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Coping and Psychological Distress in Mothers of Very Low Birth Weight Young Children

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SYNOPSIS

Objective.—This study sought to increase understanding of relations among coping strategies, sociodemographic variables, and psychological distress in mothers of high-risk (HR) and low-risk (LR) very low birth weight (VLBW; < 1,500g) infants.

Design.—The sample (*N* = 199) consisted of 77 mothers of HR VLBW infants, 43 mothers of LR VLBW infants, and a control group of 79 mothers of healthy, term infants. Data were collected with self-report questionnaires at birth and at 24 months postpartum. Relations among infant medical risk, multiple birth, maternal race, social class, and maternal coping were investigated. Hierarchical regression analyses were used to identify predictors of maternal psychological distress and to determine whether coping differentially moderated maternal psychological distress across groups.

Results.—Infant medical risk, social support, and maternal coping independently predicted maternal psychological distress. Mothers of HR VLBW infants reported significantly greater psychological distress than mothers of LR VLBW or term infants. Greater use of *avoidant* and *express emotions* coping predicted higher psychological distress for all mothers. Greater use of *humor* coping had a buffering effect, reducing distress only for mothers of HRVLBW infants. Maternal coping scores were related to maternal race and social class, rather than to severity of infant medical risk.

Conclusions.—Sociocultural sources of resiliency, as well as biological risk factors, should be considered when developing strategies to enhance coping and parenting in HR populations.

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INTRODUCTION

Over 57,000 preterm, very low birth weight (VLBW; < 1,500 g) infants are born annually in the United States (Ventura, Martin, Curtin, Mathews, & Park, 2000), and increasing numbers survive due to advances in reproductive and neonatal medicine. However, younger gestational age and lower birth weight are associated with significantly increased risk of acute medical problems and adverse developmental outcomes for children, as well as with increased parenting strain and economic hardship for families (Singer et al., 1999; Singer, Yamashita, Lilien, Collin, & Baley, 1997). In addition, many VLBW infants are multiples, which may intensify parenting demands and financial burdens (Leonard, 1998). About one third of mothers of VLBW infants experience clinically significant anxiety and depression in the neonatal period (Singer et al. 1997; Thompson, Oehler, Catlett, & Johndrow, 1993). Because greater maternal psychological distress is associated with less contingent parenting behaviors and more unfavorable child outcomes for mothers and their VLBW infants (Singer, Davillier, Preuss et al., 1996; Singer et al., 1999; Singer et al., 1997), it is important to identify protective factors, such as maternal coping, that may reduce maternal psychological distress and consequently may enhance parenting and improve child outcomes for this high-risk (HR) population.

Race and Social Class

A considerable proportion of single, African American mothers live in disadvantaged inner city neighborhoods (Jackson & Jones, 2001). The intertwined contextual stressors related to racism and poverty negatively influence physical and mental health, self-esteem, family relationships, and parenting processes (Murry, Bynum, Brody, Willert, & Stephens, 2001; Garcia-Coll, Meyer, & Brillon, 1995). VLBW birth occurs three times more frequently among poor, young, single African American women, and these mothers face an even greater pileup of stressors, as they must cope with the additional psychosocial and financial burdens related to their children's health and developmental problems (Paneth, 1995).

Stress and Coping

The transactional model of stress and coping (Lazarus & Folkman, 1984) provides a vantage point for exploring relations among stressors, maternal coping, and maternal psychological distress. Within this model, coping involves primary appraisal of the stressor, secondary appraisal of coping resources, selection and implementation of coping strategies based on comparison of primary and secondary appraisals, appraisal of outcomes, and reappraisals of the stressor and coping resources. The continuous, self-modifying nature of this model has important implications for coping research, because history and maturation may pose serious threats to validity if data are collected at remote, sequential time points (Beehr & McGrath, 1996). It is important that measurement of stressor, coping, and outcome be made proximally, close to "real-time moments of change" (Tennen, Affleck, Armeli, & Carney, 2000, p. 627).

In addition, coping should not be collapsed into broad bands for research purposes, as individual coping strategies grouped together this way are often conceptually and functionally dissimilar (Stanton, Danoff-Berg, Cameron, & Ellis, 1994). Instead, a variety of

discrete coping strategies should be measured and studied separately (Carver, Scheier, & Weintraub, 1989). Finally, because appraisal is key in the transactional model of stress and coping and because an individual's appraisals are influenced by sociocultural norms and belief systems, race and social class should be considered carefully in coping research. Emerging research indicates that race and social class evoke distinctive stressors and shape characteristic coping strategies (Brantley, O'Hea, Jones, & Mehan, 2002; Plummer & Slane, 1996; Yeates et al., 2002).

Stress-Buffering Effects of Coping

Certain coping strategies, such as religion and humor, may exert stress-buffering effects, affecting outcomes differentially across groups. For both European American (Pearce & Axinn, 1998) and African American mothers (Brodsky, 2000), religion coping was found to promote prosocial behaviors and values, improves parenting, increase quality of mother – child relationships, and strengthen family cohesion. However, for African American mothers, religion coping was associated with several additional functions, such as reducing the negative effects of racial discrimination (Daly, Jennings, Beckett, & Leashore, 1995), offering instrumental assistance and social support (Mattis & Jagers, 2001), enhancing maternal and child adjustment (Christian & Barbarin, 2001), and increasing social capital (Ellison, 1998). In a study that used blood pressure (BP) as an objective physiologic measure of stress and coping, greater use of religion coping predicted lower BP for African American, but not for European American, participants (Steffen, Hinderliter, Blumenthal, & Sherwood, 2001). In another study monitoring BP during performance of stressful tasks, humor coping was negatively associated with BP readings for females, but was positively or nonsignificantly associated with BP for males, depending on the type of task (Lefcourt, Davidson, Prkachin, & Mills, 1997). Other data have provided additional evidence that humor coping may exert differential effects based on gender. Greater use of humor coping was found to predict lower levels of depression in females, but not in males (Overholser, 1992), and to predict greater marital satisfaction, engagement in social interactions, and happiness in wives, but not in husbands (Lefcourt & Martin, 1986).

