Marital Status, Parental Status, and Allostatic Load.

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Abstract

Extensive research has examined the effect of social disadvantage on chronic stress by socio-economic status (SES), gender, and race/ethnicity, as well as the negative health implications of that stress. However, research has yet to examine other avenues of stress generation, such as marital status or parental status, and how the relationship between raising children and the physiological burden imposed by stress may vary by marital status. Using survey and laboratory data from the National Health and Nutrition Examination Survey, 2003-2006, We address this gap in the literature by examining the relationships of marital status and parental status with allostatic load and how these linkages vary by age, SES, and race/ethnicity. The sample includes adult women in their childbearing years ages 20 to 50 (N= 1,274). Findings using negative binomial regressions indicate that on average women in their early childbearing years have higher allostatic load scores if they are married or have children. Yet, for women in their later childbearing years, being single and without children is associated with greater allostatic load. There is also significant variation by SES and race/ethnicity for women over age 35, such that marriage and children primarily benefit advantaged groups during their later childbearing years.

Introduction

There is a natural process of wear and tear on the body with aging. This process can be exacerbated by exposure to chronic stressors. In the face of stress the body undergoes changes, such as increased levels of cortisol and epinephrine. The stress response happens so that the individual can better adapt to an immediate threat or situation. When stressful situations pass, the body returns to its normal state or homeostasis. Adaptation to stress is called allostasis. If this response happens sporadically and for short periods there are no damaging effects on the body. However, if the body maintains the heighted neural state due to chronic or repeated stress exposure then there is a cumulative increase in the wear and tear on the body (McEwen and Steller 1993; McEween and Seeman 1999).

Chronic stress, and the subsequent negative health effects, has been associated with social disadvantage as assessed by SES, gender, and race/ethnicity. There are a number of avenues through which social disadvantage causes chronic stress, such as exposure to crime, racial/ethnic discrimination, pollution, and other hazardous social and physical environments (Adler and Ostrove 1999; Wallis et al. 2010; Quinn et al. 2010; Elliot 2002). Lower SES groups, as compared to moderate or high SES groups, also have a higher likelihood of participating in negative coping mechanisms for stress, such as smoking or drug use, which in turn adds greater stress to the body (Baum 1999; Lantz et al. 1998). Thus, social disadvantage leads to greater chronic stress and, in turn, increases risk for poor health outcomes.

One plausible contributor to stress that has not received adequate attention in the research when examining the relationship between social disadvantage, chronic stress,

and health is family status. Family status, namely marital status and parental status, influences individuals' SES, social support, health behaviors, and time constraints (Avellar and Smock 2005; Cairney 2003; Simon 2008; Umberson 1987). All of these factors in turn contribute to individuals' exposure to chronic stress. The aim of this paper is to address the gap in the literature by analyzing the relationship between family status, including marital status and parental status, and the direct health effects of chronic stress, using physiological indicators as an outcome variable.

In a time of increasingly diverse family formations, as well as increasing concerns about morbidity, it is important to develop an understanding of how women raising children may experience more or less physiological stress depending on their marital arrangements, as this may have serious implications for both healthcare and family policies. Research also suggests that parents' health, particularly mothers' health, is related to their parenting behavior and the health of their children (Sturge-Apple et al. 2011). Thus, it is important to understand the effects of family structure on women's health not only for the women, but also for the children involved in these different types of family arrangements.

Allostatic Load

The negative health implications of chronic stress on the body can be measured using allostatic load (Geronimus et al. 2006; Seplaki et al. 2006; Turra et al. 2005; Weinstein et al 2003; Seeman et al. 1997; McEwen and Steller 1993). A measure of allostatic load is created using biological indicators of repeated exposure and adaptation to stressors as a way to assess the "wear and tear" on the body caused by these chronic stressors (McEwen and Seeman 1999; McEwen 1998; McEwen and Steller 1993).

Examples of biological indicators frequently used to measure allostatic load are systolic and diastolic blood pressure, body mass index (BMI), glycated hemoglobin levels, and cholesterol levels.

In general, research suggests that higher allostatic load scores are associated with social disadvantage, such as having lower socioeconomic status and being an ethnic or racial minority (Geronimus et al 2006; Seeman et al. 2002; Kubzansky et al. 1999). Seeman and colleagues (2002) also found a relationship between positive social experiences and lower allostatic load, suggesting important protective links between social ties and physiological dysregulation. Yet, little attention in the literature on allostatic load has been given to other avenues of chronic stress which may influence both an individual's level of social disadvantage and their social support, such as family status.

Family Status

The late 20th century has witnessed a shift away from typical two-biological-parent homes (Cherlin 2010). Due to this increased variation in family structure, it is important to understand if and how different family types impact individuals' health and well-being. Two key elements that make up an adult's family structure are his or her marital and parental status. Since the U.S. Census 2006 Current Population Study reports women are more likely than men to experience a variety of family structures, including single parent families (over 80% women in 2006) and widowhood (77.5% women for those aged 55 and over in 2002) they will be the sample of interest in this study.

Research has demonstrated that being married is protective against poor health outcomes and, by implication, other marital statuses have negative health effects (Liu &

Zhang 2012; Rendall et al. 2011; Ross, Mirowsky, and Goldsteen 1990). The main explanations for this relationship include the fact that married individuals tend to have greater social support, be of higher socioeconomic status, and have healthier lifestyles as compared to those who are not married. It is also possible though that there are selection effects, in that healthier women may be more likely to marry than women who suffer from poorer health or disability.

Married women have one more person in their close social support network as compared to single women, and social relations have consistently been found to help mediate the effects of reported daily stress on health (Thoits 2010; Turner and Marino 1994; DeLongis et al. 1988). Having a spouse or partner also tends to increase one's socioeconomic status, especially for women (Waite and Lehrer 2003; Hahn 1993). Lastly, single women are more likely than married women to participate in negative coping mechanisms, such as cigarette, alcohol, and illicit drug use, which put further stress on the body and likely increases allostatic load (Baum 1997; Umberson 1987).

