ABSTRACT

Title of Dissertation: HEALTH ASSOCIATIONS WITH INTERRACIAL AND INTER-ETHNIC MARITAL, COHABITING, AND DATING RELATIONSHIPS IN THE UNITED STATES

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Research consistently finds that health is stratified by race, ethnicity, and gender, and that romantic relationships, particularly marriage, are protective of health. Despite increasing prevalence of interracial and inter-ethnic relationships, few studies have investigated the association between partnership exogamy and health. In this dissertation, I examine whether and how heterosexual exogamy is associated with self-rated health, being overweight and obese, and depression. I additionally examine evidence for health selection into exogamous versus endogamous relationships and the evidence for health change over time in relationships. First, I use data from four panels of the Survey of Income and Program Participation, representing the adult population aged 18-59 in the US, to investigate partnership exogamy and self-rated health among Whites and nonwhites. I find that having a White partner is associated with better self-rated health for nonwhites, and that having a nonwhite partner is

associated with worse health for White women. I find evidence that people in better health select into partnerships with Whites, and that having a White partner is associated with better self-rated health over time. Second, I use data from the National Longitudinal Study of Adolescent to Adult Health, representing young adults who came of age in the 1990s, to look at associations of partner race and ethnicity with being overweight and obese, and with depression. I find that overweight and obese White women select into new relationships with Black men, and also that having a Black partner is associated with weight gain over time for White women. Finally, I find that White young men and women who are more depressed are more likely to partner with nonwhite partners, and this effect is particularly strong for White women who have Black dating partners. I find evidence for depression increase over time among White women with Black partners, though the findings suggest a weaker causal impact of interracial relationships on depression than suggested by prior studies. To interpret the results throughout, I draw on gendered theories of interracial relationship formation including status exchange theory, and gendered theories of relationships and health that focus on stress and social status.

# HEALTH ASSOCIATIONS WITH INTERRACIAL AND INTER-ETHNIC MARITAL, COHABITING, AND DATING RELATIONSHIPS IN THE UNITED STATES

by

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Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2017

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# Chapter 1: Introduction

The sociology of health looks to aspects of the social environment to explain how and why individuals come to experience different health outcomes: social structures, institutions, social interaction, social status, and social position are all salient when understanding health inequalities in sociological perspective. Across industrialized societies, people with more social ties are the healthiest across multiple measures, including lower mortality risk, less disease, better mental health, and better self-rated health (House et al. 1988; Thoits 2011; Umberson and Montez 2010). Romantic relationships represent one type of social tie that has a particularly strong influence on health (Ross et al. 1990; Umberson and Montez 2010).

This influence is unsurprising, given that romantic relationships represent a central and highly influential aspect of the social environment: romantic relationships are an arena of daily social interaction; they tie individuals to social roles with corresponding role obligations; they represent a shared environment and experiences; and they represent an exchange of economic and emotional resources. The sociology of health views patterns of physical and mental health as flowing from the "structural arrangements in which individuals are embedded" (Pearlin 1989:241). Romantic relationships are one such example of a social structural arrangement, given that they are characterized by social interaction and social roles (Stryker 1980/2003; Stryker and Burke 2000). Sociologists thus have a crucial role to play in establishing the link between social relationships, including romantic relationships, and health, particularly in explaining how this link varies by race, ethnicity, and gender (Umberson and Montez 2010).

Further, romantic relationships tend to be endogamous when it comes to certain characteristics, notably, race and ethnicity. Endogamy refers to relationships between members of the same group, including a racial or ethnic group – similar to, but distinct from homogamy, which is the tendency to partner with others of similar status (Kalmijn 1998). Race and ethnic group membership is also linked robustly to health inequalities in the literature, with women and racial minorities typically faring worse on various health outcomes (Vega and Rumbaut 1991; Williams and Collins 1995; Williams 2012). However, we know little about how health outcomes are associated with partner race. That is, what are the ramifications for health among partners who do not share the same race or ethnicity? What happens when two partners may not share similar levels of social status, discrimination, and institutional racism? What happens when a relationship is not as socially acceptable as an endogamous relationship? Does health affect partnership formation along racial and ethnic lines? This dissertation addresses these open questions using two large, nationally representative data sources: the Survey of Income and Program Participation (SIPP), and the National Longitudinal Study of Adolescent to Adult Health (Add Health). I use these data sources to examine how the racial and ethnic composition of romantic relationships – including dating relationships,[1] cohabitation relationships, and marriage – is associated with self-rated health, overweight and obesity, and depressive symptoms.

This is a particularly problematic hole in the sociological literature on health given the increasing social importance of cross-race and cross-ethnicity relationships

[1] Dating relationships are examined only in Chapters Three and Four using Add Health data.

in the present day. Interracial relationships are of growing interest in the sociological literature – not only are they increasing for some racial and ethnic groups, they are socially important because they represent the breaking down or blurring of racial boundaries, decreasing social distance between groups, and changes in the racial composition of the next generation, as children from these unions will be considered mixed race (Kalmijn 1998; Rosenfeld 2008). However, despite this breaking down of boundaries, race remains a central axis of inequality for both health and social relationships in the US (Koball et al. 2010; Williams and Jackson 2005). The racial and ethnic composition of relationships thus represents both the boundaries between racial and ethnic groups in current society, as well as the potential for cultural and economic change (Kalmijn 1998).

Current research documents several important characteristics of these unions. Interracial and interethnic unions are driven both by the state of race relations in a society, as well as by demographic trends such as immigration and a larger multiracial population. In the US, growing racial diversity and immigration patterns have resulted in greater opportunity for romantic relationships across racial and ethnic lines (Qian and Lichter 2011). Reflecting these shifts, the trends in Black-White unions reveal that in the past three decades, Black-White marriages have increased threefold (Qian and Lichter 2011; Rosenfeld 2008). However, intermarriage and social distance from Whites varies significantly across racial and ethnic groups (Lee and Edmonston 2005; Qian and Lichter 2001), indicating that racial boundaries are blurring for some, but not all, groups. Although intermarriage between Blacks and Whites has increased over the past several decades faster than for any other racial

group (Qian and Lichter 2011) and opposition to Black-White unions has steadily declined according to polling data (Newport 2013), social disapproval of Black-White unions is persistent, especially when White people are confronted with the possibility of themselves or someone in their family dating, marrying, or having children with someone Black (Herman and Campbell 2012). Black Americans are thus still the least likely racial group to marry Whites, compared with Hispanics, Asians, and Native Americans (Qian and Lichter 2007). Hispanics have the highest rates of intermarriage with Whites across all education levels (Qian and Lichter 2007). Mixed race individuals are more likely to marry whites than are single-race minority individuals (Qian and Lichter 2007), and mixed race Hispanics and Asians are more likely to marry Whites than are mixed race Black individuals (Miyawaki 2015). Cohabitation represents a larger proportion of interracial relationships between Whites and Blacks compared to marriage, and Qian and Lichter (2007) argue that this signifies that the boundaries between Blacks and Whites still remain, because cohabitation does not represent the same level of commitment and stability as marriage. Overall, compared to other non-White groups, the social boundaries between Blacks and Whites remain particularly rigid and resistant to change (Qian and Lichter 2007). Further, gender has an impact on who partners with whom in interracial relationships: the majority of interracial unions (married and cohabiting) involving a Black partner involve a Black man and a White woman, and this is true for both native and foreign born Blacks (Batson, Qian, and Lichter 2006).

There are several compelling reasons to examine whether and how the racial composition of romantic relationships might affect health outcomes in ways that are similar to, or distinct from, how romantic relationships in general impact health.

First, different racial groups are assigned unequal social status, and the race or ethnicity of one's partner may signal social status (Miller, Olson, and Fazio 2004). This conclusion is supported by the fact that higher socioeconomic status racial minorities – i.e., racial minority individuals who have greater social status – being more likely to have White partners (Fu 2001; Torche and Rich 2016; Wang and Kao 2007). Unequal social status is also offered in the health literature as a major explanation for disparities, particularly in the case of subjective health statuses including self-rated health and mental health (McLeod 2013; Phelan and Link 2015; Schnittker and McLeod 2005). Thus, it may the case that individuals with different-race partners experience social status boosts or penalties based on both their own race and their partner's race that have implications for health.

Second, and also related to status processes, one of the main theoretical explanations for partnering across racial and ethnic lines revolves around socioeconomic status of racial and ethnic minorities. Status exchange theory (Davis 1941; Fu 2001) posits that in order to marry a racially high status (i.e., White) partner, racial and ethnic minorities must have higher socioeconomic status to "exchange." The empirical research shows that higher socioeconomic status predicts interracial relationships for some minority groups, particularly Black men partnered with White women (Gullickson 2006), and high levels of education are related to marriages between Whites and Hispanics and Whites and Asians (Qian and Lichter 2011).

Recent research has additionally shown that status exchange has not declined in Black-White relationships specifically over the past three decades, despite the growing prevalence of this type of exogamous relationship; this indicates that race does indeed continue to be a status marker in dating and marriage markets, and therefore something that can be "traded" for (Torche and Rich 2016). What does this mean for health? Socioeconomic status is known to be a major driving mechanism for health inequalities; it is considered a "fundamental cause" of health disparities (Link and Phelan 1995, 2010). Thus it could be that racial minorities who enter relationships with White partners are healthier to begin with, thanks to higher socioeconomic status. It could also be the case that a status exchange theory of exogamous romantic relationships might be appropriately expanded in scope to consider health as a resource that can be "traded" for a partner's racial status. We know that healthier people, including people with better self-rated health, the non-obese, and the less depressed are more likely to marry (Fu and Goldman 1996; Lillard and Panis 1996; Mustekasaa 1992; Schwartz 2013). Thus, it is possible that racial minorities with better health – or, conversely, Whites with poorer health – select into relationships with higher or lower racial partners on the basis of health capital. But it also could be the case that being in an interracial relationship affects health, in which case partnering across racial and ethnic lines could either narrow or widen racial and ethnic health disparities, depending on the direction of the effect. I address these questions throughout this dissertation.

Third, spouses often exhibit concordance on many health outcomes and health behaviors, such as body mass index, blood pressure, smoking, and mental health,

though it is still an open question to what extent this concordance happens through assortative mating vs. causal processes (Castelnuovo et al. 2009; Meyler, Stimpson, and Peek 2007). However, because we also know that many health outcomes – especially the outcomes I will examine in this dissertation – are stratified by race, ethnicity, and nativity, it is unclear how these health disparities might play out in the case of interracial and interethnic relationships.

Finally, interracial relationships are less stable and more prone to dissolution than endogamous relationships (Bratter and King 2008; Fu and Wolfinger 2011), are prone to disapproval from family members and others (Wang et al. 2006), and are associated with lower levels of relationships satisfaction (Kroeger and Williams 2011). All of these findings point to the possibility that interracial relationships are more stressful than endogamous relationships. It is a predominant theory in the sociology of health literature that stress burden – and unequal levels of stress between different social groups – is a major driver of health inequalities across racial, ethnic, and gender groups (Pearlin et al. 2005; Schnittker and McLeod 2005), and that a central part of marriage's protective effect on health is realized through social support that buffers stress (Ross et al. 1990; Umberson and Montez 2010; Waite and Gallagher 2000). Therefore, interracial relationships might not provide the health-promoting effect that endogamous relationships do, and this effect may vary across racial and ethnic groups. Instead, they may be a case where relationship stress can be detrimental to health through behavioral and psychosocial pathways (Umberson and Montez 2010).

*Structure of the Dissertation*

In this dissertation, I examine variation in three health outcomes based on romantic relationship characteristics among the adult population aged 18-59 in Chapter Two using the SIPP and among the Add Health cohort in young adulthood in Chapters Three and Four, focusing in particular on the racial and ethnic composition of romantic relationships. Specifically, I examine self-rated health, overweight and obesity (as measured by body mass index [BMI]), and depressive symptoms. Given that these two data sources both span a broad range of ages and cohorts (SIPP) and focus in narrowly on a contemporary cohort born in the early 1980s, I am able to examine relationship formation as well as health change after relationship formation. For each type of health outcome, I separately examine the cross-sectional association of health and partner race, selection into new relationships, and health change over time. Table 1.1 displays the availability of each of the dependent variables in the data sources I use in this dissertation.

In Chapter Two, I will examine the association between the racial and ethnic composition of married and cohabiting partnerships and self-rated health among White and nonwhite adults aged 18-59 using the Survey of Income and Program Participation (SIPP). The SIPP, a large, nationally representative sample of US households, has multiple panels and each panel captures self-rated health approximately three times. Self-rated health is a commonly used measure largely because of its widespread availability in large, nationally representative data sets due to the fact that it is cheap and easy to measure consistently across survey administrations. Although its meaning is the subject of debate and empirical

investigation, and varies according to the subjective understanding of the respondent (Jylha 2009), self-rated health is generally understood to capture both aspects of actual physical health, such as physical functioning and pain (Au and Johnston 2014), as well as a cognitive orientation toward one's own health and well-being that is socially and culturally embedded (Jylha 2009). Self-rated health also robustly and consistently predicts mortality, especially for certain groups (Whites in particular) (Assari et al. 2016; Idler and Benyamini 1997). Self-rated health is better among the married and cohabiting compared to single, divorced, and widowed, and is thought to be a mediator in the association between marriage and mortality (Lillard and Panis 1996; Schoenborn 2004; Zheng and Thomas 2013). Further, there is evidence that people select into relationships on the basis of self-rated health (Joung et al. 1998; Lillard and Panis 1996). In this chapter, I examine whether and how self-rated health is associated with partner race for Whites and nonwhites in married and cohabiting relationships in the US. One prior study has addressed this topic cross-sectionally, finding that racial minorities married to Whites have better self-rated health, whereas Whites married to racial minorities report worse self-rated health (Miller and Kail 2016). I build on this research by examining this association in a longitudinal data source, and I examine the evidence for selection into exogamous and endogamous marriage and cohabitation on the basis of self-rated health, compared to self-rated health change over time. I also examine gender differences in the association of partner race on self-rated health. I draw on status exchange theory, theories of social status and health, and stress theories of health to frame my research questions.

Chapter Three examines the association between relationship racial and ethnic composition and being overweight or obese (as measured by BMI) among contemporary White young adults in the US. Prior research on the association between romantic relationships, particularly marriage, and BMI reveals a paradox: although marriage is generally found to be protective of health, married people tend to weigh more than the unmarried and previously married, and transition to marriage is associated with weight gain (Scheoborn 2004; Sobal et al. 2009; Teachman 2016). Thus, marriage (and to some extent, cohabitation) could actually have an adverse impact on health in this particular way. There is debate in the literature as to whether selection into relationships on the basis of weight or causation (that is, whether relationships cause weight gain) is primarily responsible for this pattern. There are theoretical and empirical reasons to believe that both processes are responsible (Averett et al. 2008). Further, BMI is stratified by race and ethnicity, both because of socioeconomic disadvantage among racial minority groups and due to cultural differences in the stigma attached to heavier body types (Ailshire and House 2011; Jackson and McGill 1996; Ogden and Carroll 2010). In the second study presented in this dissertation, I use the National Longitudinal Survey of Adolescent Health (Add Health) to examine the association between being overweight and obese with the racial composition of romantic relationships, including dating, cohabitation, and marriage among White young adults. Although prior studies have examined the effects of marriage and cohabitation on BMI changes and how BMI affects selection into relationships, no prior study has addressed whether and how the racial and ethnic composition of romantic relationships affects the likelihood of being overweight and

obese. The Add Health is particularly appropriate for studying interracial and interethnic couples, because the survey tracks a contemporary sample of young people who were adolescents in the mid-1990s, and younger people are more likely to be in racially and ethnically exogamous relationships (Joyner and Kao 2005). Thanks to Add Health's longitudinal design, I am able to examine both selection into relationships based on overweight and obesity measured before the start of romantic relationships among new relationships, as well as overweight and obesity trajectories from early young adulthood to young adulthood. Further, Add Health has the relatively rare advantage of capturing interviewer-measured height and weight (rather than respondent self-reported) at three out of four available waves (see Table 1.1), which makes it particularly suitable for this study. I draw on status exchange theory of interracial relationships, along with research and theory on gendered and racialized standards of body size and beauty, in this chapter.

Finally, the third study in this dissertation uses Add Health to examine the association between partnership racial and ethnic composition and mental health among White young adults, measured by depressive symptoms. A few prior studies have investigated this topic, finding that in adolescence, teens who date interracially are more likely to experience depression (Miller 2014), and in young adulthood, interracial relationships are associated with depression for non-Black respondents with Black partners (Kroeger and Williams 2011). Further, among married adults in the US generally, having a Black partner is associated with psychological distress symptoms for White women (Bratter and Eschbach 2006). However, there are several gaps in this research that I seek to fill. First, prior research either studies only one

type of relationships (e.g., dating only, or marriage only) or does not explicitly examine potential differences in the effects of more and less committed relationships, despite the fact that interracial dating is more common and socially accepted compared to more serious, committed relationships (Herman and Campbell 2012; Yancey 2007). Second, prior research does not use available longitudinal data to its full potential. In this study, I ask whether and how gender and relationship type moderate the association between partner race/ethnicity and depression for White young adults. Further, I examine evidence for selection processes into romantic relationships on the basis of prior depression compared to change in depression over time among young adults in relationships with the same partner. I draw on the stress process model (Pearlin 1989, 1999) to frame this study theoretically.

*Theoretical and Substantive Contributions*

The research in this dissertation engages with fundamental theoretical questions in the study of relationships and health that wrestle with selection versus causal processes: that is, does health affect entry into relationships, or do relationships affect health? I expand this area of research to look explicitly at interracial and interethnic relationships. This is a fruitful crossover, because much of the theoretical work on interracial and interethnic relationships has focused on how and why people enter these relationships (Gullickson 2006; Florencia and Torche 2016; Kalmijn 2010; Yancey 2007). I expand the scope of this theoretical tradition to consider whether and how health statuses might be a basis for selection into interracial and interethnic relationships specifically.

Second, I draw on theories of health that rely on stress and social status to explain health inequalities across race, gender, and marital status lines. Most research in the sociology of health focuses on health statuses as a dependent variable, arguing that social structure, status, and interaction shape individual health outcomes (Aneshensel 2013; Koball et al. 2010; Thoits 2010, 2011; Umberson and Montez 2010). One predominant tradition in this vein is the stress process model, pioneered by Leonard Pearlin (1989), and I use this framework to understand how stress associated with interracial and interethnic relationships might lead to poorer health. Further, I draw on theory in the sociological social psychology tradition that focuses on how social status shapes health disparities (Schnittker and McLeod 2005), arguing that partner race may be a measure of social status that could affect health trajectories over time. I also draw on theories of the self-concept from social psychology, including social comparisons and reflected appraisals, to theorize on how partner characteristics might shape one's own health outcomes.

Substantively, this topic is of particular importance because the US is becoming more racially and ethnically diverse (Frey 2015), and interracial relationships are becoming more common and more socially accepted, especially for certain groups. We should know whether and how the changing composition of romantic relationships is likely to affect health outcomes for individuals in different racial and ethnic groups now and in the future. Additionally, this topic is significant because there is simply very little existing research, especially regarding self-rated health and BMI. Further, the SIPP is particularly underused to study relationship racial and ethnic composition, despite the fact that its large sample size and multiple

panels makes it an ideal data source for the topic. I hope that by generating results on such an understudied topic, this research will inspire future studies that try to further untangle the mechanisms by which relationship compositional factors influence health outcomes, and vice versa.

*Analytic Approach: A General Empirical Model of Health, Health Selection, and Health Change with Partnership Endogamy versus Exogamy*

In its general form, I model the expected value of health-status $H$ at time $t$, $E[H_t]$. In Chapter Two, $H$ is self-rated health, measured using a standard five-point scale. In Chapter Three, $H$ is body mass index (BMI), categorized into normal weight versus overweight and obese. In Chapter Four, $H$ is depressive symptoms, measured with a 27-point scale. Table 1.1 displays the availability of the three dependent variables in the data sources that I use in this dissertation (SIPP and Add Health). I include a main explanatory variable of racially/ethnically endogamous versus exogamous partnership $P$ at year $t$, $P_t$. I alternatively consider $P_t$ as a vector that additionally identifies whether the partnership is a marriage, cohabitation, or dating relationship. I additionally consider $P_t$ as a vector that identifies the specific race or ethnicity of the partner (White, Hispanic, or Black) in Chapters Three and Four. Additional explanatory variables are specified in vector $Z_t$, including the individual's own race/ethnicity, gender, and age, along with additional covariates appropriate to the individual analyses. This general model $E[H_t|P_t, Z_t]$ may be estimated by ordinary least squares (OLS) regression when $H_t$ is continuous and by logistic regression (multinomial or binary) when $H_t$ is categorical. $E[H_t|P_t, Z_t]$ may be represented as a

linear function $F$, which is linear in the log-odds in the case of a binary logistic regression, as follows:

$$E[H_t|P_t, Z_t] = F(\beta_0 + \beta_1 P_t + \beta_2 Z_t) \quad (1)$$

This model has the advantage of being able to be estimated with cross-sectional data, including from a single wave of a panel survey. The multivariate model permits estimation of the association of exogamous versus endogamous partnership while controlling for differences in health that are attributable to age, gender, and own race/ethnicity, and to do so differentially for each type of partnership (marriage, cohabiting, dating). In general, however, this model will not distinguish between whether the estimated association of exogamous versus endogamous partnership is due to selection or causation. That is, exogamous partnership may be selective of individuals in better or worse health, or exogamous partnership may cause individuals to be in better or worse health. Thus, throughout this dissertation, I consider this model to represent an association between relationship exogamy or endogamy and health that is to be further explained by the second and third steps of the analysis.

A more general, longitudinal model that mitigates the limitations of the cross-sectional model may be specified in two periods, allowing for the modeling of *health change* depending on endogamous versus exogamous partnership. In this general model, health at time $t + 1$ is specified as a function of health in previous period $t$:

$E[H_{t+1}|H_t, P_t, Z_t]$.

By including health status at time $t$ in the model, differences in the process of self-reporting of health status, which may differ by race/ethnic group and gender, are

controlled for. By specifying the outcome as a change between times $t$ and $t+1$, depending on partnership character at time $t$, the direction of causation is more reasonably assumed to be from the character of the partnership to health and not the reverse. This inference about the direction of causation is not without ambiguity, however, since a health condition (or one's perception of their own health) may be an enduring or a transitory phenomenon, and any given health transition may have its roots in an enduring condition.

In its empirical form, a longitudinal model of expected value of health-status $H$ at time $t+1$, $E[H_{t+1}]$ may be specified as depending on health status at $t$ as a linear function $F$ (linear in the log-odds in the case of a logistic regression), is as follows:

$$E[H_{t+1}|H_t, P_t, Z_t] = F(\beta_0 + \beta_1 H_t + \beta_2 P_t + \beta_3 Z_t) \qquad (2)$$

The main coefficient of interest is $\beta_2$, which predicts health status at time $t+1$ as a function of the partnership's racial composition (exogamous or endogamous) at time $t$. In summary, by including health status at time $t$ in the model, characteristics that determine self-reporting of health status that may differ by race/ethnic group, and some of the selection into partnership type on health status, may be controlled for.

Finally, an underlying health condition that may precede the partnership may be the source of any cross-sectional association observed between partnership endogamy or exogamy and health, suggesting that health status is a basis of selection into endogamous or exogamous relationships. This can be modeled with a prior observation of health status, at time $t-1$, predicting partner race or ethnicity as the outcome variable. This model is applied in cases of new relationships, that is,

relationships that formed between survey observations of an individual. In its empirical form, a selection model of expected value of partner race $P$ at time $t$, $E[P_t]$ may be specified as depending on health status at time $t$-$1$, as follows:

$$E[P_t|H_{t-1}, Z_t] = F(\beta_0+\beta_1 H_{t-1} + \beta_2 Z_t) \quad (3)$$

In this model, the expected value of partner race at time $t$ in a newly formed partnership is a function of health at time $t-1$ and characteristics $Z_t$, which age, gender, and other explanatory variables.

