Because gender differences in both depression and SAH emerge in adolescence, an examination of the interrelations among these variables seems warranted. This study examined the relations among gender, depressive symptoms, and SAH in the context of a longitudinal study of normal adolescent development.

Depression and Health

Depression has been related to higher reports of both chronic and acute illness (e.g., Katon & Sullivan, 1990; Levenson, Hamer, Silverman, & Rossiter, 1987). More-
over, self-reported physical illness is a factor that distinguishes individuals with and without major depressive disorder in both adults (Rohde, Lewinsohn, & Seeley, 1990) and adolescents (Lewinsohn, Gotlib, & Seeley, 1995; Rohde, Lewinsohn, & Seeley, 1994). Among adults, depression and perceived illness appear to be reciprocally related: Self-reported physical morbidity is a strong predictor of later depression; depression in turn has a weaker, but statistically significant lagged effect on subsequent physical illness reports (Aneshensel, Frerichs, & Huba, 1984). Among adolescents, both reports of physical disease and functional impairment due to disease are risk factors for future major depressive disorder, and major depressive disorder is a risk factor for future disease and impairment due to disease (Lewinsohn et al., 1996). The mechanism for the interrelationship between depression and illness is not fully understood. Current evidence suggests that biological (e.g., immune system disruption), behavioral (e.g., health practices), cognitive (e.g., perception and interpretation of symptoms), and social (e.g., alteration of social roles) factors may play a role (Cohen & Rodriguez, 1995).

Gender Differences in Depression and Self-Assessed Health

The well-documented gender difference in depression among adults is thought to first emerge in adolescence (Nolen-Hoeksema, 1990). By the age of 15, girls and women are about twice as likely to be depressed as boys and men (Nolen-Hoeksema & Girgus, 1994). A recent 10-year study of depression in adolescents reported that gender differences first emerged between the ages of 13 and 15 and peaked between the ages of 15 and 18 (Hankin et al., 1998). Similar to depression, there are significant gender differences in SAH and related self-regulatory behavior among adults. Women rate their health more poorly, report more physical symptoms, take more sick days from work, make more physician visits, and take higher levels of prescription and nonprescription medication compared to men (National Center for Health Statistics [NCHS], 1994; Verbrugge, 1985). It appears that gender differences in SAH are first evident in early adolescence (Lewinsohn, Gotlib, & Seeley, 1997; Sweeting, 1995).

A variety of hypotheses have attempted to explain gender differences in physical morbidity. However, there has been a relative dearth of empirical research investigating potential mechanisms and no current hypothesis appears to be definitive (Gijsbers van Wijk & Kolk, 1997). For example, when biological differences (e.g., reproduction-related health problems and physician visits) are controlled, women still exhibit more morbidity (Verbrugge, 1985), indicating that psychosocial variables likely play a role. Unfortunately, research examining the emergence of gender differences in SAH in adolescence has been scant, and the role of psychological factors (e.g., mood, self-concept, willingness to report illness/seek help) has been virtually ignored (Sweeting, 1995).

Prospective Relations Among Gender, Health, and Depression

Although the emergence of gender differences in both SAH and depressive symptoms around the time of puberty has been demonstrated, little is known about the direction of causal relationships among these variables. For example, it may be that girls report more depression because of their poorer perceived health, or it may be that their higher rates of depression lead to greater reports of physical symptoms, or both. Reinherz et al. (1993) reported that the onset of health problems between ages 10 and 15 was a significant antecedent risk for later depression among adolescent girls; however, mediation was not formally tested. Nevertheless, the pattern of findings suggests that gender differences in perceived physical health may precede the gender shift in depression. Thus, one pathway to depression for women and girls may be via poorer SAH. To test this hypothesis, this study examined the reciprocal relations between depressive symptoms and SAH over two time points in a longitudinal sample of adolescents (see Figure 1).