Social Support

Social support is an important coping resource that may exert stress-buffering effects, reducing stress differentially in high-stress versus low-stress situations (Pierce, Sarason, & Sarason, 1996). For mothers of medically fragile and VLBW infants, social support has been associated with decreased psychological distress (Affleck, Tennen, & Rowe, 1991; Thompson et al., 1993). Singer, Davillier, Preuss, et al. (1996) found that maternal appraisal of stress differentially affected severity of psychological distress, dependent on level of social support for mothers of HR VLBW infants.

Coping Effectiveness

Certain maternal coping strategies are more effective than others in reducing parenting stress and psychological distress for mothers of children with serious medical conditions or developmental disabilities. Avoidant, emotion-focused, and palliative coping strategies were found to predict greater psychological distress for mothers of children with spina bifida (Barakat & Linney, 1995), autism (Dunn, Burbine, Bowers, & Tantleff-Dunn, 2001), and

congenital cardiac problems (Davis, Brown, Bakeman, & Campbell, 1998). Active, approach, and problem-focused coping strategies were found to predict lower psychological distress for mothers of children with insulin dependent diabetes (Blankfield & Holahan, 1996). For mothers of medically fragile infants, both avoidant (Feldman Reichman, Miller, Gordon, & Hendricks-Munoz, 2000) and active coping predicted greater distress (Affleck & Tennen, 1991; Affleck, Tennen, & Rowe, 1990, 1991), whereas accepting responsibility (Feldman et al., 2000) and coping by seeking meaning (Affleck & Tennen, 1991; Affleck et al., 1990, 1991) predicted lower distress.

Two coping strategies were found to exert differential effects on maternal psychological distress based on child developmental outcomes. Affleck and colleagues (Affleck & Tennen, 1991; Affleck et al., 1990, 1991) compared groups of mothers of medically fragile infants whose children were and were not subsequently diagnosed as developmentally disabled, and found that coping by minimizing was positively correlated with psychological distress only for mothers of children diagnosed as disabled. Similarly, coping by seeking meaning was more strongly negatively correlated with psychological distress for mothers of children diagnosed with developmental disabilities, and thus had a buffering effect for these mothers.

A search of the literature revealed only one study (Thompson et al., 1993) of maternal coping and psychological adjustment in which the sample was limited to mothers of VLBW infants. Thompson et al. assessed 90 mothers of VLBW infants and found that maternal psychological distress was negatively associated with adaptive coping and positively associated with palliative coping.

Findings from all these studies must be weighed carefully, because many samples were composed primarily of European American, higher social class mothers; samples were subject to hospital bias; no comparison groups were included; and in the case of Affleck and colleagues (Affleck & Tennen, 1991; Affleck et al., 1990, 1991), collection of coping data occurred 18 months prior to measurement of outcome. In addition, most studies used overly inclusive coping categories, and few of these categories were consistent across studies. Collapsing coping categories into broad bands limits clinical utility and impedes comparison of findings across studies.

Purpose and Hypotheses

Further investigation of coping in mothers of VLBW infants is warranted. VLBW infants comprise a distinct risk group, because lower birth weight and younger gestational age are positively correlated with African American race and lower social class (Paneth, 1995) in VLBW infants, but not in other infancy risk conditions, such as congenital cardiac problems (Davis et al., 1998) or spina bifida (Barakat & Linney, 1995). There may be additional unique aspects to parenting VLBW infants, as well, such as the belief that the infant will outgrow deficits or the fact that the ultimate level of disability is unclear. This study sought to increase understanding of the variability in maternal adaptation to the birth and parenting of a VLBW infant by exploring relations among coping, psychological distress, severity of infant medical risk, multiple birth, and maternal race and social class. Adaptive coping may be a protective factor that attenuates maternal psychological distress, potentially improving quality of parenting and child developmental outcomes in this HR population. The research

design was congruent with Lazarus and Folkman's (1984) transactional stress and coping model. Maternal coping and maternal psychological distress were measured proximal to a clearly identifiable stressor, at 24 months postpartum, a time point when the magnitude of VLBW-related developmental disabilities becomes apparent (Singer et al., 1999).

We formulated the following three hypotheses, anchored in the transactional stress and coping model. Because prior research on coping and psychological distress in a sociodemographically representative sample of mothers of VLBW infants was scarce, our hypotheses focused on general, rather than specific, relations among the variables.

1. There will be group differences in mean maternal coping scores, based on severity of infant medical risk, multiple birth, and maternal race and social class.
2. Infant medical risk, multiple birth, social class, social support, and coping will independently predict psychological distress for all mothers at 24 months postpartum.
3. Coping will moderate psychological distress for mothers across groups based on severity of infant medical risk and maternal race and social class.