Research is mixed on the relationship between parental status and health. Generally studies have found little to no health variation by parental status when taking into account socio-demographic factors (Verbrugge 1983; Bird and Fremont 1991; Ross, Mirowsky, & Goldsteen 1990). Yet, studies have found that parents, particularly mothers, have many stressors in their daily lives that are not experienced by adults without children in the house (Ross, Mirowsky, & Goldsteen 1990; Bird and Fremont 1991; Umberson and Williams 1999). Previous studies have also found that parents with children living in the household report lower levels of happiness as compared to same aged adults without children. Yet, adults whose children have grown up and moved out of

the house report greater levels of happiness and life satisfaction as compared to their same aged childless counterparts (Simon 2008; Nomaguchi and Milkie 2003). Having children also fulfills a normative role in the U.S. and thus comes with benefits of legitimacy along with certain rights and privileges (Verbrugge 1983; Sieber 1974). It is possible then that stress associated with parenting is canceled out by the emotional and social benefits of raising children or that this "short" term stress is made up for by benefits later.

Yet, it is also possible that the health effects of having children may shift based on other factors, including a woman's marital status. The effects of parental status on reported stress differ by marital status for women. Studies have found that unmarried parents experience higher levels of stress and depression than their non-parent and married-parent counterparts (Nomaguchi and Milkie 2003; Cairney 2003). Being single may exacerbate the stressors of parenthood due to the combination of emotional, economic, and time constraints. Social support has been found to partially mediate the relationship between stress and health, likely because social support offers emotional outlets which may help individuals cope with stressful situations (Thoits 2010; Turner and Marino 1994; DeLongis et al. 1988). Thus, losing or forgoing the support of a partner lowers the number of emotional ties a mother has available to her to help cope with the stresses of raising a child(ren). The relationship between parenting and chronic stress may also be unclear due to possible variations in this relationship given a woman's age, SES, and racial or ethnic identity.

Variations by Age, SES, and Race/Ethnicity

Age

When analyzing the impact of family status on social disadvantage, stress, and physiological dysregulation it is also important to take into account variations by age. According to the life course perspective, individuals who go through major life events, such as getting married and having children, at the same time as their peers have better outcomes than those who complete these life course events earlier or later, or never complete them at all (Giddens 1991; Morgan & King 2001; Elder, Johnson, & Crosnoe 2004; Spence & Eberstein 2009). Theories on the value of children posit that marriage and childbearing are two of the most important ways in which adults achieve stable identities (Friedman et al. 1994; Morgan & King 2001). Participating in these events can increase routines, bring predictability, and help keep individuals connected to the social world around them, thus decreasing their anxiety (Giddens 1991; Friedman et al. 1994; Morgan & King 2001). Spence and Eberstein also found that women whose first birth was earlier or later than normal were at greater risk of mortality as compared to those that had their first child at a normative age (2009). Thus, age effects may play a large role in the relationship between women's family status and allostatic load.

In general, allostatic load is also highly correlated with age. This relationship is exponential in that as age increases, allostatic load increases at an increasing rate (Seplaki et al. 2006; Seeman et al. 1997; McEwen and Steller 1993). Because of the influence of age on both family status and allostatic load, and the relationship between them, it is necessary to separate out age groups in order to fully understand the dynamics of these relationships.

SES & Race/Ethnicity

Testing for variations in the relationship between allostatic load and family status by SES and race/ethnicity is also important because differences in social disadvantage not only arise from, but also influence, variations in family status. There are two alternative ways that the relationship between family status and allostatic load might vary by SES and race/ethnicity. The first possibility is that there will be greater differences between disadvantaged and advantaged groups for non-normative family patterns, such as being single without children during the later childbearing years, as compared to normative patterns, such as being married with children. This would compound the negative effects of certain family types on SES disadvantaged groups. The second possibility is that there will be greater differences between advantaged and disadvantaged groups for normative family patterns, such as being married and having children during the later childbearing years. This would then mean that SES advantaged groups are really just more likely to reap the benefits of normative family types as compared to disadvantaged groups

Women from lower socioeconomic backgrounds tend to have lower rates of marriage, higher rates of divorce, and higher rates of out of wedlock birth (Smock et al. 2005; Cherlin 2010). Not only do single mothers have higher rates of chronic stress as compared to married mothers and women without children, they are also more likely to have a lower SES and come from a lower SES background. Lower SES is associated with poorer health in part due to a lack of resources, lower education, and greater participation in health risk behaviors (Lantz et al. 2001; Kubzansky et al. 1999; Adler et al. 1994). SES can also influence women's neighborhood context which, in turn, can expose them to stressors associated with the neighborhood such as violence and environmental hazards

(Quinn et al. 2010; Wallis et al. 2010). This places the chronic stressors experienced by lower SES women on top of the stresses of singlehood and parenthood, possibly exacerbating the negative health effects.

Racial/Ethnic minority status also adds stressors that non-Hispanic whites do not experience. One added chronic stress is that associated with individual and institutional racial/ethnic discrimination (Brown et al. 2000). Minorities, particularly blacks, are also more likely than non-Hispanic whites to be segregated into neighborhoods with greater rates of violence, exposure to environmental hazards, drug use, and overall SES disadvantage, despite their comparative SES to whites (Williams and Collins 2001; Iceland and Wilkes 2006). These stressors may again exacerbate the stress experienced by single mothers, particularly for black single mothers.

