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Relation of female gender and low socioeconomic status to internalizing symptoms among adolescents: A case of double jeopardy?

Tamar Mendelson [1,*], Laura D. Kubzansky, Geetanjali D. Datta, Stephen L. Buka [2]

Harvard School of Public Health, Boston, MA, United States

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Abstract

Characteristics associated with disadvantaged social position, such as low socioeconomic status (SES) and female gender, may play a significant role in the development of internalizing symptoms among adolescents. Indeed, theories of ''double jeopardy'' suggest that these disadvantaged status characteristics interact to produce particularly harmful mental health outcomes. We tested the hypothesis that lower SES places adolescent females at greater risk for internalizing symptoms than males. We used data from the Project on Human Development in Chicago Neighborhoods collected from a 15-year-old adolescent cohort ($n = 640$) at baseline and at two-year follow-up. Female gender predicted internalizing symptoms cross-sectionally and prospectively, whereas household income and caretaker education generally were not associated with internalizing symptoms. Findings overall did not indicate interactive effects between gender and SES indicators. However, subgroups of females at the lowest levels of caretaker education and household income displayed increased risk for specific outcomes, including higher internalizing symptom levels at follow-up and maintenance of severe symptom levels from baseline to follow-up.

Keywords: Gender; Adolescence; Internalizing; Double jeopardy; Socioeconomic status (SES); USA; Gender; Mental health

Introduction

Internalizing symptomatology, which involves a clustering of depressive, anxiety, somatic, and withdrawal symptoms, often intensifies during adolescence as youth navigates dramatic social and physical transitions (Kovacs & Devlin, 1998). Internalizing difficulties during adolescence not only impair current functioning but can also confer risk for subsequent emotional and behavioral disorders (Kovacs & Devlin, 1998; Reinherz, Paradis, Giaconia, Stashwick, & Fitzmaurice, 2003). It is critical to identify adolescent

* Corresponding author. Present address: Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, MD, USA. Tel.: +1 410 502 6219; fax: +1 410 955 9088.

E-mail addresses: tmendels@jhsph.edu (T. Mendelson), lkubzans@hsph.harvard.edu (L.D. Kubzansky), gdatta@hsph.harvard.edu (G.D. Datta), stephen_buka@brown.edu (S.L. Buka).

[1] Tamar Mendelson was a Robert Wood Johnson Health and Society Scholar at the Harvard School of Public Health when she conducted this research.

[2] Present address: Brown University, Department of Community Health, Providence, R.I.

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populations most at risk for internalizing problems so that we may develop and implement intervention and prevention strategies that are effective for them. Understanding sources of psychological vulnerability and resilience among adolescents is key to this effort.

The extent to which social disadvantage factors independently and jointly shape trajectories of mental health development among adolescents merits attention in this context. Social disadvantage factors can be defined as characteristics of an individual's identity or circumstances (e.g., gender, race/ethnicity, and socioeconomic status) that limit his or her degree of absolute and relative social, economic, and political advantage. Social disadvantage has been found to predict increased stress among adolescents (Goodman, McEwan, Dolan, Schafer-Kalkhoff, & Adler, 2005), and social disadvantage factors may well play a significant role in the onset and development of internalizing symptoms among adolescents. Female gender and low socioeconomic status can each be conceptualized as indices of social disadvantage, and evidence suggests that each may be associated with internalizing symptomatology among adolescents (Goodman, 1999; Leadbeater, Blatt, & Quinlan, 1995).

Gender

By age 13, girls begin to develop significantly more depressive symptoms than boys, a gender gap that increases over adolescence (Hankin & Abramson, 2001). Clinical disorders associated with internalizing symptoms, such as depressive, anxiety, eating, and adjustment disorders, are also more prevalent among adolescent females than males (Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993). These trends persist into adulthood: epidemiological studies indicate that women are approximately twice as likely as men to suffer from depression and anxiety (Weissman et al., 1996).

Despite significant advances, females in the United States continue to be disadvantaged relative to males with respect to key status indicators (e.g., economic and political power). The extent to which gender differences in mental health may derive from status differentials—as opposed, say, to genetic or biological influences—remains unclear. However, research suggests that gender socialization practices, as well as increases in body image dissatisfaction and ruminative coping styles among adolescent girls, play a role in female vulnerability to depression (Hankin & Abramson, 2001). Such findings are consistent with the notion that gender-based social status may impact females' self-concept, coping strategies, and behaviors so as to increase vulnerability to certain types of mental health problems. One possible explanation for gender differences in mental health profiles is that lower social status may be associated with inwardly-directed (''internalizing''-type) manifestations of distress that do not directly challenge or threaten others (see Sloman, Gilbert, & Hasey, 2003). Primate research tends to support this hypothesis, indicating, for instance, that experimentally-manipulated lower social status is associated with behavioral responses that resemble depression (Shively, Laber-Laird, & Anton, 1997).

Socioeconomic status (SES)

SES is another social stratifying characteristic with relevance for a variety of health outcomes (Adler et al., 1994). Research indicates a socioeconomic gradient in adult mental health outcomes, with higher rates of depression at lower levels of SES (Bruce, Takeuchi, & Leaf, 1991; Lorant et al., 2003). Cross-sectional and prospective data generally indicate that low SES predicts higher levels of depressive and anxiety symptoms among adolescents (e.g., Conger, Ge, Elder, Lorenz, & Simons, 1994; Goodman, 1999; McLeod & Owens, 2004). Increased stress may account in part for the association between low SES and poor mental health outcomes among adolescents. Research indicates that social disadvantage predicts increased stress among adolescents (Goodman et al., 2005), which may in turn produce negative health outcomes via biological pathways. Psychological resources, such as optimism, may also potentially mediate between socioeconomic disadvantage and mental health. Evidence suggests that youth who grow up in less educated households are less optimistic, and this reduced optimism may account for higher levels of stress among lower-SES teens (Finkelstein, Kubzansky, Capitman, & Goodman, 2007).

