

# Depressive Symptomatology in Middle-Aged and Older Married Couples: A Dyadic Analysis

Aloen L. Townsend,<sup>1</sup> Baila Miller,<sup>1</sup> and Shenyang Guo<sup>2</sup>

<sup>1</sup>Mandel School of Applied Social Sciences, Case Western Reserve University, Cleveland, Ohio.

<sup>2</sup>College of Social Work, The University of Tennessee, Memphis.

**Objectives.** Depressive symptomatology has been frequently conceptualized as an individual matter, but social contextual models argue that symptom levels are likely to covary in close relationships. The present study investigated correlation between spouses' depressive symptomatology in middle-aged and older married couples, the influence of gender and race/ethnicity in predicting variability in symptom level, and the importance of individual-level covariates (education, health, and age) and couple-level covariates (household income and net worth).

**Methods.** Results were based on secondary analysis of Wave 1 interviews with White, Black, and Mexican American married couples ( $N = 5,423$ ) from the Health and Retirement Study (HRS) and the Study of Asset and Health Dynamics Among the Oldest Old (AHEAD). Dyadic data from husbands and wives were analyzed with multilevel modeling.

**Results.** Husbands' and wives' depressive symptoms were moderately correlated, gender and race/ethnicity (and their interaction) predicted depressive symptoms, and both individual-level and couple-level characteristics were significant covariates. Similarities as well as differences are noted between the HRS and AHEAD results.

**Discussion.** Results highlight the importance of dyadic data and multilevel models for understanding depressive symptomatology in married couples. The influence of race/ethnicity merits greater attention in future research. Differences in findings between HRS and AHEAD suggest life-course, cohort, or methodological influences.

DEPRESSION is the most prevalent mental health problem in adulthood and a significant public health concern (American Psychological Association, 1993; Fisher, Zeiss, & Carstensen, 1993). Epidemiological studies have found that 10–20% of community-dwelling elderly persons report clinically significant depressive symptomatology (Blazer, Hughes, & George, 1987; Kennedy et al., 1989; Murrell, Himmelfarb, & Wright, 1983). On average, married individuals report lower depressive symptomatology than unmarried individuals (Aneshensel, Frerichs, & Clark, 1981; Blazer et al., 1987). Yet the interdependence involved in marriage (Kelley, 1981) suggests that when one spouse experiences depressive symptoms, the other spouse's risk increases. In the present study we examined correlation of depressive symptomatology in married couples and whether individual-level and couple-level characteristics predict variability in symptom level. We focused in particular on the influence of gender and race/ethnicity.

## *Social Contextual Models of Depression*

Many studies have assessed depressive symptomatology in samples of unrelated individuals and examined individual-level predictors such as age. An individualistic model implies that one's emotional state is independent of anyone else's emotional state and is unaffected by characteristics of anyone but the self. Individualistic models have been criticized for having an intrapsychic bias and neglecting interpersonal phenomena such as reciprocity and interdependence between partners (Kahana & Young, 1990; Pruchno, 1994; Thompson & Walker, 1982). Assuming independence when

interdependence is present can significantly bias results and their interpretation (Gonzalez & Griffin, 1997).

In contrast, social contextual models involve multiple parties or higher order relationships and reciprocal or interactive influences between parties (DeLongis & O'Brien, 1990; Hammen, 1999; Holahan, Moos, & Bonin, 1999). Interpersonal or interactional models of depression (Joiner & Coyne, 1999), family systems models of psychopathology (Cowan, Cowan, & Schulz, 1996), and models of emotion contagion (Hatfield, Cacioppo, & Rapson, 1992), all argue that social contexts are critical in the creation, transmission, and maintenance of emotional states. These contexts are attached to the major social roles (e.g., spouse) or social systems (e.g., ethnic groups) with which a person is involved (Pearlin, 1989; Thoits, 1986).

Evidence supporting social contextual models of depressive symptomatology is scattered across literature on depression, caregiving, and health. In the depression literature, persons living with someone who is depressed report greater depressive symptomatology than persons living with someone who is not depressed (Coyne et al., 1987; Mitchell, Cronkite, & Moos, 1983). In the caregiving and health literatures, studies have found a relationship between depressive symptomatology of family caregivers and persons with heart disease (Kahana, Young, Kercher, & Kaczynski, 1993), cancer (Given et al., 1993), and multiple sclerosis (Pakenham, 1998).

## *Marriage and Depressive Symptomatology*

The importance of social context is most evident in studies of married couples. For most married adults, marriage

provides an important source of support, identity, and gratification and involves a high level of interdependence and symbolic significance (Carstensen, Gottman, & Levenson, 1995; Veroff, Douvan, & Kulka, 1981). As other social ties are lost and stressors accumulate during middle and later adult years, the support provided by the partner can assume even greater importance for spouses' psychological well-being (Cutrona, 1996).

Among midlife and older adults, there are clear differentials in marital rates by gender and race/ethnicity. Fifty-four percent of persons aged 65 years and older were living with a spouse in 1996 (Siegel, 1999). This proportion drops to 34% for older African Americans, but it is roughly comparable to the marital rate of 48% for older Hispanics (Siegel, 1999). Regardless of race/ethnicity, men are more likely to be married than women (Hobbs, 1996).

Recently, a small body of research on depressive symptomatology in married couples has found evidence that spouses' symptomatology is related. A significant bivariate relationship has been found between partners' symptomatology in cross-sectional studies with 64 married or cohabiting couples aged 18–65 (Whiffen & Aube, 1999); with 1,040 married couples aged 65 and older (Bookwala & Schulz, 1996); and with 317 married couples aged 65 and older (Tower & Kasl, 1995). The spouse's symptom level remained a significant predictor of the partner's symptom level after other risk factors such as income and health were controlled (Bookwala & Schulz, 1996; Tower & Kasl, 1995). In addition, over time, change in one spouse's level of depressive symptoms predicts change in the other spouse's level of depressive symptoms (Tower & Kasl, 1996a). These studies are notable because of their focus on married couples, their inclusion of the partner's depressive symptoms, and their use of samples that were not selected on the basis of one partner's depression, care needs, or health status. However, these studies used analytical methods, such as ordinary least-squares multiple regression, that assume independent observations. Ignoring clustering in the sampling design can bias results (Muthén, 1997; Raudenbush, 1995).

#### *Gender, Race/Ethnicity, and Depressive Symptomatology*

Gender, race, and ethnicity are key variables associated with variations in levels of depressive symptomatology. These attributes serve as markers for differential exposure to emotionally distressing experiences (Mirowsky & Ross, 1989). They also structure access to resources that can moderate risk factors related to depressive symptoms or their consequences (House et al., 1992; Jackson, Antonucci, & Gibson, 1995).

In general, women report greater depressive symptomatology than men (Eaton & Kessler, 1981; Nolen-Hoeksema, 1990). This finding has been replicated in studies comparing unrelated married women and married men (Mirowsky & Ross, 1989) and husbands and wives (Bookwala & Schulz, 1996). The association between gender and symptomatology is congruent with the observation that marriage appears to bestow less benefit on women than on men (Thompson, 1993).

The present study was restricted to spouses who shared the same racial/ethnic background (either non-Hispanic White, non-Hispanic Black, or Mexican American, who may be of any race). Much greater attention has been paid to mental health in White adults than in Black or Hispanic adults (Aranda & Miranda, 1997; Stanford & DuBois, 1992). Comparisons of depressive symptom levels between White and Black adults have shown inconsistent results. A few studies have found lower symptomatology (Callahan & Wolinsky, 1994; Smallegan, 1989) but most have found higher symptomatology (e.g., Eaton & Kessler, 1981; Fiscella & Franks, 1997) in Black adults. Inconsistent findings are also common in studies of White and Mexican American adults (Markides, Rudkin, Angel, & Espino, 1997), although there is some evidence for higher symptomatology in Mexican Americans than Whites (Black, Goodwin, & Markides, 1998; Markides & Lee, 1990). In studies composed exclusively of Mexican American adults, especially high levels of depressive symptoms have been noted for older Mexican American women (Angel & Angel, 1995; Markides et al., 1997), suggesting an interaction of gender and ethnicity.

#### *Covariates of Gender, Race/Ethnicity, and Depressive Symptomatology*

Differences by race/ethnicity or gender are often difficult to disentangle from confounding factors such as income, health, education, and marital status (Kessler & Neighbors, 1986; Martin & Soldo, 1997). We thus included selected covariates that, according to prior research, may confound associations between gender, race/ethnicity, and depressive symptomatology. These covariates included both individual-level characteristics (education, physical health, and age) and couple-level characteristics (household income and wealth).

Educational differences in depressive symptoms have been robust, with persons with higher education consistently reporting lower symptomatology (Blazer et al., 1987; House et al., 1994; Manton, Stallard, & Corder, 1997). Among middle-aged and older adults, large disparities in educational attainment are evident between Whites, Blacks, and Hispanics (Hobbs, 1996). Comparisons between middle-aged and older men and women show small differences in educational attainment by gender, primarily at the college level (Hobbs, 1996).