# Chapter 2: Self-Rated Health Associations with Interracial and Inter-ethnic Marriage and Cohabitation in the US

*Abstract*

Health is stratified by race and ethnicity, and marriage or marriage-like relationships are generally protective of health. Despite increases in interracial and inter-ethnic relationships, few studies have investigated associations between partner race/ethnicity and health. I do so using the 1996, 2001, 2004, and 2008 panels of the Survey of Income and Program Participation (299,065 combined years of observation). I find that having a non-White (including Hispanic) partner is associated with worse self-rated health for White women. Having a White partner is associated with better self-rated health for both non-White women and men. For both Whites and non-Whites, the adverse self-rated health association with having a non-White partner is stronger for women than it is for men. To investigate selection versus causal impact explanations for these associations, I use reports of self-rated health preceding new relationships and of self-rated health at two time points in existing relationships. I find evidence for positive health selection into having a White partner, and for positive impacts on health of having a White partner relative to a non-White partner. I interpret these findings as being consistent with gendered social-exchange theory and with theory of positive status and resource effects on health.

*Introduction*

Race, ethnicity, gender, and marital status are all central axes of health inequality. Racial minorities, especially Black Americans, and the unmarried have both been found to have worse health on outcomes ranging from health behaviors like drug and alcohol abuse to chronic conditions to risk of mortality (Schoenborn, 2004; for reviews, see Koball et al. 2010; Lara et al. 2005; Wood et al. 2007, Williams 2012; Williams and Jackson 2005). Self-rated health is one such health outcome that researchers find to be positively related to being partnered (e.g., Robards, Evandrou, Falkingham, and Vlachantoni 2012) and negatively related to being of minority race or ethnicity (e.g., Beck, Finch, Lin, Hummer, and Masters 2014).

For those who are married or partnered, both own race/ethnicity and that of one's partner may be expected to have health associations, but much less is currently known about the associations of health with one's partner's race/ethnicity. Being in an interracial relationship may induce adverse impacts on health, as is suggested by studies that have found adverse associations of having a Black partner with mental health (Bratter and Esbach 2006; Kroeger and Williams 2011) and of interracial dating with mental health (Miller 2014). Specifically on self-rated health, however, a recent study (Miller and Kail 2016) finds that among married couples, having a minority race/ethnicity spouse has adverse health associations relative to having a White spouse for both White and minority race/ethnicity individuals. This suggests that the interracial/inter-ethnic versus same-race/ethnicity character of a relationship may not be the key dimension.

To better understand these associations of partner race/ethnicity with health, it is necessary also to investigate what may be the causal direction of the association. This is notoriously difficult to establish, though it is generally accepted that to do so requires longitudinal data (Goldman 2001; Lillard and Panis 1996). Selection into racially and ethnically homogamous marriage based on such "structural" economic factors as education, occupation, and income has been investigated (Gullickson 2006; Fu 2001; Schwartz 2013; Torche and Rich 2016). Studies of selection into marriage based on self-rated health (Lillard and Panis 1996; Wilson 2002), however, have not considered race/ethnicity of the spouse. The studies so far that have considered race/ethnicity of spouse or partner and health have instead taken a "stress-theory" perspective (Kroeger and Williams 2011; Miller 2014) and viewed interracial partnerships as causing worse health. However, these studies have largely been cross-sectional in nature and therefore open questions remain on the selection versus social causation explanations for associations found between partner race and health outcomes.

The dearth of studies of the association between the racial composition of couples and health status is a glaring one, given both the wealth of research showing that subjective health status is markedly stratified by relationship status, race and ethnicity, and gender, and the fact that marriage and cohabitation across racial and ethnic lines is increasing as the non-White population in the U.S. grows and racial boundaries become more porous (Miyawaki 2015; Qian and Lichter 2011). This study seeks to fill that gap by investigating the association between couples' racial composition and self-rated health, including how selection versus causal processes

may generate this association. I use longitudinal data on partnership status and self-rated health status one year apart for men and women aged 18-59 from the 1996 through 2008 panels of the Survey of Income and Program Participation (SIPP).

## *Background*

### Romantic Relationships and Self-Rated Health

Throughout the sociological health literature, one finding is largely consistent: romantic partnerships, particularly marriage, are associated with better health (Waite and Gallagher 2000). Married individuals report better health outcomes across the spectrum, from fewer health limitations (Teachman 2010) to lower morality risk, especially for men (Rendall et al. 2011; Staehelin et al. 2012). The findings on the association between cohabitation and health and mortality are more mixed (Lund et al. 2002; Harris et al. 2010; Ren 1997). Much of the existing discussion of the association between romantic relationships and health focuses on a debate between selection or protection effects: that is, are the healthy more likely to marry, or does marriage promote better health?

In this study, I examine the association of self-rated health with marriage and cohabitation in same-race and interracial and inter-ethnic relationships. Self-rated health is one of the most widely available and frequently used health outcomes in survey data (Jylha 2009). There is widespread agreement that this single question provides a useful, inclusive, and meaningful summary of an individual's perception of their own health. It is also a strong predictor of mortality risk (Au and Johnston 2014; Fayers and Sprangers 2002; Idler and Benyamini 1997). Self-rated health

represents an active cognitive process that is embedded in a social and cultural environment and includes defining health for oneself, considering medical diagnoses, functional status, and bodily symptoms, then comparing these components to culturally-specific reference groups and their own health history (Jylha 2009).

The married consistently report better self-rated health: For all age groups, married adults are the least likely to report poor or fair health, whereas widowed adults are the most likely to report fair or poor health compared to other marital statuses (Bennett 2006; Schoenborn 2004). Among fathers in the urban-U.S. Fragile Families study, married fathers report the highest levels of self-reported health (Meadows 2009), and among mothers in the same study, being continuously married is associated with better self-rated health compared to unmarried mothers (Meadows et al. 2008). Indeed, some research suggests that self-rated health may be the intervening variable in the relationship between marriage and mortality: when health is controlled for, the mortality difference between married and unmarried men has been found to disappear (Lillard and Panis 1996).

More recent research indicates that the married may overestimate their health status compared to their actual health and mortality risk, which could account for some of the marital-status gap in self-rated health (Zheng and Thomas 2013). Changes in marital status are likely also important for health outcomes (Hughes and Waite 2009), but the results are equivocal at this point as to whether marital disruptions or current marital status is more important for self-rated health. Relevant to the present study, getting married or moving in with a cohabiting (unmarried) partner is associated with an improvement in self-rated health (Cullati et al. 2014).

There is mixed evidence regarding the extent to which cohabitation benefits health, leading researchers to question whether it is the living arrangement of living with a romantic partner or the commitment and symbolic meaning of marital bonds that are more beneficial to health. The research examining cohabitation versus marriage and self-rated health specifically is limited. Some studies find that cohabitation does not improve self-rated health (Ren 1997), and cohabitation at young adult ages may even be detrimental to self-rated health (Harris et al. 2010).

Supporting selection as an explanation for positive health associations with being married, studies have found that people with worse self-rated health are more likely to divorce (Joung et al. 1998) and that young adults with unhealthy behaviors such as drug use and physical characteristics indicative of poor health, such as obesity, are less likely to marry (Fu and Goldman 1996). Further, there is evidence that couples select into relationships with one another on the basis of sharing health status and health-related characteristics, including self-rated health (Wilson 2002) and obesity (Schwartz 2013). Although shared environment and health-related behaviors also play a role in shared health status such as obesity (The and Gordon-Larsen 2009), research finds that similar levels of self-rated health before partnering is largely responsible for spousal correlation (Wilson 2002). However, most research to date concludes that although selection of the healthy into relationships plays a role in the association between romantic relationships and health, social causality pathways have more explanatory power (Harris et al. 2010; Lillard and Panis 1996; Waite and Lehrer 2003). Unhealthy men actually tend to marry or remarry sooner than healthy men, indicating adverse health selection into marriage for divorced men, who then

experience a health increase upon remarriage (Lillard and Panis 1996). Thus, the evidence for the protective effect of marriage and possibly cohabitation on health is possibly more compelling.

### Theoretical Framework: Social Causation Theories of Romantic Relationships and Health

Theoretically, sociologists of health contend that romantic relationships affect health because they provide a social structure in which individuals are embedded, and their social roles and experiences are tied to this structure (Pearlin 1989; Ross et al. 1990). Social relationships in general provide emotional support that buffers stress. Marriage, due to its symbolic meaning, provides an extra degree of commitment and stability and may foster a greater sense of obligation to stay healthy. Romantic relationships can provide economic resources and foster better mental health, which is linked to reporting better physical health (Ross et al. 1990; Umberson and Montez 2010; Waite and Gallagher 2000). Romantic relationships encourage better health behaviors, including eating healthier diets, reducing abuse of alcohol, smoking, and drugs, and going to the doctor and seeking medical care (Duncan et al. 2006; Umberson et al. 2010; Waite and Gallagher 2000).

There is evidence from at least one study that the self-rated health benefit associated with marriage is changing over time, as social norms related to marriage change. The gap in self-rated health between the married and never-married converged from 1972 to 2003, though the gap between the married and the previously-married is diverging (Liu and Umberson 2008). Another study found a converging gap in self-rated health between the married and never-married, but only

for men (Waite 2000). These findings make investigations using contemporary data sources of how marital status and self-rated health are related, and under what conditions, all the more important.

A small body of literature investigates whether the effects of marital status on self-rated health are conditional on race and ethnicity. Unfortunately, race and ethnicity, where included, are more often just treated as control variables rather than as a potentially important mechanism by which the association between romantic relationships and health might vary (Koball et al. 2010; Wood et al. 2007). The fact that different racial groups exhibit different rates of marriage and cohabitation (Raley and Bumpass 2003; Oropesa and Landale 2004) adds to reasons to consider this mechanism. The extant literature on the topic focuses primarily on Black-White differences in the marriage health advantage. Among young adults, early marriage and cohabitation have been found to be negatively associated with Blacks' but not with Whites' health (Harris et al. 2010). The authors theorize that marital responsibilities may be more stressful for Black young adults because of their socioeconomic disadvantages, especially for young Black men. Supporting this theory, another study found that for Black men, their poor self-rated health compared to White men may be due in part to stress experienced throughout their lives and particularly in their relationships, and that a lower likelihood of being married in adulthood contributed to Black women's low self-rated health (Umberson et al. 2014).

Interracial Couples and Health

Interracial relationships are of growing interest in the sociological literature – not only are they increasing for some racial and ethnic groups, they are socially important because they represent the breaking down or blurring of racial boundaries, decreasing social distance between groups, and changes in the racial composition of the next generation, as children from these unions will be mixed race. Cohabitation represents a larger proportion of interracial relationships between Whites and Blacks compared to marriage, and Qian and Lichter (2007) argue that this signifies that the boundaries between Blacks and Whites still remain, because cohabitation does not represent the same level of commitment and stability as marriage. Further, gender has an impact on who partners with whom in interracial relationships: the majority of interracial unions (married and cohabiting) involving a Black partner involve a Black man and a White woman, and this is true for both native and foreign born Blacks (Batson, Qian, and Lichter 2006).

The research on interracial relationships and health outcomes to date is sparse, and to date has found cross-sectional associations between partner race and health that are not able to parse apart selection into exogamous relationships on the basis of health compared to social causation pathways. Most research in this vein has focused on mental health. Using the National Health Interview Survey from 1997 to 2001 in a cross-sectional analysis, Bratter and Eschbach (2006) found that interracial marriage is associated with greater psychological distress for Native American men, White women, and Hispanics married to spouses who were of a different race/ethnic background and also non-white; further, distress was higher for people in interracial

marriages with Black partners. Socioeconomic status partially accounted for these group patterns. Among teens, interracial daters are at greater risk for depression than same race daters and non-daters, regardless of race or gender, offering evidence that interracial relationships are more likely to be subject to social disapproval from parents and peers (Miller 2014). According to Kroeger and Williams (2011), despite the fact that racial boundaries are blurring for some groups, Black Americans stand outside this trend – the boundaries between blacks and other groups are more rigid. For this reason, relationships with Black partners specifically may be the most stressful. In a cross-sectional analysis of young adults, the authors find that nonblack individuals with Black partners report greater depression and less relationship satisfaction compared to counterparts with nonblack partners. Most recently, a cross-sectional study using data from the 2000-2013 Current Population Survey found an association between spouse race and self-rated health among married couples. Specifically, non-Hispanic Whites with Asian, Black, and Hispanic spouses reported worse self-rated health, whereas racial minorities with White spouses reported better self-rated health (Miller and Kail 2016).

The studies on the association between exogamous relationships and health have thus far taken a social causation view of the association: that is, characteristics of interracial and inter-ethnic relationships affect health. These studies have generally concluded that greater stress in interracial relationships either causes poorer health, or that the health benefits of the relationship due to stress-buffering are attenuated in the case of interracial relationships.

However, it is not clear from the existing research that a stress theory perspective on exogamous relationships is well-supported. If this were the case, then the logical conclusion would be that exogamous relationships are associated with worse health outcomes for everyone in an exogamous relationship. Although Miller (2014) finds that interracial dating is detrimental to the mental health of all interracial daters in adolescence, most studies do not find uniformly negative effects of exogamy across race and gender, finding instead that being a racial-majority group member with a racial-minority partner is negatively associated with depression and self-rated health (Bratter and Eschbach 2006; Kroeger and Williams 2011; Miller and Kail 2016), whereas being a racial minority group member with a White partner is actually beneficial to self-rated health (Miller and Kail 2016). Therefore, it may be the case that other social causation processes are at play in the association between health and interracial and inter-ethnic relationships.

One possible explanation is that White partners have greater economic and psychosocial resources that benefit health (Carr and Springer 2010; Goldman 2001; Thoits 1995; Umberson and Montez 2010), and these resources may extend to benefit their racial minority partners' health too (Miller and Kail 2016). Another possibility is that status processes are implicated. The social psychology of health often looks to subjective social status to explain health disparities. Rooted in symbolic interactionism, this theoretical framework posits that individuals make social comparisons with significant others and their self-evaluations of status literally "get under the skin" and result in health disparities (Schnittker and McLeod 2005; Wilkinson 1999). Indeed, societies in which income inequality is high, and thus

subjective social status comparisons are more stark, are characterized by greater incidence of poor health, depression, and substance abuse (Wilkinson and Pickett 2009). There is empirical and theoretical evidence that partner race is a status marker. A status exchange theory of exogamous partnering (discussed in greater depth below) posits that race and ethnicity act as status markers on the marriage market (Kalmijn 2010), and is therefore something that can be "traded" in exchange for socioeconomic status as people form romantic relationships. Empirical evidence suggests that once relationships are formed, partner race acts as a status cue to friends and family, such that non-White partners feel that they are the targets of disapproval from friends and family of their White partners on the basis of their racial status (Miller et al. 2004). Thus, if exogamous relationships do indeed have any causal impact on health, it may be through the pathway of status processes rather than stress.

Evidence suggests that gender may moderate the effects of relationship-related stress and status on self-rated health. Although marriage is found to be equally protective of mental health for men and women (Simon 2002), marriage exerts a stronger protective effect on men's mortality (Rendall et al. 2011) and men's self-rated health is more adversely affected by marital dissolution than women's (Williams and Umberson 2004). On the other hand, women both experience more stress and are more vulnerable to the detrimental effects of chronic stress on mental and physical health (Kessler and McLeod 1984; Mirowsky and Ross 1995), which may explain the finding that White women in interracial relationships are more prone to mental distress (Bratter and Eschbach 2006). Finally, the empirical evidence

suggests that race is a stronger status cue for White women than White men in relationships with nonwhites (Miller et al. 2004).

## Theoretical Frameworks: Status Exchange in Interracial Relationships

In this study, I examine the evidence for selection processes into exogamous relationships on the basis of self-rated health, drawing on status exchange theory. The main theoretical explanations for partnering across racial and ethnic lines revolve around socioeconomic status of racial and ethnic minorities. Status exchange theory is often cited (Davis 1941; Fu 2001; Gullickson 2006) as one explanation for interracial pairings: in order to marry a partner with higher racial status (i.e., someone White), racial minorities must have higher status in the form of socioeconomic status, indicating the persistence of racial hierarchy in the marriage market and society in general (Kalmijn 2010). There is empirical support for this: higher socioeconomic status Blacks and Hispanics are more likely to marry Whites (Fu 2001; Gullickson 2006) and cohabit with Whites (Torche and Rich 2016). Despite the fact that Black/White intermarriages have increased over the past three decades, the prevalence of status exchange among higher education Blacks with White partners has not decreased over time, indicating that status exchange continues to be the best explanation for exogamous partnership formation rather than the assimilation of racial minorities into predominantly White structures and institutions, as suggested by other theoretical frameworks (Lewis and Ford-Roberson 2010; Torche and Rich 2016). Status exchange is found to be a gendered process as well: White women are more

likely than White men to marry Black and Hispanic partners with high educational attainment (Fu 2001; Gullickson 2006).

However, I argue that it may also be the case that health, like race, acts as a status marker on the interracial marriage market. We know that self-rated health and other health markers such as obesity affect one's likelihood of marriage (Fu and Goldman 1996; Schwartz 2013; Wilson 2002), and the one prior study on self-rated health and interracial and inter-ethnic partnerships suggests that the observed association could be due to selection processes by which healthier racial minorities select into relationships with White partners. Thus, I suggest that self-rated health may intersect with race as a facet of status that affects the likelihood that Whites and nonwhites partner endogamously or exogamously.

*The Present Study*

I build on the small yet growing body of literature that suggests that associations between health and partner race exist by pushing the conversation past cross-sectional findings and examining competing explanations of selection versus social causation pathways that link characteristics of marriage and cohabiting relationships to health. I use nationally representative data from SIPP that span 1996 to 2011 to examine whether and how the racial and ethnic composition of married and cohabiting relationships affects self-rated health status and changes in health. Research with these relatively recent data is particularly timely for two reasons: first, because of the growing diversity of the U.S. population and the fact that interracial relationships are becoming more common. Second, because the relationships between race/ethnicity,

marriage and marriage-like relationships, and health are themselves changing: Recent research indicates that racial self-rated health disparities (particularly Black-White) may actually be growing in recent years, and also that the marriage advantage for self-rated health may be changing (converging for the married compared to the never married, and diverging for the married compared to the divorced and widowed) (Liu and Umberson 2008). There is very little research on interracial and interethnic couples specifically using the SIPP, despite the richness of this particular data source. One prior study used the SIPP to examine the stability of interracial relationships, finding that although interracial marriages are more prone to divorce, after controlling for individual level characteristics, particularly age and education, this association disappeared (Zhang and Van Hook 2009). As noted above, the only previous study to examine the relationship between co-residential unions and self-rated health (Miller and Kail 2016) used the Current Population Survey. The cross-sectional and longitudinal character of the SIPP allows me to both conduct a replication of their cross-sectional findings and to extend the field's understanding of how those cross-sectional findings are generated by processes of inter-racial and inter-ethnic partner selection on self-rated health and of causal impacts of being in an interracial or inter-ethnic unions on self-rated health.

In the present study, I ask the following research questions:

1. What is the association between the racial composition of married and cohabiting relationships and self-rated health?

2. What is the evidence for selection versus causation processes in the association between the racial/ethnic composition of married and cohabiting relationships and self-rated health?
    a. How does self-rated health prior to entering a new marriage or cohabiting relationship affect the likelihood of partnering with a White or non-White partner?
    b. How does the racial composition of cohabiting and marriage relationships affect change in self-rated health over time?
3. How does the association between self-rated health and partner race/ethnicity vary by gender?

Research questions 2a and 2b reflect competing explanations for any observed association between the racial composition of couples and self-rated health. Evidence that self-rated health prior to entering a new marriage or cohabitation would support status exchange theory; more specifically, this association would suggest that health operates as a status marker on the marriage market that may be exchanged for a higher status partner. Evidence for a causal effect of partner race on health, on the other hand, may indicate support for either a stress theory perspective on interracial relationships if the health effects of interracial and inter-ethnic relationships are uniform across groups; on the other hand, evidence of a causal association may be better explained by status processes. I additionally investigate gender differences in the reciprocal effects of self-rated health and partner race in all analyses to determine whether gender-specific processes of status exchange or social causation are at play.

## *Data and Methods*

### Data

I use public use data from SIPP. The SIPP is administered by the U.S. Census Bureau and is a continuous series of national panels of households in the U.S. (U.S. Census Bureau 2016). The SIPP Panels beginning in 1996 have run for about four years each, with waves at four month intervals and reporting retrospective information on each of those 4 months. At Wave 1 of each SIPP panel, the survey is household-based: that is, all members of the household present at Wave 1 are included. The longitudinal design of the SIPP is person-based. SIPP follows original sample members regardless of household composition, unless they are no longer in the SIPP universe (i.e., not institutionalized, do not live in military barracks, and do not move out of the country) or are under 15 and no longer live with an original sample member (U.S. Census Bureau 2001:2-9). Individuals who were not in the sample at prior waves become part of the SIPP sample if they start living with an original sample member, and are followed as long as they continue to live with that sample member.

After Wave 1, each person carries over their sample weight from the prior wave, which is then adjusted for changes in the sample due to nonresponse and moving. For people who entered the sample after Wave 1 and were also in the SIPP universe at Wave 1 (not incarcerated, not living in military barracks, not living out of the country), that person receives a portion of the weights of the original sample persons in the household they moved into (U.S. Census Bureau 2001:8-4).

Analytic Samples

Three datasets were constructed for cross-sectional, health-change, and partner selection analyses, respectively. The cross-sectional and health-change files are person-year files of all married and cohabiting individuals aged between 18 and 59 years old, whereas the partner selection file includes only new co-resident relationships (married or cohabiting), defined by the individuals having begun to live together in the last year. I identify married couples from a spouse ID variable, available irrespective of relationship to reference person. I identify cohabiting couples, however, contingent on one of the two partners being listed as the reference person for the household. I therefore exclude subfamily cohabiting couples (e.g., living in the household of one of their parents). The health-change file is a subset of the cross-sectional file, in which individuals are observed to report health status twice, at intervals one year apart. Person-level sample weights were used for all descriptive statistics and analyses. Respondents missing individual-level weights were excluded. I adjusted for clustering at the individual level in all analyses to account for multiple observations per individual.

My rationale for restricting the samples to 18 to 59 year olds is that the meaning of self-rated health changes with age. Paradoxically, older people are disproportionately optimistic with their health assessments (Layes et al. 2012). Self-rated health doesn't have the same predictive power for mortality among older age groups as it does for younger groups (Benyamini et al. 2003), indicating that the process underlying older people's responses is possibly different from younger people. Finally, I included only opposite-sex relationships in my analyses, allowing

my gendered analyses to compare women partnered racially/ethnically exogamously with men versus men partnered racially/ethnically exogamously with women.

In the person-year file for the cross-sectional analyses, I kept data from wave 1 plus each of the following waves at which self-rated health was reported (see Table 1.1). In the 1996 panel, self-rated health was collected at waves 3, 6, 9 and 12 (each one year apart); in the 2001 panel, self-rated health was collected at waves 3, 6, and 9; in 2004, self-rated health was collected at waves 3 and 6; and self-rated health was collected in the 2008 panel at waves 4, 7, and 10. In each wave, the four previous months are reported on by the respondent. For all panels and waves of data used, I kept only the data recorded at reporting months. This is generally in keeping with SIPP analytic best practices (Schaefer 2013), because most transitions are reported to have taken place between waves (known as "seam bias," Ham, Li, and Shore-Sheppard 2007), and because some of the data in interview months other than month four are imputed.

