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Mental health disparities research: The impact of within and between group analyses on tests of social stress hypotheses

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Abstract

Social stress models are the predominant theoretical frame for studies of the relationship between social statuses and mental health (Horwitz 1999; Dressler, Oths, Gravlee 2005). These models propose that prejudice, discrimination and related social ills exert an added burden on socially disadvantaged populations (populations subjected to stigma, prejudice and discrimination) that can generate mental health problems. Researchers have used a variety of methodological approaches to study this hypothesis. In this paper we argue that researchers have not paid sufficient attention to the implications of this methodological variability, particularly the distinction between studies of within-group and studies of between-groups variation, in interpreting empirical tests of social stress theory. To fully evaluate the evidence, we need to carefully consider the convergence and divergence of results across diverse methodologies.

Keywords

stress; prejudice; methodology; health disparities; mental health; minority populations

Introduction

A core aim of the United States Department of Health and Human Services as described in Healthy People 2010 (U.S. Department of Health and Human Services 2000) is to reduce health disparities by race/ethnicity, gender, and sexual orientation. For example, explaining health disparities between African Americans and Whites on life expectancy and almost every other indicator of physical health has become a focus of considerable epidemiologic theorizing and research (Mays 2007; Williams & Earl 2007).

The concept of social disadvantage serves as a starting point for much of this work. (Dressler, Oths, Gravlee, 2005). There are many pathways through which social disadvantage can translate into health disparities, including exposure to deleterious physical and social environments and limited access to adequate health care. Recently, the social stress model has gained predominance as an explanatory frame (Dressler, Oths, Gravlee, 2005). Social stressors, particularly those related to prejudice and discrimination, have been invoked to explain disparities in diverse mental and physical health outcomes (Clark et al., 1999). The stress model therefore plays a central role in research on the reduction of health disparities (Williams and Mohammad, 2009; Dressler, Oths, Gravlee, 2005).

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The social stress model has long been the predominant paradigm in research on the relationship between social factors and mental health (Horwitz 1999). Mental health seemed the most obvious and direct health outcome that would be impacted by social stress and the majority of articles from within this frame focus on mental health outcomes (Williams and Mohammad 2008). Researchers using social stress theory hypothesize that disadvantaged position in the social structure leads to an increase in mental disorders, resulting in health disparities (Thoits, 1999; Wheaton 1999). The theory is that those of lower social standing—we refer to this as *disadvantaged social status*—are exposed to more stressful conditions and fewer resources to cope with these conditions than those of higher social standing (Pearlin, 1989). In turn, this added stress causes mental health problems (Dohrenwend 2000). For example, studies showing high disorder prevalence for those of lower socio-economic and gender statuses (i.e., the poor and women) were used to support this position (Aneshensel and Phelan 1999; Pearlin 1989; Aneshensel 1999).

In the context of mental health, researchers hypothesize that in addition to other stressors, stressors associated with prejudice and discrimination—both those directly experienced and recognized by individuals as related to prejudice and those that have a more generic ambient effect—add a unique source of stress that may explain how disadvantaged social statuses produce mental health problems (Clark, 2004; Kessler, Mickelson & Williams 1999; Meyer 2003a,b; Taylor and Turner 2002; Williams, Yu, Jackson & Anderson 1997; Williams & Harris-Reid 1999). In this paper, we examine the extent to which social stress theories are supported for mental health outcomes. We suggest that this literature has suffered from some conceptual and methodological problems that threaten our ability to draw conclusions about social stress theory. Although we propose no new theory or methodology, we offer a fresh critique, pointing out disconcerting inconsistencies in research findings that have not been sufficiently considered by researchers in the field.

As we illustrate in Figure 1a, social stress theory implies a mediational model (Clark et al. 1999; Williams & Mohammed 2009). Prejudice-related stressors are hypothesized as important, although not sole, mediators of the relationship between disadvantaged social status and mental health problems. Based on established practices for assessing mediation, empirical support for this theory requires three steps: (a) evidence of a main effect, that is, evidence for high disorder prevalence for disadvantaged social groups (represented in Figure 1a as the total effects of the paths a,b and c); (b) an association between the exposure (disadvantaged social status) and the mediator (prejudice-related stressors) (Figure 1a, path b); and (c) an association between the mediator and the outcome (mental health problems) (Figure 1a, path c) (Judd and Kenny 1981; Baron and Kenny 1986; MacKinnon, Fairchild and Fritz 2007). Mediation would be supported if these relationships were substantial and if control for the mediational pathway substantially reduced the main effect.