Physical health is another consistent correlate of depressive symptoms (Deeg, Kardaun, & Fozard, 1996). Researchers have found an association between poorer health and higher depressive symptomatology using a variety of measures, including self-rated health, functional limitations, and chronic disease conditions (e.g., Berkman et al., 1986; Turner & Noh, 1988; Williamson & Schulz, 1992). This association is also evident in a variety of populations, including medical outpatients (Borson et al., 1986), community samples (Kennedy, Kelman, & Thomas, 1990), and adults with specific disease conditions and symptoms (Banks & Kerns, 1996; Given et al., 1993). Patterns of physical health are heavily shaped by gender (Hobbs, 1996; Verbrugge, 1989) and race/ethnicity (House et al., 1992; Williams & Collins, 1995).

The relationship of age to depressive symptomatology is more complicated (George, 1993). Most often, a curvilinear relationship has been reported: The prevalence of depressive symptomatology appears to be higher among young adults, lower in middle age, then begins to climb among adults in their late 60s or older (Newmann, 1989; Kessler, Foster, Webster, & House, 1992). Age serves as a marker for a host of lifelong experiences and circumstances that are also molded by gender and race/ethnicity (Elder, George, & Shanahan, 1996; House et al., 1994; Mirowsky & Ross, 1989).

At the household level, a key correlate of depressive symptomatology is economic status. In general, persons with lower income report higher depressive symptomatology (Eaton & Kessler, 1981; Kennedy et al., 1989). In middle-aged and older cohorts, large disparities in income are apparent by race/ethnicity (Hobbs, 1996; Smith & Kington, 1997). We are unaware of any research that has examined the relationship between household wealth and depressive symptomatology. Yet racial/ethnic differences in wealth are much larger than differences in income (Smith, 1997). We thus include both income and wealth as couple-level covariates.

### *Purpose of Present Study*

Prior studies' conclusions based on married individuals (i.e., unrelated married men and women) may lead to substantial bias by using a single person to represent the dyad (Thompson & Walker, 1982). Conclusions based on studies where both spouses are interviewed but husbands and wives are analyzed independently do not take into account the interdependence of spouses' experiences (Barnett, Marshall, Raudenbush, & Brennan, 1993). In the present study we focused on couples and capitalized on a multilevel statistical technique that incorporates paired data as an integral part of the analyses. This allowed us to test whether depressive symptomatology covaries within couples and whether individual-level and couple-level characteristics predict variability in symptomatology.

Prior research also is limited by overreliance on samples of White, middle-class married couples. Knowledge about depressive symptomatology is limited for married couples who are White, especially in the middle and later adult years, but it is practically nonexistent for married couples who are of other racial/ethnic origins. Growing numbers of African American and Hispanic American elderly persons (Siegel, 1999) make it imperative for researchers to expand this knowledge base. In addition, with some important exceptions (Bookwala & Schulz, 1996; Tower & Kasl, 1995), most prior studies have used relatively small convenience samples. In the present study we used two large national data sets containing White, Black, and Mexican American couples.

Our study tested three hypotheses. First, we hypothesized that depressive symptoms of husbands and wives would be significantly correlated. Second, we hypothesized that both gender and race/ethnicity would predict variability in symptom levels. Specifically, we expected that husbands would report lower symptomatology than wives and that White couples would report lower symptomatology than Black or Mexican American couples. Furthermore, on the basis of

prior research showing elevated levels of depressive symptoms in Mexican American women, we expected gender and race/ethnicity to interact. Third, we hypothesized that the influence of gender and of race/ethnicity would be reduced once the individual's education, health, and age and the couple's income and net worth were taken into account.

## **METHODS**

### *Design and Samples*

The present study was based on secondary analysis of Wave 1 data from the Health and Retirement Study (HRS) and the Study of Asset and Health Dynamics Among the Oldest Old (AHEAD). These surveys covered the middle and older adult years; included interviews with both spouses in married couples; contained a widely used measure of depressive symptomatology and a broad array of possible predictors; and had sufficient numbers of Black, Mexican American, and White couples to permit analyses incorporating race/ethnicity.

*HRS.*—The objectives of HRS included explaining antecedents and consequences of retirement and examining relationships between health, income, and wealth over time (Juster & Suzman, 1995). HRS began in 1992 with a multistage area probability sample of households in the contiguous United States, targeting all noninstitutionalized adults aged 51–61 (i.e., born during the years 1931–41). Supplemental oversamples were drawn for African Americans, Hispanics, and residents of Florida. If a household contained a married age-eligible person, his or her spouse was automatically selected for participation even if he or she was not age eligible.

At Wave 1, HRS interviewed 12,652 individuals, representing 7,702 households. Nearly four fifths of the respondents (78%,  $n = 9,896$  individuals) were married. To select our sample of married couples, we excluded 1,540 individuals for whom we did not have a Wave 1 interview with both spouses; 730 other individuals (365 couples) where both spouses were not White/Caucasian (and non-Hispanic), African American/Black (and non-Hispanic), or Mexican American/Chicano; and 34 additional individuals (17 couples) who had missing data on variables in our analyses. These criteria resulted in a final HRS sample of 3,149 White couples, 472 Black couples, and 175 Mexican American couples. Mean duration of the current marriage was 27.60 years ( $SD = 11.14$ ).

The requirement that spouses share the same racial/ethnic background (true of 91% of the married couples with interviews for both spouses) was imposed because couples whose race/ethnicity was dissimilar were an extremely diverse group. The Mexican American couples represented the majority (62%) of couples where both spouses identified as Hispanic. We restricted the Hispanic sample to Mexican Americans because prior studies have documented differences between Mexican American adults and Hispanic adults of other origins with regard to demographic and economic characteristics and depressive symptomatology (Angel & Angel, 1995; Markides et al., 1997).

*AHEAD.*—The objectives of AHEAD included monitoring transitions in physical, functional, and cognitive health in advanced old age and relating changes in health to economic resources (Soldo, Hurd, Rodgers, & Wallace, 1997). AHEAD began in 1993 with a multistage area probability sample of households in the contiguous United States, targeting all noninstitutionalized adults aged 70 and older (i.e., born in 1923 or earlier). Supplemental oversamples were drawn for African Americans, Hispanics, and residents of Florida. If a household contained a married age-eligible person, his or her spouse was automatically selected for participation even if he or she was not age eligible.

At Wave 1, interviews were conducted with 8,222 individuals, representing 6,047 households. Only half (55%) of the respondents were married ( $n = 4,494$  individuals). We applied the same exclusion criteria from HRS to AHEAD. First, 1,080 individuals were excluded for whom we did not have interviews with both spouses. Second, we excluded 142 individuals (71 couples) because both spouses were not White (and non-Hispanic), Black (and non-Hispanic), or Mexican American. Third, we excluded 18 individuals (9 couples) for whom there were missing data. The final AHEAD sample consisted of 1,450 White couples, 132 Black couples, and 45 Mexican American couples. Mean length of the current marriage was 44.71 years ( $SD = 14.36$ ).

### Measures

All measures were based on self-report. Measures were categorized as either individual level (each spouse reported on her or his own characteristics) or couple level (joint or shared characteristics).

*Outcome.*—Depressive symptomatology was an individual-level index of eight symptoms of depression (felt depressed, everything was an effort, restless sleep, was [not] happy, felt lonely, [did not] enjoy life, felt sad, could not get going). These items were taken from the Center for Epidemiologic Studies-Depression (CES-D; Radloff, 1977) scale. Although HRS and AHEAD included additional CES-D items, only these eight items were constant across the two studies.

In HRS, respondents were asked how frequently they had experienced each symptom during the past week. Negatively valenced items were coded 1 (none or almost none of the time) to 4 (all or almost all of the time). Positively valenced items were reverse coded. Thus, in HRS this measure represented the number and frequency of depressive symptoms, with a possible range of 8–32, with higher scores indicating greater symptomatology.

In AHEAD, a dichotomous version of the items was administered (asking whether the respondent had experienced each symptom “much of the time during the past week”). Negatively valenced items were coded 0 (no) or 1 (yes). Positively valenced items were reverse coded. Thus, the measure in AHEAD represented the number of depressive symptoms experienced frequently, with a possible range of 0–8.

The original 20-item version of the CES-D has been extensively validated (Devins & Orme, 1985), and both the original and modified versions of the CES-D have been

widely used, including with elderly persons (Eaton & Kessler, 1981; Radloff, 1977; Schulz, O’Brien, Bookwala, & Fleissner, 1995). The measures in HRS and AHEAD were based on a shortened version developed for the Established Populations for Epidemiologic Studies of the Elderly (Blazer, Burchett, Service, & George, 1991; Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). Evidence for the internal consistency and concurrent validity of the modified CES-D is presented in Wallace and Herzog (1995) for HRS and in Turvey, Wallace, and Herzog (1999) for AHEAD. In our samples, the eight items had good internal consistency (overall  $\alpha = .81$  in HRS and  $.77$  in AHEAD) across all gender and ethnoracial groups ( $\alpha$  ranging from  $.73$  for Black husbands to  $.83$  for Mexican American wives in HRS and from  $.73$  for White husbands to  $.80$  for Mexican American husbands and wives in AHEAD).