To make the "new relationships" file, I compared each individual's partner ID number from wave to wave. In cases where the partner ID changed, or the individual had a missing partner ID at the first wave but reported a partner or spouse at the second, and the individual was observed at both waves, this person was marked as a previously existing sample member who entered a new partnership and was included in the new-relationships file. I also included the new partners of these individuals – that is, individuals who joined the SIPP panel because of their newly formed residential partnership. The new relationships data set contains one record per new relationship. The large majority of individuals in the four panels (N=16,266) were

observed in only one new relationship. 188 individuals were observed in multiple new relationships – 184 in two new relationships during the panel, and four people were observed in three new relationships in the panel.

### Key Variables

All variables listed here are captured for SIPP respondents and their marriage/cohabiting partners, if applicable. *Self-rated health* was measured once a year as a part of the topical modules administered in addition to the core questionnaire of SIPP. The question was: "The next few questions are about your health. Would you say your health in general is excellent, very good, good, fair or poor?" This question was asked of each member of the household (children's health was reported by their parents, which is outside of the scope of this study). This is the standard "self-rated health" question of the literature I discussed above. I recoded this variable with values 1 ("poor") through 5 ("excellent") so that larger values indicate better health.

I first constructed a combined race/ethnicity variable with four categories: Hispanic (all races) = 1, Black (non-Hispanic) = 2, White (non-Hispanic) = 3, and Asian (non-Hispanic) = 4. I coded Hispanic race/ethnicity from the SIPP's ethnicity questions which asked about Hispanic origin. In the 2004 and 2008 panels, Hispanic origin was asked: "Is [person] Spanish, Hispanic or Latino?" with possible responses yes or no. In the 1996 and 2001 panels, greater detail about Hispanic origin was provided in a variable that captures nine Hispanic origin categories: Mexican, Mexican-American, Chicano, Puerto Rican, Cuban, Central American, South American, Dominican Republic, and Other Hispanic. I coded as "Hispanic" from

these panels all respondents who indicated that they were any of these nine Hispanic origins.

To code non-Hispanic categories of race/ethnicity, I used the SIPP's four race categories: "Black Alone," "White Alone," "Asian Alone." The remaining public-use SIPP race category, "Residual," combines people who chose multiple racial categories, as well as people who selected "American Indian/Alaska Native," "Native Hawaiian/Pacific Islander," and "Other." Because of lack of detail about the racial/ethnic composition of the "Residual" category, I retain only those (non-Hispanic) respondents who were categorized as Black Alone, White Alone, and Asian Alone. My coding of *partner race/ethnicity* is identical to the coding of the focal individual's race/ethnicity.

For my cross-sectional analysis, I tested models using three different codings of race and partner race. For models restricted to White respondents, I used the four-category partner race variable (non-Hispanic White, Black, Asian, Hispanic). For models restricted to individual nonwhite groups (Hispanic, Black, Asian), I used a three-category partner race variable that was coded with three values: own race/ethnicity partner, White partner, other nonwhite partner. Following statistical testing (discussed below) of cross-sectional models with nonwhite groups treated separately versus as a combined group that favored the latter, and due to much more limited sample sizes for specific racial and ethnic partnership combinations in the selection models (see Appendix Table 2.1), I used a binary White/Nonwhite specification of race/ethnicity and partner race/ethnicity for the models of health-change and selection on health. For this binary specification of the race/ethnicity

variable, I combined Hispanics, Blacks, and Asians into "nonwhites". Note that this means that Hispanics who also marked themselves as White (either alone or with another category) are classified as nonwhite for the analysis. Theoretically, this binary coding of race/ethnicity aligns with a status exchange theoretical framework, in which (non-Hispanic) Whiteness operates as a status marker compared to other races (Kalmijn 2010).

Other variables are coded as follows. *Gender* is coded as a binary variable (0=male, 1=female). [2] For *union type,* marriage is coded as 0, cohabiting is coded as 1. *Education*, as a marker of social status and an indicator of socioeconomic status, is of crucial importance to understanding disparities in health (Link and Phelan 1995). Education is coded into four categories (less than a high school degree, high school degree, some college, and a Bachelor's or more). In the full sample, I included an indicator variable (*new relationship)* for whether or not the relationship was an existing relationship (that is, observed in the prior wave as well, provided the respondent was observed at the prior wave), or if the respondent was observed in a new relationship, that is, if the respondent was observed at the prior wave but had no partner or had a different partner. This variable is coded 0 (existing relationship) and 1 (new relationship). Note that nativity is not included in the analysis. Nativity was not asked as part of the core questionnaire in 1996 and 2001 but rather was included

[2] The ratio of men to women is not 1:1 due to the age restriction of the sample. The men in the sample skew older than women; thus, there are women in the sample who fall within the 18-59 year age range, but whose partners are not included in the sample because they are older. There are also 9,591 cases in the cross-sectional person-year data set where the focal respondent has education observed but their cohabiting or married partner is missing education. In these cases, the partner missing education is not included in the models.

as part of a topical module administered at Wave 2; therefore, there is a large proportion of missing data for nativity in these panels. I thus exclude nativity from all analyses for consistency across models.[3]

## Data Analysis

The analysis begins with a *cross-sectional* regression model of the association of self-rated health with partner race to establish whether there is a statistically and substantively significant association between partner race and self-rated health. It then is followed by models whose respective purposes are: to estimate the extent that partner's race is determined by one's level of self-rated health, in a *selection model*; and to estimate the causal effect of partner's race on self-rated health, in a *health-change* model. The *cross-sectional* and *health-change* models are closest to each other in their statistical form, and therefore are presented first.

### *Cross-sectional Model*

Formally, I denote self-rated health by $H$, as noted above as measured using a five-point scale from 1 for "Poor" to 5 for "Excellent" so that the coefficient signs

[3] In the core questionnaire for panels 2004 and 2008, all respondents were asked at each wave whether or not they were born in the U.S. This is a binary yes/no variable. This question was not included in the 2001 and 1996 core questionnaires. A topical module called "migration history" captures more in-depth information on this topic at wave 2 for all four panels, including country of birth, immigration status upon entering the US, current citizenship status, year of entry into the US, and year moved to the current state. To capture nativity for respondents in the 1996 and 2001 panels, I merged these variables in from the wave 2 topical module. As a result, however, there is a greater proportion of missing data on nativity among respondents in the 1996 and 2001 panels, because nativity is missing for any individual not observed at wave 2. This proportion of missing data was especially problematic for the new relationships subsample. Of 12,282 White individuals not missing data on other key variables, 3,045 were missing nativity in the new relationships subsample, and of 4,172 nonwhite individuals, 872 were missing nativity.

can be interpreted as indicating that a predictor variable has a positive or negative association with health. In the cross-sectional model, the expected value of self-rated health at time $t$ is a function of a main explanatory variable of White versus nonwhite partner $P$ at year $t$, $P_t$, and additional explanatory variables specified in vector $Z_t$, consisting of age, age squared, union type (cohabiting or married), education, and a flag for whether the person was observed in a new relationship at time $t$. Following previous analyses of self-rated health (see Gunasekara et al. 2011 for a review), I treat the self-rated health variable $H_t$ as a continuous, interval scale variable. Thus, $E[H_t|P_t, Z_t]$ is estimated by Ordinary Least Squares (OLS) regression, representing the expectation as a linear function $F$ as follows:

$$E[H_t|P_t, Z_t] = F(\beta_0 + \beta_1 P_t + \beta_2 Z_t) \quad (1)$$

This model was estimated with three different specifications of race and partner race $(P_t)$ to see whether the effects of partner race on self-rated health varied across individual racial and ethnic minority groups. First, I estimated models for Whites only, separately for men and women. Model 1 used a binary partner race coding (White/nonwhite). Model 2 estimated the effects of a White, Hispanic, Black, or Asian partner on health. I compared the fit of the White models with alternate partner race codings using Akaike's information criterion (AIC) and Bayesian information criterion (BIC) statistics, and used Wald tests for differences in coefficients across Hispanic, Black, and Asian partners. Next, I estimated models for nonwhites, again separately for men and women: first, a model with all nonwhites pooled, looking at the effect of a White partner; then separately-estimated models for Hispanics, Blacks, and Asians using a three-category partner race variable (own

race/ethnicity, non-Hispanic White partner, other nonwhite partner). In order to ascertain whether or not the effect of each predictor variable on self-rated health differed by gender, I also separately estimated models pooling men and women and including gender interactions on partner race/ethnicity and all other covariates.

*Health-change Model*

Closely related to the "cross-sectional" model is the "health-change" model. Again, the outcome variable is self-rated health, and the main explanatory variable is White versus nonwhite partner. Again, additional explanatory variables consist of age, age squared, union type (cohabiting or married), education, and a "new relationship" indicator. However, given the objective of the health-change model, I require two observations of self-rated health, one year apart, for each individual. This results in sample sizes that are approximately 60% of the size of those for the cross-sectional analyses, but that represent a similar population of 18-59 year old cohabiting and married individuals including both new and existing relationships. Because of these lesser sample sizes, and results of no improvement in cross-sectional model fit when breaking down the Nonwhite group into Hispanic, Black, and Asian groups, the health-change model uses a White/Nonwhite categorization of own and partner race/ethnicity. For these models, I use what Allison (1990) refers to as the regressor-variable method of estimating at the *change* in the dependent variable, here self-rated health. The equation used to estimate the effect of partner race on health change is as follows:

$$E[H_{t+1}|P_t, H_t, Z_t] = F(\beta_0 + \beta_1 P_t + \beta_2 H_t + \beta_3 Z_t) \qquad (2)$$

In this equation, the expected value of own health at time $t+1$ is a linear function of partner race at time $t$, own health at time $t$ (measured categorically, with values from 1 [poor health], the reference category, to 5 [excellent health]), and vector $Z$, which represents age, age squared, education, the union type, and whether or not the respondent is observed in a new relationship as of time $t$. Using OLS regression, I estimated this equation separately for White and nonwhite men and women, resulting in four models. I additionally estimated White and nonwhite models with pooled genders with gender interactions on all covariates to determine whether the effect of the independent variables measured at time $t$ on health at time $t+1$ varies by gender.

Note that this regressor-variable method of estimating at the change in the dependent variable is not the only modeling strategy that has been used to analyze change in an outcome variable. Another type of model that has been used in the modeling of individual outcome change in general (Morgan and Winship 2014), and change in self-rated health in particular (Gunasekara 2011), is the "change-score" method. I use the regressor-variable method consistent with Allison's (1990) arguments that it is the more appropriate method to handle "stock" type dependent variables, compared to "flow" type dependent variables. Stock type variables are those that are expected to be persistent over time unless some sort of event or circumstance alters their course (e.g., body weight), whereas flow variables must be created anew at each distinct time point (e.g., specific attitudes). In the case of a stock variable, its value at time $t$ has a causal impact on its value at time $t+1$. Self-rated health is reasonably interpreted as a stock variable, making the regressor-variable

approach appropriate. Another problem with using change scores to model self-rated health is that there is no way to measure health improvement for someone who has rated themselves at the top of the spectrum, "excellent," or health decline for someone with "poor" health (Gunasekara 2011).

Controlling for health in the previous period in which the respondent was with the same partner represents a major gain over the cross-sectional for inferring a causal impact of partner characteristics on the respondent's health. However, two, or even three, periods of observation still only partially eliminate other mechanisms as plausible alternative causal explanations (Morgan and Winship 2014; Vaisey and Miles 2014). For example, an individual could have selected his or her partner based on health conditions that imply something about his or her partner's trajectory of health stability versus decline. Controlling for health observed once only does not eliminate this type of 'selection' mechanism as an explanation for the observed relationship between partner race and health change.

*Selection Model*

The "selection model" is designed to explicitly investigate to what extent the associations between partner race and self-rated health established in the "cross-sectional model" might be attributed to selection processes whereby individuals select into racially endogamous versus exogamous relationships on the basis of self-rated health reported before the start of the relationship. To examine the evidence for selection processes I use the "new relationship" subsample described above. The equation used to estimate the effect of self-rated health at time *t-1* on partner race/ethnicity at time *t* is as follows:

$$E[P_t|H_{t-1}, Z_t] = F(\beta_0 + \beta_1 H_{t-1} + \beta_2 Z_t) \quad (3)$$

In this model, the expected value of partner race at time *t* in a newly formed partnership is a function of health at time *t – 1* and characteristics $Z_t$, which represents race, age, gender, education, and union type. Because partner race is a binary outcome (White/nonwhite), binary logistic regression is appropriate.

In the new relationships subsample, there are many individuals for whom I observe health at time *t* but not at time *t – 1*. Missing values occur for health observed at time *t – 1* for two reasons. First, if the new relationship was observed at wave 3 in the case of panels 1996, 2001, or 2004, or wave 4 in the case of panel 2008, this was also the first wave in which self-rated health was captured, by design of the survey. Second, for all individuals who entered the SIPP sample because of partnering with an existing SIPP member, there are no data predating the new relationship. In order to include a measure of self-rated health at *t* -1 in these cases, and thereby model selection on the basis of health into relationships, I used multiple imputation from their self-rated health at *t* combined with imputation equation parameters estimated and from women and men whose self-rated health was observed at both *t* -1 at *t*. The women and men whose self-rated health is observed only at *t* can be said to have left-censored observation of their self-rated health. For more discussion, see Rendall and Greulich (2016), whose multiple imputation procedures I follow in estimating this selection model. The proportion of the data for health at time *t – 1* was missing due to survey design is about 60%. This "fraction missing" is a key parameter to consider when performing multiple imputation, and the number of imputations, *m,* needs to be sufficiently large in cases of higher "fraction missing" in order for the multiple

imputation variances of the coefficients to approach the variances of the MLE (Schafer and Graham 2002). I used $m = 50$ imputations, which produced consistent results across executions of the multiple imputation procedure. Stata's *mi* system allows the use of sample weights for both the imputation equation and the analysis equation (StataCorp 2013).

The main selection logistic regression models (equation 3, above) are pooled by race and separated by gender. These models were pooled by race in order to achieve greater statistical power, and because race-separated models run previously showed that the sign of the coefficient of the main predictor variable (self-rated health at time *t-1)* was in the same direction for both Whites and nonwhites. I additionally performed the logistic regression models separately by gender with race interaction terms on all covariates to determine whether the effect of the covariates on partner race varied by race. I also separately performed the logistic regression models with gender and race pooled with gender interaction terms on all covariates to determine whether the effect of the covariates on partner race varied by gender.

*Results*

I first compare characteristics of White and nonwhite men and women currently married or cohabiting (see Table 2.1). This describes sociodemographic characteristics and relationship type of the population aged 18-59 who were married or cohabiting, separated by race/ethnicity (White and nonwhite). Both Whites and nonwhites have a much greater frequency of being married compared to cohabiting, with Whites even more likely to be married compared to nonwhites (92% versus 90%). The nonwhite married or cohabiting population is about half Hispanic, a third

Black, and one-sixth Asian. Whites have a lower prevalence of partnering exogamously compared to nonwhites, with only 4.0% of Whites are partnered with nonwhites whereas 12.2% of nonwhites are partnered with Whites. Mean age is 42 years for Whites and 40 for nonwhites. Slightly fewer (4.1%) Whites than nonwhites (4.9%) are in a new relationship (that is, one formed in the last year). Mean self-rated health for Whites is 3.91, just below a rating of "very good," whereas nonwhites report significantly worse health, with a mean score of 3.75. Whites are more than 5 percentage-points more likely to report excellent health (31.6% versus 26.2% of nonwhites), whereas nonwhites are 8 percentage-points more likely to report their health as poor, fair, or good (38.8% versus 30.8% of Whites).

[TABLE 2.1 ABOUT HERE]

Table 2.2 displays the results from the cross-sectional OLS regression model testing for the multivariate association of partner race and other covariates with self-rated health for Whites, measured concurrently – that is, the associations that I subsequently endeavor to explain with additional analyses of selection on health into exogamous partnerships, and causal associations between partner race and health. The key findings are as follows. First, as shown in Model 1, White women with nonwhite partners have worse self-rated health than White women with White partners, by about .07 points of health. This magnitude is in the range of points of health suffered for other partnership characteristics I estimated: between the loss of .03 points of health associated with being in a newly-formed relationship and the .16 points of health associated with being in a cohabiting and not marital relationship. It is nowhere near the magnitude of health suffered, however, being less educated, where the

difference between having at least a Bachelor's degree and not graduating from high school approaches a full point (0.875). The interaction effect between gender and having a nonwhite partner shows that White women experience an extra health "penalty" for having a nonwhite partner compared to White men. Because White men's health "penalty" for having a nonwhite partner is estimated at almost exactly zero, the total female adverse health effect of being partnered to a non-White man and the gender difference in the adverse health effect of having a non-White partner are identical. This statistically-significant gender interaction of having a non-White partner with health is notable too because there are few other associations with health that differ statistically by gender for Whites. This is the first indicator that gendered theories are needed to explain self-rated health associations with racial/ethnically exogamous relationships. (Full results of the gender interaction models shown in Appendix Table 2.3.)

Shown in Model 2 are the results of the Whites model with partner race divided into four categories. The key result from this model is of overall sufficiently similar associations of self-rated health across the three different Nonwhite partner groups that I am unable to improve model fit by treating them as distinct. For White men, none of the three Nonwhite partner groups' coefficients is anywhere near being statistically significantly different from zero, and the magnitudes are all close to zero. White women with Hispanic and with Black partners report worse health compared to White women with White partners, though the coefficients are significant only at the .05 level. The Asian-partner coefficient is close to zero and non-significant. I conducted Wald tests to determine whether the effects of partner race differed

between the non-White categories (that is, all categories that were not the reference category for partner race in the model) and found no statistically significant differences among the nonwhite partner race categories in terms of their effects on health. I also compared the AIC and BIC statistics between Model 1 and Model 2 for both men and women. These indicate that, both for men and for women, the White/nonwhite model specification is not improved by the separate grouping of Hispanic, Black, and Asian partners over the combined Nonwhite grouping.

I also investigated the gendered character of the interracial/interethnic association with self-rated health separately by the three different partner race/ethnic groups. White women with Hispanic partners are found to experience an additional self-rated health penalty compared to White men, as indicated by the statistically significant gender interaction. The magnitude of difference between the coefficients for White men versus White women with Black partners (0.010 versus -0.106), however, is greater than that between White men and women with Hispanic partners (0.012 versus -0.063), indicating that statistical power to detect gender interactions is low when Nonwhite partners are broken down into the three separate race/ethnic groups.

[TABLE 2.2 ABOUT HERE]

Table 2.3[4] shows the cross-sectional results for nonwhites, both in aggregate and broken down by race/ethnicity groups. For all nonwhites, the direction of association with health and having a White versus non-White partner is the same for

[4] All models include controls for age, age-squared, union type, education level, and whether or not the relationship is new since the last observation one year prior. The full results are presented in Appendix Table 2.2.

non-White and White women: that is, having a non-White male partner similarly implies worse health than having a White partner for non-White women. However, nonwhite women experience an even greater, .177 point self-rated health premium. This magnitude is on par with the effect of being married relative to cohabiting, or with the effect of having a high school degree compared to no high school degree.

Unlike White men, non-white men also experience a self-rated health premium associated with having a white partner, of .105 points. The gender difference in this premium for nonwhites is again statistically significant, however, and at .071 is almost exactly the same magnitude as the gender difference for Whites. That is, for both Whites and non-Whites, some form of gendered process of adverse association with having a non-White partner is indicated.

The results broken down by racial/ethnic group show that for all nonwhite groups, having a White partner is associated with a statistically significant self-rated health premium, with the exception of Black women with White partners (who are represented by a relatively smaller samle size in the SIPP). There are no statistically significant effects of having an exogamous relationship with another nonwhite partner for Hispanics, Blacks, or Asians.

[TABLE 2.3 ABOUT HERE]

I compared the specified models for Whites and Nonwhites (in Tables 1.2 and 1.3, respectively) to determine which specification of partner race is preferable. The Whites model that disaggregated Nonwhite partners into Hispanic, Black, and Asian resulted in a worse (or no better) fit compared to the White/nonwhite models, and the Hispanic, Black, and Asian Partner coefficients were always of the same sign

(worse SRH than for a White partner) (Table 2.2). Moreover, in the models for Nonwhites (Table 2.3), the results were substantively similar for all nonwhite groups with a White partner, and there was no effect of partner race on self-rated health for non-whites with other nonwhite exogamous partners. Given the statistically weaker results for disaggregated Nonwhite group models versus the models with a single Nonwhite category, I subsequently conduct the selection versus causation modeling with only the aggregated Nonwhite versus White grouping, and emphasize these aggregate groupings in my Discussion.

Table 2.4 presents the results from the health change models for men and women aged 18-59 in a relationship for two consecutive years. The models presented are estimated separately by race and gender, but include statistical tests for gender interactions for all covariates. Crucially for interpretation of the results in this model, self-rated health in the previous year is controlled for in estimating the association of partner race with the self-rated health outcome. I therefore interpret this association as showing the impact of partner race on self-rated health over time.

One of the key findings from this part of the analysis is that the health changes experienced by White women in relationships with nonwhite men are on average worse than the health changes of White women who are partnered with White men, although by a relatively small .036 self-rated health points. A statistically significant gender difference is found in the association of partner race with health change: the health-change "penalty" of having a nonwhite partner for White women is larger by .049 health points compared to the corresponding difference in self-rated health change for White men having a nonwhite partner (full results from the gender

interaction models show in Appendix Table 2.4). A second key finding is that the health changes of both nonwhite women and non-White men in relationships with nonwhite cohabiting or marital partners are on average worse than the health changes of nonwhite women and men in relationships with White cohabiting or marital partners. The health-change "premium" of having a White partner for nonwhite women is .090 and for nonwhite men is .073 (a difference that is statistically non-significant).

Other variables that are controlled for in estimating these partner-race effects on self-rated health change have the expected associations. Unsurprisingly, self-rated health is positively and statistically significantly related to self-rated health a year earlier for all groups. Health changes are more negative as age increases. Cohabitors experience more adverse health change than do married individuals, and health changes are more favorable the higher is the individual's education attainment. All of these associations of these control variables with health change are found for all four populations of partnered individuals: White and non-White men and women.

[TABLE 2.4 ABOUT HERE]

Although the samples and specifications are only partially overlapping between the "cross-sectional" and "health-change" models, it is nevertheless notable that the associations of partner race with self-rated health are of lesser magnitudes in the "health-change" models than in the "cross-sectional" models. One potential explanation is that the cross-sectional associations are partly due to individuals with poorer self-rated health being more likely to form a partnership with a non-White cohabitor or spouse: an "adverse selection" effect. I examine this possibility in

models that use self-rated health as a predictor of partner race/ethnicity in new cohabiting and marital relationships.

The population of those entering new coresidential unions (cohabiting and marital) is described in Table 2.5, again comparing Whites with nonwhites. Compared to all White and nonwhite 18-59 year olds in marital and cohabiting relationships (see again Table 2.1), those whose coresidential relationship began in the last year tend to be younger, healthier, and more likely to have a partner of a different race/ethnicity to their own. Many more than in the stock of current relationships are cohabiting, and unlike all current relationships, more new relationships among whites than nonwhites are cohabiting relationships (42.8% versus 32.5%). Reasons for this may include that more marriages among Whites than nonwhites begin with cohabitation.

As with the stock of current relationships, Whites are more frequently endogamous compared to nonwhites: only 6.4% of new relationships observed among Whites are with nonwhites, whereas 17.1% of new relationships observed among nonwhites are with Whites. Both Whites and nonwhites entering a new coresidential relationship have a mean age of 32 years old. As with the stock of current relationships, self-reported health is better for both Whites than nonwhites (mean of 4.0 versus 3.8). Whites in new relationships are more than 7 percentage-points more likely than nonwhites to report their health as excellent (36.3% versus 28.9%).