METHODS

Participants

The sample (N = 199) consisted of 77 mothers of HR VLBW infants, 43 mothers of low-risk very low birth weight (LR VLBW) infants, and 79 mothers of normal birth weight, term infants who participated in a longitudinal study of maternal psychological distress and parenting strain after the birth of a VLBW infant (Singer et al., 1999). Participants were prospectively, consecutively recruited between 1989 and 1991 from the newborn nurseries and neonatal intensive care units (NICUs) at three hospitals in a four-county region in the Midwest. Sample criteria for HR VLBW infants included preterm birth, < 1,500 g birthweight, oxygen supplementation for > 28 days, and documented radiologic evidence of bronchopulmonary dysplasia (BPD), a neonatal respiratory condition associated with increased morbidity (Bancalari, 2001). LR VLBW infants were preterm, < 1,500 g birthweight, required oxygen supplementation for < 14 days, and had no radiologic evidence of BPD. Term infants were > 36 weeks gestational age, > 2,500 g at birth, and free of medical illnesses or birth anomalies. Infants with congenital malformations or drug exposure, or whose mothers had psychiatric or physical disorders, mental retardation, or human immunodeficiency virus, had used illicit drugs during pregnancy, or lived greater than 2 hr driving distance were excluded.

A partial stratification sampling strategy ensured enrollment of adequate numbers of participants across socioeconomic groups (Singer et al., 1999). HR VLBW infants without significant neurologic problems and whose families were of middle or higher social class were actively recruited. Additional HR VLBW infants were recruited randomly. For each HR VLBW infant, the next LR VLBW infant of the same race and social class who could be accommodated in the follow-up schedule was recruited. Families of all VLBW infants were approached by a research assistant in the NICU who explained the study and asked parents

to volunteer. Families of HR VLBW infants were approached as soon as possible after the diagnosis of BPD was made by the attending physician. The three study groups were not different in infant gender, maternal race, education, marital status, social class, or life stressors unrelated to pregnancy or birth. HR VLBW infants had significantly younger gestational age, lower birth weight, and greater number of days on oxygen supplementation than LR VLBW infants, who in turn had significantly younger gestational age, lower birth weight, and greater number of days on oxygen than term infants. LR VLBW infants had the highest percentage of multiple birth, and term infants had the lowest (Table 1).

Procedures

Mothers who consented to participate were mailed a packet of self-report questionnaires and were given $25 for their participation. Postpartum dates were corrected for prematurity, and mothers completed questionnaires 1 month after each infant attained 40 weeks of age, the equivalent of full term gestation, and thereafter at 8, 12, 24, and 36 months postpartum. Data on psychological distress, perceived social support, and coping, collected at the 24-month visit, were used in this study. Sociodemographic and medical data were collected on participants' enrollment in the original longitudinal study (Singer et al., 1999).

Sociodemographic Variables

Multiple birth and race were dichotomized (i.e., *singleton* = 1, *multiple* = 0; *European American* = 1, *African American* = 0, respectively). The Hollingshead Two-Factor Index of Social Position (Hollingshead, 1957), a composite measure of education and occupation, was used to characterize social class. To calculate the Hollingshead Index, formal education is assigned a score ranging from 1 (*graduate or professional training*) to 7 (*less than 7 years of education*). Occupation also is assigned a score from 1 (*executives, proprietors of large concerns, and major professionals*) to 7 (*unskilled employees*). These scores are used to compute social class, which ranges from I (*highest social class*) to V (*lowest social class*). The use of a small number of social class categories increases statistical power, and if the categories are arranged according to functional cutoffs, can represent experiences characteristic of various social classes (Hoff-Ginsberg & Tardif, 1995). Therefore, Hollingshead categories I, II, and III were combined to represent higher social class, and categories IV and V were combined to represent lower social class, as one goal of this study was to investigate meaningful differences between poor and middle class mothers.

Severity of infant medical risk was dummy-coded in a linear fashion, with mothers of HR VLBW infants representing the highest risk; mothers of LR VLBW infants without BPD representing a lower level of risk; and mothers of normal birth weight, healthy, term infants serving as the control group (i.e., *HR VLBW* = 1, *LR VLBW* = 2, *term* = 0). Infant birth weight in grams and gestational age in weeks were entered as continuous variables to provide a description of the sample.

Social Support

Social support was measured with the social isolation subscale of the Parenting Stress Index (Abidin, 1986), a 120-item parent self-report questionnaire that assesses parental perceptions

of stress related to the parenting role and child characteristics. The social isolation subscale was reverse coded so that it measured social support reported by mothers.

Maternal Psychological Distress

Maternal psychological distress was measured with the Global Severity Index of Psychological Distress (GSI), a summary index of the Brief Symptom Inventory (BSI; Derogatis & Melisaratos, 1983). The BSI is a 53-item self-report inventory that assesses nine psychiatric symptom patterns having consensually validated clinical significance.

Maternal Coping

Maternal coping was measured with the Coping Orientation to Problems Experienced (COPE; Carver et al., 1989), a 60-item self-report inventory designed to assess 15 conceptually different, theoretically derived coping responses. Respondents use a 4-point Likert-type scale to indicate the ways they cope with stressful situations. The COPE was normed on 978 college undergraduates. Carver et al. noted that the COPE may be worded to assess either Dispositional coping (How I usually cope with things) or Situational coping (How I coped with a specific situation). For this study, mothers were instructed to answer with regard to the time period since the previous data collection, which had been 1 year earlier (i.e., at 12 months postpartum).