Another way that race/ethnicity and SES may interact with family status is that the health benefits of marriage may help to slow down the process of wear and tear on the body, but mainly for those individuals who are not exposed to other constant stressors. For individuals with low SES and of minority status the constant stressors faced may serve to temper the positive effects of marriage on health. Though not the focus of their paper, Geronimus and colleagues found that black/white differences in allostatic load tend to be greater for individuals over the poverty line (2006). This suggests that the benefits of having a majority status are largely felt by those who are not socially disadvantaged in other ways, such as SES in this instance. It may be possible then that the advantages associated with certain family types, at certain times in the life course where they are deemed advantageous, may benefit higher SES white women more than lower SES women of minority status.

Hypotheses

The first hypothesis is that allostatic load will vary by family status, namely marital status and having children in the home. The second hypothesis is that the relationship between allostatic load and family status will vary by age following a normative pattern. Thus women whose family statuses are normative for their age will have lower allostatic load scores as compared to women who have non-normative family status. The last hypothesis is that **t**he relationship between allostatic load and family status will vary by SES and race/ethnicity through one of two mechanisms. One mechanism is that disadvantaged groups will suffer more than advantaged groups from the stressors of non-normative family statuses. The other is that disadvantaged groups will reap less of the benefits of normative family statuses as compared to advantaged groups.

Methods

Data

The data used in this study come from two combined two-year datasets from the National Health and Nutrition Examination Survey (NHANES, 2003/2004 and 2005/2006). The NHANES uses stratified, multistage probability samples to assess health and nutrition among a nationally representative sample of non-institutionalized adults. All respondents were asked to complete an in-person questionnaire and to receive a clinical examination from a mobile examination center. This study has an over-sample of people aged 60 and older, African Americans, and Mexican Americans. My sample of interest consists of non-pregnant women ages 20 to 50 years, as they represent adult women who are in their childbearing years.

Measures

Allostatic load is the focal dependent variable. Ten biological indicators were selected to create the allostatic load index based on previous research and data availability. The ten biomarkers are systolic and diastolic blood pressure, body mass index, glycated hemoglobin, albumin, triglycerides, C-reactive protein, homocysteine, total cholesterol, and HDL cholesterol. Each of these variables was recoded as a dummy variable with respondents at high risk coded as 1. These variables were added to create an allostatic load measure ranging from 0 (no high risk indicators) to 10 (every high risk indicator). Respondents were considered high risk if they were in the worst 25% percentile of the sample following the standard approach used in previous research on allostatic load (lowest 25% for albumin and HDL cholesterol and the top 25% for all others). Following previous studies constructing allostatic load with a relatively young sample, respondents were also coded as high risk in the glycated hemoglobin, blood pressure, or total cholesterol categories if they reported taking medications for diabetes, hypertension, or high cholesterol respectively (Geronimus et al. 2006).

Cases with missing values on any of the biomarker indicators used to create the allostatic load measure (N=644 or 25%) and those whose parental status was unsure (N= 197 or 8%) were excluded from the analysis. There was less than 4% missing (n=85) on other values and, thus, respondents with missing values were not included. Overall this excluded 36% of the sample, and the final sample included 1,551 respondents. Simple bivariate analyses comparing the new sample with the full sample show the demographic composition is generally similar. There is no significant variation in parental status, age, SES, or race/ethnicity. However, the final sample is more likely to be married and to be

married with children and to have attended college, though not more likely to have graduated from college, as compared to the full sample.

Having a child present in the household is the first focal predictor. Since the data did not have a direct question regarding motherhood, having a child present in the home, along with if a woman has given birth to a child in the last 18 years, is used as an indicator for parenthood. Those women who have children living in their home but have never given birth are dropped from the sample as the role these women play in raising the children in their household is unknown. It is possible that these women are step-mothers, room mates, adoptive mothers, or other family members. Yet, this ambiguity led to the decision to remove these women in order to specifically get at the role of family status. There were not substantive differences in regression analyses when including these women. There is also a control for women who are in the "no children" category, but have given birth to children 18 years before or more. These women are all over the age of 35 and are assumed to have grown children, yet because we are unable to validate this assumption this group will be controlled for but not analyzed as a separate family type. This variable is dummy coded 0-1.

The other focal predictor is marital status. Marital status is divided into four categories including, married, now single, never married, and cohabiting. All of these categories are dummy coded 0-1. The "now single" category is comprised of women who are divorced, separated, or widowed to represent all single women who have exited out of a marriage. These categories all have similar relationships to Allostatic load as well.

Marital status and Parental status are also combined to create four family status categories; married mothers, single mothers, married women without children, and single

women without children. The single category includes women who have never been married as well as those who are divorced, separated, or widowed. For this analysis cohabiting women are combined with single women, yet placing them in the same category as married women or excluding them does not change the results, likely because of the small number of cohabiting women in the sample. Each category is dummy coded 0-1.

Control variables include age, race and ethnicity, education, and income. Age is continuous and has a range of 20-50. An age squared term was tested to account for the exponential relationship between age and allostatic load, but it was not significant given the limited age range used in this sample. When controlling for race and ethnicity, we created dummy categories for non-Hispanic White, non-Hispanic Black, Mexican, other Hispanic, and other race. Education is dummy coded into less than a high school education, a high school diploma or equivalent, some college, and college graduate. Income is dummy coded into three categories using the poverty income ratio scale, PIR, with low income respondents under 150% of the poverty level, middle income respondents between 150% and 400% of the poverty income ratio, and high income respondents above 400%. Though there are other variables possibly related to both family status and allostatic load, such as smoking and social support, they are not included in the models presented here. This is because the purpose of this study is to assess the base relationships, which should be established before attempting to analyze any mediating influences.