[TABLE 2.5 ABOUT HERE]

The results from the self-rated health selection logistic regression model into newly formed married and cohabiting relationships with a White versus nonwhite

partner are shown in Table 2.6. Self-rated health in this selection model is specified in the year before the new partnership, as the direction of inferred causality in these model is from a pre-existing level of health to a likelihood that the new partner will be nonwhite versus the reference White category. Table 2.6 also shows the coefficients and results of tests for race interactions on all covariates in the gender-separated models (full gender interaction models show in Appendix Table 2.5). I also present the results of tests for gender interactions with all covariates in the "Main Model" that pools Whites and nonwhites. The results from these self-rated health selection models show that as health improves for women, the likelihood of having a nonwhite partner decreases. That is, less healthy women are more likely to partner with nonwhite men. The race interaction is not significant, and therefore the interpretation here is that less healthy women are more likely to partner with nonwhite men regardless of a woman's own race.

There is no statistically significant association between self-rated health prior to forming a new married or cohabiting relationship and the race of one's partner for men. The nonwhite coefficient is again negative, however, and the gender interaction effect is not statistically significant. This means that I cannot say from this sample that women experience greater adverse health selection into forming a new relationship with a nonwhite partner than do men.

[TABLE 2.6 ABOUT HERE]

Other variables that are controlled for in estimating these self-rated health effects on partner race have a mixture of expected and unexpected associations. Nonwhites are more likely than Whites to have nonwhite partners. Being in a new

cohabiting relationship compared to a new married relationship decreases the likelihood of that relationship being with a nonwhite partner. The interaction between being nonwhite and cohabiting is statistically significant, such that, compared with whites, nonwhites who are entering a new cohabiting relationships are less likely than nonwhites who are entering a new marital relationship to be with a nonwhite partner. Women who cohabit are also more likely than men who cohabit to have a nonwhite partner. Increasing age for men is associated with a higher likelihood of having a new nonwhite partner, whereas the opposite direction of age effect is observed for women, whereby having a new nonwhite partner relative to having a new White partner decreases with age. These differences are complicated in their interpretation by my pooling White and nonwhite individuals, and therefore the relationships do not necessarily indicate any relationship of age to endogamy versus exogamy in relationship composition. At the highest level of education tested - having a bachelor's degree or higher - women are less likely than men to have a new nonwhite partner. As education levels increase, nonwhites see a greater "return" on education in terms of their likelihood of partnering with Whites compared to the effect of Whites' education levels on their likelihood of partnering endogamously. This finding is consistent with the status exchange theory on partner selection, which posits that nonwhites trade greater educational status for having White partners – in a way that Whites do not need to (Gullickson 2006). The new finding here, though, is that both health and education are seen to have this same direction of selection: that both better health and higher education are associated with a greater likelihood of a new partner being White.

*Discussion*

Racially and ethnically exogamous relationships are an increasingly integral and important part of the social fabric of the U.S., and will influence population characteristics for generations to come. Current research and theorizing on interracial relationships tends to focus on characteristics that make individuals more likely to partner across racial boundaries, especially education. Theory posits that status exchange, in which racial minorities exchange higher levels of socioeconomic status, particularly education, for a higher racial status White partner, drives exogamous union formation, including in the present day (Davis 1941; Fu 2001; Gullickson 2006; Torche and Rich 2016). In this formulation, education is the key for the formation of interracial relationships; however, it was previously unknown how self-rated health affects the formation of new racially and ethnically exogamous relationships.

The study of whether and how interracial and inter-ethnic romantic relationships are associated with health outcomes is a small field of investigation, despite compelling theoretical and substantive reasons to study this topic. First, we know that stress and health are closely linked, and the capacity of romantic relationships, particularly those characterized by the committed bonds of marriage, foster better health by providing social support, buffering stress, and encouraging more healthy lifestyle choices (Ross et al. 1990; Koball et al. 2010; Umberson et al. 2010; Umberson and Montez 2010; Waite and Gallagher 2000). However, we also know from the limited body of research on interracial unions and health that people in interracial partnerships may be more likely to experience depression and

psychological distress, possibly indicating that interracial relationships bring with them greater stress due to social stigmatization, lower relationship satisfaction, greater likelihood of dissolution, or other unknown challenges (Bratter and Eschbach 2006; Bratter and King 2008; Kroeger and Williams 2011). The one prior study on intermarriage and self-rated health suggests that self-rated health is also stratified by the racial composition of marriages (Miller and Kail 2016). I contribute to this growing body of research by examining the association of interracial and inter-ethnic marriages and cohabitations in a longitudinal data source that has previously not been used for this purpose, and by making a first attempt at asking whether and how this association is due to selection processes or social causation pathways linking marriage and cohabitation to self-rated health.

The results show that indeed, self-rated health is stratified on the basis of a relationship's racial/ethnic composition for married and cohabiting individuals. I first examined the cross-sectional association of partner race/ethnicity and self-rated health. The results show that for (non-Hispanic) White women, and for nonwhite men and women, having a nonwhite (including Hispanic) partner is associated with lower self-rated health. The difference is larger for women than for men, suggesting an "intersectional" process in which racial disparities in health are exacerbated for minority women by processes of partnership formation and partnership impacts on health. Previous research on Black women and self-rated health has asserted that Black women's particularly poor self-rated health is due in part to their relatively low rates of marriage (Umberson et al. 2014); however, it may also be the case that women of color are penalized particularly harshly in marriage markets for having

poor health, or that they suffer greater stress from an interracial relationship than do men of color. Understanding which of both selection and causal processes may be at play in creating the association between partner race and self-rated health is clearly important.

To investigate selection, I analyzed samples of SIPP panel members who were observed in newly formed marriages and cohabitation partnerships, and found that women were more likely to partner with a nonwhite man if their health was worse a year prior. This effect did not differ statistically by the woman's own race --- both White and nonwhite women were more likely to partner with a nonwhite man if their health was worse. This finding provides evidence that health, along with socioeconomic characteristics such as education, may act as a status marker on the marriage and dating market. The literature shows that nonwhite men and women with higher levels of education are most likely to intermarry with Whites, and this is particularly true for Black men who partner with White women (Fu 2001; Torche and Rich 2016). Further, research suggests that men and women of color who are the most educationally disadvantaged are shut out of the interracial dating and marriage market, whereas the education of Whites is not consistently associated with partnering patterns (Gullickson 2006). My results thus show further support for status exchange theory in interracial relationships beyond the usual formulations, and expand the scope of the theory to consider health as well. We also know from prior research that self-rated health, along with other health markers such as obesity, affect selection into romantic relationships (Schwartz 2013; Wilson 2002). The findings reported in the present study suggest that various health markers may be another

factor that stratifies the interracial dating and marriage market. Although education among racial and ethnic minorities determines the likelihood of partnering with a White partner, there is an additional effect of health beyond its association with education.

The second set of analyses I conducted to better understand the sources of negative associations of self-rated health with having a nonwhite partner, especially for women, were of changes in self-rated health over a one-year period, with the aim of drawing inferences about adverse causal impacts of being in an interracial relationship. The results from these analyses show that being in a relationship with a nonwhite (including Hispanic) partner is associated with a health decline over time for White women. They additionally showed that the process is gendered: that White women's more adverse health changes when partnered with a nonwhite man are greater than any health change experienced by White men in an interracial relationship. I found a similarly gendered process between nonwhite men and nonwhite women's effects of being partnered by Whites. Both nonwhite men and women with White partners are more likely to experience a better health trajectory across consecutive years. For White women, this finding supports the theory that interracial relationships are more stressful than endogamous relationships, or that they do not provide the same stress-buffering benefits as an endogamous relationship. Previous studies suggest that interracial relationships are associated with worse mental health due to heightened stress (Bratter and Eschbach 2006; Kroeger and Williams 2011; Miller 2014), particularly for the racial majority group. Research on gender differences in stress shows that women not only experience more stress, but

their mental health is also more vulnerable to the effects of stress (Kessler and McLeod 1984; Mirowsky and Ross 1995). It may be the case that this extends to self-rated health as well as mental health, and therefore that White women may be more vulnerable to the toll that the stress of being in an interracial relationship takes on health compared to White men.

However, the results for groups other than White women do not support the idea that interracial relationships adversely affect health through stress processes. Both nonwhite men and nonwhite women experience a health premium as the result of having a White partner. The social psychology of health literature looks to status processes to explain health disparities, arguing that both the structural conditions that come with higher social status (e.g., more financial resources, living in a better neighborhood, etc.) and the social psychological experience of feeling oneself to have subjectively higher status are beneficial to health (Schnittker and McLeod 2005; Wolff et al. 2010). A social exchange theory of interracial relationships suggests that for nonwhites, having a White partner is a means of achieving social status, and research in psychology has found that the race of one's partner can be a status cue (Miller et al. 2004). One possible explanation for the health benefit over time of a White partner is that having a White partner may increase perceived or real social status, which could in turn benefit actual health or one's assessment of health. Interracial and inter-ethnic relationships are still stigmatized despite their increasing prevalence, especially for Whites (Herman and Campbell 2012) and partner race is found to be a particularly salient status cue for White women who partner exogamously (Miller et al. 2004). Taken together, the results for White women and

nonwhites indicate that status effects on health may better explain a social causation explanation for the association between partner race and health over time. Whereas nonwhites experience a status boost as the result of having a White partner that benefits health, Whites – and particularly White women- experience a status penalty that adversely affects health. It is also likely that health selection and causation work in tandem here: if nonwhites with greater education and more resources, and thus better health, are more likely to enter unions with Whites, and then perhaps reap more status or resources from this union, their health is additionally likely to improve. Thus, it could be that for nonwhites, the health benefits of having a White partner are cumulative over time.

The finding of worse health one year later among women partnered with a nonwhite man indicate that the association between the racial composition of relationships and self-rated health may be explained in part by causal processes. Studies of selection versus causation in the relationship-health association typically conclude that social causation arguments are more compelling than selection arguments (Harris et al. 2010; Lillard and Panis 1996; Waite and Lehrer 2003). However, with my data limited to two, or at best three, consecutive years of health status, causal inference is less strong (Morgan and Winship 2014; Vaisey and Miles 2014). Disentangling the causal effects of a health trajectory that was already in place before an individual was observed in in the survey from health change over time within the observation period of the survey, and differentiating between selection on present health versus on a health trajectory, require a longer sequence than available in the data set used in this study. The results, therefore, are more suggestive than

definitive on there being both processes of selection and causation explaining the adverse association of having a nonwhite partner with self-rated health.

Additionally, it is clear that socioeconomic resources matter for the racial composition of partnerships; it is also well-established that socioeconomic status is a central factor driving health disparities (Link and Phelan 1995, 2010), and is also a factor that drives selection into interracial partnerships (Kalmijn 1998; Fu 2001; Gullickson 2006). Although in this chapter I emphasize social status processes as an explanation for the positive health associations with having a White partner, the role of White partners' bringing more socioeconomic resources to relationships with nonwhites is a further possible explanation. It could also then be that the positive health associations for racial minorities shown here are due to a combination of selection and causation on the basis of SES; that is, it could be that interracial partnerships are "healthier" for racial minorities because the racial minority individuals with White partners have more resources at their disposal to begin with that are protective of health (Carr and Springer 2010; Thoits 1995). Prior research suggests weak evidence that education and income may moderate the effect of partner race on self-rated health (Miller and Kail 2016). The isolation of lower educated minorities, especially Blacks, from the interracial marriage and dating market (Gullickson 2006) might also have a causal impact on the health of minorities. If the already-disadvantaged, with worse health to begin with, are also blocked out of relationships with individuals who have greater economic and health resources at their disposal, this could deepen health disparities along racial and socioeconomic lines. Although my findings suggest that partner race and one's own education have

independent effects on self-rated health, and that the effect of self-rated health on partner race is independent of education, future research should investigate whether and how partner race and partner socioeconomic status, particular partner education, together may produce differential health outcomes for different groups.

Future research may also benefit from considering whether the effect of partner race on self-rated health varies by age and period. The analysis presented here excludes adults 60 years of age and older, because the meaning of self-rated health has been shown to shift at older ages (Layes et al. 2012). Also, because the prevalence of interracial marriages have increased in recent years (Qian and Lichter 2011), older adults may be less likely to be interracially partnered, especially those that have been married for a long period of time. Those that are may therefore have unique characteristics not shared by younger adults who are interracially partnered. However, the ages considered here (18-59 years) still represents a large range, and there may be differences among younger and older adults in how interracial relationships are formed, and the experiences of stress or social status among these couples. Additionally, given that interracial marriages have increased in the past three decades (Qian and Lichter 2011), the effect of partner race on self-rated health may have changed over time. Due to sample size constraints, this study aggregates adults' health over the period of 1996-2011, and therefore does not address the possible changing meaning of interracial relationships for health throughout this time period.

Another limitation of this study is that despite the large sample size achieved by pooling across ages 18-59 and years from 1996-2011, there still are not enough cases to disaggregate racial categories beyond a White/nonwhite categorization

without losing significant statistical power needed to draw conclusions, particularly for the selection analysis of SIPP members observed in new relationships (see again Appendix Table 2.1). Previous research has found that for depression, having a Black partner specifically is associated with depression for Whites, but not other nonwhite partners (Kroeger and Williams 2011). Therefore, the use of a White/nonwhite racial categorization may mask self-rated health effects of particular partner combinations. Given adequate sample sizes, future research may benefit from comparing different partnership racial and ethnic combinations to discern whether certain combinations have stronger effects on self-rated health than others, and whether women are more susceptible to these effects than men.

# Chapter 3: Associations between Overweight and Obesity and Romantic Relationship Racial Composition among White Dating, Cohabiting, and Married Young Adults

*Abstract*

Romantic relationships, particularly marriage, and to a lesser extent, cohabitation, are generally protective of physical and mental health. However, despite this protective effect on health, romantic relationships are actually associated with higher body mass index (BMI). Further, this relationship varies by race and ethnicity, though the existing literature is scarce. This study extends the current research on relationships, BMI, and race/ethnicity by examining the association between being overweight and obese with partner race/ethnicity among White young adults. I also examine to what extent this association is due to selection on weight status into new relationships versus differences in weight change over time in existing relationships. Data come from the National Longitudinal Study of Adolescent to Adult Health. I find a positive association between being overweight or obese and having a Black and Hispanic partner for non-Hispanic White women. Moreover, I find evidence that overweight/obese White women are more likely to select into new partnerships with Black partners. I also find differences in weight change over time, such that White women with Black partners are more likely to become overweight or obese over time compared to White women with White partners. I do not find statistically significant associations between partner race and weight status for White men. I interpret these findings on the associations between partner race/ethnicity and BMI as evidence for gendered standards of beauty that are particularly oppressive for overweight and

obese women and also as consistent with social exchange theories of exogamous partnering.

*Introduction*

The relationship between romantic partnerships and health is generally considered a protective one, especially for married individuals (Waite and Gallagher 2000). For example, marriage is associated with lower incidence of disease for men and women (Dupre and Meadows 2007), lower rates of smoking, drinking, and drug abuse (Ali and Ajilore 2011; Green, Doherty, Fothergill, and Ensminger 2012; Harris, Lee, and DeLeone 2010), fewer health limitations for men (Teachman 2010), better health for unemployed women (Waldron, Hughes, and Brooks 1996), healthier behavior (Umberson, Crosnoe, and Reczak 2010), lower mortality (Johnson, Backlund, Sorlie, and Loveless 2000), particularly for men (Rendall, Weden, Favreault, and Waldron 2011; Staehelin, Schindler, Spoerri, and Stutz 2012), better mental health (DeKlyen, Brooks-Gunn, McLanahan, and Knab 2006; Hill, Reid, and Reczak 2013; Meadows, McLanahan, and Brooks-Gunn 2008; Musick and Bumpass 2012; Simon 2002) and higher life satisfaction (Uecker 2012). The association between cohabitation and health outcomes is less straightforward, with some research indicating a positive association between cohabitation and health on par with marriage (e.g, Lund, Due, Modvig, Holstein, Damsgaard, and Andersen 2002; Staehelin et al. 2012), some studies finding cohabitation to have a protective effect that is less pronounced than marriage (e.g., Duncan, Wilkerson, and England 2006), and other studies find a negative impact of cohabitation on general health, mental health, and health behaviors (Harris et al. 2010).

Several explanations are offered for the associations between partnership status and health outcomes, and the explanation usually boil down to the issue of selection versus causation (House, Umberson, and Landis 1988; Koball, Moiduddin, Henderson, Goesling, and Besculides 2010) – that is, are healthy people more likely to marry or be in partnerships, or do romantic partnerships, particularly marriage, encourage better health, by promoting better health behaviors, providing social support, and offering economic advantages? (Umberson 1992; Umberson et al. 2010; Waite and Gallagher 2000).

However, despite the protective effects that social support from romantic relationships provides for many types of health outcomes, relationships are generally found to be associated with higher body mass index (BMI), particularly marriage (Mata, Frank and Hertwig 2015; Schoenborn 2004; Teachman 2016). There is debate in the literature over whether selection effects, particularly assortative mating, are responsible for the association between partnership status and BMI, or whether aspects of partnerships cause increases in BMI (The and Gordon-Larsen 2009). For example, obese individuals are less likely to be in romantic relationships in the first place because larger bodies are stigmatized in dating and marriage markets, particularly for women (Ali, Rizzo, Amialchuk, and Heiland 2014; Fu and Goldman 1996; Gortmaker et al. 1993; Klein 2011; Mukhopadhyay 2008). Additionally, assortative mating suggests that partners will be matched on the basis of BMI (Jacobsen et al. 2007; Knuiman et al. 1996; Prichard et al. 2015; Wilson 2002). On the other hand, other researchers conclude that rather than attributing the association between relationships and BMI to selection effects, relationships actually cause

people to gain weight due to sharing an environment or lifestyle, or because partners stop worrying about maintaining a lower (more culturally desirable) weight once they are no longer on the dating market (Averett, Sikora, and Argys 2008; The and Gordon-Larsen 2009; Burke, Beilin, Dunbar, and Kevan 2004; Harris et al. 2010). Whatever the explanation, the research on partnerships and BMI, particularly marriage, strongly suggests that partnerships have important implications for individuals' weight status.

Prior research has begun to chip away at how marital status affects BMI for different racial and ethnic groups, but several major gaps remain. The existing research focuses largely on marriage, despite the fact that marriage's impact on health may be lessening as the meaning of marriage changes over time and growing numbers of people have never married or choose cohabitation over marriage (U.S. Census Bureau 2015; Liu and Umberson 2008; Wang and Parker 2014). Second, although current research has started to account for the differential effects of marriage on different racial and ethnic groups, there is virtually no peer-reviewed research to date on the interplay of exogamous vs. endogamous relationships, including dating, cohabitation, and marriage, with weight status. We know that body weight and overweight/obesity are stratified by race, ethnicity and gender, and by relationship status (Sobal, Hanson, and Frongillo 2009; Shafer 2010), and that relationship status differentially affects men and women's health across various outcomes. Yet we do not know how the racial and ethnic composition of romantic relationships is associated with weight, if at all. I draw on theoretical literature on racialized and gendered standards of beauty that argues that beauty standards related to weight are

particularly restrictive for White women, and nonwhites may have less restrictive standards for partners' weight, to frame this association between interracial relationships and weight. I also draw on status exchange theories of interracial relationships (Davis 1941; Fu 2001; Gullickson 2006), arguing that weight may represent another marker of status that affects how people partner endogamously versus exogamously. To do this, I use data from multiple waves of the National Longitudinal Study of Adolescent to Adult Health (Add Health) to examine the association between relationship racial composition and overweight/obese weight status for White young men and women. I examine results for three groups separately: first, those who are in current dating, marriage, and cohabitation relationships, regardless of duration or continuity (N=8,931 person-year observations); second, those who are observed in new dating, cohabiting, and married relationships (N=6,837 person-year observations), and finally, those who have maintained a consistent partner over time (N=1,761). With these distinct groups, I contribute to ongoing questions about the nature of the link between romantic relationships and health outcomes by examining the evidence for selection processes versus causal processes in the association between romantic relationships and overweight/obese.

## *Literature Review*

### Race, Ethnicity, Gender, and BMI

Studying health inequalities is a crucial facet of social stratification research in sociology. Indeed, the field of stratification deals with the unequal distribution of

assets across society, the rigidity of inequality, and how ascriptive traits determine the unequal distribution of assets. Physical health is one such asset that concerns scholars of inequality (Grusky and Weisshaar 2014), and BMI – particularly with regard to obesity – is one health-related outcome of increasing concern in sociology, among other disciplines.

The precise relationship between overweight and obesity and other health outcomes is the subject of much research and debate that are outside the scope of this study (see Ahima and Lazar 2013). A large body of research points to the positive association of high BMI with outcomes such as diabetes, cardiovascular disease, cancer, disability, and mortality, as well as subjective good health (Berrington de Gonzalez et al. 2010; Whitlock et al. 2009; Okosun et al. 2001). Particularly low BMI (less than 20 kg/m2) is also associated with higher risk of mortality (Ahima and Lazar 2013; Whitlock et al. 2009). Further, the prevalence of obesity has more than doubled among U.S. adults between 1976 and 2007-2008 (Ogden and Carroll 2010), and obesity prevalence increases as individuals age from adolescence to adulthood: obesity prevalence doubles from adolescence to early adulthood, and then doubles again from the 20s to the 30s (Gordon-Larsen et al. 2004; Gordon-Larsen, The, and Adair 2010).

The burden of weight gain is of particular interest to scholars of inequality because overweight and obesity are unequally distributed in the U.S. by race, ethnicity, gender, and socioeconomic status, and these social statuses intersect such that some groups, particularly Black women and low SES women, are more disadvantaged than others (Ailshire and House 2011; Zhang and Wang 2004).

Overall, Black Americans have the highest prevalence of obesity, followed by Hispanics, and then non-Hispanic whites (Pan et al. 2009; Ogden and Carroll 2010), and women have a higher prevalence of obesity than men across racial and ethnic groups (Ogden and Carroll 2010). As Americans age, gender, race, and SES intersect to exacerbate BMI disparities. The transition from adolescence to adulthood may be particularly crucial for growing obesity rates, and this is especially the case for Black and Hispanic young women (Gordon-Larsen et al. 2010). Additionally, low-educated, low-income Black women experience the greatest weight gain as they age, while high-educated, high-income White men experience the least (Ailshire and House 2011). Further, SES matters more for obesity for some groups more than others: for White men and women, SES and obesity are inversely related, whereas for Black Americans and Mexican Americans, the association between SES and obesity is dependent on gender and age (Zhang and Wang 2004). Overall, socioeconomic disadvantages are most harmful for women's health as measured by BMI (Pudrovska, Reither, Logan, and Sherman-Wilkins 2014; Zhang and Wang 2004).

BMI is not only a concern for public health reasons, but also because overweight and obese people face discrimination and stigma that their normal weight counterparts do not (Hunte 2011). Obese and overweight individuals are discriminated against in the workplace in multiple stages of the employment process (Randle 2012), and may experience social isolation (Ali, Amialchuk, and Rizzo 2012; Cunningham, Vaquera, and Long 2012). The stigma of being overweight or obese has serious consequences. For example, adults who report feeling discriminated against due to their weight experience lower rates of self-rated health and well-being (Lewis

et al. 2011; Schafer and Ferraro 2011). Women are hit particularly hard with the stigma associated with being overweight or obese and its consequences, leading some scholars to argue that obesity discrimination is a feminist issue (Fikkan and Rothblum 2011; Saguy 2012). For example, obese and overweight women compared to obese and overweight men are adversely affected in the labor market, the marriage market, and in educational attainment (Glass, Haas, and Reither 2010), and weight discrimination against women is an important factor driving obese women's class disadvantages (Mason 2012). Thus, the study of BMI, particularly overweight and obesity, is crucial for scholars of inequality because body weight intersects with ascribed social statuses to exacerbate discrimination, stigma, and inequality for some groups.