Despite the interest in health disparities research and in prejudice and discrimination as stressors, and the relevance of this research to national health priorities, researchers rarely test these three required steps. For example, only five (3%) of the one hundred and forty eight studies on mental health problems cited in a recent review conducted mediational analyses (Paradies 2006; the five studies were Williams et al. 1997; Schulz et al. 2000; Taylor and Turner 2002; Roberts, Swanson and Murphy 2004; Kessler, Mickelson and Williams 1999).

Typically researchers focus on the relationship between stressors and mental health problems (the solid line in Figure 1b) among members of disadvantaged groups. Note that in such analyses, the stressors are the independent exposure variables but they are mediators in the full conceptual model (Figure 1a). The other components of the mediational model are typically not tested. In such analyses, the full conceptual model is left unexamined. It is our

contention that by de-contextualizing the impact of stress processes (the association between prejudice-related stressors and the mental health outcomes) from the total effect under study (the relationship between disadvantaged social status and mental health outcomes), researchers misrepresent social stress theory and can arrive at flawed inferences about the role of stress in mental health..

The premises of social stress theory

Our argument is based on the following premises of social stress theory: First, our focus is the application of social stress theory to explaining mental health disparities, not all mental health differences. Not all differences are disparities (Herbert, Sisk & Howell, 2008). For example, finding higher rates of cancer for older individuals is a health difference but not a disparity (Braveman 2006). A disparity implies an injustice, an “inequality in health due to social factors or allocation of resources” (Miranda et al. 2008, p. 1102). By *mental health disparity*, we mean an excess of disease or other negative mental health outcomes for disadvantaged compared with advantaged social groups (Carter-Pokras and Baquet 2002).

The second premise is that social stress hypotheses are about average effects—social position is hypothesized to influence the group as a whole, even if not each individual or subgroup within. Disadvantaged position affects the mean level of mental health problems (e.g., psychological distress) or average disorder prevalence. Social groups are heterogeneous and researchers may examine sources of inter-individual and subgroup variation within social status groups but social stress theory is about social factors that generate differences between groups defined by position in the social structure. The theory contends that there are social forces that increase the average risk for members of disadvantaged groups compared with members of advantaged groups notwithstanding variability among group members. Therefore the disparity hypothesis stemming from social stress theory states that, on average, disadvantaged group members will fare worse than advantaged group members in health outcomes. It is important to recognize that some subgroups of the disadvantaged group may fare as well as or even better than some subgroups of the advantaged group, and vice versa. But the only relevant information for testing social stress hypotheses regards the disadvantaged group as a whole. Of course, our definition of *disadvantage* may change and shift. Indeed our definition of disadvantage may shift as a result of finding that some subgroups (e.g., poor women) but not all members of the previously defined group (e.g., women), are disadvantaged as evidenced by exposures to social stressors and resources (Meyer, Schwartz, & Frost, 2008).

The third premise is that social stress theory speaks to the causal effect of social statuses on the totality of mental health outcomes, not on specific disorders (Aneshensel 1999; Wheaton 1999). The study of gender and mental health provides a good example for why this is an important distinction. Researchers originally claimed that the higher depression prevalence among women supported social stress hypotheses related to the disadvantaged status of women in society (Gove & Tudor 1976). This claim was criticized by those who noted that men have higher prevalences of other disorders (Dohrenwend and Dohrenwend 1976). Critics argued that selecting depression from among other mental disorders to demonstrate an effect for social stress was opportune. The overall disorder prevalence for men and women, which shows no gender differences, argued against social stress as a cause of excess depression among women (Rosenfield, 1999).

Convinced by this argument, researchers reformulated gender hypotheses in terms of stress response—women respond to stress with internalizing disorders whereas men are more likely to respond with externalizing disorders. Gender was thus reinterpreted as an effect modifier of the relationship between stress and mental health problems, with gender

influencing the type of disorders expressed rather than overall disorder prevalence (Rosenfield 1999). This understanding of gender effects is now widely accepted by researchers studying social stress theory and gender (Horwitz, White and Howell-White 1996).

The fourth premise is that there is considerable heterogeneity among disadvantaged groups in the factors that influence disease outcomes, including the types of stressors to which they are exposed. Nonetheless, social stress theory is about the sociological category of disadvantage and not about particular disadvantaged groups. It is the characteristic shared by these groups—disadvantage produced by social hierarchies—that is the hypothesized cause and not anything specific about a particular group. Therefore, evidence across disadvantaged groups should be consistent—in any comparison of a disadvantaged versus advantaged group, the socially disadvantaged group should evidence greater exposure to social stress and more mental health problems than the socially advantaged group. And, as we indicated above, in each such analysis social stressors should act as mediators in the relationship between social status and health outcomes. Based on these premises, we discuss conceptual and methodological deficiencies in the ways in which social stress hypotheses have been studied in mental health disparities research.