Analytic Strategy

All of the data are weighted combining the Mobile Examination Center (MEC) sampling weights for the 2003-2004 and 2005-2006 samples, following the National Center for Health Statistics guidelines. Due to the right skewness of the allostatic load scores, negative binomial regressions are used to test the multivariate associations. The analysis proceeded in four steps. In step 1, we test to see if there is an interaction effect of age and family status on allostatic load. Though this is the second hypothesis, it is tested first because significant results indicate that the sample will need to be divided into age categories in order to properly assess the relationship between family status and allostatic load. Step 2 is to then test the individual relationships and the interaction effects of marital status and parental status on allostatic load. Step 3 is to test the interaction effects of SES and family status on allostatic load and the final step is to test the interaction effects of race, ethnicity, and family status on allostatic load.

Results

Descriptives

In Table 1 descriptive statistics are provided for all variables. Allostatic load scores ranged from zero (no risk markers) to nine (high risk on nine out of ten markers). The mean allostatic load score is relatively low at 2.42 with a median of 2. The majority of the sample, 66%, has at least one child in the household and eight percent have grown children. The mean age for women with grown children is 46.5, whereas the mean age for all women in the sample is close to 35 years. The majority of the sample is married (53%), with 41% married with children and 12% married without children. 25% of the sample are single mothers while another 22% are single without children. In terms of race

and ethnic composition the sample is 46% non-Hispanic Whites, 24% non-Hispanic Blacks, 21% Mexicans, and 9% other respondents. 36% of the sample has a PIR below 150%; with 27% of the sample having a PIR greater than 400%, and 37% between 150% and 400% of the poverty income ratio. The sample is rather evenly dispersed among education groups with 21% having less than a high school degree, 22% with a high school diploma or equivalent, 36% with some college, and 22% with a college degree.

Table 1: Descriptive Statistics (N=1,551)

	Mean/Proportion	*S.D.*	*Range*
Dependent Variable			
Allostatic Load	2.42	1.99	0-9
Focal Variables			
Has a Child	0.66	-	0-1
Married	0.53	-	0-1
Never Married	0.22	-	0-1
Divorced, Widowed, Separated	0.15	-	0-1
Cohabiting	0.10	-	0-1
Married No Child	0.12	-	0-1
Single No Child	0.22	-	0-1
Married Mother	0.41	-	0-1
Single Mother	0.25	-	0-1
Sociodemographic Controls			
Age	35.21	8.241	20-50
Grown Child	0.08	-	0-1
Race/Ethnicity			
Non-Hispanic White	0.46	-	0-1
Black	0.24	-	0-1
Mexican	0.21	-	0-1
Other	0.09	-	0-1
Education			
Less than High School	0.21	-	0-1
High School	0.22	-	0-1
Some College	0.36	-	0-1
College Graduate	0.22	-	0-1
Income			
Less than 150% of Poverty	0.36	-	0-1
150% to 400% of Poverty	0.37	-	0-1
Greater than 400% of poverty	0.27	-	0-1

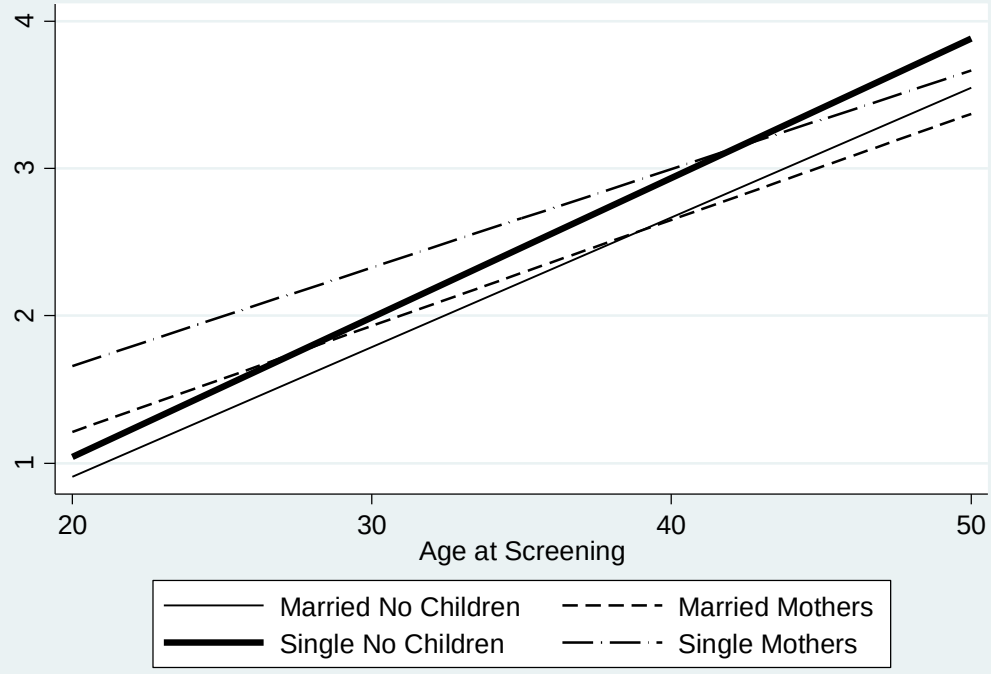
Table 2 shows mean allostatic load score by family type, SES, and age group. Because there are very few married women without children, this category should not be analyzed at length. Here we see that SES plays a large role with almost every family category showing a decrease in allostatic load from low income to middle income and from middle to high income. The most notable occurrence here is that single women without children have the lowest allostatic load score in all categories for the age group 20-35, yet they have the highest allostatic load scores for the age group 36-50. Because of this large difference by age, it seems necessary to discuss hypothesis 2 first, as not accounting for age in further analyses may confound the findings.