### Partnership and BMI

A fruitful body of literature spanning public health, sociology, psychology, and economics examines the relationship between marital status and various health outcomes, including self-rated health, functional limitations, mortality, disease, and mental health and well-being (for recent reviews, see Carr and Springer 2010; Koball et al. 2010; Wood et al. 2007). Overall, the literature points to a marriage-health premium; that is, married people have better health outcomes than the never-married, divorced, and widowed. There are several explanations offered for the robust link between marriage and health, including that healthy people are more likely to get married and less likely to get divorced (Koball et al. 2010; Robards et al. 2012), and there is evidence that selection of healthy people into marriage is in part responsible for the observed association (e.g., Fu and Goldman 1996; Joung et al. 1998; Karraker

and Latham 2015). However, much of the literature reveals that marriage itself has a positive, protective effect on health outcomes (e.g., Bennett 2006; Dupre and Meadows 2007; Johnson et al. 2000; Rendall et al. 2011; Waldron et al. 1996; Waite and Gallagher 2000). The research on marriage and health has uncovered several mechanisms that may contribute to this relationship, including health behaviors (Umberson et al. 2010), decreased substance abuse and smoking (Ali and Ajilore 2011; Curran et al. 1998; Duncan et al. 2006), and marital quality (Donoho et al. 2013; Liu and Waite 2014; Miller et al. 2013). Although most of the existing literature focuses on marriage and divorce, some studies have examined cohabitation with a partner, finding mixed results. For example, cohabitation is associated with decreased substance abuse, though the effect is less than than of marriage (Duncan et al. 2006). Overall, the literature suggests that marriage compared to coresidential partnership has a stronger protective effect (Lillard and Waite 1995; Meadows et al. 2008; Meadows 2009; Schoenborn 2004; Waite and Gallagher 2000).

However, previous research points to a paradox in the relationship between marital status and BMI compared to other health outcomes: while partnership, particularly marriage, is protective of other health outcomes, marriage and cohabitation are associated with higher BMI for men and women (Schoenborn 2004; Sobal et al. 2009; Teachman 2016; see Wood et al. 2007 for a review). This section examines this literature and the theoretical explanations offered for the seemingly paradoxical relationship between partnership status and BMI in greater depth.

## Theoretical Frameworks: Selection and Causation in the BMI-Partnership Association

The existing literature on romantic partnerships and BMI points overwhelmingly to one general finding: people in relationships, particularly married people, are heavier than people who are single (particularly never-married) or divorced. However, there is debate in the literature over why this association exists, particularly regarding the issue of selection vs. causality – that is, are heavier people more likely to be in romantic relationships, or do relationships themselves cause increases in body weight and increased risk of overweight and obesity? In this section, I review several theoretical explanations and the associated evidence for the relationship between being in a partnership and body weight. Because most of the existing literature focuses primarily on marriage, I discuss the theoretical explanations in marriage terms; however, some research extends to cohabitation and dating relationships, and I include this work when possible.

The first explanation typically offered for the association between partnerships and health is selection – that is, people who are healthier are more likely to be married or in romantic relationships because they are more desirable as partners and better suited to maintaining a stable relationship (Lillard and Panis 1996). Basically, the process of selecting marriage partners favors the healthy, rather than health being the outcome of being in a marriage or other partnership. This is consistent with Becker's (1991) theory of marriage: if there are to be gains realized from marriage, then comparative advantage is important.

However, although a selection hypothesis may make sense for when explaining the relationship between marriage and some health outcomes (e.g.,

married people are less likely to die, which is in part due to the fact that healthy people are more likely to get married [Lillard and Panis 1996]), a selection hypothesis does not satisfactorily explain the relationship between relationships and BMI in terms of explaining why people in relationships have higher BMI. In fact, a selection hypothesis would predict that the most desirable partners, in terms of health and attractiveness, are most likely to be in relationships, particularly marriage (because marriage partners are presumably selected most stringently compared to dating or cohabitation partners) – therefore, we would expect marriage and other relationships to be inversely related to higher BMI. Most research does not support this hypothesis: cross-sectional studies examining marital status and BMI generally show that married people have higher BMI than single people (Mata, Frank, and Hertwig 2015; Schoenborn 2004; Sobal et al. 2009; Sobal et al. 1992; Teachman 2016).

Assortative mating is another pattern that must be considered when discussing how selection affects the partnership-BMI association. Assortative mating is the pattern wherein partners with similar "prices" or values on the dating or marriage market will end up together (Becker 1981). In the case of BMI, this means that heavier people will end up together. The existing research provides some support for this theory. A recent meta-analysis found that 50% of studies showed a statistically significant correlation between spouses' weight (Di Castelnuovo et al. 2009). Another study found high correlation between heterosexual partners' BMI for both university students and adult couples engaged to be married (Prichard et al. 2015). A study of Swedith adults found that the greatest partner concordance in BMI occurs among couples with the shortest duration of cohabitation, indicating that sorting on the basis

of BMI on the dating and marriage market may be the driving force behind spousal concordance in BMI (Jacobson et al. 2007; however, note that a study using the Add Health cohort found that duration of cohabitation increased BMI concordance in couples [The and Gordon-Larsen 2009)] – see below). Obese individuals are also more likely to have less physically attractive partners for dating, cohabitation, and marriage (Carmalt et al. 2008).

Overall, the reality is that overweight and obese people are selected *out* of romantic relationships, including dating, cohabiting, and marriage. Overweight and obese individuals are stigmatized in marriage and dating markets, especially for women (particularly White women) (for a review, see Puhl and Heuer 2009). The dating penalty for obese women is particularly strong at various points in the life course. In adolescence, one study found that heavier girls and boys are less likely to date than normal weight boys and girls (Cawley et al. 2006), and another found that White girls who are obese are less likely to have been in romantic relationships or engage in sexual behavior than their non-obese counterparts (Ali et al. 2014). Among college-aged women, overweight women are less likely than normal-weight women to date (Sheets and Ajmere 2005). These penalties continue from adolescence to adulthood: girls and boys who are overweight in adolescence are less likely to be married at a seven year follow up (Gortmaker et al. 1993). Obese individuals have lower marriage rates than their healthier-weight counterparts (Fu and Goldman 1996). Indeed, obesity is associated with a 16% lower likelihood of marriage for women (Conley and Glauber 2006), and thinner women are more likely to be selected into both cohabiting and marital relationships. Men, on the other hand, were not less likely

to be selected into relationships based on heavy weight (Averett et al. 2008). Studies that directly examine people's preferences show the severity of weight stigma, especially for women. One study of college students found that when students were asked to rank potential sexual partners with obesity and disabilities, the least-preferred partners were obese, and men were especially likely to rank an obese partner poorly (Chen and Brown 2005). Obese women are perceived as not sexually attractive or skilled compared to normal-weight women (Regan 1996), and women who are described as overweight, obese, or fat are negatively evaluated by men and women (Smith et al. 2007). The discrimination against heavy women as romantic partners is so great, one study found that men would prefer a woman who had a history of serious drug abuse to an obese woman as a partner (Sitton and Blanchard 1995).

In summary, a selection model of romantic partnerships would predict that healthier, more attractive people (i.e., thinner people) would be more likely to be in romantic partnerships, especially marriage. The existing evidence reviewed here suggest that people likely take body weight into account when choosing partners due to cultural preferences for certain body types that are considered more attractive. However, though the research on obesity stigma finds that overweight and obese people, especially women, are seriously penalized in dating and marriage markets, this finding does not account for the fact that on average, married and cohabiting people are heavier than their single counterparts. I turn now to the evidence that romantic relationships actually cause increases in weight.

There is a wealth of research that indicates that romantic partnerships themselves, particularly marriage, have a causal relationship with various health outcomes. It is a long-standing finding in the social sciences that people with close social relationships and greater social support are healthier, and in the last several decades, serious efforts have been made to show a causal relationship between social relationships such as romantic partnerships and health outcomes (House et al. 1988). Frequently, a "marital resource model" is used to explain this effect – that is, marital status differences in health outcomes "result from the greater economic resources, social support, and regulation of health behavior that the married enjoy" (Williams and Umberson 2004: 82) (note that this theoretical framework goes by different names – for example, the "marriage protection hypothesis" [Averett et al. 2008; Waldron et al. 1996]). Partnered people experience greater social integration, emotional support, and have someone to encourage them to engage in positive health behaviors like going to the doctor and drinking less alcohol (Umberson 1992; Umberson et al. 2010; Waite and Gallagher 2000). A full review of the evidence backing this hypothesis is outside the scope of this chapter (for a recent review, see Koball et al. 2010), but the research strongly suggests that romantic relationships, particularly marriage, is protective of health, and particularly for men. For example, married men and women have a lower risk of mortality than their unmarried, divorced, and widowed counterparts, and married men experience a "survival premium" (Rendall et al. 2011); another study found that married and cohabiting men have lower mortality than men who live alone (Staehelin et al. 2012). Regulation of health behaviors are generally considered a major factor in this discrepancy: marriage

is most beneficial for preventing causes of death related to behavior, such as cirrhosis of the liver and suicide (Umberson 1987), and cohabitation and marriage both decrease young adults' alcohol and drug use (Duncan et al. 2006).

However, as with a selection model of the relationship between romantic partnerships and BMI, a marital resources or marriage protection model does not adequately explain the causal association between relationships and BMI. A growing body of literature provides evidence that relationships cause increases in body weight for men and women, which seems to contradict the idea that people with the greater social support, financial resources, and behavior regulation of marriage and other types of relationships should be healthier. A recent study, using data from the 1979 National Longitudinal Survey of Youth, found that marriage is associated with an increased risk of overweight and obesity for both men and women. Cohabitation was only associated with an increased likelihood of being overweight or obese for men, not women, though unmarried, cohabiting women were generally heavier than unmarried, non-cohabiting women (Averett et al. 2008). Another study, using waves 2 and 3 from the National Longitudinal Survey of Adolescent Health (Add Health) found that transitioning from being single or just dating to cohabitation or marriage was associated with increased odds of obesity; further, longer duration of living with a romantic partner was associated with obesity for both men and women (The and Gordon-Larsen 2009). In an Australian sample of young adults, cohabitation was associated with increases in BMI and sedentary behavior for men and women (Burke et al. 2004). Another Australian study found that recently-married women had gained

about two kilograms on average six months after their weddings (Prichard and Tiggeman 2014).

Further, the existing research indicates that transitioning into relationships may be a primary driving factor in the relationship-BMI association (Umberson et al. 2009). Jeffery and Rick (2002) found that those who married during a longitudinal study conducted in Minnesota gained weight, while those who divorced lost weight; another study using the US National Health and Nutrition Epidemiological Follow-up Survey (NHEFS) found that women who married gained more weight than those who remained consistently married (Sobal et al. 2003), echoing the results of a prior study using the National Survey of Personal Health Practices and Consequences that found that women who entered marriage had a greater weight gain than those who remained married, and marital status and weight gain had no association for men (Rauschenbach et al. 1995).

Several explanations have been offered to explain the seemingly paradoxical association between marriage and cohabitation, and increased BMI. One explanation has been dubbed the "marriage market hypothesis," and posits that people consider maintaining a healthy and attractive weight important when searching for a partner, but once people feel that they are "off" the marriage market, they no longer value maintaining their weight and thus feel freer to gain weight (Averett et al. 2008). Qualitative research supports this hypothesis, especially in the case of women: women describe "relaxing" about their weight after entering committed relationships, including marriage and cohabitation, which led to weight gain (Bove and Sobal 2011). Further, the fact that marriage has a stronger effect on weight gain than

cohabitation can be interpreted as evidence that the more serious the commitment, the more likely partners are to consider themselves removed from the marriage market and thus "let themselves go" (Averett et al. 2008).

Another explanation offered in the literature revolves around the influence of behavioral changes and shared lifestyle and environment for cohabiting and married couples. A "spousal obligation" hypothesis asserts that spousal role obligations encourage married and cohabiting people to cook and eat together (Averett et al. 2008; Sobal et al. 2003). There is evidence that this is the case. In general, married people exercise less than unmarried people (Nomaguchi and Bianchi 2004), and cohabitation is associated with negative dietary changes in women and less physical activity for men (Burke et al. 2004). Shared environmental and lifestyle factors may help account for the fact that there is often concordance between spouses on various health outcomes, including BMI (Di Castelnuovo et al. 2009; Knuiman et al. 1996; Meyler et al. 2007). The and Gordon-Larsen (2009) examined this issue directly using the Couples Sample from Wave 3 of Add Health, asking whether BMI concordance among dating, cohabitating, and married couples is due to assortative mating or shared behaviors and environment. They found that couples married or cohabiting for two or more years had the strongest concordance in obesity and health behaviors (physical activity and sedentary behavior), leading them to conclude that the duration of sharing an environment, rather than assortative mating, may play a significant role in the relationship between partnership and weight gain.

Race/Ethnicity, Partnership, and BMI

Race and ethnicity are linked to both the likelihood of marrying and cohabiting, and the likelihood of being overweight and obese, yet to date, there is not a robust literature on how relationships and race/ethnicity intersect to affect BMI (Schafer 2010). Further, there is no study to date that has examined how the racial composition of romantic partnerships and BMI are related.

Marriage rates differ widely by race: for example, it is estimated that in 2014, 51% of White American adults were currently married, compared to 43% of Hispanics and 29% of Black Americans (U.S. Census Bureau 2014). Cohabitation rates also differ: non-Hispanic Whites are most likely to have experienced both cohabitation and marriage compared to Black and Hispanic Americans, whereas among the never-married, 17% of Black Americans have cohabited, compared to 10% of Hispanics and 9% of Whites (Bramlett and Mosher 2002). Further, as discussed previously, the risk of overweight and obese varies by race and ethnicity: Black Americans have the highest prevalence of obesity, followed by Hispanics, and then non-Hispanic whites (Pan et al. 2009; Ogden and Carroll 2010), and women have a higher prevalence of obesity than men across racial and ethnic groups (Ogden and Carroll 2010). Given these facts, it is reasonable to assume that the association between BMI and romantic partnerships might differ by race.

A handful of studies have addressed this question, both from the perspective of how race and weight affect selection into relationships, and how the causal association between partnerships and BMI. One study, using a cross-sectional design that pooled together multiple U.S. surveys, found considerable variation in the

association between marital status and BMI by gender and race/ethnicity. Specifically, the researchers found that single Hispanic and Black men weighed less than their married counterparts, unlike White men, where there was no difference between the never-married and married. Among women, Black women overall weighed more than White women, and separated Black women were more likely to be overweight and obese than separated White women (possibly due to the economic hardships of being a separated Black woman). Also, the researchers found that among Whites, White women's weight did not differ by marital status, though divorced White men were less likely to be overweight or obese than married White men. Further, married Hispanic men had notably higher odds of being overweight and obese than never married, cohabiting, and divorced/separated Hispanic men (Sobal et al. 2009). Although this study provides compelling reasons to believe that race moderates the partnership-BMI relationship, it is limited in its ability to theorize about possible reasons.

Several studies have found evidence that the effect of cohabitation and marriage on body weight differs by race and ethnicity, though this remains an under-researched topic. Using the National Longitudinal Survey of Youth (1979 cohort), Schafer (2010) posited that a preference for women with heavier body types among Black Americans may interact with the effect of marriage on weight gain. The results of this study showed that marriage is associated with increases in BMI regardless of race and gender, and cohabitation is associated with a smaller increase in BMI for men only. Black women were especially affected by marriage – marriage increased the likelihood of becoming obese for Black women. Another recent study using Add

Health waves 1 and 3 examined links between early marriage and cohabitation (that is, marriage and cohabitation in the early 20s) and BMI, finding that marriage (not cohabitation) was associated with higher weight for Black men and women, as well as White women (not White men), when controlling for weight in adolescence (Harris et al. 2010). Although these two studies found comparable results – that women, and Black women in particular, are more likely to gain weight as a result of marriage – another recent study using Americans' Changing Lives survey found that although marriage is associated with a modest weight gain for Whites, marriage was actually associated with a modest weight *loss* for Blacks (Umberson et al. 2009).

### Theoretical Frameworks: Interracial Relationships and BMI

The empirical findings that point to variation by race/ethnicity in the association between romantic relationships and BMI beg the question of whether the racial and ethnic composition of relationships might also affect BMI. Three theoretical frameworks lend support to the notion that endogamous vs. exogamous relationships might be associated with BMI: gendered and racialized standards of beauty, status exchange theory, and stress theory.

Research on body type preference and partner selection and race supports the notion that there are racial and ethnic differences in partnering that could lead to variation in the partnership-BMI association by race and ethnicity, creating a selection effect. Evidence on body type preferences indicates that Black Americans are more accepting of heavier body types than White Americans are when considering potential partners. Studies have shown that Black men prefer larger body types for women and associate fewer unfavorable characteristics with obese women

compared to White men; the effect is similar for Black women compared to White women, though smaller in magnitude (Jackson and McGill 1996). More recently, among Internet daters, White men and women preferred thinner body types than their non-White counterparts, and White men in particular were found to value thinner partners compared to Black and Hispanic men (Glasser et al. 2009). This race difference holds for ideal body types as well – as early as adolescence, Black adolescent boys select heavier bodies as ideal compared to White adolescent boys (Thompson et al. 1996). The attractiveness penalty for White girls and women may even extend beyond the body type preferences expressed by potential romantic partners: one study, using data collected from Add Health interviewers at wave 1, found that interviewers rated overweight and obese Black and White girls as less attractive than their normal weight counterparts, but that White girls were penalized more severely for heavier weight (Ali et al. 2013).

These preferences translate into actual relationship consequences on the basis of body size, and the evidence suggests that overall, overweight and obese White women are most heavily penalized on the dating and marriage market for their weight. Starting in adolescence, obese White girls are less likely to date or engage in sexual behavior compared to their normal weight counterparts, whereas Black adolescent girls do not differ in their likelihood of dating or engaging in sexual behavior by weight (Ali et al. 2014). In adulthood, although both Black and White obese women have lower probabilities of marrying than their non-obese counterparts, the effect is smaller for Black women (Averett and Korenman 1999). Further, different cultural preferences for body types between racial and ethnic groups could

affect not only selection into relationships, but also how relationships affect BMI trajectories over time. For example, if nonwhite individuals are more accepting of heavier body types, and people who perceive themselves as "off" the dating or marriage market are less likely to worry about maintaining a lower weight (in keeping with a "marriage market hypothesis" [Averett et al. 2008]), these two factors could interact such that White individuals in interracial relationships might be more prone to weight gain than White individuals in same-race relationships. Second, we know from a limited body of prior research that perceived and actual spouse and sexual partner evaluations affect one's body image and body satisfaction (Miller 2001; Ogden and Taylor 2000; Pole et al. 2004), demonstrating that romantic partners are a salient source of understanding one's own weight, therefore possibly affecting one's actual weight. Theories of the self-concept as used in sociological social psychology offer important insights on how this process works. The self-concept is the totality of "the individuals' thoughts and feelings having reference to himself as an object" (Rosenberg 1979:7), and forms through social interaction, particularly interaction with significant others. One of the processes that affects the self-concept, or the self as a social product, is reflected appraisals, which has its roots in Cooley's "looking glass self" – that is, the self-concept is comprised of our perception of how we appear to others, our impressions of how others assess us, and the feelings about ourselves that we derive from these impressions (Cooley 1902, In Stryker and Vryan 2003). Rosenberg (1979), building on Cooley, identifies reflected appraisals and social comparisons as two main principles of self-concept formation. Applying this theory to romantic relationships and BMI, if an individual has a partner who is lighter or

heavier, or who perceives certain body types as more or less attractive, that individual may begin to see themselves in light of the standards set by their partner, a significant other (Rosenberg 1979), and may consider their partner's weight to be a relevant basis for social comparison. A White woman with a non-White partner might be more likely to see herself as attractive regardless of weight status due to the reflected appraisals she receives from her partner, and become more relaxed about weight gain. Conversely, if, for example, White men are more prejudiced against heavy women and prefer thinner partners, White women who are with White men might be more likely to maintain a lower weight.

Interracial relationships can be seen as evidence of expanding racial boundaries for some groups, particularly Hispanics and Asians (Miyawaki 2015; Qian and Lichter 2007), and are on the rise as the U.S. becomes more racially and ethnically diverse, particularly as the biracial and multiracial population grows (Qian and Lichter 2007, 2011). However, previous research has shown that couples' racial composition is associated with relationship instability, stress, disapproval from others, and adverse mental and physical health outcomes (Bratter and King 2008; Bratter and Eschbach 2006; Joyner and Kao 2005; Kroeger and Williams 2011; Miller 2014; Miller and Kail 2016; Wang et al. 2006), which may in turn affect BMI outcomes. One study found that among Add Health respondents, interracial relationships are of shorter duration than same-race relationships and less likely to result in cohabitation or marriage (Kroeger-D'Souza 2010). Other studies using Add Health data have found that adolescents who date across racial and ethnic lines are associated are more likely to exhibit depressive symptoms (Miller 2014) and nonblack young adults with

Black partners report more depressive symptoms than nonblack young adults with nonblack partners (Kroeger and Williams 2011). Further, White women and Hispanic men and women with cross-race spouses report higher distress (Bratter and Eschbach 2006). Whites in interracial and inter-ethnic relationships report lower self-rated health (Miller and Kail 2016). These findings from studies on the health of Whites[5] in interracial and inter-ethnic partnerships indicate that indeed, exogamous relationships may be more prone to stress and thus less protective of health. However, research has not examined the association between racial composition of couples and other health outcomes such as BMI. Many studies in the medical literature on obesity indicates that stress, particularly chronic stress, is associated with weight gain, possibly because stress activates a neural response that increases the motivation to consume unhealthy "comfort" food and also promotes insulin secretion (Dallman 2010; Dallman et al. 2003). Thus, it is reasonable to posit that interracial relationships, being more stressful and prone to stigma than endogamous ones for Whites specifically, could cause weight gain in the long term.

Status exchange theory is often cited (Davis 1941; Fu 2001; Gullickson 2006) as one explanation for interracial pairings: in order to marry a partner with higher racial status (i.e., someone White), racial minorities must have higher status in the form of socioeconomic status. There is empirical support for this: higher

[5]Conversely, there is evidence that stress theory may not adequately address the effect of interracial and inter-ethnic relationships on nonwhites, given that having a White spouse is correlated with better self-rated health for nonwhites (Miller and Kail 2016). Regardless, because this study is limited to Whites, I draw primarily on prior findings that support the idea that exogamous relationships are stressful and therefore adversely associated with health outcomes for Whites. See Chapter Two of this dissertation for a discussion of the limits of stress theory and health as applied to nonwhites in endogamous relationships.

socioeconomic status Blacks and Hispanics are more likely to marry Whites, especially in Black male/White female unions (Fu 2001; Gullickson 2006; Torche and Rich 2016). It may be the case that body weight, as one facet of physical attractiveness, acts as an additional marker of status that may be exchanged for a White partner. Following the theoretical and empirical insights on racialized and gendered standards of body size for women outlined above, it may be that heavier White women are considered lower status on dating and marriage markets by White men, who prefer thinner partners. Research has found that this is true for heavier women in terms of exchanging weight for partner socioeconomic status: women's weight is negatively correlated with their husband's income (Oreffice and Quintana-Domeque 2010), providing evidence that indeed, body weight may be a status marker on dating and marriage markets, especially for women. Similarly, overweight and obese White women may select into relationships with nonwhite partners because their lower "body status" shuts them out of partnerships with White men.

Overall, the research offers fairly robust evidence for a few key associations between relationships, BMI, race/ethnicity, and gender. First, body weight affects how people are selected into romantic relationships, and heavier White women are especially penalized due to restrictive cultural ideals about body size. Second, relationship status is causally related to BMI. Studies have shown that both marriage and cohabitation, especially marriage and longer-lived relationships, are associated with higher BMI, and these effects vary by race, possibly with Black women most adversely affected.