Double jeopardy

Thus, previous research suggests that female gender and low SES may each independently contribute to the development of internalizing difficulties. Although joint effects of female gender and low SES have received far less attention, there are theoretical and empirical reasons to predict that these status factors in combination may have particularly deleterious mental health effects. Specifically, the *double jeopardy hypothesis* (Beale, 1970; Dowd & Bengston, 1978) suggests that two or more simultaneous sources of social disadvantage may interact to produce especially problematic outcomes. Thus, ill effects of SES may be more potent

for adolescent females than males. As McLeod and Owens (2004) have noted, the mechanisms underlying double jeopardy effects may derive from social evaluation processes (i.e., one's perceived self-worth as a function of social comparisons with others) (Cartwright, 1950; Gerth & Mills, 1953) and/or stress-based responses (i.e., lower-status individuals may experience more stressors but have fewer coping resources) (Aneshensel, 1992; Turner, Wheaton, & Lloyd, 1995).

How might female gender and low SES interact to increase risk for poor mental health? Adolescent girls may be more likely than boys to experience and/or be vulnerable to stressors that are more prevalent in low-SES environments. For instance, some data suggest that parental attachment and monitoring serve unique protective functions for girls with respect to internalizing and externalizing problems (Formoso, Gonzales, & Aiken, 2000). However, the likelihood of adequate parental monitoring appears to be reduced among socially disadvantaged and single-parent families (Pettit, Laird, Dodge, Bates, & Criss, 2001). Maternal depression, marital conflict, lower levels of optimism, single-parent households, violence exposure, and abuse are other factors that may be more prevalent in low-SES settings (e.g., Conger et al., 1994; Drake & Zuravin, 1998; Finkelstein et al., 2007; Stein, Jaycox, Kataoka, Rhodes, & Vestal, 2003) and which may impact girls' risk for internalizing symptoms to a greater extent than boys'.

Consistent with the double jeopardy hypothesis, research using adult samples suggests that low socioeconomic status in childhood may be associated with greater depression among women than men (Gilman, Kawachi, Fitzmaurice, & Buka, 2002), and low education may be associated with greater social and psychological disadvantage for women than men (Thurston, Kubzansky, Kawachi, & Berkman, 2005). Such effects may also be relevant for earlier developmental stages. For instance, data suggest that low socioeconomic status assessed at age 5 may have a more negative impact on risk for depressive, anxiety, and internalizing symptoms during adolescence for girls than boys (Leve, Kim, & Pears, 2005; Spence, Najman, Bor, O'Callaghan, & Williams, 2002).

We are aware of only a limited number of studies that have focused specifically on interactive effects of gender and socioeconomic status in predicting internalizing symptoms among adolescents. Previous findings in this area have been inconsistent. For instance, McLeod and Owens (2004) found mixed support for gender-SES double jeopardy effects among children followed from ages 10–11 through ages 14–15 in a nationally representative sample. Whereas poverty history predicted decreased school competence and self-worth more strongly for girls than boys, poverty predicted increased depression and hyperactivity for boys but not girls. By contrast, in a cross-sectional study by Schraedley, Gotlib, and Hayward (1999) the association of income with depressive symptoms did not vary significantly by gender among grade and high school youth. In a cross-sectional study in Finland, Frojd, Marttunen, Pelkonen, von der Pahlen, and Kaltiala-Heino (2006) found that perceived financial difficulties were associated with depression for both sexes, although perceived financial difficulties were more common among adolescent girls than boys. Similarly, Conger et al. (1994) found that economic pressure predicted increases in internalizing symptoms for both boys and girls from 7th through 9th grade. However, in a cross-sectional study using a somewhat older, all-White adolescent sample, Gore, Aseltine, and Colton (1992) found that girls had more depressive symptoms than boys in association with low parental education and low perceived standard of living.

Differences in developmental stage may partially explain these disparate findings. Given that gender differences in depressive symptoms become more pronounced over the course of adolescence and, as McLeod and Owens (2004) have noted, social status characteristics become more salient as children mature (Rosenberg & Pearlin, 1978), we might expect the combination of female gender and low SES to have more pronounced effects on internalizing symptoms at later stages of adolescence. Indeed, research on subjective perceptions of social status indicates a growing awareness of status by age 15 (Goodman et al., 2007). The studies reviewed above suggest double jeopardy effects for female gender and low SES may emerge among youth in mid- to late adolescence (Gore et al., 1992). However, to our knowledge this question has not been examined using longitudinal data from a racially and ethnically diverse adolescent sample.

The present study investigated the effects of gender and socioeconomic status on internalizing symptoms among a sample of adolescents in mid- to late-stage adolescence using both cross-sectional and prospective data. We used data from the Project on Human Development in Chicago Neighborhoods (PHDCN) collected from a racially and ethnically diverse 15-year-old adolescent cohort at baseline and at two-year follow-up. This sample included a large proportion of individuals with low socioeconomic position. Whereas McLeod and Owens used a parent-report measure of internalizing, we employed a self-report measure, given other work suggesting that caregiver characteristics may bias parent reports of youth functioning (Youngstrom,

Loeber, & Stouthamer-Loeber, 2000). We included two indices of socioeconomic status (household income and caretaker educational attainment) to provide a more nuanced assessment of the construct.