Table 2: Mean Allostatic load by Family type, SES, and Age with Number of Women

Age 20-35					
SES	Means	Single Mother	Married Mother	Single no Child	Married no Child
Mean		2.19 (222)	1.98 (290)	1.46 (204)	1.66 (70)
Poverty	2.13 (317)	2.31 (151)	2.19 (111)	1.50 (48)	1.43 (7)
Middle	1.83 (308)	2.07 (59)	1.91 (125)	1.53 (98)	2.08 (26)
High	1.46 (161)	1.33 (12)	1.69 (54)	1.31 (58)	1.41 (37)
Age 36-50					
		Single Mother	Married Mother	Single No Child	Married No Child
Mean		3.08 (169)	2.73 (348)	3.41 (138)	3.06 (110)
Poverty	3.31 (236)	3.13 (99)	3.36 (90)	3.58 (36)	3.45 (11)
Middle	2.97 (271)	3.21 (57)	2.64 (131)	3.28 (53)	3.43 (30)
High	2.68 (258)	2.07 (13)	2.36 (127)	3.43 (49)	2.84 (69)

When testing to see if the relationship between family type and allostatic load changed given the respondents age[1] we found that single women without children experienced a significantly stronger positive relationship between allostatic load and age as compared to all other marital groups. This is to be expected given the findings reported in the means table above. A visual representation of this analysis is presented in graph 1 below.

Graph 1: Relationship between Age and Allostatic Load by Family Type



The first notable thing in this graph is that both mothers and childless married women of all ages have lower allostatic load scores as compared to single women with the same parental status. Thus, it is likely parental status that is playing the largest role in the observed interaction between age, family type, and allostatic load.

This graph shows that, for women in their early twenties, being without children is associated with lower allostatic load scores than having children. For women in their thirties, being single without children is associated with higher allostatic load scores than married mothers. And for those in their forties, single women without children have the highest allostatic load score, even greater than single women with kids. For women over forty being married without children is also associated with worse health as compared to married mothers even though women who are married without children have the lowest allostatic load scores among younger women. These relationships speak to the life course perspective as being without children is normative in early reproductive years, yet in later reproductive years it is more normative to have started a family. Because of this strong interaction between age and family type, the rest of the analyses will be divided into two age groups, 20-35 and 36-50 years.

Regression Analysis

My first hypothesis is that there will be a relationship between allostatic load and family status, namely marital and parental status. Below is a table using negative binomial regression. All of the models are divided into two age groups, 20-35 and 36-50 years, due to the fact that the relationship between allostatic load and family status has already been shown to vary between these ages. Model 1 shows the relationship between the main independent variables, marital and parental status, and allostatic load. Model 2 adds in the socio-demographic controls. Model 3 tests for interactions between marital and parental status while controlling for socio-demographic characteristics.

Table 3: Weighted Coefficients and SE for Negative Binomial Regressions of Allostatic Load Scores on Children, Marital Status, and Demographic Factors
(n=1551) (age 20-35 n=786) (age 36-50 n=765)

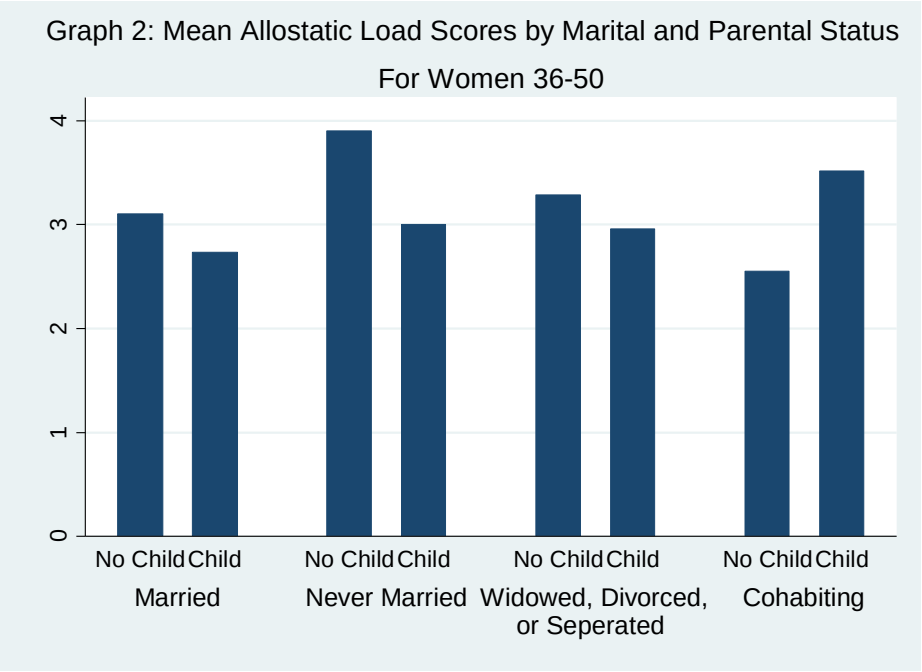
	20-35			*36-50*		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Child	.221*	-.047	-.041	.011	-.052	.128
	(.083)	(.083)	(.144)	(.070)	(.071)	(.136)
Marital status	-	-	-	-	-	-
Never married	-.028	-.180+	-.229	.362***	.282**	.535**
*married as referent	(.099)	(.097)	(.161)	(.078)	(.100)	(.145)
Divorced, Widowed,	.294*	.175	.375+	.048	-.057	-.030
Separated	(.110)	(.119)	(.218)	(.061)	(.065)	(.117)
Cohabiting	.039	-.041	.001	.189	.087	-.026
	(.140)	(.131)	(.190)	(.117)	(.108)	(.192)
Interactions	-	-		-	-	
Child*never married			.128			-.481*
			(.220)			(.221)
Child*now single	-	-	-.259	-	-	-.043
			(.238)			(.149)
Child* cohabit	-	-	-.079	-	-	.261
			(.238)			(.212)
Age	.023**	.035***	.034***	.051***	.050***	.048***
	(.007)	(.008)	(.008)	(.007)	(.008)	(.007)
Grown Child	-	-	-	.289**	.156	.222+
				(.104)	(.117)	(.121)
Below 150% of poverty	-	.124	.140	-	.205+	.202+
* above 400% of PIR referent		(.116)	(.114)		(.104)	(.105)
Between 150% and 400%	-	.054	.066	-	.080	.069
		(.115)	(.116)		(.093)	(.097)
Mexican	-	.012	.012	-	.088	.085
*Non-Hispanic White Referent		(.104)	(.100)		(.078)	(.078)
Other	-	.045	.055	-	-.037	-.035
		(.111)	(.110)		(.104)	(.099)
Black	-	.354***	.339***	-	.096	.107
		(.077)	(.083)		(.060)	(.067)
High School Diploma/GED	-	-.090	-.086	-	-.015	-.024
*Less than high school referent		(.101)	(.102)		(.080)	(.081)
Some College	-	-.249*	-.248*	-	-.077	-.074
		(.118)	(.119)		(.078)	(.079)
Bachelors Degree or Greater	-	-.613***	-.593***	-	-.285**	-.268**
		.(150)	(.151)		(.092)	(.096)
F statistic	5.10**	5.43***	4.43**	18.93***	7.36***	8.87***