Empirical findings in studies of social stress

In what follows, we examine evidence about the effect of disadvantaged group status and prejudice related stressors on mental health problems. For illustrative purposes we limit our discussion to research on three disadvantaged social groups: lesbians, gay men, and bisexuals (LGB); women; and African-Americans. These groups have very different characteristics but they share a disadvantaged social status and are important for sociological analysis in current American society.

The total effect of social status on health (Fig 1a) concerns inter-group variability in level of mental health problems typically measured as the difference in distress or disorder prevalence between members of socially disadvantaged (e.g., African Americans) and advantaged (e.g., Whites) groups. We refer to this as *between-groups analyses* (Brondolo 2008)

In contrast, the study of stress processes and their impact on the outcome (Figure 1b) examines intra-group variability—that is, the relationship between exposure to stress (e.g., prejudice related stress) and the outcome (again, distress or disorder prevalence). We refer to this as *within-group analyses* (Brondolo 2008). This can be measured as variability among a group that combines members of advantaged *and* disadvantaged groups (e.g., Williams et al., 1997; Schulz et al. 2000; Taylor and Turner 2002; Kessler, Mickelson and Williams 1999) or, as is most often the case, variability among members of the disadvantaged group alone (see Parides 2006).

A full test of social stress hypotheses requires mediational analysis. But this is not usually done. Researchers typically assess either the main effect (Figure 1c) or the impact of stress processes (Figure 1b) rather than a model that tests the full mediational hypothesis (Figure 1a). Examining the results of within-group analyses in isolation from the results of between-groups analyses may lead to errors in causal inference because correct interpretation is context dependent. Each type of analysis tells us about a different aspect of the causal process. In general, the main effect and the stress processes are examined in different studies.

Recent analyses suggest that for lesbians, gay men, and bisexuals, empirical evidence about stress processes and the main effect both support social stress hypotheses. Studies have

shown that lesbians, gay men, and bisexuals who experience more prejudice related stress have more mental health problems than those who have experienced less stress (within-group analyses), and that the population as a whole has a higher prevalence of mental disorders than heterosexuals (between-groups analyses) (see Meyer 2003b for review and meta-analysis). However, despite the apparent consistency across methods in support of mediational hypotheses, no one study has yet tested the full mediational model depicted in Figure 1a.

For African Americans and women, evidence from analyses of stress processes (within-group analyses) and main effects (between-groups analyses) diverge. That is, research reviews conclude that exposure to stress related to racism and sexism such as perceived discrimination is associated with more mental health problems among African Americans and women, respectively (Paradies 2006; Williams & Mohammed, 2009; Williams and Williams-Morris 2000; Williams, Neighbors and Jackson 2003; Krieger 2000). However, the preponderance of the evidence shows that, as a group, African Americans do not have elevated rates of mental disorders compared with Whites. The same patterns are reported from studies of women and men when the outcome is prevalence of all mental disorders (Williams et al 2007; Rosenfield 1999; McLeod and Nonnemaker 1999; Williams et al. 2003; Williams and Harris-Reid 1999; Kessler et al. 1994; Kessler et al. 1999; Kessler et al. 2005; Robins and Regier 1991.)

The evidence regarding gender and race/ethnicity shows a relationship between the hypothesized stress process, the independent variable in Figure 1b (which is the hypothesized mediator in the full model) and the outcome (Figure 1b) but no main effect (Figure 1c). Even before mediational analysis, convergent evidence is needed because each type of analysis (within -and between-groups) addresses only part of the hypothesized causal relationships necessary to support social stress theory. Returning to the full mediational model, these findings represent support for path c but not for path a in Figure 1a. We therefore must conclude that the combined evidence does *not* support the mediational hypotheses of social stress theory regarding gender and race/ethnicity.

Divergence in Sources of Evidence

In the remainder of this paper, we consider differences between within-group and between-groups analyses in terms of what each type of analysis tells us about our causal inquiry. We evaluate the implications of these types of analyses for the causal contrast, measurement of the stress construct, impact of sampling bias, and the outcome measures used.

The causal contrast

One source of divergence is the differing comparisons used in the two types of analyses. The main effect test is about causes of variation between groups (the disadvantaged vs. the advantaged group) whereas the stress process test is about causes of variation within groups. Evidence from these analyses may differ because the causes of these two types of variation may be different (Rose 1985). To explain this, we use a counterfactual approach to causal inference, common in epidemiology, statistics and the social sciences (Maldonado and Greenland 2002; Pearl 2000; Morgan and Winship 2007).