Method

Sample and Procedures

The sample consisted of 103 boys and 129 girls who participated in a longitudinal study of the experiences of adolescents (Larson & Richards, 1989). Participants were randomly selected from four elementary and junior high schools; two of the schools were located in a working class, blue-collar suburb of Chicago, whereas the other two schools were located in a middle-class community. Stratified random sample selection was utilized to ensure equivalent representation of gender, grade, community, and season of data collection in the original sample. All participants were Caucasian, reflecting the ethnic composi-
tion of the communities from which they were sampled. For this research, the variables of interest were assessed at the second and third assessments of the larger longitudinal study (henceforth referred to as Waves 1 and 2). Participants were in grades 7 through 10 for Wave 1 of this report (mean age in years = 13.7, \(SD = 1.2\), range = 11–16) and in grades 9 through 12 at Wave 2 (mean age in years = 15.6, \(SD = 1.3\), range = 13–18). At each wave, participants completed questionnaires in a group format in schools, with examiners present to clarify questions if necessary. Informed consent was obtained from both the adolescents and their parents.

There were missing data because of absenteeism when surveys were administered or attrition. Reasons for attrition included refusal or failure to obtain parental permission to participate, family moves, and two cases of death of the child (Larsen, Richards, Monetta, Holmbeck, & Duckett, 1996). Of the 232 participants included in the study, 82 (35.3%) were not surveyed at Wave 2. The effect of missing data on study variables and demographics was examined by comparing participants with complete data with those with missing data. Compared to participants with complete data, those with missing data rated their global health more poorly at Wave 1 (\(t[230] = 3.102, p < .01\)). Sex of the adolescent and depression were marginally related to missingness (\(\chi^2[1, N=232] = 2.85, p = .09\), \(t[230] = 1.75, p = .08\), respectively). There were no differences between the groups on mean level of physical symptoms at Wave 1 (\(t[230] = 1.19, p = .24\)) or on school grade (\(t[230] = -.81, p = .42\)). The data analytic strategy used in the study permitted the inclusion of all possible cases (\(N = 232\)) (vs. a listwise deletion procedure). This helped minimize the potential for biased results that can occur in the presence of missing data (see Results section for a more detailed discussion of the missing data strategy).

**Measures**

**Depressive Symptoms.** Depression is typically viewed in terms of three constructs: depressive mood, depressive syndromes, and depressive disorders (Compa, Ey, & Grant, 1993). Because this was a sample of normal adolescents, this study assessed the continuum of depressive symptoms and not clinical depression. Participants completed a 14-item version of the Children's Depression Inventory (CDI; Kovacs, 1985) modeled after the short form of the Beck Depression Inventory (BDI-SF; Beck & Beck, 1972) at Waves 1 and 2. The CDI is a self-report scale that quantifies a variety of depressive symptoms (e.g., perceived mood, vegetative functions, self-evaluation). It has demonstrated a strong relationship to clinical interview measures of children's depression (Garber, 1984). Coefficient alphas were .81 and .71 for Waves 1 and 2, respectively. The correlation between the 14 items of the short form and the full 27-item version was .93 in Wave 1 of this data set (only the 14-item version was given at Wave 2). Items were averaged to form scale scores. Items are presented as a choice of three sentences that receive scores of 0, 1, or 2, with higher scores indicating more severe depressive symptoms (e.g., 0 pts: “I have fun in many things”; 1 pt.: “I have fun in some things”; 2 pts.: “Nothing is fun at all”).
Global Health Ratings. Global health ratings were assessed at each time point using the standard single-item format: “How would you rate your physical health” with a 5-point response scale from “excellent” to “poor.” Lorig et al. (1996) report the test-retest reliability on this item over a 10-day interval to be .92 in a sample of adults. This single item has been shown to be a strong predictor of physical morbidity and mortality (Idler & Benyamini, 1997). This item exhibited a modest, significant correlation with physical symptom reports at both waves of this study (see Table I), indicating that these are related, though independent measures of SAH.