*Individual-level predictors.*—Gender was coded 0 (female) or 1 (male). Education (highest grade of school or year of college completed) was measured in years (from 0 to 17 = 17 or more). Health was assessed by a widely used global rating with response categories of “excellent” (coded 1), “very good,” “good,” “fair,” and “poor” (coded 5). Age was calculated (in years) by subtracting the year of the participant’s birth from the year of the interview. Both studies measured these predictors in identical ways. For the multi-level analyses, we centered education, health, and age around their respective median values in each sample to facilitate interpretation of results (the median education level was high school graduate in both samples; the median rating for health was “very good” in HRS and “good” in AHEAD; the median age was 56 in HRS and 74 in AHEAD). Thus, after centering, high scores on education represented education beyond high school and high scores on health represented worse health.

*Couple-level predictors.*—Race/ethnicity was coded as two dichotomous variables: 0 (White or Mexican American) versus 1 (Black), and 0 (White or Black) versus 1 (Mexican American). Thus, White couples were the reference category. In both studies, respondents were asked three questions to determine race/ethnicity: “Do you consider yourself Hispanic or Latino?”; if yes, “Would you say you are Mexican American, Puerto Rican, Cuban (“Cuban American” in AHEAD), or something else?”; if no, “Do you consider yourself primarily White or Caucasian, Black or African American, American Indian, or Asian?” (followed by “or something else?” in AHEAD).

Household income in HRS and AHEAD was the total income for the preceding year from all sources (e.g., husband’s and wife’s labor earnings, Social Security income, income from other household members). It was reported by the spouse designated to provide financial information or was imputed for the household. Respondents were asked for exact monetary amounts. When unable or unwilling to provide exact amounts, they were given a set of bracketed categories and asked to pick one. Details about the procedures used to assess and impute income in HRS are contained in Moon and Juster (1995). Similar procedures were applied in AHEAD (Smith, 1997). Imputed values provided on the

public use files were used for cases with missing data on income.

To assess wealth, we used the measure of household net worth available in both HRS and AHEAD. Net worth summarizes the household's tangible wealth in terms of both housing equity and nonhousing equity, such as savings (Smith & Kington, 1997). Procedures used in HRS and AHEAD to assess and impute net worth mirrored those for household income (Moon & Juster, 1995). Imputed values provided on the public use files were used for cases with missing data on net worth. For the multilevel analyses, logged values were calculated for both household income and net worth, and we centered these values around their respective means to facilitate interpretation.

### Analysis Plan

To analyze data we used multilevel modeling (MLM), which is ideally suited to analyses of hierarchical data, such as paired data from husbands and wives (Raudenbush, Brennan, & Barnett, 1995). By taking clustering in the sample design into account, MLM provides corrected standard errors of estimates and, hence, more accurate statistical inferences (Kreft & de Leeuw, 1998). Because of differences in measurement of depressive symptoms and in study design and sampling, HRS and AHEAD were analyzed separately. HRS and AHEAD both entailed complex sampling designs. To account for differential probabilities of selection and nonresponse, we weighted data using the normalized poststratification household-level weight provided in the public use data sets.

Prior to multilevel analyses, we used two-way mixed analysis of variance (ANOVA) to test for differences in individual-level covariates (education, health, and age) by gender and race/ethnicity. Because couples are nested within race/ethnicity, gender and race/ethnicity are crossed effects; thus, this design takes into account possible correlation between spouses in education, health, and age (Winer, Brown, & Michels, 1991). At the couple level, we used one-way ANOVA to test for differences in household income and net worth by race/ethnicity. Significant ANOVA results were followed by post-hoc Bonferroni comparisons.

The multilevel analyses used the HLM 5 program (Raudenbush, Bryk, Cheong, & Congdon, 2000) and full maximum likelihood estimation to test three alternative, nested models. In each model the intercept was specified as a random effect. We used change in the value of the  $-2 \log$  likelihood function ( $\Delta-2 \ln L$ , also referred to as the deviance statistic; Kreft & de Leeuw, 1998) and the proportion reduction in "explainable" variance within couples and between couples ( $PRV_w$  and  $PRV_b$ ; Bryk & Raudenbush, 1992) to determine whether each model represented a significant improvement in fit over the prior model.

An initial model with gender as the sole predictor tested our hypothesis that depressive symptomatology would be correlated within couples. This model provided an estimate of the intraclass correlation ( $\rho$ ), which represented the average association of depressive symptoms between spouses. It also established whether there was sufficient between-couple variability in symptomatology to warrant further multi-

level analysis (Bryk & Raudenbush, 1992). The equations for this model were as follows:

$$\text{at Level 1, } Y_{ij} = \beta_{0j} + \beta_{1j} (\text{Male}) + r_{ij};$$

$$\text{at Level 2, } \beta_{0j} = \gamma_{00} + u_{0j},$$

$$\text{and } \beta_{1j} = \gamma_{10}.$$

At Level 1,  $Y_{ij}$  represents the outcome (depressive symptoms) for individual  $i$  in couple  $j$  and  $r_{ij}$  represents the residual effect for individual  $i$  in couple  $j$ . At level 2,  $u_{0j}$  represents the residual effect for couple  $j$ .  $\gamma_{00}$  represents the average depressive symptoms score for wives, and  $\gamma_{10}$  represents the average difference in symptom scores between husbands and wives. We assumed  $r_{ij}$  and  $u_{0j}$  were random variables with zero means; the variances for these random variables were designated by  $\sigma^2$  and  $\tau_{00}$ , respectively.

To investigate our hypothesis that gender and race/ethnicity would account for significant variability in depressive symptoms, we tested a second model that included gender and race/ethnicity (with female and White as the reference categories). To investigate a possible interaction, we fixed the effects for race/ethnicity but allowed the effect for gender to vary nonrandomly (i.e., gender could vary solely as a function of race/ethnicity). The equations for this model were as follows:

$$\text{at Level 1, } Y_{ij} = \beta_{0j} + \beta_{1j} (\text{Male}) + r_{ij};$$

$$\text{at Level 2, } \beta_{0j} = \gamma_{00} + \gamma_{01} (\text{Black}) + \gamma_{02} (\text{Mexican American}) + u_{0j},$$

$$\text{and } \beta_{1j} = \gamma_{10} + \gamma_{11} (\text{Black}) + \gamma_{12} (\text{Mexican American}).$$

$\gamma_{00}$  now represents the average symptom score for White wives;  $\gamma_{01}$  represents the average difference in symptom scores between White wives and Black wives;  $\gamma_{02}$  represents the average difference in symptom scores between White wives and Mexican American wives;  $\gamma_{10}$  represents the average difference in symptom scores between White husbands and wives;  $\gamma_{11}$  represents the average difference in symptom scores between Black husbands and wives; and  $\gamma_{12}$  represents the average difference in symptom scores between Mexican American husbands and wives.  $Y_{ij}$ ,  $r_{ij}$ ,  $u_{0j}$ ,  $\sigma^2$  and  $\tau_{00}$  retain the same meaning as in Model 1.

To determine whether gender and race/ethnicity remained significant predictors of depressive symptoms after controlling for both individual-level and couple-level covariates, we tested a final model that added fixed individual-level effects for education, health, and age and fixed couple-level effects for income and net worth. We centered covariates to facilitate interpretation of results (Bryk & Raudenbush, 1992; Kreft & de Leeuw, 1998). The equations for this final model were as follows:

$$\text{at Level 1, } Y_{ij} = \beta_{0j} + \beta_{1j} (\text{Male}) + \beta_{2j} (\text{Education}) + \beta_{3j} (\text{Health}) + \beta_{4j} (\text{Age}) + r_{ij};$$

$$\text{at Level 2, } \beta_{0j} = \gamma_{00} + \gamma_{01} (\text{Black}) + \gamma_{02} (\text{Mexican American}) + \gamma_{03} (\text{Income}) + \gamma_{04} (\text{Net Worth}) + u_{0j},$$

$$\beta_{ij} = \gamma_{10} + \gamma_{11} (\text{Black}) + \gamma_{12} (\text{Mexican American}),$$

$$\beta_{2j} = \gamma_{20},$$

$$\beta_{3j} = \gamma_{30},$$

and  $\beta_{4j} = \gamma_{40}.$

$\gamma_{00}, \gamma_{01}, \gamma_{02}, \gamma_{10}, \gamma_{11},$  and  $\gamma_{12}$  retain the same meaning as in Model 2 except that these effects are now adjusted for the covariates. In other words, the  $\gamma_{00}, \gamma_{01}, \gamma_{02}, \gamma_{10}, \gamma_{11},$  and  $\gamma_{12}$  effects assume median education, health, and age and mean income and net worth.  $\gamma_{20}$  represents the average effect of education;  $\gamma_{30}$  represents the average effect of health;  $\gamma_{40}$  represents the average effect of age;  $\gamma_{03}$  represents the average effect of income; and  $\gamma_{04}$  represents the average effect of net worth on depressive symptomatology. The remaining terms ( $Y_{ij}, r_{ij}, u_{0j}, \sigma^2$  and  $\tau_{00}$ ) retain the same meaning as in Model 1.