RESULTS

Factor Analysis of the COPE

The COPE individual item scores were subjected to a principal components analysis (PCA) with Varimax rotation, because the instrument had not been used previously to assess coping in mothers of 2-year-olds or mothers of HR infants, and because Carver et al. (1989) reported several marginal factor loadings (i.e., < .5) and low reliability for some subscales. In addition, many of the COPE subscale scores were moderately to highly correlated. PCA yielded 7 components, or clusters of coping strategies, that explained 50.22% of the variance (Eisengart, Singer, & Fulton, 2002). Items with factor loadings < .5 on rotated components were dropped, and summated scores for remaining items were used to represent total scores for each component. Reliability for components was good (α = .74 – .92), as shown in Table 2, and the majority of bivariate correlations were low (r = .01 – .40, with most < .2), as shown in Table 3. This coping model, composed of *alcohol – drug, avoidant, express emotions, humor, proactive, religion*, and *seek social support*, was used in subsequent analyses. The fact that alcohol – drug was the lowest mean coping score may be due to the sample exclusionary criterion regarding prenatal drug exposure. Mothers who did not use drugs during pregnancy may have been less likely to cope by using alcohol or drugs at 24 months postpartum.

Data Analysis

Prior to data analyses, GSI (Derogatis & Melisaratos, 1983) scores that were significantly skewed were normalized using a square root transformation; however, original scores are reported in all tables. Maternal psychological distress, social support, and coping were entered as continuous variables in all statistical analyses. In addition, to provide a more

comprehensive description of the sample, percentages of mothers experiencing symptoms of clinically significant moderate and severe psychological distress (i.e., > 84th and > 98th percentiles, respectively) were computed for each group (i.e., HR VLBW, LR VLBW, and term) by comparing maternal GSI scores to cutoff scores reported by Derogatis and Melisaratos for their normative, nonpatient, female group. Pearson chi-square tests were used to compare group differences in categorical variables, and means and standard deviations were computed for continuous variables.

Descriptive Findings

Thirty-nine percent ($n = 77$) of the mothers had HR VLBW infants, 22% ($n = 43$) had LR VLBW infants, and 40% ($n = 79$) had term infants. HR VLBW infants had lower birth weights, $F(2, 196) = 928.64$, $p < .001$, and younger gestational ages, $F(2, 196) = 865.57$, $p < .001$, than LR VLBW and term infants. Mothers of term infants delivered more singletons than did mothers of HR and LR VLBW infants, $\chi^2(2, N = 199) = 23.36$, $p < .001$. There were no group differences in race or social class. African American mothers were more socioeconomically disadvantaged (i.e., Hollingshead categories IV or V) than European American mothers, $\chi^2(1, N = 199) = 18.46$, $p < .001$.

Mothers of HR VLBW infants reported greater symptoms of clinically significant moderate psychological distress than did mothers of LR VLBW infants or mothers of term infants, $\chi^2(2, N = 199) = 7.25$, $p < .03$, whereas mothers of LR VLBW infants reported the least psychological distress. Perceived social support did not differ among the three groups of mothers. Sample characteristics are shown in Table1.

Correlations Among Sociodemographic Variables, Infant Medical Risk, Social Support, and Maternal Coping

Bivariate correlations for all variables were examined, and results are shown in Table 3. Maternal psychological distress was not correlated with multiple birth, race, or social class, but was correlated with infant medical risk, social support, and avoidant, express emotions, and religion coping. Infant medical risk was related only to maternal psychological distress. There were no significant correlations between multiple birth and maternal distress, social support, or coping. Social class was correlated with race, and both were associated with alcohol – drug and avoidant coping. In addition, social class was associated with social support, and race was associated with express emotions, seek social support, and religion coping.

Social support was correlated with maternal psychological distress and with avoidant, proactive, religion, and seek social support coping. Three coping strategies (i.e., proactive, religion, and seek social support coping) were positively correlated with social support but were not correlated with psychological distress. Therefore, to determine whether these coping strategies might exert an indirect effect on psychological distress by increasing social support, partial correlations between psychological distress and social support, controlling for each of these coping strategies, were examined. None of these partial correlations achieved significance, so results are not included.

Effects of Infant Medical Risk and Sociodemographic Variables on Maternal Coping

Multivariate analysis of variance (MANOVA), followed up with univariate analyses and individual comparisons where appropriate, was used to explore the effects of infant medical risk, multiple birth, race, and social class on maternal coping. All seven coping strategies were entered as dependent variables, with infant medical risk, multiple birth, social class, and race used as factors. Results of the MANOVA showed no significant main effects for infant medical risk or multiple birth. In other words, coping strategies were not different for mothers of HR VLBW, LR VLBW, or term infants, or for mothers of infants born singleton or multiple.

However, the MANOVA revealed a significant main effect on coping for race, $\Lambda = .79$, $F(7, 181) = 7.01$, $p < .001$, and a trend toward a main effect for social class, $\Lambda = .93$, $F(7, 181) = 1.84$, $p = .082$. There were no interaction effects for Race × Social Class. Follow-up univariate analyses revealed significant main effects for race on alcohol – drug, avoidant, express emotions, religion, and seek social support coping (Table 4). There was also a significant main effect for social class on avoidant, $F(1, 187) = 8.50$, $p = .004$. Post hoc pairwise comparisons with Bonferroni corrections revealed that African American mothers used more alcohol – drug, avoidant, and religion coping and less express emotions and seek social support coping than European American mothers. Mothers of lower social class used more avoidant coping than mothers of higher social class.