We were interested in assessing whether female gender and low SES each independently predicted internalizing symptoms and also in whether a gender-by-SES interaction effect would be evident, such that low-SES females would be at significantly higher risk for internalizing symptoms than females of higher SES levels or males. We used three sets of analyses to examine effects of gender and SES on internalizing symptoms. (1) We evaluated whether lower SES has more negative effects on internalizing symptoms for adolescent females than males at baseline and follow-up. (2) We explored the association of gender and SES with more severe symptom levels, hypothesizing that females at lower levels of SES might be at greater risk than males for maintaining or developing severe internalizing symptoms over the two-year follow-up. (3) We assessed gender differences among adolescents at the tail ends of the SES distribution for this sample. We hypothesized that individuals with neither type of social disadvantage (i.e., males of higher SES) have the fewest internalizing symptoms, whereas individuals with one type of disadvantage (either low-SES males or females of higher SES) would report more symptoms. The relative distress levels for these two groups with one social disadvantage factor depend on whether SES or gender is more predictive of distress in our sample. Because females with low SES have two disadvantaged status characteristics, we expected they would report the most internalizing symptoms.

Method

Design

The PHDCN is a multidisciplinary study of youth, families, and neighborhoods, involving a community survey and longitudinal cohort study component. (For a detailed description of PHDCN's design and methods, see Earls & Buka, 1997.)

Sampling

Using 1990 U.S. census data for the entire city of Chicago, investigators identified 343 neighborhood clusters (NCs), each with a population of approximately 8000 residents and which were similar with respect to socioeconomic and ethnic characteristics, housing density, and family structure. A probability sample of 80 NCs grouped according to seven levels of race/ethnicity composition and three average SES levels was selected from the 343 NCs for more intensive study. An overlapping cohort design was used to sample approximately 900 children within each of 7 age cohorts (birth and ages 3, 6, 9, 12, 15, and 18) from randomly selected households ($N = 6226$). From 1995–1996, home-based interviews were conducted with primary caregivers and children (Wave 1), and follow-up assessments were performed approximately two years later (Wave 2).

Participants

We used data obtained from adolescents and their caretakers in the 15-year-old cohort (Cohort 15) at Waves 1 and 2. Baseline data on internalizing symptoms, SES, and other psychosocial and demographic factors were obtained at Wave 1 from 696 adolescents in Cohort 15 and their caretakers. Two-year follow-up data on internalizing symptoms were obtained at Wave 2 from 557 adolescents (80.03%) of the original Cohort 15 sample. Adolescent nonresponders at Wave 2 did not differ from responders with respect to gender, per capita family income, caretaker educational attainment, or baseline levels of internalizing symptoms.

Given that the vast majority of adolescents identified themselves as African American, Hispanic, or non-Hispanic White, adolescents reporting other racial or ethnic identities ($n = 26$) were excluded from analyses to improve our ability to control for effects of race and ethnicity more precisely. When multiple adolescents were nested in a family, one was randomly selected for exclusion ($n = 3$). Listwise deletion was used for the other variables, with no more than 17 cases missing on any given variable. In total, 56 adolescents were excluded based on these considerations. The resulting baseline sample consisted of 640 adolescents. Only adolescents with both baseline and Wave 2 outcome data were used in prospective analyses; the Wave 2 sample consisted of 455 adolescents. The 56 individuals who were excluded did not differ significantly from the rest of the baseline sample with respect to gender, SES, or demographic factors. Table 1 displays sample demographic and psychosocial characteristics.

Measures

The *Youth Self-Report* (YSR; Achenbach, 1991) is a self-report measure of internalizing and externalizing symptoms over the past six months. The respondent is asked to report how well each item describes him or her, with 0 indicating "not true," 1 "somewhat or

Table 1
Demographic and psychosocial sample characteristics

Sample characteristic	Baseline frequency (%)	Baseline internalizing score (mean, S.D.)	Wave 2 internalizing score (mean, S.D.)
Race/ethnicity			
Latino	300 (46.88%)	14.23 (9.08)	13.02 (9.52)
African American	239 (37.34%)	12.34 (8.29)	11.77 (8.65)
Non-Latino White	101 (15.78%)	12.34 (7.62)	11.46 (7.38)
Family history of depression			
Yes	178 (27.81%)	14.12 (9.00)	13.45 (9.37)
No	462 (72.19%)	12.88 (8.44)	11.94 (8.76)
Caretaker marital status			
Married	334 (52.19%)	12.69 (8.29)	12.09 (9.13)
Single	221 (34.53%)	13.15 (8.37)	12.69 (8.84)
Partnered	85 (13.28%)	15.53 (10.08)	12.68 (8.62)
Caretaker education			
<12th grade	280 (43.75%)	14.02 (9.04)	13.21 (9.77)
12th grade	78 (12.19%)	13.14 (8.52)	13.13 (9.76)
>12th grade	258 (40.31%)	12.37 (8.21)	11.26 (7.51)
Missing	24 (3.75%)		
Annual per capita household income			
<$2500	145 (22.66%)	14.52 (8.63)	12.70 (9.44)
$2500–$4999	134 (20.94%)	12.76 (8.73)	12.71 (9.42)
$5000–$10,000	183 (28.59%)	12.19 (8.52)	11.58 (8.36)
>$10,000	148 (23.13%)	13.17 (8.51)	12.30 (8.89)
Missing	30 (4.69%)		
Gender			
Female	329 (51.41%)	15.87 (9.23)	14.77 (9.74)
Male	311 (48.59%)	10.43 (6.88)	9.71 (7.11)

sometimes true,'' and 2 ''very true or often true.'' This study used YSR data collected from youths at baseline and at Wave 2. We used only the internalizing subscale, which includes items assessing depression/anxiety, somatic complaints, and withdrawal. The internalizing subscale has demonstrated adequate psychometric properties (Achenbach, 1991; Achenbach & Rescorla, 2001). This includes a Cronbach's alpha coefficient of 0.90, an eight-day test–retest correlation of 0.89, and evidence of both criterion validity (correlation with clinical ratings) and construct validity.