Physical Symptom Reports. At each time point, participants rated the extent to which they had experienced 15 commonly occurring physical symptoms (headache, coughs, sore throat, muscular aches and pains, stomach ache, earache, congested or stuffy nose, constipation, vomiting, bad acne, skin rashes, diarrhea, weight change, allergies, and breathing trouble) over the previous 3 months. Each symptom was rated on a four-point scale: never, once or twice, occasionally, once a week or more. These symptom items are consistent with those used in previous studies of adolescent health (Mechanic & Hansell, 1987; Wickrama, Lorenz, & Conger, 1997) and did not overlap with the CDI items. Items were averaged to form a scale score such that higher scores indicate more frequent experience of physical symptoms.

Results

Descriptive Analyses

Item means (average rating per item), standard deviations, and correlations among study measures appear in Table I. On average, participants endorsed relatively low levels of depressive symptoms (scale means = 4.6 and 5.5 for each wave, possible range = 0 to 28) and physical symptoms (scale means = 12.3 and 12.6, possible range = 0 to 45), consistent with the nonclinical nature of the sample. On average, participants rated their overall health between “good” and “very good.” Cross-sectional correlations suggested that high levels of depressive symptoms were associated with more frequent physical symptoms and with poorer ratings of global health. These relationships were also evident from the prospective correlations. Finally, depressive symptoms, frequency of physical symptoms, and global health ratings were all moderately stable.

Path Analyses

Cross-lagged path models were used to evaluate the prospective relationships between the health variables and depressive symptoms and our mediational hypotheses. Separate path models were run for frequency of physical symptoms and global health ratings because of the significant correlation between these two variables ($r = .46$ at Wave 1 and $r = .28$ at Wave 2, both $p < .01$). The hypothesized model is presented in Figure 1. When the pattern of findings was suggestive of one of our hypothesized mediational pathways, we tested whether the path was significantly different from zero using the delta method (Sobel, 1988).

As with most prospective studies, data for some participants were not available at both waves of assessment. Analyzing only cases with complete data has the potential to produce biased results (Muthén, Kaplan, & Holllis, 1987). Therefore, we wanted to reduce the potential bias in our findings by analyzing the total sample ($N = 232$). To do this, we estimated our path model using full-information maximum likelihood estimation. This estimation procedure does not impute data; rather, it breaks the likelihood
function down into components based on patterns of missing data, which allows estimation to proceed using all available data (for a more in depth discussion of this approach to missing data, see Arbuckle, 1996). The path models were estimated in Mplus 1.4 (Muthén & Muthén, 1998). To implement full-information maximum likelihood estimation, intercepts (for endogenous variables) and means (for the exogenous gender variable) were estimated. Because of the relatively low levels of depressive symptoms and physical symptoms in this nonclinical sample, square root transformation (Neter, Wasserman, & Kutner, 1990) was used to reduce skew in the study variables.

There was significant age variability in our sample. Therefore, preliminary analyses tested whether age moderated relationships between the health variables and depressive symptoms and the effects of gender on depressive symptoms and the health variables. To do this, two age cohorts (7th/8th graders and 9th/10th graders at Wave 1) were created and the path models were compared across these two groups. Nested model comparisons suggested that only 1 of 16 path coefficients differed across the age cohorts. Although significant in both cohorts, the stability of the frequency of health symptoms was stronger for the younger than older cohort (path coefficients = .68 and .49, respectively, p < .01). All other paths and covariances were equivalent in both the frequency of health symptoms and the health ratings models. In subsequent analyses, the younger and older cohorts were combined.

In addition, we tested whether our path models were different for boys and girls. To do this, nested model comparisons were used to compare our cross-lagged model across gender. These nested comparisons suggested that the path models were equivalent for boys and girls, which is consistent with other findings (Anheuser et al., 1984; Lewinsohn et al., 1994).