Predictors of Maternal Psychological Distress

Multiple regression analyses were used to estimate the value of infant medical risk, multiple birth, social class, race, and coping in predicting maternal psychological distress, controlling for social support, and to determine whether these variables differentially moderated psychological distress across maternal groups. To select coping predictors for testing in the regression models, correlations between GSI scores and coping were examined separately for each maternal group, and the coping strategies found to be correlated with psychological distress for at least one maternal group were selected. For mothers of HR VLBW infants, psychological distress was positively correlated with express emotions ($p < .01$), and negatively correlated with humor ($p < .01$) and religion ($p < .05$). For mothers of term infants, distress was positively correlated with avoidant ($p < .05$) and express emotions ($p < .05$). For mothers of LR VLBW, there was a strong trend toward a positive association between psychological distress and avoidant coping ($p = .055$). Therefore, avoidant, express emotions, humor, and religion coping were selected for testing in the regressions.

Hierarchical regression analysis.—A hierarchical regression analysis was used to examine the total contribution of coping to maternal psychological distress, over and above the contributions of multiple birth, social class, race, infant medical risk, and social support. GSI score was used as the criterion variable. Sociodemographic variables were entered in a block on Step 1; HR VLBW and LR VLBW were entered separately on Steps 2 and 3; social support was entered on Step 4; and then avoidant, express emotions, humor, and religion coping were entered in a block on Step 5.

This model explained 29.9% of the variance of maternal psychological distress. Race, social class, and multiple birth did not contribute to maternal distress. HR VLBW was found to be a significant predictor, explaining 3.1% ($p = .01$) of the variance, but neither LR VLBW nor term achieved significance. Therefore, at 24 months postpartum, the birth and parenting of a HR VLBW infant, but not a LR VLBW or a term infant, contributed significantly to maternal psychological distress. Social support was the strongest predictor, explaining 19.2% ($p < .001$) of the variance. The four coping strategies jointly were found to explain 9.2% ($p < .001$). Greater use of humor predicted lower psychological distress ($p \leq .05$), whereas greater use of Denial ($p = .007$) and express emotions ($p < .001$) predicted greater distress. Religion was not a predictor of maternal psychological distress when all four selected coping strategies were entered together. Results for this full model are shown in Table 5.

Predictive value of individual coping strategies: Hierarchical regressions.— Separate hierarchical regressions were used to determine the singular contributions to maternal psychological distress of avoidant, express emotions, humor, and religion coping, as well as any differences in moderating effects of each of these four coping strategies, based on infant medical risk and maternal race and social class. Coping scores were centered to reduce or eliminate multicollinearity (Aiken & West, 1991). Coping was judged to moderate psychological distress differentially if the magnitude of the effect of coping varied across groups (Baron & Kenny, 1986). If interaction terms were found to be nonsignificant, they were dropped from each model, because higher order terms that are not significant may reduce the power of the tests for lower order terms (Aiken & West, 1991; Neter, Kutner, Nachtsheim, & Wasserman, 1996).

To test the differential effects of coping across infant medical risk groups, sociodemographic variables were entered in a block on Step 1; HR VLBW and LR VLBW were entered separately on Steps 2 and 3; and social support was entered on Step 4. Each coping strategy was entered on Step 5; and its interaction terms (i.e, Coping × HR VLBW and Coping × LR VLBW) were entered separately on Steps 6 and 7. To test the differential effects of coping for African American and European American mothers, the same procedures as mentioned earlier were followed for each coping strategy, but the interaction term for race (i.e., Coping × Race), rather than the interaction term for infant medical risk, was entered on Step 6 for the final step of the model. Similarly, to test the differential effects of coping for mothers in higher and lower social classes, the interaction term for social class (i.e., Coping × Social Class) was entered on Step 6.

When tested individually, avoidant and express emotions coping were found to be significant predictors of maternal psychological distress, but none of their interaction terms added significant variance to the models. These findings indicated that greater use of avoidant and express emotions coping predicted greater maternal psychological distress for all mothers, regardless of severity of infant medical risk, race, or social class. The unique contribution of avoidant coping was 2.7% ($p = .008$), and the full model, composed of the sociodemographic variables, infant medical risk, social support, and avoidant coping, accounted for 24.2% of the variance in maternal distress. The unique contribution of express emotions was 6% ($p < .001$), and the full model, composed of the sociodemographic

variables, infant medical risk, social support, and express emotions coping, accounted for 27.2% of the variance in maternal psychological distress.

When humor was tested individually, it did not achieve significance. However, the interaction term Humor × HR VLBW was found to be significant, explaining 1.6% ($p = .04$) of the variance of maternal psychological distress. The interaction term Humor × LR VLBW and interaction terms for race and social class were all nonsignificant. Therefore, humor coping was found to moderate maternal psychological distress differentially across infant medical risk groups, reducing psychological distress significantly for mothers of HR VLBW infants, but not for mothers of LR VLBW or term infants. Humor did not have differential effects based on maternal race or social class. The full model for humor coping, including sociodemographic variables, infant medical risk, social support, humor coping, and both humor interaction terms, explained 22.7% of the variance in maternal psychological distress.

A summary of these results is shown in Table 6. Neither religion coping nor any of its interaction terms achieved significance, so results of that regression analysis are not included.