Three items were removed from the internalizing subscale in Wave 2 due to low item-to-scale correlation. The resulting YSR internalizing scale is highly consistent with the current version of the YSR (Achenbach & Rescorla, 2001), including 27 of the original 32 items in the current scale (item differences consist of items introduced in the recent revised YSR, as well as those items dropped from Wave 2 as noted above). Scores from the reduced scale were used in this study. We used raw YSR scores instead of scaled scores because the latter involve adjustments based on gender, and we were interested in assessing relations of gender and socioeconomic status to symptoms in the absence of such adjustments.

Data on demographic and psychosocial characteristics were obtained from face-to-face interviews with caretakers in Wave 1 conducted as part of the longitudinal cohort study. Predictor variables were *youths' gender* (''female'' and ''male''), *per capita household income* (''<$2500,'' ''$2500–$4999,'' ''$5000–$10,000,'' and ''>$10,000''), and *caretaker educational attainment* (''<high school,'' ''completed high school,'' and ''>high school''). *Per capita household income* refers to the annual household income divided by the number of individuals in the household. *Caretaker education* refers to the primary caretaker's highest level of schooling. Covariates were *youths' race/ethnicity* (''African American,'' ''Latino,'' and ''non-Latino White''), *caretaker marital status* (''single,'' ''partnered,'' and ''married''), and *family history of depression* (''yes,'' ''no,'' assessed by asking the primary caretaker whether anyone in the youth's family has ever suffered from depression). The variable reference categories used in analyses were as follows: female gender, per capita household income >$10,000, caretaker education >high school,

non-Latino White race/ethnicity, married caretaker status, and no family depression history.

Statistical analysis

Gender and SES differences in raw mean YSR internalizing scores were assessed at baseline and Wave 2 using *t*-tests and univariate regression models.

Effects of gender and SES on symptom scores

Linear regression models were estimated to assess the relation of gender, SES, and their interactions to baseline internalizing symptoms. In Model 1, baseline internalizing scores were regressed on gender, caretaker education, and per capita household income. Model 2 added the interactions of gender × caretaker education and gender × household income. Models 1 and 2 were estimated first without covariates, and subsequently while controlling for race/ethnicity, caretaker marital status, and family history of depression.

Similar linear regression models were estimated to assess the relation of gender, SES, and their interactions to Wave 2 internalizing symptoms. In Model 1, Wave 2 internalizing scores were regressed on baseline internalizing scores, gender, caretaker education, and per capita household income. Model 2 added the interactions of gender × caretaker education and gender × household income. Models 1 and 2 were estimated first without covariates, and subsequently while controlling for race/ethnicity, caretaker marital status, and family history of depression.

Effects of gender and SES on symptom severity

We wanted to assess effects of gender and SES on severity of internalizing symptoms scores, in addition to the full range of internalizing scores assessed previously. Polytomous logistic regression models were estimated to test for gender and SES main effects and interactions in predicting changes in internalizing symptom severity across the two-year follow-up. ''Severe'' symptoms were defined as the top tertile of YSR internalizing scores (the top tertile included internalizing scores >16 at baseline and >14 at Wave 2). A three-level categorical dependent variable was created that specified whether each adolescent *stayed severe at follow-up*, *became severe by follow-up*, or *was not severe at follow-up.* We estimated two models, consistent with the approach used in our linear regression analyses (i.e., main effects in Model 1 and interactions added in Model 2). Models were estimated first without covariates, and subsequently while controlling for the effects of race/ethnicity, caretaker marital status, and family history of depression.

Effects of gender and ''higher'' versus ''lower'' SES on symptom scores

Given that this sample is skewed toward the low end of the SES continuum, we also conducted analyses in which SES was dichotomized to assess whether more pronounced gender differences would be evident at the tails of the SES distributions. A four-level gender-by-SES variable was created using *caretaker education* as the SES indicator, with the following categories: male-higher caretaker education ($n = 133$), male-lower caretaker education ($n = 133$), female-higher caretaker education ($n = 125$), and female-lower caretaker education ($n = 147$). ''Lower caretaker education'' was defined as <12 years, and ''higher caretaker education'' was defined as >12 years; adolescents whose caretakers had 12 years of schooling were not included. We labeled the high-end education category ''higher education,'' rather than ''high,'' to emphasize that most caretakers in this category (approximately 74%) did not complete a bachelor's degree.

A separate four-level predictor variable was also created using *per capita household income* as the SES indicator, with the following categories: male-higher income ($n = 75$), male-lower income ($n = 68$), female-higher income ($n = 73$), and female-lower income ($n = 77$). ''Lower income'' was defined as <$2500 (bottom income quartile), and ''higher income'' was defined as >$10,000 (top income quartile); adolescents with intermediate household incomes were not included. We labeled the high-end income category as ''higher income,'' rather than ''high,'' to emphasize that most households in this category are better conceptualized as middle than upper class.

The gender-by-income categories contain fewer individuals than the gender-by-caretaker education categories. This is because more adolescents occupied the intermediate household income levels than the intermediate caretaker education levels due to the way the categorical SES variables were defined (income was subdivided by quartiles, whereas caretaker education was defined according to *less than*, *greater than*, or *equal to* 12 years of schooling).

Linear regression models (both unadjusted and adjusted for psychosocial factors) were estimated in which the four-level education-by-gender variable served as the predictor and baseline internalizing symptoms as the outcome. The gender-by-education variable was dummy coded, and the male-higher education category served as the reference group. The models were also estimated to predict Wave 2 internalizing symptoms while controlling baseline internalizing scores. These models were subsequently re-estimated using

the four-level income-by-gender variable as the predictor. In these analyses, higher-income males served as the reference group.