[a]Consists of Widowed, Divorced, or Separated
+p<.10 *p<.05 **p<.01 ***p<.001

Model 1 shows that for women 20-35 having a child in the home is associated with significantly higher levels of allostatic load, as is being divorced, widowed, or separated as compared to married. For women over 35 we see that women who have never married have significantly higher allostatic load scores as compared to married women, yet there is no

significant difference between those who have a child and those who do not. In Model 2, when adding in controls for SES, education, and race/ethnicity only the never married category remains significant but the pattern of the relationship varies by age group. There is a suppressor effect for women 20-35 in model 2, in that when controlling for background demographics, being never married becomes significantly associated with lower allostatic load. In contrast, never married women over age 35 have higher allostatic load than married women.

Model 3 tests for interactions between marital status and having a child in the home. There are no significant interactions between marital and parental status for women ages 20-35. For women ages 36-50, having children is associated with significantly lower allostatic load scores for never married women as compared to married women. This is evidenced in graph 2 below where the difference between having a child and not having a child is much greater for never married women than for married women. Interestingly in the graph having a child has the opposite relationship for cohabiting women yet this difference is not significant possibly due to mediation or the lower number of cohabiting women in the sample.



Also notable in table 3 is that being black is associated with higher allostatic load scores for the younger cohort but not for the older cohort. Education is also a more significant predictor for the younger cohort, but being in the low income group is not significant for the young cohort as it is for the older cohort. It is logical that SES would not be significant for the younger cohort as these are women just starting out in life and their current SES may not reflect the SES they grew up in or the SES they will achieve. The greater significance for education in the new cohort may be due to the fact that other factors, such as SES, are less predictive for this group.

SES and Race/Ethnicity

The third hypothesis is that there would be variation in the relationship between family structure and allostatic load by SES and race/ethnicity. Based on the previous literature we arrived at two ways in which this relationship could vary by SES and race/ethnicity. The first possibility is that the non-normative family statuses will vary more than normative family

statuses based on SES and race/ethnicity, in effect showing a stronger deleterious effect on disadvantaged women. The other possibility is that the normative family statuses will vary more based on SES and race/ethnicity, thus advantaged groups would be reaping more benefits. For this section the focus is mainly on women ages 36-50, as it is to be expected that there are fewer significant differences in allostatic load for women aged 20-35 as wear and tear on the body happens exponentially. Thus, differences are likely to become greater at older ages.

For women 36-50 being married and having children appears to be beneficial, thus if the first mechanism discussed is correct then we would expect to see that the negative effects of being single and childless would be significantly worse for women with low SES and of racial/ethnic minority groups. Therefore, the difference in allostatic load scores between SES and racial/ethnic groups for single women without children will be greater than for married mothers. On the other hand if the second mechanism is correct then we would expect that the benefits of marriage and children would be significantly greater for upper SES white women. This means that we would see a greater difference in allostatic load scores by SES and race/ethnicity for married mothers as compared to single women without children.

In Table 4 below the marital and parental categories are combined into four different family type categories, single without children, married without children, single mothers, and married mothers. Model 1 shows the relationship between these family types and allostatic load and Model 2 adds controls for socio-demographic characteristics. Model 3 shows interactions between these family types and the poverty income ratio while Model 4 shows the interactions between race/ethnic group and family types. While Models 1 and 2 are divided into 20-35 and 36-50 age categories only the 36-50 age category is shown for models

3 and 4, as this is the age group We are focusing on to test the hypotheses concerning disadvantage. There were no significant interactions for women 20-35.

Table 4: Weighted Coefficients and SE for Negative Binomial Regressions of Allostatic Load Scores on Children, Marital Status, and Demographic Factors (n=1409) (20-35 n=702) (36-50 n=707)