DISCUSSION

This study investigated relations among parenting-related stressors, coping, race, social class, and psychological distress in mothers of VLBW infants at 2 years postpartum, and tested the following three hypotheses:

Hypothesis 1: There Will Be Group Differences in Mean Maternal Coping Scores, Based on Severity of Infant Medical Risk, Multiple Birth, and Maternal Race and Social Class

Our first hypothesis was partially supported. Maternal race and social class, but not multiple birth or severity of infant medical risk, were found to exert main effects on coping. African American mothers used more alcohol – drug, avoidant, and religion, and less express emotions and seek social support coping, than European American mothers. Mothers of lower social class used more avoidant coping than mothers of higher social class. As discussed earlier, factors related to race and social class may have shaped mothers' appraisals of stressors, resources, coping, and outcomes. Therefore, race and social class may have been more important in determining mothers' coping than the actual severity of infant medical risk at 24 months postpartum. Results of another study of critically ill infants hospitalized in the NICU indicated that parental coping was not correlated with severity of neonatal illness (Spear, Leef, Epps, & Locke, 2002). Findings from this study indicate that this lack of relations between infant risk and parental coping extends well beyond the neonatal period.

African American mothers' greater use of religion may be due to sociocultural factors. Religion coping is central to African American life and provides a valuable source of social support, as well as a unique means to express emotions, for African American mothers (Brodsky, 2000; Murry et al., 2001). Both African American and lower social class mothers' greater use of avoidant coping may allow them to withdraw from the severe contextual stressors associated with racial discrimination and dangerous inner city neighborhoods

(Brodsky, 2000) while they face the additional formidable demands of parenting their VLBW infants. African American mothers' higher alcohol – drug coping scores may have reflected sociocultural risk factors as well as a mechanism to withdraw from stressors.

There are two possible explanations for the finding that African American mothers used less seek social support and express emotions coping than European American mothers. First, there may be a functional overlap of these strategies with religion coping in the African American community. Second, COPE items designed to assess seek social support and express emotions coping may not have tapped into culture-specific coping concepts relevant to African American mothers, whereas items that assessed religion may have been more culturally meaningful in these domains.

Hypothesis 2: Infant Medical Risk, Race, Social Class, Multiple Birth, Social Support, and Coping Will Independently Predict Psychological Distress for all Mothers at 24 Months Postpartum

Hypothesis 2 was partially supported. Infant medical risk, social support, and maternal coping independently predicted maternal psychological distress for mothers of HR VLBW, LR VLBW, and term infants at 24 months postpartum. Social support was the strongest predictor; greater social support was associated with lower psychological distress. Greater use of avoidant and express emotions coping predicted greater psychological distress for all mothers, confirming previous findings (Affleck et al., 1990, 1991; Thompson et al., 1993). Multiple birth, race, and social class were not found to be significant predictors of maternal psychological distress. One explanation for these data may be that the arduous demands associated with parenting a HR VLBW child obscured the effects of contextual stressrs. Another explanation may be the diversity of personal experiences and resources that exists within, as well as between, ethnic and socioeconomic groups (Garcia-Coll et al., 1995; Murry et al., 2002).

Although religion coping was found to be correlated with maternal psychological distress, it was not a significant predictor of distress. There are several possible reasons for this finding. First, religion coping may have affected maternal distress indirectly or may have affected other components of mothers' well-being. Second, it is possible that items on the COPE did not adequately reveal the scope of religion coping for the African American mothers. Mattis (2001) found that 45% of African American women who rated themselves as "not at all" or "a little bit" religious on standard questionnaires nevertheless reported religion to be a very valuable personal coping strategy. Finally, researchers have suggested that findings on religion coping may be equivocal because church settings may duplicate the same stressors and lack of resources found in the disadvantaged neighborhoods in which they are located (Brodsky, 2000), or because life crises may challenge faith and may leave some mothers with bitter feelings toward religion and God (Wilson & Miles, 2001).

Hypothesis 3: Coping Will Moderate Psychological Distress for Mothers Across Groups Based on Severity of Infant Medical Risk, Multiple Birth, and Maternal Race and Social Class

Hypothesis 3 was partially supported. Although no differential effects were found for multiple birth or maternal race and social class, humor coping was found to moderate psychological distress differentially based on severity of infant medical risk. Humor significantly reduced maternal distress only for mothers of HR VLBW infants. These mothers represent a model of increased parenting stress due to more severe infant medical risk, suggesting that humor coping exerted a buffering effect similar to that of social support. In other words, humor coping may exert differential effects, reducing psychological distress only in high-stress situations, such as the birth and parenting of a HR VLBW infant.

Lefcourt et al. (1997) suggested that humor may be a more effective coping strategy for females because it is associated with the anticipation of social support and shared positive feelings, whereas in males it is associated with interpersonal competitiveness or aggression. Humor may have relieved distress in mothers of HR VLBW infants by evoking affective states or interpersonal interactions that increased social support or enhanced feelings of social connectedness.

Strengths and Limitations

There have been few prior studies of maternal adaptation to HR infancy conditions, and only one (Thompson et al., 1993) study in which participants were exclusively mothers of VLBW infants. this study contributed to the literature in several ways. First, the sample was racially and socioeconomically representative of the VLBW population, whereas poor and minority VLBW families have been underrepresented in prior studies. Because the number of mothers in each group was adequate and a partial stratification sampling strategy was used, potential confounding variables such as maternal pregravid stressors, education, social class, and race were controlled. Furthermore, the sample for the study was regional and drawn from several sites, in contrast to samples for prior studies, which were drawn from the NICUs at single hospitals. Second, no prior study has included a normative group for comparison, and complete demographic characteristics of samples were not presented consistently. This study included a control group of mothers of term infants, and presented comprehensive demographic data on the sample. Third, no previous research has investigated the effects of race and social class on coping in mothers of medically fragile, preterm, or VLBW infants, whereas this study focused on these variables. Fourth, existing studies (Affleck & Tennen, 1991; Affleck et al., 1991; Thompson et al., 1993) have examined two or three broad categories of maternal coping, whereas this study investigated seven distinct coping strategies. Inconsistent or broadband coping taxonomies have limited the clinical utility of previous research data and have hampered comparison of findings across populations.