The preceding analyses assumed the random effect at each level was normally distributed. In our study, depressive symptom scores were positively skewed in both HRS and AHEAD, a typical pattern in nonclinical, community samples. In addition, the outcome was assessed as a symptom count in AHEAD. In these situations, assuming that Level 1 random effects (residuals) are normally distributed may be unrealistic (Raudenbush et al., 2000). Therefore, we conducted additional analyses. For HRS, we reran our analyses using a log 10-transformed version of depressive symptomatology. For AHEAD, we reran our analyses using a hierarchical generalized linear model (HGLM) for count data. These HGLM analyses used a Poisson sampling model with overdispersion and a log-link function (Raudenbush et al., 2000). However, HGLM does not allow data to be weighted. We present results from the initial analyses and note any differences between these results and the transformed or Poisson results.

**RESULTS**

*Analyses of Covariates*

*HRS sample.*—Table 1 presents HRS descriptive information and ANOVA results for the covariates. Each of the

individual-level covariates was significantly related to race/ethnicity and/or gender. For education, White husbands and wives had the highest mean levels and did not differ from each other, and Mexican American husbands and wives had the lowest education and did not differ from each other. Black husbands and wives had intermediate levels, which were significantly different from both other ethnorracial groups, and Black husbands had significantly less education than their wives. For global health, the sample’s mean rating was in the “very good” category. White wives reported significantly better health, on average, than any other group, and their mean health rating was significantly better than that of their husbands. Mexican American wives reported the worst health but did not differ significantly from their husbands. Black husbands and wives reported intermediate health ratings, which were not significantly different from each other or from Mexican American husbands and wives, but which did differ significantly from White husbands and wives. Husbands were approximately 4 years older than wives, regardless of race/ethnicity.

At the couple level, the three ethnorracial groups differed significantly on both income and net worth. White couples reported the highest income and Mexican American couples reported the lowest (less than half of what White couples reported). Similarly, White couples were wealthiest on net worth and Mexican American couples were poorest. Disparities in net worth were even larger than disparities in income.

*AHEAD sample.*—Table 2 presents AHEAD descriptive information and ANOVA results for the covariates. Each of the individual-level covariates was significantly related to race/ethnicity and/or gender. For education, White husbands and wives had significantly higher mean education levels compared with other respondents, but they did not differ significantly from each other. Mexican American husbands and wives had significantly lower mean education levels compared with others but also did not differ from each other. Black husbands and wives had intermediate levels of education that were significantly different from both White and Mexican American respondents as well as from each other. For global health, the sample’s mean rating was in the “very good” category. Only a main effect for race/eth-

Table 1. Mean (SD) Individual-Level and Couple-Level Covariates for Married Couples From the Health and Retirement Study (Wave 1) by Race/Ethnicity and Gender

Characteristics	White Couples		Black Couples		Mexican American Couples		Total Sample
	Husbands	Wives	Husbands	Wives	Husbands	Wives	
Individual level	(n = 3,149)	(n = 3,149)	(n = 472)	(n = 472)	(n = 175)	(n = 175)	(N = 7,592)
Education	12.70 (2.95)	12.64 (2.26)	10.59 (3.54)	11.77 (2.80)	6.51 (4.32)	6.42 (3.85)	12.20 <sup>a</sup> (3.10)
Health	2.45 (1.15)	2.30 (1.10)	2.90 (1.17)	2.85 (1.11)	3.05 (1.16)	3.19 (1.16)	2.47 <sup>a</sup> (1.15)
Age	57.69 (5.40)	53.71 (5.61)	57.98 (6.01)	53.32 (5.75)	57.77 (5.96)	53.24 (5.66)	55.68 <sup>b</sup> (5.93)
Couple level	(n = 3,149)		(n = 472)		(n = 175)		(N = 3,796)
Household income	\$60,577 (51,220)		\$46,668 (36,127)		\$28,277 (19,200)		\$57,350 <sup>c</sup> (49,171)
Household net worth	\$298,363 (563,704)		\$124,540 (310,552)		\$94,157 (173,785)		\$267,258 <sup>c</sup> (530,778)

<sup>a</sup>Significant interaction effect.  
<sup>b</sup>Significant gender effect.  
<sup>c</sup>Significant race/ethnicity effect.

Table 2. Mean (SD) Individual-Level and Couple-Level Covariates for Married Couples From the Study of Asset and Health Dynamics Among the Oldest Old (Wave 1) by Race/Ethnicity and Gender

Characteristics	White Couples		Black Couples		Mexican American Couples		Total Sample
	Husbands	Wives	Husbands	Wives	Husbands	Wives	
Individual level	(n = 1,450)	(n = 1,450)	(n = 132)	(n = 132)	(n = 45)	(n = 45)	(N = 3,254)
Education	11.96 (3.28)	12.17 (2.61)	8.30 (4.51)	10.01 (3.66)	4.67 (3.97)	4.91 (4.04)	11.63 <sup>a</sup> (3.42)
Health	2.88 (1.13)	2.74 (1.14)	3.32 (1.15)	3.45 (1.09)	3.53 (1.08)	3.42 (1.10)	2.88 <sup>b</sup> (1.15)
Age	75.96 (5.50)	72.72 (6.25)	76.69 (5.58)	71.59 (6.96)	76.82 (7.89)	72.31 (8.46)	74.33 <sup>a</sup> (6.24)
Couple level	(n = 1,450)		(n = 132)		(n = 45)		(N = 1,627)
Household income	\$32,773 (35,256)		\$20,665 (14,951)		\$15,296 (12,408)		\$31,307 <sup>b</sup> (33,883)
Household net worth	\$292,080 (585,999)		\$95,896 (142,676)		\$67,980 (103,305)		\$269,966 <sup>b</sup> (558,541)

<sup>a</sup>Significant interaction effect.

<sup>b</sup>Significant race/ethnicity effect.

nicity was significant: White respondents rated their health as better than other respondents did. Health ratings of Black and Mexican American respondents were not significantly different from each other. Husbands were consistently older than wives, but the magnitude of the average age difference varied by race/ethnicity: 3.24 years in White couples, 5.10 years in Black couples, and 4.51 years in Mexican American couples.

At the couple level, both socioeconomic covariates were significantly related to race/ethnicity. White couples reported significantly higher incomes than either Black couples or Mexican American couples, who did not differ from each other. On net worth, White couples again had significantly greater wealth than either Black or Mexican American couples, who did not differ from each other.

### Multilevel Analyses

#### HRS sample.

1. Correlation of symptom levels within couples and variability of symptom levels between couples (Model 1). HRS results for all three multilevel models are presented in Table 3. Variances of the random effects in Model 1 indicated significant variability in depressive symptom levels between couples ( $\tau_{00} = 3.07$ ), although greater variability was evident at the individual level ( $\sigma^2 = 8.19$ ). Moderate correlation in depressive symptoms was evident between spouses,  $\rho = \tau_{00}/(\tau_{00} + \sigma^2) = .27$ . As expected, husbands' symptom level ( $\gamma_{10}$ ) was significantly lower than wives' symptom level ( $\gamma_{00}$ ). Expressed

Table 3. Results for Multilevel Models of Depressive Symptomatology in Married Couples (N = 3,796) From the Health and Retirement Study (Wave 1)

Parameter Estimates	Models Without Covariates				Model With Covariates, Model 3 (All Predictors)	
	Model 1 (Gender Only)		Model 2 (Gender and Race/Ethnicity)		Coefficient	SE
	Coefficient	SE	Coefficient	SE		
Intercept, $\gamma_{00}$	12.12***	0.06	12.05***	0.06	11.75***	0.06
Gender and race/ethnicity						
Male, $\gamma_{10}$	-0.72***	0.07	-0.71***	0.07	-0.72***	0.07
Black, $\gamma_{01}$			0.49*	0.21	-0.32	0.20
Mexican American, $\gamma_{02}$			1.00***	0.30	-0.33	0.29
Male × Black, $\gamma_{11}$			0.19	0.27	0.30	0.25
Male × Mexican American, $\gamma_{12}$			-0.92**	0.37	-0.59	0.35
Individual-level covariates						
Education, $\gamma_{20}$					-0.01	0.01
Health, $\gamma_{30}$					1.04***	0.03
Age, $\gamma_{40}$					-0.04***	0.01
Couple-level covariates						
Income, $\gamma_{03}$					-0.19**	0.06
Net worth, $\gamma_{04}$					-0.14***	0.02
Variances of random effects						
Couple level, $\tau_{00}$	3.07***		3.06***		1.99***	
Individual level, $\sigma^2$	8.19		8.17		7.45	
-2lnL	39590.65		39565.75		38386.92	

Notes: SE = standard error; -2lnL = value of the -2 log likelihood function. Education, health, and age are centered around their respective medians (i.e., high school graduate, very good health, and 56 years old). Income and net worth are logged and centered around their respective means.

\* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ .

in terms of means, the average symptom score for wives was 12.12 and the average symptom score for husbands was  $12.12 - 0.72 = 11.40$ .

2. *Effects of gender and race/ethnicity (Model 2)*. Model 2 provided a significant improvement in fit ( $\Delta -2\ln L = 26.80$ ,  $\Delta df = 4$ ,  $p < .001$ ). At the same time, adding race/ethnicity to the model resulted in minimal reduction ( $<1\%$ ) in explainable variance between couples,  $PRV_b = (3.07 - 3.06)/3.07 = .003$ .