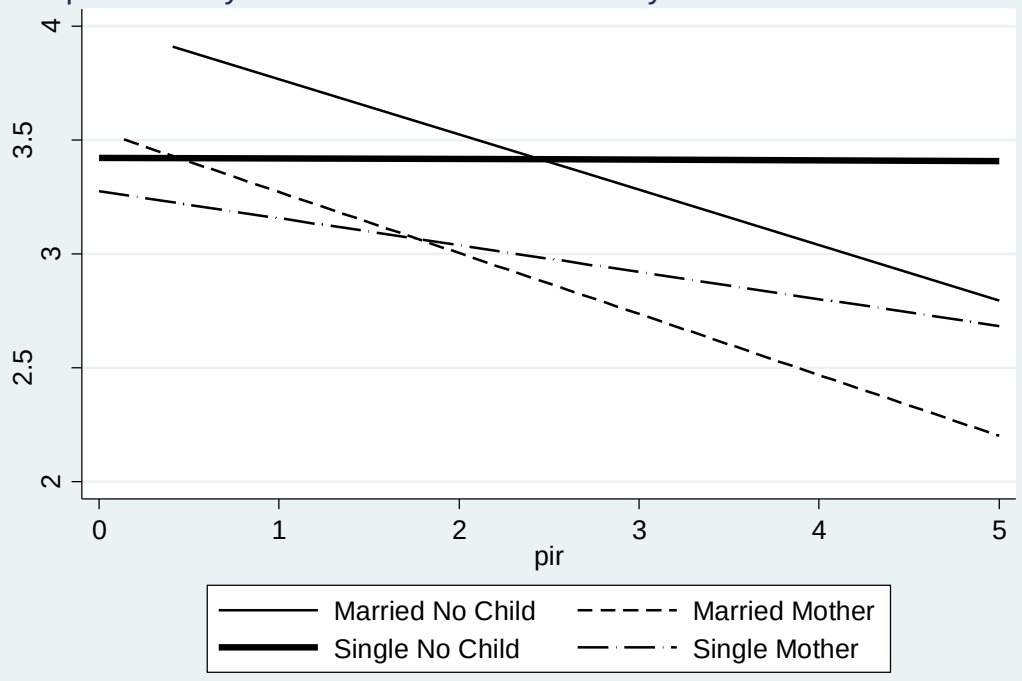
	20-35		*36-50*			
	Model 1	Model 2	Model 1	Model 2	Model 3	Model 4
Family status'						
Married no Child	.034	.090	-.181*	-.175+	.288	-.203
*Single no child referent	(.160)	(.156)	(.087)	(.107)	(.182)	(.126)
Married Mother	.186+	.032	-.190*	-.150+	.237	-.181
	(.106)	(.106)	(.080)	(.101)	(.154)	(.116)
Single Mother	.332**	.032	-.035	-.144	.148	-.168
	(.099)	(.109)	(.107)	(.133)	(.179)	(.186)
Interactions						
Single Mother*PIR	-	-	-	-	-.095	-
					(.070)	
Married no child*PIR	-	-	-	-	-.133*	-
					(.049)	
Married Mother*PIR	-	-	-	-	-.118**	-
					(.040)	
Single Mother*Mexican	-	-	-	-	-	-.095
						(.266)
Married no child*Mexican	-	-	-	-	-	.479*
						(.204)
Married Mother*Mexican	-	-	-	-	-	.027
						(.254)
Single Mother*Black	-	-	-	-	-	.180
						(.248)
Married no child*Black	-	-	-	-	-	-.131
						(.182)
Married with child*Black	-	-	-	-	-	.305*
						(.178)
Age	.028**	.041***	.047***	.045***	.047***	.045***
	(.007)	(.008)	(.007)	(.008)	(.008)	(.008)
Grown Child	-	-	.210*	.068	.079	.080
			(.093)	(.104)	(.106)	(.100)
Poverty Income Ratio	-	.126	-	.171+	.038	.179+
		(.120)		(.010)	(.035)	(.099)
Mexican	-	-.007	-	.077	.044	.033
*Non-Hispanic White Referent		(.104)		(.075)	(.074)	(.186)
Other	-	.006	-	-.049	-.065	-.050
		(.115)		(.104)	(.107)	(.105)
Black	-	.296**	-	.113+	.104+	-.018
		(.076)		(.061)	(.057)	(.129)
High School Diploma/GED	-	-.066	-	-.032	-.017	-.034
*Less than high school		(.103)		(.081)	(.083)	(.083)
Some College	-	-.239+	-	-.108	-.092	-.106
		(.123)		(.078)	(.079)	(.078)
Bachelors Degree or Greater	-	-.621***	-	-.317**	-.293*	-.317**
		(.155)		(.095)	(.109)	(.098)
F statistic	6.47***	6.07***	17.98***	7.89***	6.62***	6.93***

[a]Consists of Widowed, Divorced, or Separated

+p<.10 *p<.05 **p<.01 ***p<.001

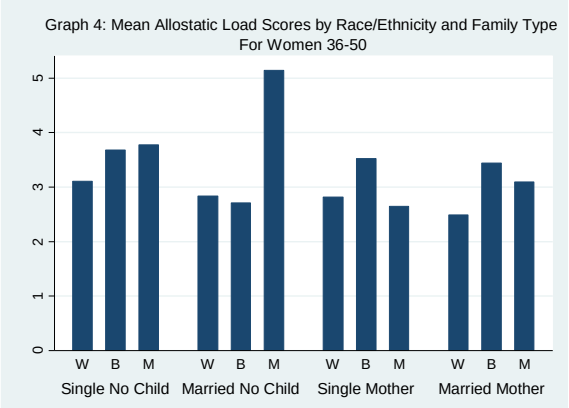
Model 1 shows that for women 20-35 being a single mother is associated with significantly higher allostatic load scores as compared to being single without a child, yet this is accounted for in model 2 by adding socio-demographic controls. For women 36-50, being married with and without children is associated with significantly lower allostatic load compared to single women without children. Though this relationship is weaker when adding in the socio-demographic controls in Model 2, it is still significant. In model 3 the coefficient for the interaction between the poverty income ratio and both married mothers and married women without children, as compared to single without child, is significant and negative. This means that as income increases the average allostatic load score decreases more for married women, with or without children, as compared to single women without children. A visual representation of this relationship is shown in graph 3 below.