There are several limitations to the study, and results should be examined cautiously. First, data may be specific to the sample, and the cross-sectional design precludes any conclusions about causal relations. Findings may be valid only for mothers of VLBW infants at 24 months postpartum, and may not generalize to other time points or other populations. Second, data were obtained from self-report questionnaires and were not corroborated by

independent observations. However, subjective report represents a valid dimension of psychological distress, and self-report is a legitimate means of assessing the individual's personal appraisals. Most widely used measures of social support are self-report and assess perceived social support (Pierce, Sarason, & Sarason, 1996). Third, regression models tested either four coping strategies conjointly or a single coping strategy at a time. Because individuals generally use two or more coping strategies concurrently (Tennen et al., 2000), data analyses may not have captured the effectiveness of various combinations of coping strategies used simultaneously. This may have accounted for the relatively low effect sizes of the individual coping strategies. Fourth, unknown variables, not considered in the study, may have played mediating or moderating roles in relations among mothers' coping, psychological distress, race, and social class, or may have functioned as suppressor variables in the regression analyses. Fifth, coping may have affected outcomes other than psychological distress that influence parenting behavior, and any of these variables may have had additive or synergistic effects. Adaptive outcomes may be due to the unique effects of one, or the combined effects of several, protective factors (Murry et al., 2001). Additional research is needed to illuminate these complicated associations.

Conclusions

The population of VLBW infants is rapidly expanding as a combined result of reproductive technology that has increased multiple births and progress in medical technology that has reduced neonatal morbidity. VLBW infants may be emblematic of HR infancy conditions, and their mothers may share certain aspects of parenting, such as caregiver burden and medical costs, with mothers of infants with varying risk conditions. Therefore, findings from this study may be generalizable to maternal adaptational processes in other HR populations.

This study represents a first step in understanding the relations among coping, race, social class, and psychological distress in mothers of VLBW infants. Findings underscored the importance of considering the diverse ecological contexts in which parenting and coping occur. Further research should use culturally sensitive models to examine the complex associations among biological and socioeconomic risk factors, individual behaviors, and sociocultural processes and institutions that influence coping, maternal functioning, and parenting. Interventions that incorporate culturally embedded sources of resiliency, such as religion, and stress-buffering protective factors, such as humor coping and social support, could enhance parenting in HR populations. Mothers of VLBW infants should be presented with information concerning adaptive and maladaptive coping strategies shortly after delivery, and mothers who might be more likely to use maladaptive coping strategies should be identified and provided more focused services.

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TABLE 1

Sample Characteristics

Variables	HR VLBW Infants (*n* = 77)	LR VLBW Infants (*n* = 43)	Term Infants (*n* = 79)
Birth weight (in grams)[a]	956.14 ± 257.14	1263.84 ± 177.92	3475.91 ± 544.29
Gestational age (weeks)[a]	27.25 ± 2.12	30.37 ± 2.48	39.78 ± 1.32
Multiple birth			
Singleton *N*(%)	65 (84%)	26 (61%)	75 (95%)
Multiple[b] *N*(%)	12 (16%)	17 (40%)	4 (5%)
Race			
African American *N*(%)	34 (44%)	22 (51%)	37 (47%)
European American *N*(%)	43 (56%)	21 (49%)	42 (53%)
Social class[c]	3.45 ± 1.16	3.65 ± 1.11	3.63 ± 1.03
Maternal psychological distress[d]	0.416 ± 0.422	0.26 ± 0.31	0.34 ± 0.48
Moderate[e] (%)	23%	5%	13%
Severe[f] (%)	0%	0%	4%
Maternal social support[g]	12.89 ± 4.24	13.33 ± 4.59	13.38 ± 4.55

Note. HR = high risk; VLBW = very low birth weight; LR = low risk.

[a] HR VLBW < LR VLBW < Term, $p < .001$.

[b] LR VLBW > HR VLBW, $p < .001$; LR VLBW > Term, $p < .001$.

[c] M ± SD; Hollingshead Scale (Hollingshead, 1957); *range* = 1 – 5, highest - lowest social class.

[d] M ± SD; Global Severity Index of Psychological Distress (GSI); (Derogatis & Melisaratos, 1983) score; *range* = 0 – 4, lowest – highest.

[e] > 84th percentile compared to female, nonpatient norms for GSI (Derogatis & Melisaratos, 1983); HR VLBW > LR VLBW and Term, $p < .05$.

[f] > 98th percentile compared to female, nonpatient norms for GSI (Derogatis & Melisaratos, 1983).

[g] Social Isolation Subscale, Parenting Stress Index (Abidin, 1986); *range* = 6 – 30, lowest – highest, reverse coded.