Design effects

The above analyses were conducted using SAS version 9.1.3 (SAS Institute, Inc., Cary, North Carolina). SAS-callable SUDAAN version 9.0.1 (Research Triangle Institute, Research Triangle, North Carolina) was utilized to account for possible auto-correlation of observations within neighborhoods due to the design of the study.

Results

Table 1 displays demographic and psychosocial characteristics for the sample. Girls reported significantly more internalizing symptoms than boys at baseline ($t(638) = 8.48$, $p < 0.0001$) and at Wave 2 ($t(434) = 6.37$, $p < 0.0001$). Per capita annual household income was not significantly associated with baseline or Wave 2 internalizing symptoms in univariate regression analyses. Caretaker education <12 years predicted higher baseline ($B = 1.65$, SE $B = 0.74$, $p < 0.05$) and Wave 2 ($B = 1.95$, SE $B = 0.93$, $p < 0.05$) internalizing symptoms as compared with caretaker education >12 years; however, the overall regression models were not significant, suggesting small effects.

Effects of gender and SES on symptom scores

Table 2 displays results of linear regression models estimating main and interactive effects of gender and SES on baseline and Wave 2 internalizing scores. As results of unadjusted models were very similar to those of models controlling for race/ethnicity, caretaker marital status, and family history of depression, only adjusted results are presented. Female gender predicted higher baseline internalizing scores, as well as higher internalizing scores at Wave 2 while controlling for baseline symptoms. Somewhat surprisingly, per capita household incomes between $2500 and $4999 and between $5000 and $10,000 were associated with a lower likelihood of baseline internalizing symptoms as compared

Table 2
Linear regression models predicting baseline and Wave 2 internalizing symptoms

	Baseline		Wave 2	
	Model 1	Model 2	Model 1	Model 2
Gender				
Male	−5.49 (0.64)***	−6.00 (1.26)***	−1.81 (0.67)**	−0.28 (1.17)
Female (reference)	–	–	–	–
Education				
<12th grade (low)	0.51 (0.81)	1.24 (1.23)	0.42 (0.74)	1.50 (1.06)
12th grade (medium)	0.41 (1.10)	0.90 (1.74)	1.90 (1.03)	1.53 (1.76)
>12th grade (higher; reference)	–	–	–	–
Per capita income				
<$2500 (lowest)	0.08 (0.94)	−1.08 (1.35)	−0.58 (1.38)	−0.59 (1.93)
$2500–$4999 (low)	−1.87 (0.88)*	−2.40 (1.29)	0.08 (1.26)	0.18 (1.59)
$5000–$10,000 (medium)	−1.81 (0.83)*	−2.77 (1.30)*	−0.55 (1.10)	0.23 (1.61)
>$10,000 (higher; reference)	–	–	–	–
Gender × low education		−1.48 (1.42)		−2.12 (1.54)
Gender × medium education		−0.91 (2.23)		0.60 (2.08)
Gender × higher education (reference)		–		–
Gender × lowest income		2.40 (1.79)		−0.31 (1.88)
Gender × low income		1.03 (1.72)		−0.62 (1.78)
Gender × medium income		1.91 (1.69)		−1.69 (1.87)
Gender × higher income (reference)		–		–

*$p < 0.05$; **$p < 0.01$; ***$p < 0.0001$.

Data are shown as standardized coefficients with standard errors in parentheses. Model 1 includes social stratification variables; Model 2 includes social stratification variables and interaction terms. Models are adjusted for race/ethnicity, caretaker marital status, and family history of depression. Wave 2 models are also adjusted for baseline internalizing scores. Missing data on income and caretaker education were statistically controlled using dummy codes (results not shown). Models account for the non-independence of individuals clustered in neighborhoods.

with income >$10,000. No significant main effects of SES were observed in predicting Wave 2 internalizing symptoms. No significant gender-by-SES interactions were observed in either the baseline or Wave 2 analyses.

Effects of gender and SES on symptom severity

Symptom severity over the follow-up period was assessed via a three-level categorical outcome variable, as described in the analysis summary. Ninety-nine youths (15.5%) maintained high internalizing symptoms across the follow-up period, 64 (10%) developed high scores, and 477 (74.5%) did not report high scores at follow-up.

Table 3 displays results of prospective analyses that test main and interactive effects of gender and SES in predicting the three-level symptom severity outcome. As results of unadjusted models were very similar to those of models controlling for race/ethnicity, caretaker marital status, and family history of depression, only adjusted results are presented. Female gender predicted greater likelihood of maintaining high internalizing symptoms over the two years (versus reporting low internalizing levels at follow-up). Neither caretaker education nor household income predicted symptom severity status at follow-up.

Significant interactions between gender and per capita income <$2500 were found in relation to (1) maintaining high internalizing symptoms over two years and (2) becoming high on internalizing by the follow-up. However, as indicated by the wide confidence intervals, these cells have limited sample size, and the estimates should be interpreted with caution. The interactions were probed by re-estimating the regressions stratified by gender. For girls (but not boys), household income <$2500 predicted maintaining high internalizing symptoms over two years (as compared with household income >$10,000). With respect to the second interaction, the relation between household income and becoming high on internalizing was not significant for either gender.

Effects of gender and ''higher'' versus ''lower'' SES on symptom scores

Four-level gender-by-SES variables were calculated, as described previously. Fig. 1a–d displays unadjusted mean levels of baseline and Wave 2 internalizing symptoms for each category of gender-by-SES. Means are generally in the predicted direction, particularly for the gender-by-education variable.