Black wives ( $\gamma_{01}$ ) and Mexican American wives ( $\gamma_{02}$ ) reported symptom levels that were significantly higher than White wives reported ( $\gamma_{00}$ ). Mexican American wives reported the highest symptomatology, on average (i.e.,  $M = 12.05 + 1.00 = 13.05$ , compared with 12.54 for Black wives and 12.05 for White wives). Furthermore, White husbands ( $\gamma_{10}$  yielding  $M = 12.05 - 0.71 = 11.34$ ) reported significantly lower mean symptomatology than their wives reported. Mexican American husbands ( $\gamma_{12}$  yielding  $M = 12.05 - 0.71 + 1.00 - 0.92 = 11.42$ ) also reported significantly lower symptomatology than their wives reported. Black husbands ( $\gamma_{11}$  yielding  $M = 12.02$ ) and wives were not significantly different from each other, however. The largest gender difference occurred in Mexican American couples (a difference of 1.63 points, on average, compared with an average difference of 0.71 points in White couples and 0.52 points in Black couples). White couples reported lower symptomatology ( $M = 11.70$ ) than Black couples ( $M = 12.28$ ) or Mexican American couples ( $M = 12.24$ ).

3. *Addition of covariates (Model 3)*. The final model showed the effects of gender and race/ethnicity (and their interaction) after adding both individual-level and couple-level covariates. Model 3 provided a dramatic improvement in fit ( $\Delta -2\ln L = 1178.83$ ,  $\Delta df = 5$ ,  $p < .001$ ). Adding covariates resulted in a 9% reduction in variance within couples ( $PRV_w = .088$ ) and a 35% reduction in variance between couples ( $PRV_b = .350$ ).

Four of the five covariates were significantly related to depressive symptomatology. At the individual level, poorer health (i.e., above the median, indicating worse health) and younger age were significant predictors of higher symptomatology, but education was not significantly related to symptomatology. At the couple level, both lower income and net worth (below the mean) were significantly related to higher symptoms. All else being equal, health was the most important predictor.

As predicted, adding the covariates produced several changes regarding the effects of gender and race/ethnicity. First, the difference between White wives and Black wives ( $\gamma_{01}$ ), which previously was significant, was no longer significant ( $M = 11.75$  for White wives and 11.43 for Black wives). Second, the even larger difference between White wives and Mexican American wives ( $\gamma_{02}$ ), which previously was significant, also was no longer significant ( $M = 11.42$  for Mexican American wives). Indeed, the decrease in the relative magnitude of this  $\gamma_{02}$  coefficient (from 1.00 in Model 2 to  $-0.33$  in Model 3) was the most dramatic change between Model 2 and Model 3, indicating that in HRS the statistical controls had their strongest impact on conclusions about the de-

pressive symptomatology of Mexican American wives. Third, the gender difference in the Mexican American couples was no longer statistically significant, although the difference still remained greater in the Mexican American couples (1.31 points difference, on average) than in the White couples (0.72 points difference) or the Black couples (0.42 points difference). Fourth, contrary to expectation, White couples now reported higher symptomatology ( $M = 11.39$ ) than Black couples ( $M = 11.22$ ) or Mexican American couples ( $M = 10.76$ ).

When results from the log10-transformed analysis were compared with these results, there was only one difference in the conclusions. With the transformed outcome, the difference between Mexican American husbands and Mexican American wives was statistically significant ( $p < .05$ ).

#### *AHEAD sample.*

1. *Correlation of symptom levels within couples and variability of symptom levels between couples (Model 1)*. AHEAD results for all three multilevel models are presented in Table 4. Variances of the random effects in Model 1 indicated significant variability in depressive symptomatology between couples, although the proportion of variance was greater at the individual level ( $\sigma^2 = 2.14$ ) than at the couple level ( $\tau_{00} = 0.77$ ). Once again, depressive symptoms were moderately correlated between spouses ( $\rho = .26$ ). As predicted, husbands reported a significantly lower level of symptoms ( $M = 1.08$ ) than wives ( $M = 1.33$ ).
2. *Effects of gender and race/ethnicity (Model 2)*. Model 2 represented a significant improvement in fit over the initial gender-only model ( $\Delta -2\ln L = 43.69$ ,  $\Delta df = 4$ ,  $p < .001$ ). Adding race/ethnicity to the model resulted in a modest 4% reduction in variance between couples, however ( $PRV_b = .039$ ).

Mean symptomatology for White wives ( $M = 1.27$ ) was not significantly different from that for Black wives ( $M = 1.63$ ) but was significantly lower than that for Mexican American wives ( $M = 2.88$ ). Symptomatology for White husbands ( $M = 1.03$ ) was significantly lower than that for their wives, and symptomatology for Mexican American husbands ( $M = 1.85$ ) also was significantly lower than that for their wives. Black husbands ( $M = 1.58$ ) were not significantly different from their wives. The gender difference was largest in Mexican American couples (1.03 points, on average, compared with 0.24 points for White couples and 0.05 points for Black couples). White couples reported lower symptomatology ( $M = 1.15$ ) than Black couples ( $M = 1.60$ ) or Mexican American couples ( $M = 2.36$ ).

3. *Addition of covariates (Model 3)*. Results for the final model indicated a significant improvement in fit ( $\Delta -2\ln L = 630.26$ ,  $\Delta df = 5$ ,  $p < .001$ ). Adding covariates resulted in an 11% reduction in variance within couples ( $PRV_w = .108$ ) and a much more dramatic 43% reduction in variance between couples ( $PRV_b = .432$ ).

Three of the five covariates were significantly related to symptomatology. Lower education, poorer health, and



Table 4. Results for Multilevel Models of Depressive Symptomatology in Married Couples ( $N = 1,627$ ) From the Study of Asset and Health Dynamics Among the Oldest Old (Wave 1)

Parameter Estimates	Models Without Covariates				Model With Covariates, Model 3 (All Predictors)	
	Model 1 (Gender Only)		Model 2 (Gender and Race/Ethnicity)		Coefficient	SE
	Coefficient	SE	Coefficient	SE		
Intercept, $\gamma_{00}$	1.33***	0.04	1.27***	0.04	1.47***	0.04
Gender and race/ethnicity						
Male, $\gamma_{10}$	-0.25***	0.05	-0.24***	0.06	-0.36***	0.05
Black, $\gamma_{01}$			0.36	0.20	-0.20	0.18
Mexican American, $\gamma_{02}$			1.61***	0.40	0.80**	0.26
Male $\times$ Black, $\gamma_{11}$			0.19	0.21	0.23	0.24
Male $\times$ Mexican American, $\gamma_{12}$			-0.79*	0.35	-0.77*	0.33
Individual-level covariates						
Education, $\gamma_{20}$					-0.04***	0.01
Health, $\gamma_{30}$					0.56***	0.02
Age, $\gamma_{40}$					0.01	0.00
Couple-level covariates						
Income, $\gamma_{03}$					0.04	0.05
Net worth, $\gamma_{04}$					-0.06**	0.02
Variances of random effects						
Couple level, $\tau_{00}$	0.77***		0.74***		0.42***	
Individual level, $\sigma^2$	2.14		2.13		1.90	
-2lnL	12624.40		12580.71		11950.45	

Notes: SE = standard error; -2lnL = value of the -2 log likelihood function. Education, health, and age are centered around their respective medians (i.e., high school graduate, good health, and 74 years old). Income and net worth are logged and centered around their respective means.

\* $p \leq .05$ ; \*\* $p \leq .01$ ; \*\*\* $p \leq .001$ .

lower net worth predicted higher depressive symptoms. All else being equal, being a Mexican American wife was the strongest predictor.

As expected, adding the covariates produced several noteworthy changes regarding the effects of race/ethnicity. First, Mexican American wives ( $M = 2.27$ ) still reported significantly higher symptomatology than White wives, but the magnitude of the difference was reduced substantially. Indeed, the decrease in the relative magnitude of this  $\gamma_{02}$  coefficient (from 1.61 in Model 2 to 0.80 in Model 3) was the most dramatic change between Model 2 and Model 3, indicating that in AHEAD the statistical controls had their strongest impact on conclusions about the depressive symptomatology of Mexican American wives. Second, White couples no longer reported the lowest symptomatology ( $M = 1.29$ , compared with 1.20 for Black couples and 1.70 for Mexican American couples). Contrary to expectations, addition of the covariates in AHEAD did not change conclusions about gender differences, which remained significant in the White couples and the Mexican American couples but not the Black couples. The gender difference remained largest in Mexican American couples (average difference was 0.36 in White couples, 0.13 in Black couples, and 1.13 in Mexican American couples).

When results from the Poisson analysis were compared with these results, there were only two differences in the conclusions. In the Poisson analysis, the difference between Mexican American husbands and Mexican American wives was not statistically significant ( $p > .05$ ), whereas age was significantly related to depressive

symptoms ( $p < .05$ ). Older age (above the median) predicted higher depressive symptomatology.

## DISCUSSION

In the present study we applied a social contextual framework (e.g., Holahan et al., 1999; Joiner & Coyne, 1999) and multilevel modeling (Bryk & Raudenbush, 1992) to investigate depressive symptomatology in middle-aged and older married couples who were White, Black, or Mexican American. Couples were drawn from Wave 1 of HRS and AHEAD. Our goals were to examine the correlation between spouses' depressive symptoms, the influence of gender and race/ethnicity in predicting variability in symptom level, and the relative importance of both individual-level covariates (education, health, and age) and couple-level covariates (household income and net worth).