*Research Questions*

The existing research has several major gaps that I seek to fill with this study. First, the research on how relationships affect BMI with regard to race and ethnicity is quite scarce, and given that some studies show contradictory findings, more investigation is needed. The one existing study using Add Health that examines the longitudinal relationship between relationship, BMI, and race/ethnicity only examines White and African Americans, does not consider partner race, and does not use the most recent wave of Add Health data (Wave 4, collected when participants are in their late 20s, on average) (Harris et al. 2010). Second, the current literature has largely ignored dating relationships, instead relying on the marital status categories of married, cohabiting, or single (regardless of dating relationships). Third, there is a need for more research examining the association between relationships, BMI, and race/ethnicity in early adulthood for several reasons: the transition from adolescence to adulthood is particularly important for weight gain trajectories (The and Gordon-larsen 2004), especially for racial and ethnic minorities (Sharoun-Lee et al. 2009), and because relationship transitions have a considerable impact on weight status (Sobal et al. 2003; Umberson et al. 2009), and young adulthood is a time of entering new relationships. Finally, and most glaringly, there has not yet been an investigation of the association between relationships and BMI that accounts for couples' racial composition. Thus, this study asks the following research questions.

1. What, if any, is the association between the racial composition of married, cohabiting, and dating relationships and being overweight/obese for White young adults?

2. What is the evidence for selection vs. causation processes in the association between the racial/ethnic composition of married, cohabiting, and dating relationships and overweight/obesity in young adulthood?
    a. Does overweight/obesity prior to entering a new romantic relationship affect the likelihood of partnering with a same- or different-race/ethnicity partner for Whites?
    b. Does the racial composition of marriage, cohabiting, and dating relationships affect change in weight and the likelihood of becoming overweight/obese over time?
3. Does the association between partner race and overweight/obesity among White men and women vary by gender?

## *Data and Methods*

### Data

To draw conclusions about the population of the U.S. who were enrolled in middle and high school in the mid-1990s, I use data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), focusing on weight outcomes in waves 3 and 4. Add Health is a nationally representative, longitudinal study of adolescents who were enrolled in 7$^{th}$ through 12$^{th}$ grade in the 1994-5 school year (Chen and Chantala 2014; Harris 2013). The sampling design is clustered by school: a stratified sample of 80 schools was selected from the Quality Education Database (QED) (stratified by region, urbanicity, school type, ethnic mix, and size). For each school selected, a feeder school was identified and also recruited. The final sample has a

total of 132 schools. Multiple waves of data were collected from students at these schools. At Wave 1 (1994-1995), over 90,000 students completed a questionnaire. Additionally, at Wave 1 adolescents were sampled from the enrollment rosters for the schools in the sample to participate in the in-home interview portion of the study, stratified by grade and sex. Black adolescents with highly educated parents were oversampled. In-home interviews were conducted in 1995 (Wave 1), 1996 (Wave 2), 2001 (Wave 3), and 2008 (Wave 4). Respondents' parents also completed an in-home questionnaire at wave 1 only. The core in-home sample includes 12,105 respondents (Chen and Chantala 2014).

There are several reasons that Add Health is an appropriate data source to answer the research questions outlined above. First, Add Health includes interviewer-measured height and weight, rather than self-reported height and weight, at Waves 2, 3, and 4. Measured height and weight are considered much more reliable and accurate measures for constructing BMI than self-reported height and weight (Stommel and Schoenborn 2009). Second, the Add Health tracks contemporary young adults. The Add Health sample was born between approximately 1976 and 1984, and were in their late twenties at Wave 4, collected in 2008. This is important because it means that these respondents represent today's population of adults who are working, marrying, divorcing, having children, etc. It is also important because the meaning of the racial composition of relationships has changed over the past generation: for example, Black-White intermarriage increased threefold from 1980 to 2008 (Qian and Lichter 2011). Thus, the Add Health sample represents individuals who are partnering in contemporary society. Finally, the Add Health is an ongoing study, and data

collection for Wave 5 is slated to begin between 2016 and 2018 (Carolina Population Center 2016); therefore, there will be opportunities in the future to extend this study to see whether and how relationship racial composition affects body weight into middle adulthood.

### Analytic Sample

The analytic sample for this study is drawn from Wave 3 and Wave 4 in-home sample respondents who reported being in a current relationship at the time of the interviews in 2001 (W3) and 2008 (W4). Because the sample sizes are very small for nonwhites partnered with other nonwhites of different races, I restrict the analytic sample only to White men and women who report having Hispanic, Black, Asian, and White partners. At each wave, respondents were asked to list their past and present romantic relationships. From the respondents who listed any relationships, I selected only those respondents that reported that a relationship (of any type, including dating, married, and cohabiting) was current, who indicated that they were currently married, or that indicated they were currently cohabiting with a romantic partner at each wave. Narrowing the sample in this way resulted in some respondents having more than one relationship listed. From here, I dropped all same sex relationships. I then constructed a relationship "weight" based on certain relationship attributes in order to identify the most important or influential relationship a respondent reported. To do this, I assigned relationships different values for being a marriage, a cohabitation, lasting three months or longer, having sex in the relationship, having a pregnancy in the relationship, or being an interracial relationship (I devised this method based on the method used by Add Health researchers to construct the Wave 3 romantic pairs

sample ["Wave III In-Home Interview Data Codebook," National Longitudinal Study of Adolescent to Adult Health]). I then kept only the relationships with the maximum relationship "weight" or value. Because some respondents still had more than one current relationship using these data reduction criteria, I then simply selected the first relationship listed. Appendix Table 3.1 shows the sample sizes for each partnership racial composition, by gender. Sample sizes are particularly small for relationships between non-Whites with other non-White partners, such as Asians and Blacks. However, there is sufficient sample size to examine Whites who partner exogamously with each racial and ethnic group separately. Only for White men with Black women partners are there fewer than 100 cases.

Based on this initial current relationship sample, I constructed three data sets for the three steps of the analysis (described below). First, I constructed a person-wave data set for the *cross-sectional* analysis. This data set pools White respondents in current relationships at Wave 3 and White respondents in current relationships at Wave 4. Those with a current relationship in both waves contribute two person-wave observations to the data set. The analytic sample consists of those respondents who are not pregnant and in opposite-sex relationships only, who identify as White and identify their partners as White, Black, Hispanic, or Asian and who are not missing data on any analysis variables (age, education, household roster variables, living arrangement, skin tone, nativity, duration of the current relationship, and BMI reported at wave). The resulting sample consists of 3,897 White male and 5,034 White female person-wave observations.

Second, I constructed a person-wave data set for the *selection* analysis that reflects White men and women who report current relationships with new partners since the prior observation. To construct this sample, I compared the year that respondents reported their relationships starting to the year they were last interviewed, and only kept those respondents whose relationship durations indicated they entered the relationship after the prior wave of data collection. This sample consists of 3,123 White male and 3,798 White female person-wave observations. In all analyses of the cross-sectional and selection samples, statistical tests and standard errors are adjusted for clustering within individual.

Third, I constructed a person-level data set for the *BMI change* analysis that reflects White men and women who report current relationships with the same partner at both Waves 3 and 4. Unfortunately, one limitation of the Add Health data is the inability to directly link Wave 3 relationships to relationships reported at Wave 4 (by, for example, a unique partner ID number). This was done by design to maximize data confidentiality for participants. I therefore use age, race, and gender as proxies for determining whether a partner changed between waves 3 and 4. I compared partner age at Wave 3 with the expected age of that partner at Wave 4 based on the length of time elapsed between interviews. If the Wave 4 partner matched the Wave 3 partner on race, gender, and expected age (plus or minus one year, to adjust for the timing of birthdays within the calendar year), I designated that partner as being the same. Of course, it is impossible to know for sure whether the partner was in fact the same person; however, this is the closest I can come to determining partner identity, and at the very least, respondents in this subsample have partners with consistent

race/ethnicity and age characteristics over time even if the actual person changed. This sample consists of 703 White men and 1,058 White women.

### Key Variables

***Body mass index.*** The key dependent variable in this study is body mass index (BMI), which is equal to weight in kilometers over height in meters squared. BMI is frequently used as a measure of body fat, and high BMI is linked to outcomes including diabetes, cardiovascular disease, cancer, disability, and mortality (Berrington de Gonzalez et al. 2010; Whitlock et al. 2009; Okosun et al. 2001). BMI is also criticized in the literature as not being an ideal proxy for fat mass, although there is an association between fat mass and BMI in subjects (Ahima and Lazar 2013; Muller 2013). However, for the purposes of social science research, height and weight are the most commonly reported variables that allow measurement of respondent body size. Add Health has the advantage of including height and weight as measured by the interviewer, rather than self-reported height and weight, which tends to overestimate BMI at the low end of the BMI scale (BMI <22) and underestimate it at the high end of the scale (BMI>28) (Stommel and Schoenborn 2009). Measured BMI is generally considered a more valid and reliable measure of body weight than self-reported BMI.

For this study, I primarily use BMI as a categorical variable coded as normal weight (coded as 0, BMI is less than 25) and overweight/obese (coded as 1, BMI of greater than or equal to 25), following the Centers for Disease Control classifications (Centers for Disease Control and Prevention 2015). BMI categories have been criticized as arbitrary thresholds (Muller 2013), yet they can be useful when

examining change in BMI status over time, including whether individuals transition from one BMI status to another (e.g., Rendall et al. 2012). Additionally, this categorical specification of BMI is most theoretically consistent with the idea that BMI may be associated with relationship outcomes (and vice versa) because BMI is a facet of physical attractiveness, in which normal weight people are more attractive than overweight and obese people.

***Race/ethnicity.*** In my coding of race, I account for both racial and ethnic identification, as Hispanic ethnicity has been found to be an important facet of racial identity (Vaquera and Kao 2006). Race and ethnicity were asked at waves one and three. I use responses from wave one[6] to construct a race variable. The Add Health asks respondents three questions that I use to code race: first, whether or not they are of Hispanic origin; second, whether or not they identify as Black, Asian, native American, or White; and finally, respondents who chose more than one race (that is, multiracial respondents) were asked which race they most identify with. Because self-identified race is likely an important predictor of the race of a person's partner (Miyawaki 2015), I code race and ethnicity to account for the respondent's racial identity as closely as possible; therefore, I categorize multiracial respondents with the racial group they most identify with. Respondents who indicated they are of Hispanic origin were coded as Hispanic, regardless of race chosen. For the present study, I

[6] Race of the respondent was not asked at waves two or four. Because more respondents at wave four are missing values for race measured at wave three than race measured at wave one, I opted to use race measured at wave 1. Some respondents changed their racial categorization between waves 1 and 3: of the entire Add Health sample observed at waves 1 and 2.5% of respondents changed their race between waves (n=378). Of the Wave 3 current relationship sample, 2.3% changed race between waves and 2.4% of the wave 4 current relationship changed race between waves. I retain these individuals in all analyses.

restrict respondent race to Whites only, including multiracial Whites, due to sample size limitations with respect to exogamous relationships of non-White respondents.

***Partner race/ethnicity.*** Partner race and ethnicity was collected using two questions in the Add health for both waves three and four. It is reported by the Add health respondent and therefore is not a measure of the partner's self-identified race. Respondents were asked whether their partner was of Hispanic origin, and asked to select one racial category (Black, Asian, Native American, or White) for their partner. For the present study, I restrict partner race to non-Hispanic White, Black, Asian, and Hispanic. I omit White respondents partnered with Native Americans for the present study due to small sample sizes.

***Control Variables.*** *Gender* is coded dichotomous (0=male, 1=female) and was asked at each wave. *Age* is a continuous variable asked at each wave (age range at wave 3 was 18-26, age range at wave 4 was 24-32). *Union type* is a three-category variable to capture whether the respondent is or has been in a marriage, cohabiting, or dating relationship with their current partner. I code relationship type as "married" if the respondent is or was ever married to the partner, "cohabitation" if the respondent currently or previously cohabited with their partner but was never married to the partner, and "dating" if the respondent did not report ever marrying or cohabiting with the partner. *Educational attainment* is coded as a four-category variable. Note that because of the age range of the sample at Wave 3, many students had not yet had a chance to complete a college degree, though all had the opportunity to begin college coursework and graduate from high school. Educational attainment is correlated both with lower risk of overweight and obesity (Ailshire and House 2011) and also with a

greater likelihood of dating across race for Hispanics in particular (Miyawaki 2015; Qian and Lichter 2007). *Multiracial* identifies respondents who identify with more than one race at Wave 1 (but selected "White" as the race they most identify with). *Biological children* measures whether or not the respondent lives with one or more of their own biological children. Prior research has indicated that having children increases risk of obesity for men and women (Weng et al. 2004). *Living arrangements* measures whether the respondent reports living in their parents' home, their "own place," or another living arrangement (not specified by Add Health). This variable captures a dimension of the life course transition from living with parents to living on one's own, and may have an impact on how influential a person's partner is for their health. *Skin tone* is interviewer-rated skin tone, measured at Wave 3, measured continuously from 1 (darkest) to 5 (lightest). *Foreign born* is coded 0 for US-born and 1 for born outside of the US. Relationship duration is a continuous variable, measured in years, and reflects the respondents' report of the year their relationship started subtracted from the year of the interview.

Due to the complex sampling design of the Add Health, I use sample weights, school-based clusters, and a post-stratification variable ("region") for descriptive statistics and analyses (Chen and Chantala 2014) with the *BMI change* sample, those respondents observed in a relationship with a partner with stable characteristics from Wave 3 to Wave 4. Because the Wave 3 and 4 pooled samples for the *cross-sectional* and *selection* analyses had more than one observation per person, I use individual-level clustering to adjust standard errors rather than school-based clusters and post-stratification strata.

Data Analysis

The analysis begins with a *cross-sectional* logistic regression model predicting the likelihood of being overweight or obese for Whites by partner race (Hispanic, Black, or Asian). It then is followed by models whose respective purposes are: (1) to estimate the extent that partner race for Whites is determined by one's overweight/obesity status, in a *selection model*; and (2) to estimate the causal effect of partner's race on the likelihood of being overweight/obese and on BMI change (measured continuously), in a *BMI-change* model. Although I conduct my analyses and describe the results in the above order, the *cross-sectional overweight/obese* and *BMI status-change* models are closest to each other in their statistical form and outcome variables, and therefore are presented immediately below, followed by the selection model.

*Cross-sectional Model*

The first step of the analysis is the *cross-sectional model,* to establish whether there is a statistically significant and substantively significant association between partner race and the likelihood of being overweight or obese for Whites. Formally, I denote being overweight/obese (compared to reference group normal weight) by 0, as noted above as measured as having a BMI of 25 or over. In the cross-sectional model, the probability of being overweight/obese at time $t$ is a function of a main explanatory variable of partnership race $P$ at wave $t$, $P_t$, and additional explanatory variables specified in vector $Z_t$. Vector $Z_t$ consists of age, relationship type (married, cohabiting, dating), education level, whether or not the respondent is multiracial at time $t$, whether there are biological children in the household, living arrangement,

skin tone, nativity, and relationship duration (in years). Treating the binary overweight/obese vs. normal weight variable $O_t$ as a dichotomous variable, $E[O_t|P_t,Z_t]$ is estimated by logistic regression, representing the expectation as a logistic function $F$ as follows:

$$E[O_t|P_t,Z_t] = F(\beta_0+\beta_1 P_t + \beta_2 Z_t) \quad (1)$$

In order to ascertain whether or not the effect of each predictor variable on the likelihood of being overweight or obese differed by gender, I also separately estimated models pooled by gender with gender interactions on all covariates.

For this *cross-sectional* model analysis, I used the person-wave dataset of all individuals reporting current relationships at waves 3 and 4, described above. The models were estimated separately for White men and women, for a total of two models. Because the same individual frequently contributes more than one wave of BMI health while partnered, "clustering" of observations within individuals is adjusted for in estimating the standard errors.

*BMI-change Model*

The second step of the analysis is the "BMI-change" model. The outcome variable is BMI, specified as a binary outcome[7] (normal vs. overweight/obese) and is

[7] I also tested a specification of the BMI-Change model using a continuous BMI outcome variable. This specification did not produce any statistically significant results, suggesting that any association between partner race/ethnicity and BMI is not a general one across all BMI levels, but rather, occurs as a contrast between normal and overweight or obese partners. This is consistent with a theoretical interpretation, discussed above, that considers weight as a facet of attractiveness, in which normal weight partners are considered more attractive and desirable than those who are overweight or obese.

measured at wave 4. Again, the main explanatory variable is partner race/ethnicity for Whites among those who are partnered with the "same" partner at both waves 3 and 4. The model includes additional explanatory variables age, relationship type (married, cohabiting, dating), education level, multiracial, biological children in the household, living arrangement, skin tone, nativity, and relationship duration in years. However, the objective of the BMI-change model, and therefore the time specification of the outcome variable, is different than for the cross-sectional model. I use what Allison (1990) refers to as the regressor-variable method of estimating at the *change* in the dependent variable, here the likelihood of being overweight or obese, and interpret the results as suggesting a causal impact of partner race on BMI status among individuals in long term relationships with stable partners. The period of time over which BMI change is measured is approximately seven years. The equation used to estimate the effect of partner race on BMI change for Whites is as follows:

$$E[O_{t+1}|P_t, BMI_t, Z_t] = F(\beta_0 + \beta_1 P_t + \beta_2 BMI_t + \beta_3 Z_t) \quad (2)$$

In this equation, the probability of being overweight/obese at time $t+1$ (wave 4) is a logistic function of partner race at time $t$ (wave 3), BMI at time $t$ (measured continuously), and vector $Z$, which represents the variables described above measured at time $t$ (wave 3). These latter variables include relationship type. See Appendix Table 3.2 for the matrix of Wave 4 relationship type by Wave 3 relationship type.

I estimated the above equation (2) as a logistic regression model. I estimated this equation separately for White men and women, resulting in two models. I additionally estimated the model with pooled genders with gender interactions on all covariates to determine whether the effect of the independent variables measured at

time *t* on health at time *t+1* varies by gender. These models are estimated from person-level Add Health data set of respondents who were observed with partners of consistent age, gender, and race/ethnicity from waves 3 to 4 (the "same partner" sample). To account for Add Health's complex sampling design, I use school-based clusters and post-stratification region strata to adjust standard errors.

I selected the regressor-variable approach to modeling BMI change over time over the change score method, as supported by Allison (1990). See Chapter Two of this dissertation for a full discussion of the differences between these methods. As discussed in Chapter Two, Allison (1990) argues that the regressor-variable approach is most appropriate for stock variables (compared to flow variables), and supplies body weight as one example of a stock variable. One prior study measuring change in marital status and change in BMI over time among the NHANES cohort used a change-score as the outcome variable (the difference between baseline and follow-up BMI) while controlling for baseline BMI as well (Sobal et al. 2003), though this approach does not follow methodological recommendations. Further, because my focus in this chapter is on the relationship between weight and partnering, it makes sense to examine BMI as a normal vs. overweight/obese variable, because overweight/obese may better represent physical attractiveness, theoretically speaking. The regressor-variable method of examining change allows both a binary and continuous specification of the outcome variable. Looking to a prior example using Add Health, The and Gordon-Larsen (2009) used a binary obsese/non-obese outcome variable specification and found that transitioning from being unpartnered at time *t* to being partnered at time *t+1* was associated with greater probability of obesity at time

*t+1,* but did not include a control for BMI at time *t* in order to capture a dimension of change, rather than simply likelihood at one point in time. In their analysis, it could be that BMI trajectories over time were more responsible for changes in BMI than change in partnership status. I aim to improve on these prior studies' methods with the analysis presented here. Controlling for BMI in the previous period in which the respondent was with the same partner represents a major gain over the cross-sectional for inferring a causal impact of partner characteristics on the respondent's health.[8]

*Selection Model*

The "selection model" is designed to investigate to what extent the associations between partner race and being overweight/obese established in the "cross-sectional model" might be attributed to selection processes whereby individuals select into endogamous vs. exogamous relationships on the basis of weight reported before the start of the relationship. To examine the evidence for selection processes, I first determined which relationships formed between wave 2 and 3, and wave 3 and 4, respectively, formally denoted above as times *t* (waves 3 and 4) and *t-1* (waves 2 and 3). I then predict partner race of a new cohabiting, dating, or married partner at wave 3 and 4 (time *t)* by weight status approximately seven years prior at waves 2 and 3 (time *t-1).* Note again that the sample used for the selection model pools waves 3 and 4, and thus some individuals who were observed with new partners at both waves 3 and 4 contribute two person-wave observations.

[8] Note also that there is debate in the literature between using raw BMI scores vs. BMI z-scores when examining change in BMI over time. Studies, mostly focused on children and adolescents, have concluded that raw BMI is preferable to BMI z-scores (e.g. Berkey and Colditz 2007; Cole et al. 2005).

Consider the following BMI selection model into endogamous vs. exogamous relationships for Whites:

$$E[P_t|O_{t-1}, Z_t] = F(\beta_0+\beta_1 O_{t-1} + \beta_2 Z_t) \quad (3)$$

In the above model, the expected value of partner race at time *t* in a newly formed married, dating, or cohabiting partnership is a function of overweight/obesity at time *t – 1* and characteristics $Z_t$, which represents age, relationship type, education level, multiraciality, biological children in the household, living arrangement, skin tone, foreign born, and relationship duration measured at time *t*. Multinomial logistic regression is used to estimate this model for Hispanic, Black or Asian partners, with non-Hispanic White partner as the base outcome.

However, in the new relationships subsample, missing values occur for BMI observed at time t – 1, and therefore of $O_{t-1}$ in equation 3, for two reasons. First, the Add Health observed sample was smallest at wave 2 compared to all other waves, because the wave 2 follow-up to wave 1 did not include respondents who were no longer in high school at wave 2. Therefore, for respondents in new relationships at wave 3 (based on the length of the relationship – that is, the relationship started after the interview period for wave 2), the wave 2 interview was not administered and therefore interviewer-measured BMI data from wave 2 was not recorded. This is important because Wave 2 BMI was interviewer-measured, shown to be a more valid and reliable way to measure BMI (Stommel and Schoenborn 2009), whereas at Wave 1, BMI is calculated from self-reported weight and height. Therefore, it would not be

optimal to substitute Wave 1 BMI for wave 2 BMI for individuals observed in new relationships at Wave 3, due to increased reporting error. Second, BMI data at waves 2 or 3 could be missing at random due to non-response on that particular item.

In order to include a measure of interviewer-measured BMI at the prior observation to help account for possible selection on the basis of health into relationships, I used multiple imputation (MI). That is, for cases where a new relationship was observed at Wave 3, I impute interviewer-measured BMI at Wave 2, and for cases where a new relationship was observed at Wave 4, I impute interviewer-measured BMI at Wave 3. In the imputation equation, I used self-reported BMI from Wave 1, plus interviewer-measured BMI at the current wave (that is, the wave the new relationship is observed) to impute interviewer-measured BMI at the prior wave. More specifically, to impute measured BMI at wave 2 to use to predict partner race at Wave 3, I used Wave 1 self-reported BMI as well as measured BMI at Wave 3. I also included in the imputation equation interviewer-measured BMI from other men and women whose BMI was observed at waves 2 and 3. For new relationships observed at Wave 4, in the imputation equation I used self-reported BMI from wave 1 as well as measured BMI at Wave 4. I also included measured BMI from other men and women whose BMI was observed at Waves 3 and 4. The imputation equation also included the covariates used for the regression models (partner race, gender, education level, relationship type, age, multiracial identity, having biological children in the household, living arrangement, skin tone, nativity, and relationship duration). Twenty imputations were performed ($m$=20). This application of multiple imputation to correct for error in self-report is analogous to that used by Schenker et al. (2010), and

represents an improvement over using only Wave 1 BMI as a predictor variable for individuals observed in new relationships at Wave 3 because it allows for interviewer-measured BMI to be used, reducing reporting error due to self-reports of height and weight.