Causes are defined as the difference in the outcome in the presence of the exposure to what the outcome would have been had the exposure been absent. This is a theoretical comparison, called the *causal contrast*: it is the comparison that most clearly allows us to identify a cause (Greenland and Robins 1986; Maldonado and Greenland 2002). For example, the causal contrast for understanding the causal effect of smoking a pack of cigarettes a day on lung cancer is the difference between the lung cancer incidence among

people who smoke to what this incidence would have been among *the same people* had they not smoked. This comparison is theoretical because the causal contrast is unobservable—in our example, we cannot observe what would have happened to smokers had they not smoked. We do not know, for example, if and how various factors, other than their smoking, such as their environment, genetic makeup, etc., would have affected their health. In lieu of this unobservable causal contrast we employ as a substitute a proxy causal contrast replacing the people of theoretical interest (the smokers in this example) with a comparison group of people whom we think are similar.

As a result of using a substitute for the theoretical causal contrast, whether or not we determine that an exposure is a cause for disease depends to a great extent on the comparison group we choose (Rothman and Greenland 1998). For example, what is the best comparison group for determining the effect of smoking on lung cancer? If the comparison group comprised people who had never smoked, smoking a pack of cigarettes a day for 20 years would emerge as a clear cause of lung cancer. The causal contrast implied by this comparison is the difference between the disease risk for people who have smoked a pack a day and what their risk would have been had they not smoked at all. However, studying the effect of the same exposure, would lead to different conclusions if the comparison were with people who have smoked 2 packs a day for 20 years. In this context, smoking 1 pack a day will not emerge as a cause of lung cancer; indeed, if people who smoked 1 pack of cigarettes a day are healthier than those who smoked 2 packs of cigarettes a day, it may appear as a factor that is protective against the disease. For testing the total social status effect in disparities research, the prevalence of mental health problems is compared between the group of interest and a comparison group. In this between-groups analyses, the group of interest (e.g., African Americans) is the group with a putative risk exposure (i.e., disadvantaged social status) and the comparison group (e.g., whites) is a stand-in for the theoretical, unobtainable causal contrast—members of the group of interest had they not been exposed (i.e. African Americans had they not had a disadvantaged social status in our society).

In analyses of stress processes (the hypothesized mediator), the impact of stressors related to prejudice and discrimination on mental health outcome is tested in within-group analyses. The comparison is between disadvantaged group members who have experienced higher levels of social stress and their peers who have experienced lower levels of social stress. Therefore, disadvantaged group members who have experienced lower levels of social stress are the stand-in for the theoretical, unobserved causal contrast—members of the disadvantaged group had they not experienced social stress at all. The different comparisons shape the meaning of the construct being tapped. In interpreting results from within-group analyses, it is important to note that within-group analyses cannot detect those aspects of the social and physical environment that affect all group members and are therefore invariant.

There are a myriad of ways through which society's norms and institutions favor advantaged group members. While members of disadvantaged groups may be quite cognizant of the many factors through which society discriminates against their group, there will be limited variation in and thus limited evidence for the effect of this exposure in within-group designs (Meyer 2003a). For example, all African Americans have in common exposure to a certain level of racism-related stressors. Using a within-group study design, researchers compare those with minimal exposure to racism with others who have higher levels of exposure to racism. But the effects of the minimal level of exposure to which *all* group members are exposed cannot be captured in within-group studies.

The impact of these normative and institutional disadvantages is exquisitely captured in between-groups studies, but the choice of a comparison is no less challenging. Most

typically, advantaged group members are chosen for comparison—whites for blacks, men for women, and heterosexuals for homosexuals. In such comparisons, the disease rate in the advantaged group is a substitute for what the disease rate in the disadvantaged group would have been had its group members not been subjected to disadvantage. Structural factors, ubiquitous, invariant, and therefore muted in within-group designs, can have a robust effect in between-groups comparisons.

However, thinking through the intended causal contrast shows that the choice of between-groups comparisons is not always simple. Assume, for example, that, for a variety of reasons including structural barriers, fewer gay men than straight men were in committed relationships. In a study of social stress of gay men, should the comparison be with a group of heterosexual men with a similar proportion in a committed relationship? The answer depends on the conceptual model studied: Yes, if being in a committed relationship is seen as a difference between gay and heterosexual men that is unrelated to prejudice and discrimination, but no, if the difference between the groups in rates of committed relationships is conceptualized arising out of structural disadvantage; that is, if it is seen as a structural stressor.