TABLE 2

Maternal Coping: Scale Reliability, Mean Scores, and Group Differences

Coping Component	α	No. of Items	*M* ± *SD*				Group Differences	
			HR VLBW	LR VLBW	Term	Range	*F*	*p*
1. Alcohol and Drug	.82	4	4.40 ± 1.18	4.42 ± 1.12	4.57 ± 1.81	4–13	.29	.74
2. Avoidant	.79	7	10.14 ± 3.10	9.81 ± 2.84	10.51 ± 3.47	7–24	.70	.50
3. Express emotions	.74	4	10.13 ± 2.88	9.51 ± 2.52	9.99 ± 2.94	4–16	.56	.58
4. Humor	.86	4	7.51 ± 2.48	7.12 ± 2.69	7.14 ± 2.69	4–16	.53	.59
5. Proactive	.91	16	47.70 ± 8.43	46.95 ± 9.55	46.51 ± 9.44	19–64	.46	.64
6. Religion	.92	4	12.21 ± 3.60	11.91 ± 3.71	11.95 ± 4.00	4–16	.31	.73
7. Seek social support	.88	7	19.91 ± 4.15	19.42 ± 5.25	20.09 ± 5.22	7–28	.26	.77

Note. HR = high risk; VLBW = very low birth weight; LR = low risk.

TABLE 3

Correlations[a] Among Psychological Distress, Infant Medical Risk, Sociodemographics, Social Support, and Coping for All Mothers

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Maternal psychological distress	—	−.14*	.01	−.08	−.01	−.43**	−.06	.23**	.26**	−.12	.06	−.18*	−.07
2. Infant medical risk	—	—	.13	−.09	−.02	.05	.00	.04	−.02	−.07	−.03	−.01	.05
3. Multiple birth	—	—	—	−.07	−.12	−.06	.06	.06	−.02	−.02	.06	.04	.03
4. Social class	—	—	—	—	−.31**	−.18*	−.15*	−.22**	.04	.14	.12	.05	.07
5. Race	—	—	—	—	—	−.13	−.28**	−.17*	.17*	.11	.08	−.20*	.25**
6. Social support	—	—	—	—	—	—	−.14	−.21**	−.10	.13*	.24**	.30**	21**
7. Alcohol and drug	—	—	—	—	—	—	—	.28**	−.01	.07	−.16*	−.04	−.12
8. Avoidant	—	—	—	—	—	—	—	—	.06	.15*	−.19**	−.04	−.10
9. Express emotions	—	—	—	—	—	—	—	—	—	.07	.15*	−.08	.35**
10. Humor	—	—	—	—	—	—	—	—	—	—	.18*	.09	.23**
11. Proactive	—	—	—	—	—	—	—	—	—	—	—	.35**	.40**
12. Religion	—	—	—	—	—	—	—	—	—	—	—	—	.13
13. Seek social support	—	—	—	—	—	—	—	—	—	—	—	—	—

[a]Spearman's *Rho* correlation coefficients

*$p < .05$.

**$p < .01$.

TABLE 4

Effects of Race on Maternal Coping

	African American	European American		
Coping	***M* ± *SD***	***M* ± *SD***	***F*(1, 187)**	***p***
Alcohol and Drug	4.90 ± 1.96	4.09 ± 0.490	11.47	.001
Avoidant	10.92 ± 3.62	9.58 ± 2.65	4.11	.050
Express emotions	9.41 ± 2.71	10.35 ± 2.85	5.13	.025
Religion	12.87 ± 3.34	11.42 ± 3.96	10.18	.002
Seek social support	18.62 ± 5.06	20.91 ± 4.42	12.33	.001

TABLE 5

Hierarchical Regression: Variance of Maternal Psychological Distress Conjointly Explained by Four Significant Coping Strategies, Controlling for Sociodemographic Variables, Infant Medical Risk, and Social Support

Step	Predictor Variables	β[a]	*t*	R^2 Change[b]	*F* Change	Total Adj. R^2[c]
1	Sociodemographic variables			.02	1.05	.001
	Multiple birth	.03	0.51	—	—	—
	Race	−.02	−0.22	—	—	—
	Social class	−.01	−0.21	—	—	—
2	HR VLBW	.16	2.39*	.03	6.15*	.03
3	LR VLBW	−.02	−0.26	.01	0.97	.03
4	Social support	−.36	5.31***	.19	48.09***	.22
5	Maternal coping			.09	6.42***	.30
	Avoidant	.18	2.71*	—	—	—
	Express emotions	.23	3.76***	—	—	—
	Humor	−.13	−2.01*	—	—	—
	Religion	−.03	−0.44	—	—	—

Note. HR = high risk; VLBW = very low birth weight; LR = low risk.

[a]Standardized regression coefficient of variable in full model (*i.e.,* at Step 5).

[b]Variance explained by variables at entry.

[c]Cumulative variance explained at each step.

*$p < .05$.

***$p < .001$.

TABLE 6

Summary of Unique Contributions to Maternal Psychological Distress: Avoidant, Express Emotions, and Humor Coping and Humor Interaction Terms

Step	Predictor	β[a]	R^2 Change[b]	*F* Change	Total Adj. R^2[c]
5	Avoidant	.18	.030	6.76**	.24
5	Express emotions	.27	.060	15.48***	.28
5	Humor	.01	.010	1.39	.22
6	Humor × HR VLBW	−.16	.020*	4.14*	.23
7	Humor × LR VLBW	.01	.000	0.03	.23

Note. Step 1 = sociodemographic variables; Step 2 = HR VLBW; Step 3 = LR VLBW; Step 4 = Social support; HR = high risk; LR = low risk; VLBW = very low birth weight.

[a] Standardized regression coefficient of variable in full model (*i.e.,* at Step 5).

[b] Variance explained by variable at entry

[c] Cumulative variance explained at each step.

* $p < .05$.

** $p = .01$.

*** $p < .001$.