For the analysis models, I first performed the multinomial logistic regression model represented by equation 3 separately for White men and White women. Second, I used gender interactions on all covariates to determine whether being overweight/obese predicted partner race differently for men and women. However, because there are no cases in the data where a White woman who is foreign-born has a Black partner, the multinomial logistic regression model with gender interactions would not converge. Therefore, I instead performed separate logistic regression models to predict a binary outcome of partner race for each race individually (that is, a separate model predicting Hispanic partner, Black partner, and Asian partner), compared to a partner of any other race, with gender interactions on all covariates. The variable *foreign-born* (respondent) is omitted from the logistic regression model predicting a Black partner, causing 35 observations to be dropped. The full results from the gender interaction models predicting partner race are shown in Appendix Table 3.3 and discussed below with the results presented in Table 3.5.

*Results*

Descriptive statistics for the three groups described above (all White men and women in the US cohort that was in high school in the mid-1990s in current relationships, those in new relationships, and those in relationships with partners with stable characteristics over time (inferred to be the same partner) are shown in Tables

2.1, 2.2, and 2.3, respectively. Table 3.1 displays descriptive statistics for White young adult men and women, aged approximately 19 through 30 years old at the time of observation (with mean age of about 25 years), who report current dating, married, and cohabiting relationships. Gender differences were tested using t-tests for continuous variables and chi-squared tests for categorical variables; p-values are represented by asterisks in the "Men vs. Women" column. Both White men and women are most frequently partnered with endogamous White partners, with 89.4% of White men having a current White partner and 87.9% of White women reporting a current White partner. For men, Black partners are the least frequently reported (1.3% of current relationships), whereas for women, Asian partners are the least frequently reported (2.8% of relationships). The chi-squared tests indicate that partner race differs by gender ($p<.001$). Not surprisingly, White men and women are rated as having a light skin tone by interviewers, with a mean skin tone of 4.95 points on a five-point scale. Between 2% and 3% of men and women report being multiracial. A very small percentage is foreign-born – about 1% of women and less than 1% of men. White men and women are mostly married (41.1% of men and 47.5% of women), but the distribution of relationship type varies by gender ($p<.001$), with women more likely than men to be married. The current relationships reported are about three to four years long, and women report slightly longer relationships by about half a year ($p<.001$). Most of the population lived in their own place – approximately three-quarters of men and women, though the overall distribution of the type of living arrangement varies by gender ($p<.05$), with White women more likely than White men to live in their own place and less likely to live with parents or in another home.

Substantially more women than men report having biological children in the household (45.9% compared to 30.1%, $p<.001$). Men and women differ in their educational attainment ($p<.001$). Most have at least some college (41.6% of men and 41.9% of women), and 22.7% of White men have finished a BA or further education, compared to 29.0% of women. The average BMI for White young adults is about 28 for men and 27 for women ($p<.001$), which falls in the "overweight" range, and White men are more frequently overweight and obese than women (62% of men and 50% of women).

[TABLE 3.1 ABOUT HERE]

Table 3.2 displays descriptive statistics for White men and women who are observed in new relationships in approximately the previous seven years (the time between waves 2 and 3, and waves 3 and 4). The characteristics of this population mirror the full group (reported in Table 3.1) in current relationships, though the new relationship population is not more frequently married compared to other relationship types – rather, women in the new relationships sample are most frequently married (37.0% of women), whereas men in new relationships are most likely to be in a dating relationship (37.4% of men), and overall, type of relationship varies by gender ($p<.001$). Again, endogamy is the norm for Whites, though women report endogamy at slightly lower rates than men (87.2% compared to 89.2% of men), and women more frequently have Black partners compared to White men, whereas men more frequently have Asian partners compared to White women (3.8% versus 2.9%). Overall, partner race is statistically significantly different for White men compared to White women in new relationships ($p<.001$). Relationship duration among Whites in

new relationships averages about two years, and again, women report longer relationships than men ($p<.001$). BMI measured at between six and seven years prior is less than the BMI reported by the current relationship population, which is unsurprising given that respondents were younger at the prior time point and BMI tends to increase with age, especially as people transition from adolescence into adulthood (Gordon-Larsen et al. 2010). However, men are found to have greater mean BMI at the previous time point than women ($p<.001$) and a greater frequency of being overweight/obese than women ($p<.001$). This gender difference for individuals in relationships contrasts with studies of all adult men and women, which find that obesity is more prevalent among women than men for adults observed from 1999-2008, approximately the same period as this study examines (Flegal et al. 2010). This contrast between findings for those in relationships versus all adults is consistent with a greater overweight and obesity "penalty" for women than men in forming relationships. That is, women are more likely to be excluded from the dating and marriage market on the basis of weight than men are (Fu and Goldman 1996; Puhl and Heuer 2009). However, another study using Add Health data finds comparable rates of obesity between men and women (Gordon-Larsen et al. 2010), suggesting that the relative youth of the Add Health sample may also be a factor.

[TABLE 3.2 ABOUT HERE]

Finally, Table 3.3 displays descriptive statistics for White men and women who are observed in long term relationships with partners with the same measured characteristics over a time period of approximately seven years, from about 2001 to 2008 (see Analytic Sample section for details), here assumed to be the same partner at

both points in time that they were observed, though their relationship type may have changed over this time period (see Appendix Table 3.2). This population has a greater percentage of endogamy compared to all current relationships and new relationships: 94.3% of White men and 93.2% of White women have White partners, though the distribution of partner race is not statistically significantly different between men and women for this relatively smaller sample (the *p*-value is only statistically significant at the 0.10 level). Again, women report longer relationship duration (measured at wave 3) than men ($p<.001$) and women are more likely than men to live with biological children ($p<.001$). The age of this population, measured at wave 3 is 22.3 years for men and 21.9 years for women ($p<.001$). Men have higher mean BMI at both waves 3 and 4 ($p<.05$) and greater risk of being overweight/obese compared to women ($p<.001$).

[TABLE 3.3 HERE]

Tables 2.4, 2.5, and 2.6 show the results from the cross-sectional, selection, and BMI change models, respectively. Results from gender interaction models (in which White men and women are pooled and gender is interacted with all covariates) are presented in Appendix Tables 2.3, 2.4, and 2.5. All tables display logistic coefficients, but also odds ratios below on the key variables. Table 3.4 displays the results from the cross-sectional logistic regression model predicting the likelihood of being overweight/obese on partner race among White men and women observed in current dating, marriage, and cohabiting relationships at two points in time (about seven years apart), pooled. For men, there is no statistically significant effect of partner race on the likelihood of being overweight/obese. For women, on the other

hand, having a Hispanic partner is associated with 1.47 times the likelihood of being overweight/obese, and having a Black partner is associated with 2.14 times the risk of being overweight/obese. The gender interaction for Black partner is statistically significant, indicating that the effect of having a Black partner on overweight/obesity is greater for White women than White men. These cross-sectional results are the associations that I further disaggregate into selection and causal associations in the selection and BMI change models.

Being in a dating or cohabiting relationship is associated with an lesser likelihood of being overweight/obese compared to being married for both men and women, consistent with prior findings regarding the association between marital status and weight (Harris et al. 2010; Teachman 2016). For women, higher levels of education are associated with a lower risk of overweight/obese, which is consistent with previous research that finds that for women, obesity and low SES are mutually reinforcing disadvantaged statuses (Pudrovska et al. 2014). Age is associated with an increase in the likelihood of being overweight/obese for White men and women.

[TABLE 3.4 ABOUT HERE]

Table 3.5 shows the results from the selection model, which is a multinomial logistic regression model predicting partner race (Hispanic, Black, Asian, with reference group White partner) among those who began a new relationship in approximately the seven years after the prior observation. Table 3.5 also shows statistical significance for gender interactions (full gender interaction model shown in Appendix Table 3.3). The results indicate that for White women, selection into relationships likely accounts for at least a portion of the cross-sectional association

between having a Black partner and the likelihood of overweight/obesity. Being overweight/obese (compared to normal weight) before starting a new romantic relationship more than doubles the chances that a White woman will partner with a Black partner, compared to a White partner. The gender interaction results indicate that there may be a gender difference in this effect, such that being overweight or obese is more likely to predict having a Black partner for White women compared to White men; however, the gender interaction on Black partner is only statistically significant at the $p<0.10$ level. Being overweight/obese before the start of a partnership does not affect partner race for White men, nor does it affect the likelihood of having a Hispanic or Asian partner for White women.

Skin tone also affects White women's partnership outcomes: having lighter skin is associated with a reduced likelihood of having any nonwhite partner for White women, and an reduced likelihood of a Hispanic partner for White men. No effects of being multiracial on partner race are found. Being foreign born has mixed effects on partner race: foreign-born men are less likely to have Hispanic partners compared to White partners but more likely to have Black partners compared to White partners, whereas for White women, being foreign decreases the chances of having a Black partner. However, it is noteworthy that the sample sizes for foreign-born respondents are very small in this analysis (about 1% of the sample), so these results may represent the pattern observed among just a few cases.

The results also show that being in a cohabiting or dating relationship, compared to a marriage, is associated with a higher likelihood of a Black partner for White women; likewise, cohabiting relationships compared to marriages increase the

likelihood of having an Asian partner for White women. This is consistent with prior research showing that interracial relationships are more likely to be cohabiting than married (Joyner and Kao 2005) and more likely to be dating rather than progress to cohabiting or marriage (Kroeger-D'Souza 2010). Having biological children in the household is also associated with having a Black partner for White women, and this association is statistically significantly different from the association between having biological children in the household and having a Black partner for White men. White women with lower education are more likely to partner in new relationships with Black and Hispanic partners. Specifically, having a Bachelor's degree or more education decreases the likelihood of a Hispanic partner (compared to having less than a high school degree), and having some college or a Bachelor's degree or more education decreases the likelihood of having a Black partner for White women. This may indicate a type of inverse status exchange, in which less-educated White women partner with lower racial status men (Torche and Rich 2016).

[TABLE 3.5 ABOUT HERE]

Finally, Table 3.6 displays the results from the BMI-change models testing for the multivariate association of partner race and other variables with BMI among White men and women who report current relationships with the "same" partners over a period of about seven years (i.e., partners with the same characteristics at two points in time in Waves 3 and 4 of the Add Health). In these models, BMI is measured both as a binary outcome, predicted using a logistic regression model. Odds ratios for the key independent variable (partner race) are presented. These models were estimated separately by gender, and statistical significance levels for gender

interaction models (shown in Appendix Table 3.4) are indicated in the "Men vs. Women" columns for each specification of the outcome variable, BMI. Key for interpretation of this model is the inclusion of BMI (measured continuously) measured at time *t* (Wave 3) as a covariate for estimating the effect of partner race on BMI at time *t+1* (Wave 4), consistent with the regressor-variable framework for examining change in a "stock" dependent variable over time (Allison 1990). I interpret this association as suggesting a causal relationship between partner race and being overweight/obese.

Looking at the results from the logistic regression model predicting overweight/obesity over time, the key finding from this portion of the analysis is that White women's chance of being overweight/obese is adversely affected by having a Black partner, compared to White women partnered with White male partners. Moreover, the magnitude of this effect is substantial. The odds of being overweight or obese at Wave 4 are 15 times greater for White women with consistent Black partners over this time period of approximately seven years than for White women who are consistently partnered with White partners over the same time period. Further, there is some evidence that this overweight/obesity-inducing effect may be stronger for White women compared to White men, indicated by the results of the gender interaction for having a Black partner: the p-value for the gender interaction effect is statistically significant at the 0.10 level. There is an estimated 3.23 increase in the odds of being overweight/obese at Wave 4 for White women with a Hispanic partner; the coefficient for this association is statistically significant only at the 0.10 level. No

statistically significant effect is observed for White men with any non-white partner category, nor is it observed for White women with Asian partners.

In the logistic regression model results for BMI change, BMI at a prior point in time is, unsurprisingly, a strong predictor of being overweight/obese for both men and women, though it is a stronger predictor for White men than White women, suggesting greater continuity of BMI over time for men. For White women, again, being multiracial increases the likelihood of overweight/obesity, and this effect is statistically significantly stronger for White women than for White men, as indicated by the gender interaction results. It is interesting that this association appears in the BMI change model but not the cross-sectional analysis already described; it appears that being multiracial, for White women, increases the likelihood of becoming overweight/obese over time specifically. Unlike in the cross-sectional and BMI selection results discussed above, there is no association between relationship type at the first point in time and the likelihood of being overweight/obese about seven years later for men or women. This is perhaps because in these stable relationships with "same" partners, the commitment level is more likely to be high regardless of relationship type, whereas in the other analyses, partnerships may have represented different durations and therefore more varying levels of commitment. This interpretation is supported by the fact that almost all of the relationships observed at Wave 4 are marriage or cohabitations, rather than dating, by Wave 4 (see Appendix Table 3.2). Having biological children in the household at Wave 3 also decreases the risk of becoming overweight/obese for White women, which appears to differ from other studies finding that the more children women have, the more likely they are to

be obese in middle age (Weng et al. 2004). However, the difference found here may be due to the specific population examined (young Whites observed in continuous relationships). Finally, having a Bachelor's degree or more education decreases the likelihood of overweight/obesity for White women, and younger age predicts a lower risk of overweight/obesity for White men.

*Discussion*

There is a paradox in the literature on romantic relationships and weight: although heavier people, especially women, are penalized on the marriage market for being overweight or obese and are less likely to marry or enter new relationships (Averett et al. 2008; Conley and Glauber 2006; Gortmaker et al. 1993; Puhl and Heuer 2009), people in relationships - especially marriage and cohabitation - are more likely to gain weight (Averett et al. 2008; Burke et al. 2004; Jeffery and Rick 2002; The and Gordon-Larsen 2009). This is considered paradoxical, because romantic relationships are usually associated with better health outcomes, not worse, due to both selection processes of the healthier being more likely to partner, as well as romantic relationships having a protective effect on health (Lillard and Panis 1996; Umberson and Montez 2010). Explanations proposed for this paradox include aspects of the shared environment that come with a romantic partnership, such as eating together, that can cause weight gain (Averett et al. 2008), and possibly because people no longer feel the need to work to be attractive in order to win a partner (Bove and Sobal 2011). Prior studies have examined some facets of how these processes of selection and causation may be gendered and racialized, specifically whether the propensity to gain weight varies by gender and race, and whether selection into relationships on the

basis of BMI varies by gender and race. Previous cross-sectional findings, including those that use Add Health data (Harris et al. 2010) indicate that the association between relationship status and BMI varies by race and gender to some degree, such that Black women in romantic partnerships are particularly heavy (Harris et al. 2010; Schafer 2010). Further, existing empirical research indicates that selection processes are gendered and racialized, such that White women in particular are penalized on the dating and marriage market for being overweight/obese (Puhl and Heuer 2009) and considered less desirable partners (Ali et al. 2013), whereas Black men are more accepting of heavier body types in potential partners (Glasser et al. 2009).

However, previous research has not examined whether these selection and causal processes in the association between romantic relationships and BMI may vary by partner race as well as one's own race. In this study, I fill that gap by investigating the association between interracial and inter-ethnic partnerships and overweight/obesity, thus contributing to the literature on how partner selection and the causal association between romantic relationships and overweight/obese are gendered and racialized. I first examined whether any association exists between partner race in current dating, marriage, and cohabiting relationships among White young adults approximately 19 to 30 years old who were enrolled in middle and high school in the mid-1990s U.S. Although this population may represent just one cohort, this is the cohort that is currently starting families and having children, and interracial relationships among this population should be of particular interest, as their partnering and fertility behaviors will affect the racial and ethnic composition of the next generation - and possibly also the health status of the next generation. The

results from the cross-sectional analysis show that White women with Black partners are more likely to be overweight/obese, and the association of having a Black partner is stronger for women compared to men. Further, White women with Hispanic partners are also more likely to be overweight/obese. These results represent the associations to be explained - to what extent can this association be attributed to the propensity of White women to partner with Black and Hispanic men on the basis of their weight status, indicating a status exchange process, and to what extent can this association be attributed to causal processes, including stress, status, and resources, in interracial relationships?

Overall, I find evidence for both selection processes and for causal processes, the latter indicated by change over time in overweight and obesity. The results from the selection analysis show that among White young adults in the cohort, White women who are overweight or obese are more likely to enter new relationships with Black partners compared to with White partners. This finding suggests that the cross-sectional association between having a Black partner and being overweight/obese is due at least in part to selection mechanisms for White women. I interpret this finding as being suggestive of a status exchange process. Status exchange theory posits that race acts as a status marker on the marriage and dating market (Kalmijn 2010), and most research to date examines the extent which education is "exchanged" by minorities, particularly Black men, for obtaining a White partner; recent studies suggest that this process continues in the present day at levels identical to thirty years ago, even as interracial pairings become more common (Torche and Rich 2016). In this study, I extend this theoretical framework to apply to weight status. The existing

research indicates that people who are heavier are less likely to partner in the first place, especially White women (Puhl and Heuer 2009). We know that being overweight or obese is also a status marker, particularly for women, as it is an important cultural facet of physical attractiveness (Chen and Brown 2005; Saguy 2014). This study posits that thinness and heaviness may also act as status markers that can be "exchanged" for partner race. The results support this idea, suggesting that heavier White women are unable to trade thinness, as a marker of physical attraction, for a higher "status" White partner.

The results from this study also speak to prior research that investigates why there is such a gender imbalance in the propensity for partnering across particular racial and ethnic lines. Belot and Fidrmuc (2010) found that height explains these gender imbalances: they explain the fact that White women are more likely to have Black spouses than White men, but White men are more likely to have Chinese spouses than White women, as the result of the greater average height of Black men compared to Chinese men. Although the authors of this study do not specifically suggest that height acts as a status marker that can be exchanged for a White partner in the case of Black men, it may be that weight and height both represent markers of gender-specific physical attractiveness that may be "exchanged" for a White partner on the marriage and dating market, as indicated by the findings presented here, which bring together height and weight into one measure (BMI), though my findings are more pertinent to women's weight and height than men's.

Finally, I investigated the propensity for individuals to become overweight/obese over time among White men and women observed in dating,

cohabiting, and marriage relationships with partners with stable characteristics in terms of age, race, and gender over a period of at least seven years. Due to data limitations, I cannot say definitively that a partner is in fact the same, but I assume that it is likely that they are the same person. Moreover, we know that these partners have the same crucial characteristic of interest (race/ethnicity). The results show that White women who are partnered with Black partners, and possibly also White women who are partnered with Hispanic partners, experience an adverse impact on their likelihood of being overweight/obese at follow-up. This effect is, substantively speaking, quite strong for White women with Black partners: these women are 14.7 times more likely to be overweight or obese at follow-up when consistently partnered with Black partners compared to White women consistently partnered with White partners.

Research on the causal link between romantic relationships and health typically relies on relationships' abilities to buffer stress to explain how relationships protect health (Umberson and Montez 2010); however, this explanation is not satisfactory for explaining a causal link between relationships and BMI, because relationships are typically shown to adversely affect weight by causing weight gain (Averett et al. 2008; The and Gordon-Larsen 2009), and transitioning into romantic relationships, particularly marriage, is linked to weight gain (Jeffery and Rick 2002; Sobal et al. 2003). Thus, researchers have typically looked to various aspects of the social environment to explain weight gain in relationships, including shared environment, relaxed standards of weight due to the commitment relationships provide, and partner concordance in health outcomes, especially among partners who

have lived together for a long duration (The and Gordon-Larsen 2009). This study, by bringing partner race to bear, pushes this literature forward in several ways. First, one interpretation of the finding that having a Black partner increases White women's likelihood of overweight/obesity may be evidence that interracial relationships, especially those with Black partners, are more prone to stress for Whites and thus greater weight gain compared to relationships with same-race partners. Medical literature shows that stress and weight gain are linked, especially chronic stress (Dallman 2010); it could be the case that the chronic stress of being in a relationship that is stigmatized or subject to the disapproval of family and friends leads to weight gain.

However, in both the case of selection and status exchange as well as causality and stress, there is another possible interpretation for the results presented in this study that should not be ignored. Bringing together social psychological theory on the self-concept with prior theorizing on romantic relationships and weight gains points to a different conclusion. Prior research indicates three important patterns for interpreting these results. First, Black men are accepting of heavier bodies and find them more attractive (Glasser et al. 2009; Jackson and McGill 1996), including in adolescence (Thompson et al. 1996). Second, people relax their worries about gaining weight in romantic relationships (Averett et al. 2008). Third, romantic relationships are a primary source of reflected appraisals and inform the self-concept, including the self-concept as it pertains to the perceptions of one's own body and body satisfaction (Miller 2001; Ogden and Taylor 2000; Pole et al. 2004).

Taking together the weight selection and weight change results, there appear

to be multiple processes explaining the associations between White women's Black partners and greater likelihood of being overweight or obese. First, it is reasonable to conclude that White women with Black partners gain weight in the course of a relationship because they are shielded by the relationship from particularly oppressive body weight standards that might be of greater importance with a White male partner. Similarly, with regard to selection processes, it may be that White women find more satisfying relationships with men who do not subscribe to body type ideals that are particularly oppressive for women's bodies. "Fat shaming" is a pernicious part of our culture, and it rests largely on the promotion of an attractiveness ideal that idealizes thin, White female bodies, resulting in cultural and structural forces that oppress heavy women (Fikkan and Rothblum 2011; Saguy 2014), resulting in worse labor, education, and marriage outcomes (Glass et al. 2010). We thus should perhaps not disregard overweight/obese White women's partnering with Black men as purely a status-exchange process in which heavy White women simply can't attract a White partner, but would want to otherwise, and consider the possibility that White women may be exercising agency by selecting partners who are more supportive and accepting. Future research and theorizing on romantic relationships and weight should be mindful that although obesity is a public health concern, its stigmatization is linked to gender and race inequalities, and consider how to study weight and obesity from a perspective that both attends to health and to "fat" as a feminist issue (Saguy 2012).

This study combines the BMI categories of overweight and obese together into a single category. Operationalizing BMI in this way was done both to consider

BMI as a status marker related to attractiveness, and to incorporate the social psychological processes of weight gain based on a partner's perceptions of attractiveness over time. This is different, however, from studying the question of interracial relationships' associations with BMI from a public health perspective, in which obesity specifically would alternately be examined.

An important limitation of the main Add Health dataset is the lack of BMI information from partners. Another possible explanation for the results observed in this study is assortative mating: that White women who are overweight/obese are more likely to partner with Black men who are also overweight/obese. Assortative mating on weight status has been observed in relationships in general, but not specifically in interracial relationships (Schwartz 2013). Similarly, the results from the change over time analysis could be due to White women's weight gain in conjunction with Black partners' weight gain, reflecting a process of partner concordance in overweight/obesity (Castelnuovo et al. 2009). Evidence from the Add Health Romantic Pairs data set (a small subsample of the full Add Health sample) suggests that shared environments lead to partner concordance in BMI over time (net of race) (The and Gordon-Larsen 2009). However, without partner BMI in the full Add Health data set, and given the relative rarity of any given interracial combination, I am unable to test the extent to which assortative mating and/or partner concordance are also factors explaining the observed associations of White women's and men's BMI with being in an interracial romantic relationship.

The analyses from this study do not give clear answers on how White women's weight and having a Hispanic partner are related. The cross-sectional results

showed that there is a positive association between White women's overweight/obese status and having a Hispanic partner, but it is hard to say based on this study to what extent this association might be due to selection or causal processes. In the BMI change analysis, the Hispanic partner coefficient does not reach statistical significance at an alpha level of .05 or less, so it is hard to say whether the observed effect is real and would be more clearly seen with a larger sample size, or simply by chance. Prior research provides some clues as to what might drive the cross-sectional association observed here between a Hispanic partner and being overweight/obese. First, Hispanics are heavier than non-Hispanic Whites in the US (Pan et al. 2009; Ogden and Carroll 2010), and prior research has found that Hispanic adolescents are less prone to feelings of depression and low self-esteem as the result of perceiving themselves as overweight or obese (Ge et al. 2001). Taken together, these findings may indicate that Hispanics, like Black Americans, are more accepting of heavier body types and thus more likely to partner with White women who are heavier.