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Physical Symptoms. First, we tested the prospective relationships between frequency of physical symptoms and depressive symptoms and the effect of gender on these variables. The path coefficients for significant paths in this model are presented in Figure 2. Both depressive and physical symptoms were stable over time. Gender predicted physical symptoms at both time points and marginally predicted depressive symptoms at Wave 1. Girls reported a higher frequency of physical symptoms and marginally higher levels of depressive symptoms. Higher reported frequency of physical symptoms predicted higher levels of depressive symptoms 2 years later. However, depressive symptoms did not prospectively predict physical symptoms. These findings suggest that physical symptoms at Wave 1 might mediate the relationship between gender and depressive symptoms at Wave 2. This mediational path was significant (Z =

\[ Z = \text{significant} \]
Global Health Ratings. Second, we tested the prospective relationships between global health ratings and depressive symptoms and the effect of gender on these variables. Gender predicted global health ratings (path coefficient = .17, p < .001) and, to a lesser extent, depressive symptoms (path coefficient = .11, p < .10) at Wave 1. Girls reported somewhat higher levels of depressive symptoms and rated themselves in poorer health than boys. Neither cross-lagged path was significant (path coefficients = .05 and .06, ps > .10). Thus, our mediational hypotheses were not supported for global health ratings and depressive symptoms. Although the cross-sectional correlations (Table I) indicate a strong concurrent relation between depressive symptoms and global health ratings, the direction of causality cannot be determined with these data.

Discussion

This study is the first to directly examine reciprocal relations between gender, SAH, and depressive symptoms in a sample of adolescents. The 2-year lag in assessments of these variables and controlling for previous levels of depressive symptoms made this an extremely conservative test of causal relationships. Results suggest that adolescent girls’ perception of greater physical symptoms places them at risk for increases in subsequent depression. Consistent with previous research (Lewinsohn et al., 1996), reports of physical symptoms were related to depressive symptoms both concurrently and longitudinally. Moreover, the path from gender to physical symptom reports (Wave 1) to depressive symptoms (Wave 2) was significant. Thus, greater symptom reports among adolescent girls partially accounted for subsequent increases in depressive symptoms. The direction of these relationships is consistent with previous findings in adults over a shorter time frame (Aneshensel et al., 1984). Global health ratings, on the other hand, did not prospectively predict depressive symptoms but did bear strong concurrent relations to depression. It may be that global health perception is part of the generally negative self-perceptions that often accompany depressed mood.

Most previous accounts of the emergence of gender differences in depression in adolescence have not considered SAH among key factors, so it is unclear where health perceptions may fit into larger theoretical models of gender differences in adolescent depression. Lewinsohn and colleagues (Lewinsohn et al., 1994, 1996, 1997) suggest that a key mechanism for the relation between SAH and depression may be functional impairment. Thus, it may be that adolescent girls’ higher rates of perceived physical symptoms lead to restriction of important social or academic activities, which in turn leads to increases in depressed mood. Consistent with this notion, adult women exhibit greater levels of disability due to illness (e.g., sick days from work/school) (Verbrugge, 1985). Of relevance is research suggesting that, among adolescents, perception of competence across a variety of domains (e.g., social, scholastic, athletic) is related to depression (Harter & Whitesell, 1996). It is possible that poor SAH influences perceived competency in these important domains. One point of uncertainty, however, is whether women’s greater restriction of activities is related to greater actual illness compared to men or to gender differences in the propensity to assume the sick role. Empirical examination of gender differences in illness socialization in children has been scant; however, it has been suggested that girls may be socialized to more readily adopt sick role behavior than boys (Walker & Zeman, 1992).

Another possible mechanism for the physical symptom–depression relationship is that increases or fluctuations in physical symptoms among adolescent girls may lead to greater self-focused attention, which may make them vulnerable to depressed mood. Consistent with this notion, previous research has found a significant relationship between symptom reports and introspectiveness among adolescents (Hansell & Mechanic, 1985). Moreover, self-consciousness is a psychosocial variable linked to depression in adolescents (Chen, Mechanic, & Hansell, 1998; Lewinsohn et al., 1997) and adults (Ingram, 1990). Additionally, coping strategies characterized by focusing inward on negative mood states (i.e., rumination), as opposed to engaging in distraction strategies, are thought to enhance and perpetuate depressed mood states (Nolen-Hoeksema, Morrow, & Fredrickson, 1993). Although gender differences in trait measures of self-focused attention