In both surveys depressive symptoms are moderately correlated between spouses. Knowledge of the symptom level in one spouse predicts approximately one quarter of the variance in the other spouse's symptom level. This highlights the advantage of using analytical methods such as multilevel modeling that incorporate this interdependence and suggests that studies based on unrelated married individuals or independent analyses of husbands and wives may lead to biased results (Hox & Kreft, 1998).

Social contextual models theorize that the correlation between spouses' depressive symptom levels arises from factors such as assortative mating, marital interaction patterns, emotion contagion, or shared environment and history (Hatfield et al., 1992; Joiner & Coyne, 1999; Tower & Kasl, 1996b). The surveys on which our secondary analysis is

based did not include measures to evaluate these explanations. Also, although the surveys sought to minimize the possibility of response contamination between spouses, we cannot entirely exclude this possibility. Interviewers were instructed to interview spouses separately, but this was not always possible. In HRS Wave 1, interviewers noted active participation of spouses in only 12% of interviews, however. In an additional 17% of interviews spouses reportedly listened to at least part of the interview but did not interfere. We have no comparable information from AHEAD Wave 1.

In both surveys we find significant variability in mean depressive symptom level between couples. This variability is an important finding, because most research on depressive symptomatology emphasizes central tendencies. This variability also cautions us that any particular couple may deviate significantly from the average for the sample as a whole (Raudenbush, 1995). Variability was even greater at the individual (i.e., within-couple) level. Thus, symptom levels are correlated within couples and spouses share some joint risk of depressive symptomatology, but spouses also have individual characteristics that influence their risk.

Consistent with prior research on married individuals (Mirowsky & Ross, 1989) and married couples (Bookwala & Schulz, 1996), we find that wives report higher symptomatology than husbands, on average. With few exceptions (Angel & Angel, 1995; Callahan & Wolinsky, 1994), past research has not considered whether this gender difference might be moderated by race/ethnicity. Our results show that it is. In both surveys, no significant gender difference is evident in Black couples, a consistent but moderate difference appears in the White couples, and the largest difference appears in Mexican American couples. These findings caution against extrapolating from research based wholly or predominantly on White married adults and argue for greater attention to Black and Mexican American married couples in middle and later adulthood.

Our finding of no significant gender difference in Black couples was unanticipated, but there is some evidence that Black married couples may be more egalitarian in gender role ideology and division of household labor than White married couples (Staples & Johnson, 1993; Willie & Greenblatt, 1978). Mirowsky and Ross (1989) documented a significant relationship between perceived equity in marital relationships and wives' depressive symptomatology, although their research did not include race as a predictor. Thus, further research is needed to explain the unique pattern of findings for the Black couples.

For Mexican American couples, our results are consistent with prior research noting especially high depressive symptoms in older Mexican American women (Angel & Angel, 1995; Markides et al., 1997). Our study extends this prior research on Mexican American adults to Mexican American married couples. Black and colleagues (1998) found the highest level of symptomatology among older Mexican American women who were nonrecent immigrants to the United States. This may help explain why we find higher symptomatology in Mexican American wives in AHEAD (i.e., the oldest cohort) than in HRS. Indeed, our findings indicate that Mexican American wives aged 70 and older are the group most at risk for elevated depressive symptoms.

One especially noteworthy conclusion is the importance of controlling for both individual-level characteristics and couple-level characteristics. Adding these substantially improved model fit and also changed several conclusions about differences in depressive symptom level by gender or race/ethnicity, particularly conclusions pertaining to Mexican American couples. Thus, we must be careful not to attribute differences to gender or race/ethnicity that may be due to other factors.

All the covariates are significantly related to depressive symptomatology. The relationships for education, age, and income are not consistent across the two surveys, however. For example, lower education predicts higher symptomatology in AHEAD, whereas education is not significantly related to symptomatology in HRS. Poorer health and lower household net worth are the only covariates that consistently predict higher symptomatology in our study. As George (1993) noted, some risk factors for depression appear to remain relatively robust throughout the adult life course, whereas others appear to vary in salience. Life-course theories explaining why risk factors may fluctuate are not well developed, however.

The association between poor health and depressive symptoms has been consistently noted in prior research (e.g., Deeg et al., 1996). Because our study is cross-sectional, we cannot examine reciprocal relationships between physical health and depressive symptoms. Other research (e.g., Aneshensel, Frerichs, & Huba, 1984) has documented the importance of this topic for future investigation.

To our knowledge, this is the first study to examine the association between net worth and depressive symptoms, and it is striking that net worth has an independent effect after we control for income and the other predictors. As Smith (1997) has noted, racial/ethnic differences in wealth are much larger than differences in income. It seems desirable, therefore, to include net worth in future studies of depressive symptomatology and to explore the pathways through which assets such as housing equity or savings are linked to depressive symptoms. Ideas about how such research might proceed can be gleaned from Smith and Kington's (1997) work on the relationship of wealth to physical health in the HRS and AHEAD surveys.

Why the covariates have a stronger impact on conclusions about the Mexican American couples is unknown. Part of the explanation may be that they have the lowest levels of education, income, and net worth in our study. Further research is clearly needed on risk factors for depressive symptomatology in Mexican American married couples and ways to reduce these risks. Our sample of Mexican American couples is relatively small, particularly in AHEAD. Thus, it is imperative to see whether our results will replicate. Given the rapidly growing numbers of Mexican American and other Latino elderly persons in the United States (Siegel, 1999), the mental health needs of elderly Hispanics are likely to become increasingly salient in the years ahead.

Differences in results between HRS and AHEAD raise questions about the reasons for this divergence. One possibility is age differences between the two samples: HRS targeted middle-aged adults (aged 51–61) and AHEAD targeted the oldest old adults (aged 70 and older). Our

inclusion of age in the analyses should minimize this possibility, however. A second possibility is life-course or cohort differences, because the two surveys sampled adults who were born during different historical periods (between 1931 and 1941 in HRS and in 1913 or earlier in AHEAD). Not only may the older AHEAD cohort have had different life experiences that could influence present levels of depressive symptoms (Elder et al., 1996), they also may have different perceptions about mental health and the possible stigma associated with reporting depressed mood (Veroff et al., 1981). Period effects seem unlikely to account for the observed differences, because the two surveys were conducted within a year of each other. A third possibility is differences in measurement, because HRS used a four-category response scale to assess the frequency of depressive symptoms and AHEAD used a dichotomous scale to assess the occurrence of frequent symptoms (i.e., whether the symptom was experienced "much of the time").

Significant variance both within couples and between couples remains unexplained by our final model. Thus, further research is needed to identify other characteristics that can explain why some spouses report more symptomatology than their partners and why some couples report more symptomatology than other couples. Research suggests several mechanisms for the development and maintenance of depressive symptoms, such as attributional styles, cognitions about the marital relationship, shared environment, generation of stressful life events, and interaction patterns (Davila & Bradbury, 1998; Hammen, 1999; Joiner & Coyne, 1999; Tower & Kasl, 1996b).

Several limitations should be noted. First, our study is cross-sectional. Few studies have examined depressive symptoms in married couples over time (for an exception, see Tower & Kasl, 1996a). Longitudinal studies are sorely needed to address questions such as how husbands' and wives' symptomatology are related over time; how spouses' depressive symptoms are related to changes in health, socioeconomic assets, or other risk factors; and whether antecedents and consequences of chronically elevated depressive symptoms in married couples are different from those of acute or episodic symptomatology.

Second, our results may not generalize to other racial/ethnic groups or to couples who do not share a common racial/ethnic identity. In addition, there may be important distinctions within the three groups we studied. For example, differences among Mexican Americans in acculturation and immigration history (Aranda & Miranda, 1997; Black et al., 1998) and differences among African Americans in geographic region or religiosity (Staples & Johnson, 1993; Taylor, Jackson, & Chatters, 1997) may influence depressive symptoms.

Third, mean depressive symptom levels fall in the bottom quartile of possible scores, with the exception of a higher level for Mexican American wives in AHEAD. This is consistent with other research showing that high symptomatology is not the norm in community samples of middle-aged and older adults, especially those who are married (Fisher et al., 1993; Kennedy et al., 1989). In more selective samples, such as couples coping with serious illness, marital distress, or other major stressors, one might expect higher levels of

depressive symptoms, stronger correlation between spouses' symptoms, and perhaps different predictors. In addition, our conclusions should not be generalized to married couples coping with clinical depression.

Despite these limitations, the present study extends current knowledge in several ways. It expands the small but growing body of evidence that spouses' depressive symptomatology is interdependent (e.g., Bookwala & Schulz, 1996; Tower & Kasl, 1995, 1996b) by applying multilevel modeling to data from husbands and wives. It reveals significant variability in symptom levels between couples. It documents that couple-level characteristics as well as individual-level characteristics predict symptomatology. It provides unique information on the significance of household net worth. It highlights the desirability of including couples from diverse racial and ethnic backgrounds. It raises awareness of possible life-course, cohort, or methodological influences.