A similar problem arises in studies of social stress among women. Men are typically used as a comparison group for women in studies of gender differences in rates of mood disorders. Differences in rates of depression between men and women have been interpreted as supporting a gender stress hypothesis (Schwartz 1991). But, as Rosenfield (1989) observed, the fact that men are typically employed out of the home introduces bias to these studies because differential work activities rather than gender may have caused the observed between-groups differences in depression. Using non-traditional working women to compare with working men, Rosenfield failed to replicate the ubiquitous higher depression prevalence for women.

Here too, it is important to specify the social stress construct of interest. That men are traditionally employed out of the home is a reflection of their advantaged social position, which can be conceptualized as a relevant part of the exposure construct. In this view, gender norms that make it more likely that men work outside the home are part of what we define as a gender-related disadvantage and a relevant source of social stress for women. But if the stress construct were more narrowly defined—for example, if it focused on overt acts of discrimination only—then controlling for employment would be important so that effects of other aspects of the work environment would not confound the relationships under investigation.

In summary, in studying causal relationships we rely on the salience of a putative causal factor within the context of the specific circumstances assessed in the comparison of the exposed and unexposed. The comparison group provides the backdrop against which we see whether a putative cause has an effect or not. The validity of the construct *social stress*, therefore, is determined by how well the experience of the actual comparison group estimates the experience of the theoretical, but unobservable, comparison we intended. Thus, the between-groups main effect—the relationship between social status and mental health outcomes—tells us about the causal effect of disadvantaged social status on mental health, whereas the within-group test—the comparison among the disadvantaged social group members—tells us about the causal effect of inter-individual variation in experiences of prejudice and discrimination.

Measurement of the stress construct

Within- and between-groups analyses also employ different approaches to the measurement of stress. In within-groups analyses, researchers typically use measures of self-reported

exposure to stressful events and chronic strains (e.g., perceived everyday discrimination) (Paradies 2006 Clark et al. 1999; Williams, Neighbors and Jackson 2003). Such measures aim to capture external, objective, events and conditions through subjective (or appraised) experiences of stress (Meyer, 2003a). The difficulty is that self-reports cannot completely capture actual occurrences (Krieger 2000). Furthermore, appraised self-reports of social stress also, significantly, include evaluative processes applied by the individual. For example, Contrada (et al. 2000) suggested that disadvantaged group members are often motivated to ignore instances of discrimination to avoid disruption of social relationships. Thus, the construct being tapped is more than social stress; it includes the perception, appraisal, labeling, recall, and reporting of stressful experiences (Dohrenwend et al. 1993; Lazarus 1991; Lazarus & Folkman 1984). Psychological and personality factors that determine differences in perception, appraisal, labeling, recall, and reporting of discrimination may have independent effects on health outcomes, unrelated to the effects of structural discrimination and they therefore confound the observed differences.

Even when objective ratings are used to limit these evaluative distortions (Dohrenwend 1993), the measures are likely to tap more than social stress for another reason. For example, many studies of social stress measure experiences of everyday and traumatic discrimination events. But at least some level of discrimination is a common exposure among minority group members. What determines why some members of a disadvantaged group experience more discrimination events than others? The reasons for differential exposures may include physical appearance (e.g., skin tone), social class, personality factors, geographic mobility, and residential characteristics. It is also possible that cultural, psychological, and biologic factors determine if not exposure, then recognition, recall, and reporting of social stress. To the extent that these factors are related to the mental health outcomes of interest, they could confound the relationship between perceived discrimination and mental health (Clark 2004).

Most critically, there are many aspects of structural discrimination that are missed by experiential measures of social stress because they are invisible to the individual. Discrimination can be invisible because it is purposely disguised, as when employers make an effort to conceal discrimination in hiring, for example. Social stress may also have occurred due to distal unobservable factors, as when hiring practices give priority to people with recommendations from social networks which exclude disadvantaged group members (Link and Phelan 2000). Such indirect discrimination has financial, social, and psychological consequences that may affect health outcomes but it would be missed in measures of experiential stress.

In summary, measures of experienced social stress, such as perceived discrimination, typically used in within-group analyses contain considerable measurement error that can bias the results either toward or away from the null. The social stress construct being tapped by such measures is quite different than the construct being tapped by measures associated with between-groups comparisons.

In contrast to within-group studies, in between-groups studies, explicit measures of stress related to prejudice are often entirely avoided (for exceptions see Kessler, Mickelson and Williams 1999; Turner and Avison 2003). Based on the notion that all members of a disadvantaged group are subject to inequality and prejudice, the exposure to social stress is measured as the disadvantaged social status itself. If a study finds that members of the socially disadvantaged group under study have higher disorder prevalence than members of the comparison, advantaged, group, this is interpreted as a reflection of the social stress to which the disadvantaged group is exposed (Aneshensel and Phelan 1999).