Formal tests of these differences were conducted using linear regression models with continuous internalizing symptoms as the outcome (see Table 4). Results presented in Table 4 are adjusted for race/ethnicity, caretaker marital status, and family depression history. Income was also controlled in analyses using the gender-by-caretaker education predictor variable, and caretaker education was controlled in analyses using the gender-by-income predictor. Compared to the reference group of males whose caretakers completed more than 12 years of schooling, being female with a caretaker who did not complete high school and being female with a caretaker who completed more than 12 years of schooling were both significantly associated with baseline internalizing symptoms. In Wave 2 analyses, compared with the reference group, being female with a caretaker who did not complete high school was significantly associated with internalizing symptoms.

Similarly, as compared to the reference group of males with per capita annual household incomes >$10,000, being female with a household income >$10,000 and being female with a household income <$2500 were both associated with baseline internalizing symptoms, but no gender-by-income categories predicted Wave 2 internalizing in adjusted models. Overall, these findings tend to suggest that being female is associated with internalizing symptoms regardless of SES. However, being female with a caretaker who did not complete high school was uniquely and significantly associated with Wave 2 internalizing symptoms. This finding is consistent with the double jeopardy hypothesis but should be interpreted with caution, given that analyses with Wave 1 data and with the gender-by-income variables did not indicate that the female-lower-SES category was more predictive of symptoms than the female-higher SES category.

Discussion

This study investigated the effects of gender and SES disadvantage on internalizing symptoms among adolescents, both cross-sectionally and prospectively. With respect to independent effects of the hypothesized social disadvantage factors, female gender emerged as a risk factor for internalizing difficulties as predicted. In both cross-sectional and prospective analyses, adolescent females were more likely than males to report internalizing symptoms, even after adjusting for demographic and psychosocial factors. With respect to symptom severity over time, girls were also at higher risk than boys for maintaining more severe levels of internalizing symptoms over the two-year follow-up.

Caretaker education and per capita household income did not predict internalizing symptoms in most

Table 3
Polytomous logistic regression models of prospective associations for gender and SES with internalizing symptom severity at follow-up ($n = 455$)

		Model 1	Model 2
Gender			
Male	Maintained severe symptoms	0.23 (0.15, 0.37)*	0.11 (0.03, 0.39)*
	Developed severe symptoms	0.81 (0.46, 1.41)	3.23 (0.84, 12.38)
	No severe symptoms at follow-up (reference)	1.0	1.0
Female (reference)		–	–
Education			
<12th grade (low)	Maintained severe symptoms	1.09 (0.54, 2.21)	1.46 (0.68, 3.14)
	Developed severe symptoms	1.00 (0.50, 2.00)	1.44 (0.56, 3.71)
	No severe symptoms at follow-up (reference)	1.0	1.0
12th grade (medium)	Maintained severe symptoms	1.49 (0.59, 3.79)	1.15 (0.35, 3.71)
	Developed severe symptoms	1.45 (0.64, 3.28)	1.32 (0.39, 4.44)
	No severe symptoms at follow-up (reference)	1.0	1.0
>12th grade (higher; reference)		–	–
Per capita income			
<$2500 (lowest)	Maintained severe symptoms	0.66 (0.32, 1.37)	0.35 (0.14, 0.85)*
	Developed severe symptoms	0.99 (0.33, 2.98)	2.64 (0.54, 12.83)
	No severe symptoms at follow-up (reference)	1.0	1.0
$2500–$4999 (low)	Maintained severe symptoms	0.77 (0.35, 1.65)	0.64 (0.26, 1.56)
	Developed severe symptoms	1.06 (0.37, 3.03)	2.23 (0.43, 11.53)
	No severe symptoms at follow-up (reference)	1.0	1.0
$5000–$10,000 (medium)	Maintained severe symptoms	0.57 (0.29, 1.13)	0.48 (0.21, 1.11)
	Developed severe symptoms	0.90 (0.33, 2.48)	1.80 (0.35, 9.28)
	No severe symptoms at follow-up (reference)	1.0	1.0
>$10,000 (reference)		–	–
Gender × low education	Maintained severe symptoms		0.45 (0.12, 1.63)
	Developed severe symptoms		0.49 (0.09, 2.51)
	No severe symptoms at follow-up (reference)		1.0
Gender × medium education	Maintained severe symptoms		1.88 (0.39, 9.01)
	Developed severe symptoms		1.20 (0.21, 6.78)
	No severe symptoms at follow-up (reference)		1.0
Gender × higher education (reference)			–
Gender × lowest income	Maintained severe symptoms		8.50 (1.48, 48.91)*
	Developed severe symptoms		0.14 (0.02, 0.91)*
	No severe symptoms at follow-up (reference)		1.0
Gender × low income	Maintained severe symptoms		2.47 (0.40, 15.36)
	Developed severe symptoms		0.25 (0.03, 1.86)
	No severe symptoms at follow-up (reference)		1.0
Gender × medium income	Maintained severe symptoms		2.56 (0.43, 15.24)
	Developed severe symptoms		0.35 (0.05, 2.63)
	No severe symptoms at follow-up (reference)		1.0
Gender × higher income (reference)			–

*$p < 0.05$.

Three-level categorical outcome variable is listed in the second column. Data are shown as odds ratios with 95% confidence intervals in parentheses. Model 1 includes primary predictors; Model 2 includes predictors and interaction terms. Models are adjusted for race/ethnicity, caretaker marital status, and family history of depression. Missing data on income and caretaker education were statistically controlled. Models account for the non-independence of individuals clustered in neighborhoods.