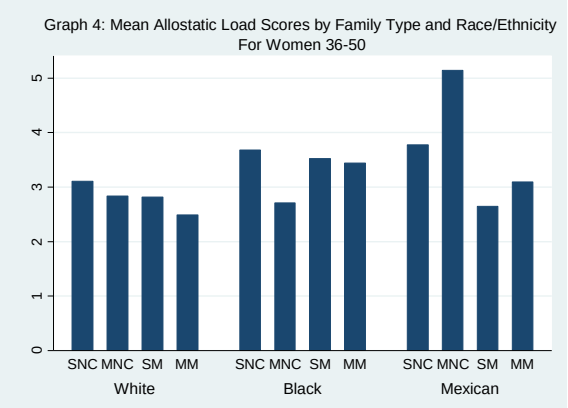
Graph 3: Family Status and Allostatic Load by Income for Women 36-50



Here the slope in allostatic load scores based on income for married women with and without children is significantly greater than the slope for single women without children. Thus marital status, and being married with children, seems to be particularly beneficial for women at higher SES. In fact, married women in poverty have higher allostatic load scores than their single counterparts. Thus, the data on SES seems to speak towards the second mechanism discussed above.

The next step is to test if there are any interactions between race/ethnicity and family type on allostatic load. This is represented in Model 4 of Table 4 where being white and single without children is the referent group. Here we see two positive significant interactions, one between married without children and being Mexican and the other between being married with children and being Black. This means that the difference in allostatic load scores between Whites and Mexicans is significantly greater for married women without children as compared to single women without children. And, the difference in allostatic load scores between Whites and Blacks is significantly greater for married women with children as compared to single women without children. This is visually depicted in the two panels below. Both panels represent the same data, yet the first is arranged by family type and the other by race/ethnicity for ease of interpretation.





Here we see that being married with children is only associated with lower allostatic load for whites. Indeed, there is such a great variation in the relationship between family type and allostatic load by race/ethnicity that no general conclusion seems warranted without further analysis. Unfortunately the small sample size of this data set does not allow further exploration into the differences between these groups. Basically we can assess that there is less racial variation in allostatic load scores for single women without children as compared to married women. This again speaks towards the hypothesis that the benefits of certain family types, namely marriage and having children, is felt more for whites than for minority groups. Nonetheless, because of the large variation in relationships between family type and allostatic load by race/ethnicity, this can not be assessed with certainty.

Discussion

Understanding the social mechanisms that influence physiological dysregulation is important to our society, particularly when these can impact not only individual lives but the lives of others, as is the case when examining family status. In this paper we tested to see if allostatic load varies by marital status and parental status. Building on previous literature we also examined how these relationships vary by age, SES, and race/ethnicity.

The first hypothesis was that there was a relationship between family status, measured by marital status and having a child in the household, and allostatic load. The initial findings suggested that women ages 20-35 who have never been married have significantly lower allostatic load scores as compared to married women, yet for women ages 36-50 never having been married is associated with significantly higher allostatic

load scores. There is also a significant relationship between marital status and having children for women 36-50, in that having children is associated with lower allostatic load for never married women as compared to married women.

These findings not only speak to the existence of a relationship between family type and allostatic load, but also to the second hypothesis that the relationship between family type and allostatic load varies by age following predictions derived from a life course perspective. From a life course perspective, deviations from normative life course patterns result in worse mental and physical health outcomes. Thus, here we see that women who get married and have children before the normative time, their late 20's, have worse health than their peers. Yet, for women in their late 30's and 40's, being single without children is associated with greater wear and tear on the body as compared to women who are married with children. Part of this relationship for women in their later reproductive years could be a selection effect as women who are already in poor health may be less likely to opt into marriage or parenting.

The last hypothesis is that the relationship between family structure and allostatic load varies by SES and race/ethnicity. The data suggests that the relationship varies among different racial and ethnic groups. In general the past literature led us to believe that there would be either a compounding effect on health causing lower SES minority women to have higher allostatic load scores or that the beneficial effect of family type would be greater for higher SES white women. In general the data suggests that social factors may be more important to more advantaged groups. Thus, it is not necessarily that disadvantaged groups are suffering more from the stresses of being single, but that the benefits of being married with children is greater for advantaged groups. In fact, being

married seemed to be slightly worse for the health of low income minority women than being single. Yet, this relationship is complicated to parse out given the large racial and ethnic variations and the limited sample size.

Limitations

There are three main limitations to this study, the fact that we were unable to get directly at parenthood status, the lack of longitudinal data, and the small number of cases prohibiting deeper analysis. Using children in the household and ever given birth as a measure of parenthood does not fully get at the concept of parenthood because it obscures different parental types such as stepmoms, adoptive moms, and divorced women who do not have custody of their children. This may actually be a more conservative measure though as the differences between women who are primary care givers for children and those who are not are likely to be larger than the differences between women who happen to have children in their households as compared to those who do not. There was also no substantive difference between these analyses and analyses including all women and using household child as a measure of parental status.

Another limitation was the lack of longitudinal data in assessing the relationship between age, family type, and allostatic load. It is possible that the differences in the relationship between family type and allostatic load by age could be a cohort effect. This would mean that being single without children is better for the younger generation as a whole, whereas it was better to be married with children for the older generation. Because of the drastic difference in this relationship over a very short span of years, it seems likely that these reflect life course patterns rather than cohort differences. Yet, future

research should attempt to view this relationship using longitudinal data in order to parse out exactly how these relationships change as individuals' age.

The last limitation is the small number of cases. The small number of cohabiters prevents further exploration into how this group might differ from both married and single women. The fact that the number of cases became too small when broken into family status categories also precluded assessing the significance within racial/ethnic groups which would have allowed a better understanding of the differences between these groups in the relationship between family type and allostatic load. Future research should investigate the racial and ethnic variation in the relationship between family type and allostatic load, to parse out the exact relationships and theoretically why they exist.

Conclusions

These findings suggest that there is a relationship between family status and physiological dysregulation. And, that this relationship varies based on age, SES, and race/ethnicity following a life course pattern and primarily benefiting advantaged groups. Future research should take into account family status when examining social factors that contribute to variations in allostatic load. Marital status should also be considered as a moderator in the relationship between other risk factors and allostatic load. This work may help us to better comprehend the relationship between social factors, namely social disadvantage, and the physiological stress process.

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