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2 The path model was also run using only participants who had complete data at both time points (N = 148). Results were comparable: sex was related to symptoms at Wave 1, path coefficient = .23, p < .05, which in turn were related to depressive symptoms at Wave 2, path coefficient = .20, p < .05. This indirect path was significantly different from zero, Z = 1.963, p < .05. Depressive symptoms were not prospectively related to physical symptoms, p > .10.
are not consistently found, the relation between self-focused attention and symptom reports appears to be stronger for girls and women (Williams & Wiebe, 2000). Future research should attempt to clarify the role of self-focused attention in the relationship between gender, SAH, and depressed mood.

The potential relations between SAH and other hypothesized risk factors for depressed mood deserve mention. For example, early puberty relative to peers has been suggested as a risk factor for depressed mood among adolescent girls (e.g., Petersen, Sarigiani, & Kennedy, 1991). Recently, however, Wichstrom (1999) reported data suggesting that pubertal timing in and of itself does not appear to mediate the gender-depression relationship. Rather, dissatisfaction with appearance (which may co-occur with early pubertal timing) may be an important mechanism for the development of gender differences in depression. Given that both dissatisfaction with appearance and poorer SAH have now been linked to depressed mood in adolescent girls, the manner in which these two risk factors are related warrants empirical investigation.

In a review of the literature on the emergence of gender differences in depression during adolescence, Nolen-Hoeksema and Girgus (1994) conclude that an interactive model is best supported by the available data. Such an interactive model posits that girls possess characteristics or risk factors for depression prior to adolescence, but it is only in the face of the unique challenges of early adolescence that their higher rates of depression emerge. It is not clear how SAH fits into such a model. Current data do not indicate that girls have poorer SAH prior to adolescence (Sweeting, 1995). However, similar to the case of depression, girls may be predisposed to focus on symptoms or assume the sick role (i.e., are socialized differently than boys with respect to illness behavior) and it is only in conjunction with shifts in their physical symptoms during puberty that they begin to assess their health more poorly. That is, bodily changes (e.g., menarche, increases in body fat) that occur in early adolescence may interact with preexisting tendencies to produce a shift in SAH. These predisposing tendencies may be similar to those thought to influence the development of depression (e.g., ruminative coping, low sense of mastery; Nolen-Hoeksema, Larson, & Grayson, 1999), or it may be that gender differences in SAH emerge independently, but then serve to make girls vulnerable to concurrent and subsequent depression.

There are several important limitations to this study. Whereas depressive symptoms are a risk factor for the development of depressive disorders and have been linked to many of the same psychosocial problems (e.g., decreased quality of life) as clinical depression (Gotlib, Lewinsohn, & Seeley, 1995), generalization of these findings to clinical depression disorders should be made cautiously. Future research should replicate and extend these findings by including more comprehensive and objective measures of both health and psychopathology.

Conclusions based upon these findings are also limited by the relatively long time lag between study variables and by participant attrition. Although this provided a very conservative test of causal relations and statistical techniques were used to compensate for attrition, it is possible that stronger relationships between SAH and depressed mood would be found using a shorter time frame and participants with greater variability in the constructs of interest. Furthermore, our data suggest that gender differences in both SAH and depressed mood are already evident by the seventh grade. Future research attempting to capture the shift in both of these variables should target children before age 13. Finally, the sample was composed of Caucasian, middle-class adolescents. Study findings should be replicated with adolescents of varying ethnicity and socioeconomic status.

Despite these limitations, this study represents the first test of reciprocal relations between gender, SAH, and depressive symptoms. Findings of this study suggest that the emergence of gender differences in perceived physical symptoms in adolescence may have important ramifications for the development of higher levels of depressed mood among girls. Empirical examination of the consequences of poor SAH among adolescents has been relatively neglected. This study suggests that adolescence is a critical time point for studying the development of gender differences in both health perceptions and depression.

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