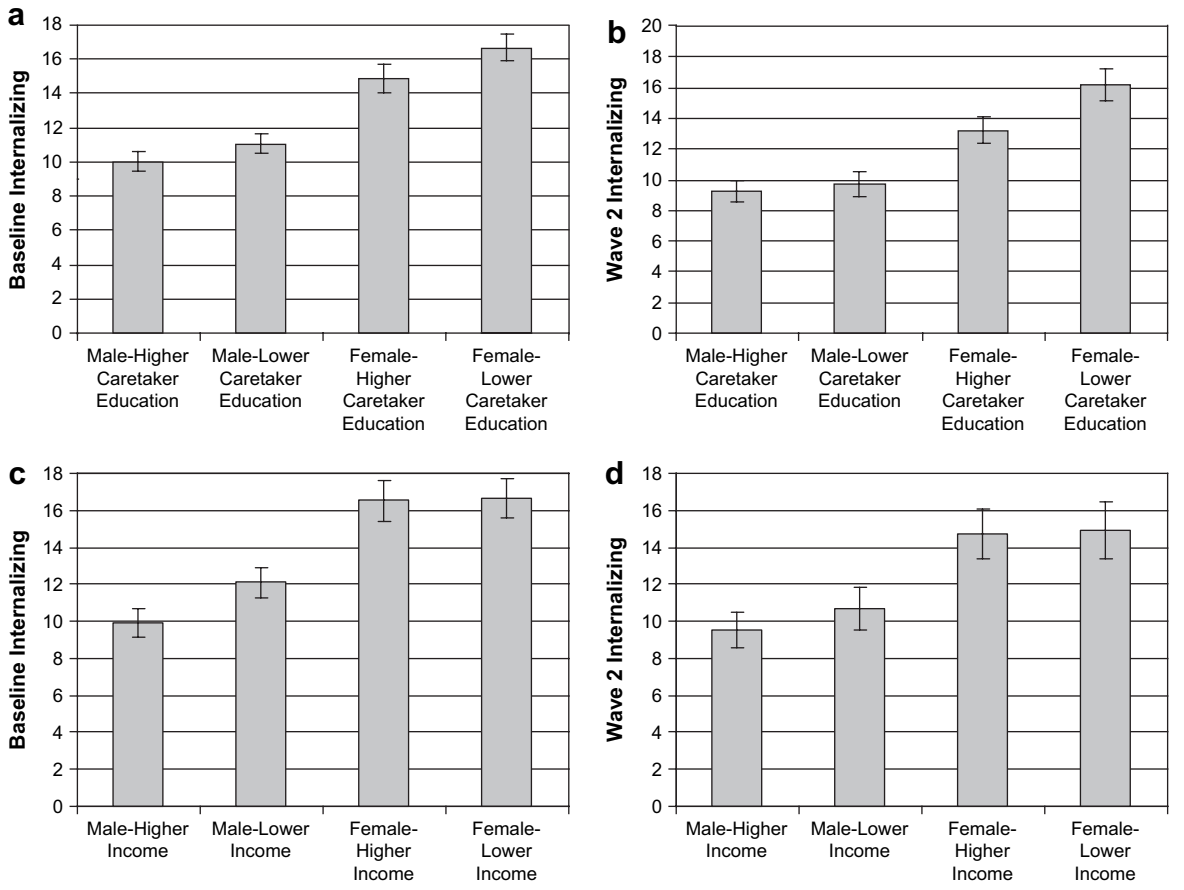

Fig. 1. Association of gender-by-SES variables with baseline and Wave 2 internalizing symptoms: gender-by-caretaker education at (a) baseline and (b) Wave 2; gender-by-income education at (c) baseline and (d) Wave 2. Error bars display the standard error for each mean.

analyses. Low caretaker education predicted higher baseline and Wave 2 internalizing symptoms in univariate linear regression analyses. However, the overall models were not significant, suggesting small effects, and caretaker education was no longer significant in linear regression models controlling for demographic and psychosocial factors. Per capita annual household income between $2500 and $4999 and between $5000 and $10,000 were each associated with *lower* levels of baseline internalizing symptoms than household income >$10,000 in multiple regression models. This income effect is not consistent with predictions or previous findings. We also re-estimated our cross-sectional and prospective multiple linear regression models using separate models for each SES indicator (results not shown) and obtained a lack of main effects for either SES measure.

Studies with adolescent samples have generally found a positive relation between low SES and depressive or internalizing symptoms (e.g., Conger et al., 1994; Goodman, 1999; McLeod & Owens, 2004). We believe it is advantageous that our sample included many adolescents from low-SES households, as this has not always been the case in prior research (e.g., Gore et al., 1992). However, our ability to detect SES effects was limited by the fact that few adolescents in our sample came from high-SES households, creating a problem of restriction of range. It is also worth noting that other investigators (e.g., Conger et al., 1994; Frojd et al., 2006; Schraedley et al., 1999) used subjective indices of economic hardship, which may predict adolescent self-reported mental health more strongly than the objective SES measures in the PHDCN. In addition, our study used longitudinal data, which has been the case in some (Conger et al., 1994; McLeod & Owens, 2004) but not all (Frojd et al., 2006; Gore et al., 1992; Schraedley et al., 1999) other studies in this area.

The generally weak relation of SES indicators to internalizing outcomes in our sample complicates assessment of gender-by-SES interaction effects. Although

Table 4
Four linear regression models with gender-by-SES variables predicting baseline and Wave 2 internalizing symptoms

	Baseline	Wave 2
Male-lower caretaker education	−0.18 (0.83)	−0.58 (1.15)
Female-higher caretaker education	4.98 (1.01)***	0.96 (0.90)
Female-lower caretaker education	5.85 (1.06)***	2.33 (1.00)*
Male-higher caretaker education (reference)	–	–
	Baseline internalizing	Wave 2 internalizing
Male-lower income	0.66 (1.36)	−2.44 (1.44)
Female-higher income	6.25 (1.17)***	0.44 (1.26)
Female-lower income	5.24 (1.45)**	−0.46 (1.84)
Male-higher income (reference)	–	–