Any differences in outcome between the groups are attributed to the stressors adherent to disadvantaged group membership. But specifying the construct in this way is debatable (Kaufman and Cooper 2001; Kaufman and Cooper 2001). The problem is that although some elements of the implied (but not directly measured) exposure may be relevant to the hypothesized social stress, others may be irrelevant. For example, cultural traditions associated with social status may be related to health (e.g., eating habits, family structures, value systems) but are not what we mean to capture in social stress.

In summary, in between-groups comparisons, group status is a stand-in for the social stress process. Which of the factors that are thus tapped are part of the social stress construct is a theoretical question that needs to be explained. This should be made explicit by researchers using this approach. To the extent that disadvantaged group status captures factors that are not theoretically part of social stress constructs, between-groups analysis may be biased (either by finding spurious social stress effects or by masking true effects). Nevertheless, there are benefits to defining social stress as disadvantaged group status. It captures structural constraints that cannot be tapped in direct social stress measures (i.e., aspects of the social stress that are invariant or those that are not experienced or recognized by individuals as stressful).

Sampling Bias

Biases that arise in the sampling of the exposed and unexposed groups also differ in between- and within-group analyses. In between-groups comparisons, sampling bias may be introduced through differential response or participation rates for the advantaged and disadvantaged social groups. To the extent that two groups participate at different rates, and the reasons for non-participation are related to mental health outcomes, bias in the findings can occur. For example, findings from the Epidemiologic Catchment Area (ECA) and the National Comorbidity Study of mental disorders in representative samples of the United States population failed to find elevated disorder prevalence for African Americans compared with whites, as would be expected by the social stress hypothesis (Kessler et al. 1994; Robins et al. 1991; Kessler et al. 2005). One explanation offered for this finding is that sampling bias led to an overrepresentation of healthier African Americans, thus masking the true rate differences (Williams and Harris-Reid, 1999). This is plausible because of challenges in sampling disadvantaged populations. Even in the census, carried out with far greater resources than most psychiatric epidemiologic studies, there is a considerable undercount of young African Americans, for example, due to higher rates of institutionalization, poverty and homelessness (Choldin 1994). The factors underlying this under-representation are plausibly related to risks for mental health problems. Sensitivity analyses of the ECA considered this possibility and discarded them in these particular instances (Leaf, Myers and McEvoy 1991). Nonetheless, this potential always needs to be considered in between-groups studies

Within-group comparisons have different challenges in sampling. Personality factors that influence recognition and perception of discrimination may lead to different attitudes toward participation in research studies. Thus, a study on racism and health may attract people with greater interest in the topic, leading to less variability in the sample and greater potential for reporting bias. For example, compared with healthy individuals, people with more mental health problems may be motivated to find reasons for their health problems, may be more likely to participate in studies, and more likely to remember and report social stressors (Sackett 1979).

The outcome measures

Assessing mental health outcomes is a challenge in both between-groups and within-group analyses. Two questions can be delineated: First, is the outcome chosen representative of the universe of mental health outcomes or does it represent a subset that may have unique associations with the disadvantaged group of interest (Aneshensel, Rutter and Lachenbruch 1991)? Second, are the reliability and validity of the outcome measure similar for the disadvantaged and advantaged groups (Brown et al. 1999)?

The first issue, regarding the bias in the choice of the outcome is well illustrated, and has been already discussed, in studies of stress related to gender and mental health (Aneshensel et al. 1999; Horwitz, White, and Howell-White 1996). When men and women are compared on mood disorders, women show significantly higher disorder prevalence, seemingly supporting the social stress hypothesis; when men and women are compared on substance use disorders, men have higher disorder prevalence, seemingly refuting the social stress hypothesis (Kessler et al., 1994; Robins and Regier 1991).

Which outcome provides the correct answer to the question of the impact of social stress depends on the research question. It is plausible to hypothesize that social stress causes some, but not other, disorders. But, we claim, there has to be a good rationale for such a differentiation among mental health outcomes. In the absence of such a rationale, unless the full range of outcomes are studied social stress theory is not fully tested (Aneshensel et al. 1991). The second issue concerns potential differences in the reliability and validity of the mental health outcome measures between the socially disadvantaged and socially advantaged groups. If, for example, social groups differ in the threshold for recognizing or reporting symptoms, overall estimates of mental disorders would be biased. Groups that recognize and/or report symptoms at a lower threshold would appear to have more disorder than groups that recognize symptoms at a higher threshold. For example, Meyer (2003b) suggested that the apparent high prevalence of mental disorders in gay men, lesbians, and bisexuals might be related to differential response styles between them and heterosexuals. The choice of outcome measure is less likely to have an impact on within-group comparisons because the greater within-group cultural homogeneity would make differential response patterns less likely.