#### ACKNOWLEDGMENTS

This research was funded by a grant from the National Institute on Aging (R01 AG17546). The authors gratefully acknowledge Julián Montoro Rodríguez, Ini Choi, and Yeonhee Rho for assistance with data management; A. Regula Herzog for consultation related to the assessment of depressive symptoms and overall study design in the HRS and AHEAD surveys; Michael Rovine for consultation on statistical analyses; and Daniel Hill for advice regarding selection of design weights. The data used in this research were made available by the Institute for Social Research, University of Michigan, Ann Arbor. A preliminary paper based on this study was presented at the 52nd Annual Scientific Meeting of The Gerontological Society of America in November 1999.

Address correspondence to Dr. Aloen Townsend, Mandel School of Applied Social Sciences, Case Western Reserve University, 10900 Euclid Avenue, Cleveland, OH 44106-7164. E-mail: alt7@po.cwru.edu

#### REFERENCES

- American Psychological Association (1993). *Vitality for life: Psychological research for productive aging*. Washington, DC: Author.
- Aneshensel, C., Frerichs, R., & Clark, V. (1981). Family roles and sex differences in depression. *Journal of Health and Social Behavior*, 22, 379-393.
- Aneshensel, C., Frerichs, R., & Huba, G. (1984). Depression and physical illness: A multiwave, nonrecursive causal model. *Journal of Health and Social Behavior*, 25, 350-371.
- Angel, R., & Angel, J. (1995). Mental and physical comorbidity among the elderly: The role of culture and social class. In D. Padgett (Ed.), *Handbook on ethnicity, aging, and mental health* (pp. 47-70). Westport, CT: Greenwood Press.
- Aranda, M., & Miranda, M. (1997). Hispanic aging, social support, and mental health: Does acculturation make a difference? In K. Markides & M. Miranda (Eds.), *Minorities, aging, and health* (pp. 271-294). Thousand Oaks, CA: Sage.
- Banks, S., & Kerns, R. (1996). Explaining high rates of depression in chronic pain: A diathesis-stress framework. *Psychological Bulletin*, 119, 95-110.
- Barnett, R., Marshall, N., Raudenbush, S., & Brennan, R. (1993). Gender and the relationship between job experiences and psychological distress: A study of dual-earner couples. *Journal of Personality and Social Psychology*, 64, 794-806.
- Berkman, L., Berkman, C., Kasl, S., Freeman, D., Jr., Leo, L., Ostfeld, A., Cornoni-Huntley, J., & Brody, J. (1986). Depressive symptoms in relation to physical health and functioning in the elderly. *American Journal of Epidemiology*, 124(3), 372-388.
- Black, S., Goodwin, J., & Markides, K. (1998). The association between chronic diseases and depressive symptomatology in older Mexican Americans. *Journal of Gerontology: Medical Sciences*, 53A, M188-M194.
- Blazer, D., Burchett, B., Service, C., & George, L. (1991). The association

- of age and depression among the elderly: An epidemiologic exploration. *Journal of Gerontology: Medical Sciences*, 46, M210–M215.
- Blazer, D., Hughes, D., & George, L. (1987). The epidemiology of depression in an elderly community population. *The Gerontologist*, 27, 281–287.
- Bookwala, J., & Schulz, R. (1996). Spousal similarity in subjective well-being: The Cardiovascular Health Study. *Psychology and Aging*, 11, 582–590.
- Borson, S., Barnes, R., Kukull, W., Okimoto, J., Veith, R., Inui, T., Carter, W., & Raskind, M. (1986). Symptomatic depression in elderly medical outpatients: I. Prevalence, demography, and health service utilization. *Journal of the American Geriatrics Society*, 34, 341–347.
- Bryk, A., & Raudenbush, S. (1992). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.
- Callahan, C., & Wolinsky, F. (1994). Effect of gender and race on the measurement properties of the CES-D in older adults. *Medical Care*, 32, 341–356.
- Carstensen, L., Gottman, J., & Levenson, R. (1995). Emotional behavior in long-term marriage. *Psychology and Aging*, 10, 140–149.
- Cowan, P., Cowan, C., & Schulz, M. (1996). Thinking about risk and resiliency in families. In E. M. Hetherington & E. Blechman (Eds.), *Stress, coping, and resiliency in children and families* (pp. 1–38). Mahwah, NJ: Erlbaum.
- Coyne, J., Kessler, R., Tal, M., Turnbull, J., Wortman, C., & Greden, J. (1987). Living with a depressed person. *Journal of Consulting and Clinical Psychology*, 55, 347–352.
- Cutrona, C. (1996). *Social support in couples: Marriage as a resource in times of stress*. Thousand Oaks, CA: Sage.
- Davila, J., & Bradbury, T. (1998). Psychopathology and the marital dyad. In L. L'Abate (Ed.), *Family psychopathology: The relational roots of dysfunctional behavior* (pp. 127–157). New York: Guilford.
- Deeg, D., Kardaun, J., & Fozard, J. (1996). Health, behavior, and aging. In J. Birren & K. W. Schaie (Eds.), *Handbook of the psychology of aging* (4th ed., pp. 129–149). San Diego, CA: Academic Press.
- DeLongis, A., & O'Brien, T. (1990). An interpersonal framework for stress and coping: An application to the families of Alzheimer's patients. In J. Akamatsu, M. A. Stephens, S. Hobfoll, & J. Crowther (Eds.), *Family health psychology* (pp. 221–239). Washington, DC: Hemisphere.
- Devins, G., & Orme, C. (1985). Center for Epidemiological Studies Depression Scale. In D. Keyser & R. Sweetland (Eds.), *Test critiques* (Vol. 2, pp. 144–160). Kansas City, MO: Test Corporation of America.
- Eaton, W., & Kessler, R. (1981). Rates of symptoms of depression in a national sample. *American Journal of Epidemiology*, 114, 528–538.
- Elder, G., Jr., George, L., & Shanahan, M. (1996). Psychosocial stress over the life course. In H. Kaplan (Ed.), *Psychosocial stress: Perspectives on structure, theory, life-course, and methods* (pp. 247–292). San Diego, CA: Academic Press.
- Fiscella, K., & Franks, P. (1997). Does psychological distress contribute to racial and socioeconomic disparities in mortality? *Social Science & Medicine*, 45, 1805–1809.
- Fisher, J., Zeiss, A., & Carstensen, L. (1993). Psychopathology in the aged. In P. Sutker & H. Adams (Eds.), *Comprehensive handbook of psychopathology* (2nd ed., pp. 815–842). New York: Plenum.
- George, L. (1993). Depressive disorders and symptoms in late life. In M. Smyer (Ed.), *Mental health and aging: Progress and prospects* (pp. 65–73). New York: Springer.
- Given, C., Stommel, M., Given, B., Osuch, J., Kurtz, M., & Kurtz, J. (1993). The influence of cancer patients' symptoms and functional status on patients' depression and family caregivers' reactions and depression. *Health Psychology*, 12, 277–285.
- Gonzalez, R., & Griffin, D. (1997). On the statistics of interdependence: Treating dyadic data with respect. In S. Duck (Ed.), *Handbook of personal relationships* (2nd ed., pp. 271–302). New York: Wiley.
- Hammen, C. (1999). The emergence of an interpersonal approach to depression. In T. Joiner & J. Coyne (Eds.), *The interactional nature of depression* (pp. 21–35). Washington, DC: American Psychological Association.
- Hatfield, E., Cacioppo, J., & Rapson, R. (1992). Primitive emotional contagion. In M. Clark (Ed.), *Review of personality and social psychology: Emotion and social behavior* (Vol. 14, pp. 151–177). Newbury Park, CA: Sage.
- Hobbs, F. (1996). *65+ in the United States*. (P23-190 Current Population Reports: Special Studies). Washington, DC: U.S. Bureau of the Census.
- Holahan, C., Moos, R., & Bonin, L. (1999). Social context and depression: An integrative stress and coping framework. In T. Joiner & J. Coyne (Eds.), *The interactional nature of depression* (pp. 39–63). Washington, DC: American Psychological Association.
- House, J., Kessler, R., Herzog, A. R., Mero, R., Kinney, A., & Breslow, M. (1992). Social stratification, age, and health. In K. W. Schaie, D. Blazer, & J. House (Eds.), *Aging, health behaviors, and health outcomes* (pp. 1–32). Hillsdale, NJ: Erlbaum.
- House, J., Lepkowski, J., Kinney, A., Mero, R., Kessler, R., & Herzog, A. R. (1994). The social stratification of aging and health. *Journal of Health and Social Behavior*, 35, 213–234.
- Hox, J., & Kreft, I. (1998). Multilevel analysis methods. *Sociological Methods and Research*, 22, 283–299.
- Jackson, J., Antonucci, T., & Gibson, R. (1995). Ethnic and cultural factors in research on aging and mental health: A life-course perspective. In D. Padgett (Ed.), *Handbook on ethnicity, aging, and mental health* (pp. 22–46). Westport, CT: Greenwood Press.
- Joiner, T., & Coyne, J. (1999). *The interactional nature of depression*. Washington, DC: American Psychological Association.
- Juster, F. T., & Suzman, R. (1995). An overview of the Health and Retirement Study. *The Journal of Human Resources*, 30(Suppl.), S7–S56.
- Kahana, E., & Young, R. (1990). Clarifying the caregiving paradigm: Challenges for the future. In D. Biegel & A. Blum (Eds.), *Aging and caregiving: Theory, research, and practice* (pp. 76–97). Newbury Park, CA: Sage.
- Kahana, E., Young, R., Kercher, K., & Kaczynski, R. (1993). Testing a symmetrical model of caregiving outcomes during recovery from heart attacks. *Research on Aging*, 15, 371–398.
- Kelley, H. (1981). Marriage relationships and aging. In R. Fogel, E. Hatfield, S. Kiesler, & E. Shanas (Eds.), *Aging: Stability and change in the family* (pp. 275–300). New York: Academic Press.
- Kennedy, G., Kelman, H., & Thomas, C. (1990). The emergence of depressive symptoms in late life: The importance of declining health and increasing disability. *Journal of Community Health*, 15, 93–104.
- Kennedy, G., Kelman, H., Thomas, C., Wisniewsky, W., Metz, H., & Bijur, P. (1989). Hierarchy of characteristics associated with depressive symptoms in an urban elderly sample. *American Journal of Psychiatry*, 146, 220–225.
- Kessler, R., Foster, C., Webster, P., & House, J. (1992). The relationship between age and depressive symptoms in two national surveys. *Psychology and Aging*, 7, 119–126.
- Kessler, R., & Neighbors, H. W. (1986). A new perspective on the relationships among race, social class, and psychological distress. *Journal of Health and Social Behavior*, 27, 107–115.
- Kohout, F., Berkman, L., Evans, D., & Comoni-Huntley, J. (1993). Two shorter forms of the CES-D depression symptoms index. *Journal of Aging and Health*, 5, 179–193.
- Kreft, I., & de Leeuw, J. (1998). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage.
- Manton, K., Stallard, E., & Corder, L. (1997). Education-specific estimates of life expectancy and age-specific disability in the U.S. elderly population: 1982 to 1991. *Journal of Aging and Health*, 9, 419–450.
- Markides, K., & Lee, D. (1990). Predictors of well-being and functioning in older Mexican Americans and Anglos: An eight-year follow-up. *Journal of Gerontology: Social Sciences*, 45, S69–S73.
- Markides, K., Rudkin, L., Angel, R., & Espino, D. (1997). Health status of Hispanic elderly. In L. Martin & B. Soldo (Eds.), *Racial and ethnic differences in the health of older Americans* (pp. 285–300). Washington, DC: National Academy Press.
- Martin, L., & Soldo, B. (1997). Introduction. In L. Martin & B. Soldo (Eds.), *Racial and ethnic differences in the health of older Americans* (pp. 1–9). Washington, DC: National Academy Press.
- Mirowsky, J., & Ross, C. (1989). *Social causes of psychological distress*. New York: Aldine de Gruyter.
- Mitchell, R., Cronkite, R., & Moos, R. (1983). Stress, coping, and depression among married couples. *Journal of Abnormal Psychology*, 92, 433–448.
- Moon, M., & Juster, F. T. (1995). Economic status measures in the Health and Retirement Study. *The Journal of Human Resources*, 30(Suppl.), S138–S157.
- Murrell, S., Himmelfarb, S., & Wright, K. (1983). Prevalence of depression and its correlates in older adults. *American Journal of Epidemiology*, 117, 173–185.