*$p < 0.05$; **$p < 0.01$; ***$p < 0.0001$.
Data are shown as standardized coefficients with standard errors in parentheses. The baseline models predict baseline internalizing symptoms. The Wave 2 models predict internalizing symptoms at follow-up, controlling for baseline symptoms. All models are adjusted for race/ethnicity, caretaker marital status, and family history of depression. Household income is controlled in the caretaker education models; caretaker education is controlled in the income models. Models account for the non-independence of individuals clustered in neighborhoods.

interaction effects can be obtained in the absence of significant main effects (see Moffitt, Caspi, & Rutter, 2005), this is somewhat less common. Indeed, gender-by-SES interactions were not significant either in cross-sectional or prospective linear models, contrary to what would be predicted based on the double jeopardy hypothesis. The fact that SES was generally not associated with internalizing symptoms suggests that in a predominantly low-SES sample, independent and interactive effects of this social disadvantage factor may be difficult to ascertain. Alternatively, SES may simply not impact internalizing symptoms strongly among adolescents, either for males or females. Further research on combined effects of gender and SES in adolescent samples displaying more heterogeneity in SES indicators would be helpful in clarifying this issue.

Nevertheless, analyses did hint that a subgroup of females at the lowest levels of SES might be at risk for certain outcomes. For example, analyses on symptom severity at follow-up indicated risk for females in the lowest quartile of household income. Females from the lowest annual household income group (<$2500) were more likely than males from that income group to maintain severe internalizing scores across the two-year follow-up (as compared with not reporting severe scores at follow-up). However, this result should be interpreted with caution because small cell sample sizes yielded a wide confidence interval for the interaction term estimate.

Findings were somewhat consistent in analyses using categorical gender-by-SES predictor variables to assess gender differences at the extremes of SES within this sample. It is noteworthy that the pattern of baseline internalizing scores for the gender-by-caretaker education variable is in the expected direction (see Fig. 1a and b), with the lowest scores for males whose caretakers completed more than 12 years of schooling (no social disadvantage factors) and the highest scores for females whose caretakers did not complete high school (two social disadvantage factors). However, differences among internalizing scores in the four categories are not large, suggesting small effects. Overall, findings indicated that female gender predicted baseline internalizing, regardless of whether females were ''lower'' or ''higher'' on SES indicators. However, females whose caretakers had the lowest levels of education (<12 years) were at highest risk for internalizing symptoms at Wave 2. This pattern of findings was more pronounced for the gender-by-caretaker education analyses than for the gender-by-income analyses, possibly due to smaller sample sizes in the gender-by-income categories.

Similar to Conger et al. (1994) and Schraedley et al. (1999), few significant gender-by-SES interactions were apparent in our analyses. By contrast, Gore et al. (1992) found that adolescent girls with low parental education and standard of living had higher levels of depression than boys of comparable SES, and McLeod and Owens (2004) found that poverty predicted lower school competence and self-worth for girls but higher depression and hyperactivity for boys. Differences across studies are likely due in large part to differences in the age groups studied, as well as differences in methodology and populations sampled. For instance, McLeod and Owens used parent reports of psychological functioning, whereas we used self-reports. Previous studies assessed depressive symptoms specifically, rather than internalizing symptoms more generally. Depressive and internalizing symptoms would be expected to show similar patterns, given the fact that internalizing symptomatology incorporates depressive phenomena; however, some variations may occur as a function of measurement differences. Socioeconomic status measures also varied by study (parental education, subjective perceptions of hardship, and income). The populations sampled ranged from rural to urban and from all-White to racially diverse. Considering our findings in light of these others, it seems that double jeopardy effects for gender and SES do not emerge

consistently across these various study designs, methods, and samples.

Although some studies have highlighted an increase in depression across adolescence (e.g., Hankin & Abramson, 2001), we did not observe an increase in internalizing scores between the baseline and two-year follow-up for males or females. However, this result is not necessarily inconsistent with theory or previous research. For instance, data suggest that increases in depression may occur most consistently for girls entering adolescence (i.e., ages 12–15) (Angold & Costello, 2006), rather than the 15- to 17-year-old age group in our sample. Nonsignificant decreases in depression scores have been found in other studies, including McLeod and Owens' (2004) study on the transition from ages 10–11 to ages 14–15.

This study has certain limitations. While our sample displayed some variation in socioeconomic status, participants were from predominantly lower levels of household income and caretaker education, which likely restricted our ability to assess the impact of socioeconomic status on internalizing symptoms. In addition, we analyzed data from two assessments, limiting the extent to which we can infer trajectories of mental health outcomes over adolescence. Although we controlled for race and ethnicity in analyses, we did not have a sufficiently large sample to stratify by race and ethnicity in order to explore possible cultural differences in the effects of social status factors. It is also important to note that, while our study addressed the impact of SES on internalizing symptoms, the relation is likely to be bidirectional (e.g., family history of depression can result in lower educational attainment or earnings for parents). However, we controlled for family history of depression in analyses, reducing the extent to which those selection effects are likely to impact our findings.

In summary, this study assessed the impact of gender and SES disadvantage on internalizing symptomatology among a cohort of disadvantaged 15- to 17-year-old adolescents. Findings indicate that female gender predicted internalizing problems cross-sectionally and prospectively, whereas SES was generally not associated with internalizing outcomes. Overall, results do not strongly support the double jeopardy hypothesis of interactive negative effects for female gender and low SES in a sample of predominantly lower-SES adolescents. However, females at the lowest levels of caretaker education and household income did appear to have somewhat increased risk for internalizing symptoms. Findings suggest that intervention efforts focused on low-SES adolescent populations would do well to target adolescent girls as a group at higher risk for internalizing symptoms regardless of their relative household income and caretaker education. In addition, females at the lowest levels of SES merit further study as a group that is potentially at highest risk for severe or continued internalizing problems.

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