Discussion: Inference for social stress as a cause of mental disorders

The ultimate purpose of both the within- and between-groups comparisons in mental health disparities research is to assess whether or not social stress is a cause of mental health problems and, if so, to explain the processes through which it works. To fully describe social stress as a cause, researchers would need to demonstrate that disadvantaged status is related to higher incidence of mental disorders or higher mean levels of mental health problems (using the between-groups analyses) and that putative social stress processes (such as perceived discrimination) affect mental health outcomes and explain the disparity.

As with most epidemiologic approaches, analyses of the total effect (between-groups differences in level of mental health problems) can, in the absence of bias, identify that an exposure is a cause, but it does not explain how the cause works. (Shadish, Cook and Campbell 2002). Applied to health disparities, between-groups analyses can show a causal effect of disadvantaged group status but leaves unexamined the pathways through which disadvantage has an effect. In contrast, studies of the social stress process typically use within-group analysis that can capture the workings of stress, but not its differential effect (Clark et al., 1999; Meyer, 2003b).

A study that examines both within- and between-groups variance is necessary to test the total mediational hypothesis described in Figure 1a. Taylor and Turner (2002) provide an example of such a study. They found elevated levels of depressive symptoms for young African Americans compared with whites and found that this difference was explained, at least in part, by exposure to social stress.¹

Whether a single study has the data needed to conduct a full mediational analysis, or whether the data come from separate studies, researchers need to examine convergences and divergences from within- and between-groups analyses. Because within and between-groups analyses use different comparison groups to simulate the causal contrast, measure different aspects of social stress constructs, and pose different methodological challenges, the results from these two types of studies may differ. The difference between what we can infer from these methodologies can be exploited for a fuller understanding of the effect of social stress on mental health.

There are four possible combinations of evidence from the two types of studies: there could be consistent evidence in support or in refutation of social stress hypotheses from both types of studies, or there could be inconsistent evidence with results from within-group studies supporting and results from between-groups studies refuting social stress hypotheses, or vice versa.

The strongest evidence for an etiologic role of social stress on health is a convergence of findings that show more distress or disorder for the disadvantaged group in the between-groups comparison and more distress or disorder for people with a greater level of social stress in the within-group comparison. This provides evidence for a mental health disparity and evidence that the disparity is related to social stress processes (e.g., prejudice and discrimination).

Other studies found this pattern in the case of lesbians, gay men and bisexuals vs. heterosexual populations (Meyer, 2003b). Such convergence of findings provides stronger support for the social stress hypothesis than do results from one study design alone because the probability of both types of studies giving a false positive result is lower than the probability for false results from each type of study alone. However, as we noted in the introduction, social stress theory is not about the relationship between a particular social group and mental health but rather the relationship between the category of disadvantaged group status and mental health. For the theory to be supported this pattern of results should adhere to the preponderance of disadvantaged groups. The evidence does not support this conclusion.

Mixed results from the two types of analyses, especially in the case of African Americans and women, are more common. Most common are results showing that stressors affect mental health problems in within-group analyses (e.g., greater exposure to perceived discrimination is related to more symptoms of depression) in the absence of results showing a main effect in between-groups analyses (e.g., African Americans and whites have the same disorder prevalence).

An important question is what explains this inconsistency. One explanation is that methodological limitations of between-groups studies are more severe than the methodological limitations of within-group designs. Another explanation is that while disadvantaged status causes excess stress, resilience and coping of disadvantaged groups

¹It should be noted, however, that even in this study, as reported by the authors, when conventional coding of the outcome variable was used, African Americans no longer had higher distress scores than whites. In addition, discrimination related stress did not mediate the relationship.

mitigate the impact of this stress (Clark et. al. 1999), in effect canceling each other, leading to the observed results of no difference between groups. This would be an example of mediation in the face of a suppressed main effect (Shrout and Bolger 2002; MacKinnon et al. 2006). But this explanation is questionable on theoretical grounds. We disagree that a stressor so perfectly embedded in its remedy can be conceptualized as a causal factor. That is, if social disadvantage contains both a cause and a cure in equal proportions, can we say that the social disadvantage causes mental disorders? Indeed, social stress theory is often framed in terms of the maldistribution of both stressors *and* coping resources across social status groups (Pearlin, 1989). Therefore, the very notion that a disadvantaged social group fares better than the advantaged group in availability of coping resources contradicts social stress theory.

