

Title: Two Sides of the Same Coin: An Ecological Examination of Comorbidity of Mental and Physical Health in the United States

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BACKGROUND. Self-rated health (SRH), such as general health status, strongly predicts future morbidity and mortality. At the individual level, there is vast evidence of a range of social factors influencing SRH. A global assessment of health may be less informative than a subtler appraisal involving two spheres of influence – mental and physical dimensions. Currently, there is a dearth of evidence related to the density of the association between these aspects of health at the population level (Zimmerman & Bell, 2006). What is less known is the extent to which these two features of health are associated at the broader social level, the extent to which they vary across regions, and whether there are aspects of the structural environment which are associated with the relationship between physical and mental health at the broader geographic level.

In regards to contextual effects on health – as established in other studies (Subramanian, Kawachi, & Kennedy, 2001; Subramanian, Kim, & Kawachi, 2005) – contexts represent a collective unit, with their own characteristics, norms, and health status and are distinct from the individuals who compose a community or society. Rose (1992) posits that the determinants of individual health are different from the determinants of the health of populations; moreover, individual disease risk cannot be viewed in isolation from his/her population – there is a need to contextualize individual risk within a distribution of population risk. Therefore, it is logical that the broader group-level associations offer an additional piece of the puzzle. Additionally, exposures existing at the wider level of social organization have demonstrated their role in shaping the prevalence of poor SRH (Kennedy, Kawachi, Glass, & Prothrow-Stith, 1998; Kawachi, Kennedy, & Glass, 1999). Consistent with Durkheim’s notion of the social rate of suicide, there are social exposures, which alter disease resistance generally (Cassel, 1976), existing at the group or population level.

In addition to describing the pattern of comorbidity across the U.S., this work asks whether there are specific aspects of the broader social environment that are associated with this pattern. For example, poverty’s common association with poor mental and physical health indicates that general susceptibility may be shaped by the social rate of exposure to fundamental causes of poor health. Fundamental causes of the disparate burden of disease stem from economic and political conditions that generate and perpetuate social and economic inequality (Krieger, 1994; Link & Phelan, 1995; Doyal, 1995); common is the notion that poverty is pathogenic to both physical and mental health.

PURPOSE. The purpose of this study is to estimate state-level co-occurrence between self-rated physical and mental health, examine the pattern of results, and investigate the putative role of broader social structural factors in shaping the levels of comorbidity at the state.

METHODS. This ecological study utilized data from two sources, the 2000 Census and the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). The data were linked via Federal Information Processing Standard (FIPS) codes. Face-to-face survey of a non-institutionalized adult general population sample was conducted in the 2001-2002 NESARC (N=43,098). Blacks, Hispanics, and young adults were oversampled; overall response rate was 81%. Details of the study and sampling frame can be found elsewhere (Grant, Stinson, Dawson, Chou, Dufour, Compton et al., 2004; Grant, Moore, Shepard, & Kaplan, 2005). General physical and mental health were measured using the Short-Form 12, Version 2 (SF-12v2, Gandek, Ware, Aaronson, Alonso, Apolone, Bjorner et al., 1998). A norm-based score of: 1) general physical health and 2) general mental health was created, providing two continuous values with mean 50, standard deviation ± 10 , and range 0-100, which were then aggregated to the state level. The SF-12v2 has been shown to be a reliable and valid measure of current functioning widely used in population surveys (Gandek et al., 1998). The correlation between physical and mental health by state was calculated using linear regression. Alpha was set at $p < 0.05$. To adjust for complex sample design of the NESARC, all analyses were conducted using SUDAAN (RTI, 2004). Social structural data were obtained from the Census and the characteristics of the environment were culled to provide a picture of the socio-economic and political landscape within each state. Income inequality (assessed via gini coefficient), poverty (assessed via $\% \leq \text{FPL}$), density of population, and state representation (e.g., Red/Blue) were selected as these represent different dimensions of the broader social structural environment within which health is embedded.

PRELIMINARY CONCLUSIONS: Initial results reveal a significant overall positive relationship between state-level mental and physical health ($\beta = .11$ [SE=.01], $p < .0001$), with a wide range of associations between mental and physical health at the state level, from a negative (Montana, $\beta = -.33$ [SE=.01], $p < .01$) to a positive (Alabama, $\beta = .39$ [SE=.05], $p < .0001$) relationship. The finding of a significant inverse relationship between these two features of health in Montana and Colorado is unique and will be further investigated in the study. In addition, geographic clustering is found, with stronger associations located in the greater southern region of the United States. It is anticipated that ecological associations will be found between indicators of social structural inequalities and state-level health, especially regarding the southern states. A potential benefit of this study is to contribute empirically to establishing the need to investigate the prevalence of comorbidity at the state level and factors contributing to putative patterns of self-rated health, but also to assist in monitoring the goals of Healthy People 2010 of increasing quality of life and reducing health disparities.

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Figure 1. Correlation of mental and physical health by U.S. State