- Muthén, B. (1997). Latent variable modeling of longitudinal and multilevel data. In A. Raftery (Ed.), *Sociological methodology* (pp. 453–480). Boston: Blackwell.
- Newmann, J. (1989). Aging and depression. *Psychology and Aging, 4*, 150–165.
- Nolen-Hoeksema, S. (1990). *Sex differences in depression*. Stanford, CA: Stanford University Press.
- Pakenham, K. (1998). Couple coping and adjustment to multiple sclerosis in care receiver-carer dyads. *Family Relations: Interdisciplinary Journal of Applied Family Studies, 47*, 269–277.
- Pearlin, L. (1989). The sociological study of stress. *Journal of Health and Social Behavior, 30*, 241–256.
- Pruchno, R. (1994). Studying caregiving families: Theoretical and methodological challenges. In E. Light, G. Niederehe, & B. Lebowitz (Eds.), *Stress effects on family caregivers of Alzheimer's patients: Research and interventions* (pp. 333–350). New York: Springer.
- Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Journal of Applied Psychological Measurement, 1*, 385–401.
- Raudenbush, S. (1995). Hierarchical linear models to study the effects of social context on development. In J. Gottman (Ed.), *The analysis of change* (pp. 165–201). Mahwah, NJ: Erlbaum.
- Raudenbush, S., Brennan, R., & Barnett, R. (1995). A multivariate hierarchical model for studying psychological change within married couples. *Journal of Family Psychology, 9*, 161–174.
- Raudenbush, S., Bryk, A., Cheong, Y., & Congdon, R., Jr. (2000). *HLM 5: Hierarchical linear and nonlinear modeling*. Lincolnwood, IL: Scientific Software International.
- Schulz, R., O'Brien, A., Bookwala, J., & Fleissner, K. (1995). Psychiatric and physical morbidity effects of dementia caregiving: Prevalence, correlates, and causes. *The Gerontologist, 35*, 771–791.
- Siegel, J. (1999). Demographic introduction to racial/Hispanic elderly populations. In T. Miles (Ed.), *Full-color aging: Facts, goals, and recommendations for America's diverse elders* (pp. 1–19). Washington, DC: The Gerontological Society of America.
- Smallegan, M. (1989). Level of depressive symptoms and life stresses for culturally diverse older adults. *The Gerontologist, 29*, 45–50.
- Smith, J. (1997). Wealth inequality among older Americans. *Journals of Gerontology: Psychological Sciences and Social Sciences, 52B*(Special Issue), 74–81.
- Smith, J., & Kington, R. (1997). Race, socioeconomic status, and health in late life. In L. Martin & B. Soldo (Eds.), *Racial and ethnic differences in the health of older Americans* (pp. 106–162). Washington, DC: National Academy Press.
- Soldo, B., Hurd, M., Rodgers, W., & Wallace, R. (1997). Asset and Health Dynamics Among the Oldest Old: An overview of the AHEAD study. *Journals of Gerontology: Psychological Sciences and Social Sciences, 52B*(Special Issue), 1–20.
- Stanford, E. P., & DuBois, B. (1992). Gender and ethnicity patterns. In J. Birren, R. Sloane, & G. Cohen (Eds.), *Handbook of mental health and aging* (2nd ed., pp. 99–117). San Diego, CA: Academic Press.
- Staples, R., & Johnson, L. (1993). *Black families at the crossroads: Challenges and prospects*. San Francisco: Jossey-Bass.
- Taylor, R., Jackson, J., & Chatters, L. (1997). *Family life in Black America*. Thousand Oaks, CA: Sage.
- Thoits, P. (1986). Multiple identities: Examining gender and marital status differences in distress. *American Sociological Review, 51*, 259–272.
- Thompson, L. (1993). Conceptualizing gender in marriage: The case of marital care. *Journal of Marriage and the Family, 55*, 557–569.
- Thompson, L., & Walker, A. (1982). The dyad as the unit of analysis: Conceptual and methodological issues. *Journal of Marriage and the Family, 44*, 889–900.
- Tower, R. B., & Kasl, S. (1995). Depressive symptoms across older spouses and the moderating effect of marital closeness. *Psychology and Aging, 10*, 625–638.
- Tower, R. B., & Kasl, S. (1996a). Depressive symptoms across older spouses: Longitudinal influences. *Psychology and Aging, 11*, 683–697.
- Tower, R. B., & Kasl, S. (1996b). Gender, marital closeness, and depressive symptoms in elderly couples. *Journal of Gerontology: Psychological Sciences, 51B*, P115–P129.
- Turner, R., & Noh, S. (1988). Physical disability and depression: A longitudinal analysis. *Journal of Health and Social Behavior, 29*, 23–37.
- Turvey, C., Wallace, R., & Herzog, R. (1999). Depression: A revised CES-D measure of depressive symptoms and a DSM-based measure of major depressive episodes in the elderly. *International Psychogeriatrics, 11*, 139–148.
- Verbrugge, L. (1989). The twain meet: Empirical explanations of sex differences in health and mortality. *Journal of Health and Social Behavior, 30*, 282–304.
- Veroff, J., Douvan, E., & Kulka, R. (1981). *The inner American: A self-portrait from 1957 to 1976*. New York: Basic Books.
- Wallace, R., & Herzog, A. R. (1995). Overview of the health measures in the Health and Retirement Study. *The Journal of Human Resources, 30*(Suppl.), S84–S107.
- Whiffen, V., & Aube, J. (1999). Personality, interpersonal context and depression in couples. *Journal of Social and Personal Relationships, 16*, 369–383.
- Williams, D., & Collins, C. (1995). United States socioeconomic and racial differences in health: Patterns and explanations. *Annual Review of Sociology, 21*, 349–386.
- Williamson, G., & Schulz, R. (1992). Physical illness and symptoms of depression among elderly outpatients. *Psychology and Aging, 7*, 343–351.
- Willie, C., & Greenblatt, S. (1978). Four “classic” studies of power relationships in Black families: A review and look to the future. *Journal of Marriage and the Family, 40*, 691–694.
- Winer, B., Brown, D., & Michels, K. (1991). *Statistical principles in experimental design* (3rd ed.). New York: McGraw-Hill.

Received January 28, 2000

Accepted May 11, 2001