We must also consider explanations that accept both sets of results as valid, and consider that the conclusion to be drawn from this inconsistency leads to refutation of social stress theory. With few exceptions (e.g., Sellers and Shelton 2003), researchers do not consider such a conclusion.

Oddly, the interpretational challenge posed by inconsistent findings in between-and within-group analyses can go unrecognized even in studies that examine both. For example, Kessler et al. (1999) and Williams et al. (1997), failed to find the prerequisite between-groups disparity—the disadvantaged social group, African-Americans did *not* have elevated disorder prevalence compared with Whites. Yet, in both papers the authors continued to examine exposure and reactivity to perceived discrimination as a potential causal factor—a mediator in the relationship of disadvantaged social status and mental disorder. Clearly, however, social stress cannot be a cause of a disparity if no disparity has been documented. As we illustrated in Figure 1a, disparities in outcome is a condition for showing a mediational effect in the causal relationship of social structures and mental health problems. We find it perplexing that while there is growing recognition in the field that there is no racial mental health disparity (e.g., Kessler et al. 1999; Williams et al. 2007; Schulz et al., 2000), researchers continue to suggest that discrimination is a mediational process that explains mental health disparities. The implications for social stress theory of such inconsistencies are rarely discussed.

To better investigate the causal role of social stress in health disparities it is important to examine all aspects of the social stress model as it is reflected in evidence from both within- and between-groups analyses. If we accept as valid the preponderance of evidence in between-groups studies of African Americans vs. whites and women vs. men, then a reasonable interpretation is that social disadvantage does not cause mental disorders in these populations. Consistent with the findings from within-group analyses, we may conclude that the appraisal and experience of stress rather than the structural stress has etiologic significance for mental disorders. That the results of these two types of analyses may validly differ is consistent with Rose's (1992) important insight that the causes of variation between groups may be different from the causes of variation within groups. Within-group analyses can easily miss or misattribute the causes of health disparities by focusing on the individual and ignoring the etiologic context (Krieger, 2000; Schwartz & Carpenter 1999).

Holding on to a theoretical perspective without sufficient evidence leads to stagnation in science because “a theory that cannot be mortally endangered cannot be alive” (Platt 1964:349). As a starting point to further our understanding of stress theory, researchers should examine the discrepancy in results from the two approaches to the study of health disparities and design studies that would explicitly address plausible alternative explanations for the observed discrepancies. For example, studies could test whether reporting bias explains the relationship of perceived discrimination and mental disorder found in within-

group studies by comparing results from studies that use self-report vs. objective ratings of discrimination (Dohrenwend et al. 1993). If the use of objective ratings decreases the discrimination-mental disorder association, then reporting bias would be supported as an explanation for the discrepancy. Alternately, the hypothesis of unreliability of the mental health measure among the disadvantaged group obscuring the association in between-groups studies could be examined through a series of sensitivity analyses to see the viability of this explanation (Phillips 2003).

Researchers may otherwise choose to reformulate the theory itself. As we described above, such reformulation has led to theorizing about the role of gender in internalizing and externalizing disorders (Rosenfield, 1999). Another approach may be to redefine social categories of disadvantage. Intersectionality suggests that intersections of group characteristics, such as poor women, form categories whose social meaning cannot be captured by the disparate elements of the intersection (Glenn, 2001). It is possible that conceptualizing social groups in terms of intersections could help refine social stress hypotheses (Meyer, Schwartz, & Frost, 2008). Some work on intersections shows it to be a promising conceptual tool for refining epidemiological predictions (Mccall 2005). However researchers approach this problem, they must start by recognizing inconsistencies in the evidence and proposing new directions for study. We hope that this paper will encourage such new thinking.

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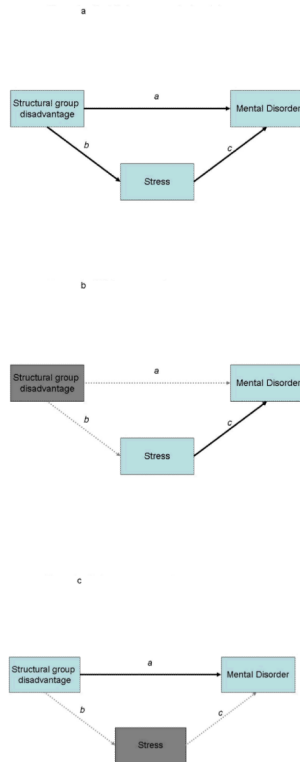


Figure 1.
a: Social stress conceptual model
b: Within-group analyses
c: Between-groups analyses