One limitation of this study is the inability, due to limited sample sizes, to analyze racial and ethnic partnership combinations other than non-Hispanic White men and women who partner with Blacks, Hispanics, and Asians. This limitation may be particularly pertinent with regards to interpreting weight gain by Whites with Black partners as evidence that interracial relationships are more stressful and therefore conducive to weight gain. Given the conclusion that interracial and inter-ethnic relationships may actually be protective of nonwhites' health (Miller and Kail 2016), it could be that nonwhites in exogamous relationships experience healthier weight, contradicting the idea that exogamous relationships are inherently stressful

for both White and minority health. As interracial relationships continue to gain in prevalence, researchers may benefit from analysis of new data sources that allow for a more comprehensive examination of interracial and interethnic pairings and health outcomes. Second, this study is limited in its ability to draw conclusions about the effects of having the same partner over a given period of time. Add Health does not allow researchers to link respondents' partners across waves, thus it is impossible to say for certain whether or not someone was observed with the same partner, or simply with a different partner who shared demographic characteristics with the prior current partner. Moreover, these waves are themselves far apart in time (approximately seven years). Analysis of individuals known to be with a partner across multiple time points would give better opportunities for causal inference on the relationship between partner race and BMI outcomes. Further, assuming that indeed the sample used for the BMI change analysis represents men and women who were continuously partnered with the same partner over a seven year period, this subgroup may have unique characteristics that are not shared by individuals whose partnerships do not last for such a long period of time.

Finally, future research should consider disentangling the effects of being in different types of romantic relationships with interracial and interethnic partners on overweight and obesity. That is, to what extent are these effects observed in marriage, cohabitation, or dating relationships? Prior research on relationships and weight gain has focused almost exclusively on marriage and cohabitation, and the theories offered for the association between romantic relationships and weight typically rely on the commitment that comes with being "off" the marriage market once one is married

(Averett et al. 2008) and the ramifications of sharing an environment and health behaviors over a long period of time (The and Gordon-Larsen 2009). However, it is reasonable to conclude that if overweight and obese people are less likely to marry (Gortmaker et al. 2008; Fu and Goldman 1996), they may also be less likely to enter dating and cohabitation relationships. In this study, I find that being married is associated with a greater likelihood of overweight/obese than cohabiting or dating, regardless of partner race, and that White women are more likely to have cohabiting Black and Asian partners than marriage partners, and more likely to date Black partners than marry them. Taking together the findings that both weight status and partner race vary by relationship type, it is conceivable that relationship type may moderate the association between partner race and weight outcomes. Future research, especially with a data source with sufficient sample size, should examine whether and how relationships type, partner race, and overweight/obesity interact.

# Chapter 4: Interracial and Inter-ethnic Marriage, Cohabiting, and Dating Relationships and Depression among White Young Adults in the US

*Abstract*

Sociologists of mental health are concerned with how social context, social processes, and social interactions shape experiences of mental health and depression. The dominant theoretical paradigm in the sociology of mental health is the stress process, which posits that there is a direct relationship between experiences of stress and resulting psychological distress, including depressive symptoms; however, this relationship is also contingent on social statuses and social support. As such, two topics are central to literature in the sociology of mental health: the stratification of mental health by race, ethnicity, and gender, and the effect of romantic relationships on mental health. However, only a handful of studies have examined whether and how the racial/ethnic composition of romantic relationships is linked to depressive symptoms, despite the fact that interracial relationships are increasingly common today and possibly subject to greater stress and conflict due to social disapproval and stigma. These studies have found that interracial dating in adolescence and romantic relationships with Black partners in young adulthood are associated with greater depression. However, prior research has not used longitudinal data to investigate to what extent selection processes on the basis of mental health may explain this association compared to social causation explanations, nor has prior research directly examined how different types of relationships with exogamous partners may be

related to depression, despite the fact that interracial dating relationships may be more socially acceptable than marriage or marriage-like relationships, but also represent lower levels of commitment and stress-buffering. This study brings together insights from the stress process model, status exchange theory of interracial relationships, and empirical insights on how interracial dating versus more committed relationships differ to examine the longitudinal association between partner race/ethnicity and depression selection into relationships and depression trajectories over time for White men and women in early adulthood. I use data from the National Longitudinal Survey of Adolescent to Adult Health (Add Health), focusing on current dating, marriage, and cohabiting relationships observed among White men and women approximately 18-32 years of age. I find a positive association between depression and having a Black partner for White women and between depression and having any nonwhite (Black, Hispanic, or Asian) partner for White men. I find that this phenomenon is driven primarily by married and cohabiting nonwhite partners for White men, whereas for White women it is in dating relationships with Black partners that there is evidence that depression is increased. I find evidence that more depressed White men are more likely to select into married and cohabiting relationships with nonwhite partners compared to White partners. I also find evidence that depressed women are more likely to select into dating relationships with Black partners compared to with White partners. I interpret these findings as expanding the scope of status exchange theory to suggest that mental health may be a status marker in interracial dating and marriage markets. Further, I find evidence that White women in long term relationships with Black partners are more likely to experience increased depression

over time compared to White women with endogamous partners. I interpret these findings as offering support for a stress process interpretation of White/Black relationships' effect on White women's mental health.

*Introduction*

The sociology of mental health is uniquely positioned to examine mental health not from a clinical or medical perspective, but from the perspective of understanding how social status and social structure intersect to create stress and distress in people's lives (Pearlin 1999). Central to the sociology of mental health is viewing mental health from a social causation perspective. Researchers and theorists engaged in the sociology of mental health have identified stress, caused by a variety of social processes including social relationships, financial hardships, life events, social inequalities, as a major factor that causes inequalities in health, especially psychological distress and depression (Thoits 2010; Turner and Lloyd 1999).

Two central topics in the sociology of mental health literature are the link between ascribed social statuses and mental health, particularly race, ethnicity, and gender, and the role of social relationships, particularly romantic relationships, in mitigating or aggravating the stress process and thus causing distress to be unequally distributed across the population (Brown 2003; Earl, Williams, and Anglade 2011; Ross 1995; Thoits 2010). Although social status attached to some characteristics – notably, gender and socioeconomic status – is associated with mental health inequalities such that lower status groups (women and lower socioeconomic status) experience greater levels of depression, studies of the relationships between race and depression show more mixed results, with some studies finding that Blacks in the US

having lower prevalence of mental health disorders, despite what a social status and stress perspective on mental health might predict (Earl et al. 2011; Schnittker and McLeod 2005).

Second, romantic relationships are understood as key to a social causation perspective on mental health. Romantic relationships can be both a source of social support and social stress, and researchers have identified characteristics of romantic relationships and partners, such as life stage and relationship quality, that affect mental health outcomes associated with relationships (e.g., Carr et al. 2014; Uecker 2012; Umberson and Montez 2010; Williams 2003). Further, there is evidence that the association between romantic relationships and mental health may differ by one's race and ethnicity (e.g., Brown et al. 2012; Fagan 2009; Harris et al. 2010; Kiecolt, Hughes, and Keith 2008). However, studies of the link between romantic relationships and mental health, when they do hone in on race and ethnicity specifically, typically account only for the race/ethnicity of one partner and generalize about patterns by race from this information alone, not accounting for whether the racial composition of a relationship also moderates the association between relationships and mental health.

A handful of recent studies have taken the first pass at remedying this omission, and have brought together research on race and mental health with insights on marital status and mental health to examine the impact of the racial composition of romantic relationships on mental health. Interracial relationships between Blacks and Whites are becoming increasingly common over time, though they are still subject to social disapproval, and are less common than relationships between Whites and other

ethnic groups, including Hispanics and Asians (George and Yancey 2004; Herman and Campbell 2012; Qian and Lichter 2007, 2011). (For a more extensive review of the literature on trends and patterns in cross-race and cross-ethnicity relationships, see the introduction to this dissertation.) One cross-sectional study, using the National Health Interview Survey to examine gender differences in distress based on the racial composition of married couples in the US found that nonblack people with Black spouses, especially White wives with Black husbands, were especially likely to report psychological distress, and individuals in marriages between Hispanics and other nonwhite people report higher levels of distress as well (Bratter and Escbach 2006). Two studies have used the National Longitudinal Study of Adolescent Health (Add Health) to study this particular topic. One study found that among teenagers, those who had ever dated interracially were more likely to report depressive symptoms (Miller 2014); the other found that among young adults, having a Black partner was associated with depressive symptoms for nonblack respondents regardless of the type of relationship (Kroeger and Williams 2011). Thus far, the predominant explanation offered to explain these associations, which have been cross-sectional in nature, have focused on the theory that different racial compositions of romantic relationships may be linked to experiencing more or less stress and thus psychological distress and depression. However, prior research has not investigated the association between partner race and depression longitudinally, and although some studies have investigated only marriage (Bratter and Eschbach 2006) while another investigated only dating in adolescence (Miller 2014), the type of relationship – dating compared to more committed, coresidential relationships – has not been considered as a

moderating factor in the association between partner race and depression. I build on these prior studies to continue to investigate the association between the racial composition of romantic relationships and mental health, defined by reporting depressive symptoms, by using longitudinal data to ask whether people select into interracial and interethnic relationships on the basis of depression or whether interracial and interethnic relationships may be said to cause psychological distress. Further, I expand on prior literature by considering how the link between partner race/ethnicity and depression may vary by type of relationships, as empirical work on the social acceptability of different types of interracial relationships suggests.

## *Literature Review*

### Race and Gender Inequalities in Mental Health

Scholars of the sociology of mental health argue that mental health disparities are fundamentally sociological: social status and inequality pattern mental health outcomes, and the sociological approach to mental health is, at its core, the study of the link between social structure and the individual. As Blair Wheaton put it, "realized or not, mental health is everyone's dependent variable" (2001:228). As with other resources, such as economic resources and physical health, mental health is unequally distributed according to social status and patterns of social interaction. In this section, I briefly review some findings about racial, ethnic, and gender inequalities in mental health before turning to a more theoretical discussion of how sociologists of mental explain these disparities and how this theoretical framework will apply to the study at hand.

Race, ethnicity, and nativity are all stratifying social statuses that are associated with risk of exposure to stress (Brown, Donato, Laske, and Duncan 2013). In this respect, Whites are expected to experience fewer mental health problems. However, some studies find that Blacks experience lower prevalence of mental health disorders than Whites, including depression (Brown et al. 2013; Earl et al. 2011; Schnittker and McLeod 2005), whereas some studies find that there is no difference in levels of psychological distress reporting by Blacks compared to Whites, though Blacks report lower levels of well-being (Williams, Yu, Jackson, and Anderson 1997). One explanation for this puzzling finding is that Blacks in the US derive social psychological resources, including self-esteem, from close friends and family rather than social comparisons with broader (White) society, and this buffers Blacks from experiencing relatively poor mental health (Hughes and Demo 1989). However, more critical stances toward this often-repeated phenomenon is that most studies examining racial differences in mental health control for socioeconomic status, causing racial differences to disappear; however, given that race strongly patterns socioeconomic disparities in the US, this method conceals inequalities that are fundamentally about race as well as SES (Williams and Collins 1995). Troubled mental health may also manifest in substance abuse instead of depression for Blacks (Brown et al. 2013), and engaging in behavioral responses to stressors (such as drinking or smoking) may mitigate the association between stress and depression for Black young adults (Boardman and Alexander 2011). Another explanation offered is that Blacks have stronger family networks that buffer mental health problems, though recent research does not find empirical support for this theory (Mouzon 2013). Further, other studies

do not find that there is no difference between the mental health of Black and White Americans, finding instead that Blacks experience more distress and depressive symptoms compared to Whites (Turner and Avison 2003), due to discrimination and greater exposure to stress (Brown, Williams, Jackson, Neighbors, Torres, Sellers, and Brown 2000). Statistics from the 2009 National Health Interview Survey find that both Black and Hispanic adults in the US are more likely to have feelings of sadness (one measure of depressive symptoms) than White adults (Pleis, Ward, and Lucas 2010).

*Gender*

Adult women in the US are more likely than men to report feelings of sadness, worthlessness, hopelessness, and that everything is an effort, which are all depressive symptoms (Pleis et al. 2010). Despite the fact that women have more social support (which is found to mitigate the effect of stress on mental health), women have higher levels of depression (Denton et al. 2004; Umberson et al. 1996), whereas men are more likely to have problems with alcohol and drug abuse, even when accounting for the level of social support men and women have (Umberson, Chen, House, Hopkin, and Slaten 1996) and regardless of marital status (Simon 2002). Some researchers suggest that the higher levels of distress and depression among women are because women are more likely to report emotions in a survey context, especially depression. However, research indicates that even when response biases are accounted for, women experience distress more frequently than men (Mirowsky and Ross 1995). Women do not seem to realize the same mental health gains in terms of reduced risk of depression from marriage than men do, found one study; the author concluded that

this is because women are socialized to internalize stress and distress, putting others' feelings before their own (Elliott 2013). Several explanations are consistently offered and tested in the literature for the gender disparity in depression and distress. First, women experience greater exposure to stressful life conditions, such as being single parents and having lower income, and to stressful life events (Denton et al. 2004; Kessler and McLeod 1984). Second, women may have fewer social psychological resources to draw on when combating stress, such as levels of self-esteem and mastery (Denton et al. 2004). Third, gender socialization prompts women to internalize distress (resulting in depressive symptoms), whereas men are more likely to externalize (Rosenfield, Lennon, and White 2005; Rosenfield 2012). Fourth, in addition to being exposed to more stress in life, stress, particularly chronic stress, may predict women's mental health more strongly than men's (Denton et al. 2004). However, the ultimate conclusion is that regardless of how you look at it, women do indeed experience more psychological distress than men (measured using various scales similar to the CES-D) (Mirowsky and Ross 1995).

In this section, I have briefly summarized some of the major findings on racial, ethnic, and gender inequalities in mental health. I focus in particular on depressive symptoms as a manifestation of psychological distress. However, it is important to note that depressive symptoms are not the only measure of mental health, and research suggests that different groups are more or less likely to express psychological distress through internalizing behavior such as depression vs. externalizing behavior, such as antisocial behavior, anger, and substance abuse problems. One explanation for this is that self-salience – beliefs and values about the

importance of the self and others in social relations – may be responsible for these differences in expression, because groups are differently socialized about how to express negative emotions (Rosenfield 2012; Rosenfield, Lennon, and White 2005). For example, women are socialized to prioritize others' feelings over themselves (Denton et al. 2004), and expressions of depression may not be seen as socially acceptable in Black communities in particular (Alang 2016). Further, research indicates that Black girls and women may privilege the self more strongly than White girls and women, especially in higher socioeconomic status groups, and thus Black women have lower rates of depressive symptoms – which contradicts the idea that more structural disadvantage necessarily results in poor mental health (Rosenfield 2012). Thus, although depressive symptoms, measured using an abbreviated CES-D scale (discussed more below), represent the dependent variable in this study, it is important to note that excluding other behaviors, such as substance abuse, may not capture the full range of distress experienced by respondents.

### Theoretical Framework: The Stress Process Model

Sociologists are in a unique position to address the issue of mental health. Unlike psychologists, we do not look first and foremost to the individual level to address mental health issues; unlike medical doctors, we are not primarily concerned with medical diagnoses and treatments (Aneshensel, Phelan, and Bierman 2013); and unlike psychiatrists and other clinical practitioners, we are not caught up in figuring out how to assign people into categories of "ill" or "healthy" (Mirowsky and Ross 2002). Instead, sociologists of mental health are invested in studying mental health in social context.

The study of stress and its impact on mental health has become a dominant paradigm in the sociology of mental health literature, and its insights drive this study as well as other studies on the effect of the racial composition of relationships on mental health (Miller 2014; Kroeger and Williams 2011). Since the late 1970s, this perspective has developed and flourished. It finds its home squarely in sociology due to its emphasis on a social causation model of distress, which is a major facet of the role that sociologists of mental health play (Wheaton 2001). The stress process model (SPM), engineered by Leonard Pearlin, has become an indispensable tool for the conceptualizing a social causation model of stress and distress (Pearlin 1989, 1999). The stress process model is grounded in the social structure and personality (SSP) perspective more broadly in that it examines the relationship between social structures and individual functioning (House 1981). The stress process model builds on SSP by identifying how social structure, stressors, and distress are related.

Status and inequality are connected to every component of the stress process, including the stressors people are exposed to, the resources they have to cope with stressors, and their experienced distress; this emphasis on status and inequality as superimposed on the stress process makes the model compelling to sociologists (Pearlin 1999). Stressors are the experiential circumstances that give rise to stress, such as stressful life events and chronic everyday stressors, like relationship conflict or experiences of discrimination. Moderating or mediating resources (the terminology has changed over time – see Pearlin 1989, 1999; Wheaton et al. 2013) reflect an individual's personal resources or resources embedded in small-scale social structures such as social relationships with friends and family members. Moderating resources

including coping, the behaviors that individuals employ on their own behalf to prevent or avoid stress; social support, including instrumental and emotional support from friends, family members, and the immediate community; and self-concept resources including self-esteem and mastery (Pearlin 1989).

Finally, distress is the ultimate outcome variable in the SPM. Distress is a defined as a subjective emotion that includes both depression and anxiety (Ross and Mirowsky 2003). Sociologists of mental health usually measure distress with indices rather than diagnostic categories (Mirowsky and Ross 2002), though mental disorder can be included in the SPM as well (Pearlin 1999).

## Romantic Relationships and Mental Health: Theoretical Frameworks and Empirical Evidence

### *Social Causation Perspectives*

Social relationships and social support enhance health, including mental health; substantial evidence has accumulated in the social sciences to make this connection (Thoits 2011; Umberson and Montez 2010). The finding that the unmarried are at greater risk of psychological distress, including depression, is consistent in the sociological and social psychological research (Mirowksy and Ross 1989; Thoits 1987). In studies of US adults, married people report fewer symptoms of depression (and substance abuse problems) than the unmarried (Simon 2002; Koball et al. 2010; Umberson and Montex 2010). As with the association between any health outcome and marital status, there is always the question of whether people with better health select into relationships, or if relationships cause better health (Lillard and Panis 1996; Waite and Gallagher 2000). In most sociological treatments of mental health,

including depression, mental health is treated as the dependent variable, which is supported by sociology's major theoretical framework's for understanding the social contexts of mental health, particularly the stress process model, which grew out of the social structure and personality framework. In this framework, the obvious flow of causality is from social context, structure, and social relationships to mental health outcomes (Pearlin 1989; Pearlin 1999; see also Milkie 2010).

There is ample evidence from the existing research in support of a social causation framework for understanding the association between depression and romantic relationships. Studies show that marital gain is beneficial for mental health whereas marital loss is associated with increased depressive symptoms when using longitudinal data: several studies have found that people who married between waves saw reductions in depressive symptoms in longitudinal data sources (Kim and McKenry 2002; Simon 2002; Simon and Marcussen 1999), whereas marital losses increase depressive symptoms over time (Simon 2002; Barrett 2000). Young adults who marry and stay married experience less depression than those who remain unmarried over time, including when accounting for prior depression (Horwitz et al. 1996). Marital biography matters as well: both the previously married and the never married experienced more depressive symptoms compared to the currently married (Hughes and Waite 2009). Another study found that among low income mothers, although exiting or entering marriage were not related to changes in psychological distress, those who were continuously married experienced less distress than those who were unmarried (Hill, Reid, and Reczek 2013). Marriage is also found to be

positively associated with mental health as measured by life satisfaction, even when controlling for pre-marriage life satisfaction (Grover and Helliwell 2014).

Researchers and theorists have offered multiple mechanisms by which social relationships, particularly romantic relationships, affect mental health. These explanations typically focus on social causation, that is, how relationships connect individuals to social structure and buffer stress. Drawing on identity theory in sociological social psychology (as posited by Sheldon Stryker), one explanation posits that social relationships, including marriage, involve engagement in social roles – which are the core of one's social identity. Roles attached to marriage provide meaning and purpose and thus enhance mental health (Musick and Bumpass 2012; Thoits 1987). Another explanation rests on social support: romantic partners provide emotional support as well as a social connection to broader networks of family and friends (Ross 1995; Umberson and Montez 2010). Additionally, social support is a moderating resource in the stress process model as described by Pearlin (1989, 1999): social support as provided by romantic relationships can provide both emotional and instrumental support to buffer chronic and event stressors (Thoits 2011).

Within the sociological literature on romantic relationships and depression, there is evidence that certain characteristics, such as race, gender, and the type of relationship may moderate the association between relationships and depression. Women are more likely to experience distress in the form of depression, as discussed above; thus, marital status and marital loss are more predictive of depression for women, whereas being unpartnered or losing a partner are more predictive of substance abuse for men (Simon 2002). Romantic relationships may be particularly

important for Blacks' mental health, who face unique stressors outside of the home, such as unfair treatment (Lincoln and Chae 2010). However, one hole in the literature on the association between romantic relationships and mental health for different racial and ethnic groups is including the race or ethnicity of respondents' partners. Most studies draw conclusions about how the romantic relationships impact mental health based only on one individual's race, or on the race of only one partner in a relationship; presumably these studies assume that respondents' partners are of the same race or ethnicity and draw conclusions based on this assumption, though this is not typically explicated in studies.

Most studies to date focus on the association of marriage and depression. However, not all relationships offer the same level of commitment, engagement in social roles, or stability, and thus type of romantic relationship has been found to moderate the association between relationships and depression. Some studies have looked at marriage compared to cohabitation in terms of their association with depression, finding that cohabitation may not provide the same mental health benefits as marriage (Lamb et al. 2003; Ross 1995). Compared to married people, cohabitors are more depressed (Brown 2000; Kim and McHenry 2002; Lamb et al. 2003) and among young adults specifically, cohabitation may even be detrimental to depression compared to being without a coresidential partner (Harris et al. 2010). Theorists conclude that cohabitation does not convey the same mental health benefits due to the lower level of commitment offered compared to marriage (Umberson and Montez 2010) and greater relationship instability among cohabitors (Brown 2000). Finally, very few studies have examined the association between being in a dating relationship

and depression in adulthood, possibly due to the lack of data sources that provide information about romantic partners that do not live in the same household. Research focusing on dating relationships and mental health typically examine this association in adolescence, finding that dating is linked to greater depression for adolescents (Greca and Harrison 2005; Miller 2014; Soller 2014), especially for adolescent girls (Joyner and Udry 2000). Explanations for this finding typically point to the stress and instability of adolescent relationships, drawing on social causation theories such as the stress process model to posit that adolescent relationships, representing potential emotional turmoil in a life stage already marked by self-concept development and greater depression risk (Rosenberg 1979; Arnett 2007), cause stress and thus depression (e.g. Miller 2014; Soller 2014).

*Social Selection Perspectives*

We know that selection on the basis of some health statuses – particularly self-rated health and obesity – affects the likelihood of entering new marriages, such that the healthier and the non-obese are more likely to marry (Fu and Goldman 1996; Schwartz 2013; Wilson 2002). To date, there is limited research on whether and how depression might affect selection into relationships. That is, are the depressed more or less likely to enter new romantic relationships than the non-depressed, and if so, what type of relationships with what types of partners? Given that other health statuses affect selection into relationships, and the common sense conclusion that happier people may be more attractive relationship partners, it is not a stretch to conclude that depression may negatively impact one's likelihood of entering a romantic relationship (Mastekasaa 1992). Among studies that do consider this research question, mixed findings have been reported. Among Norwegian unmarried adults, greater

psychological well-being predicted entry into marriage (Mastekasaa 1992). One study examining gender differences in the associations of depression and marriage using a longitudinal data source did not find any support for selection into marriage entry or marital loss among men or women (Simon 2002). Another study found that among adults aged 18-35 interviewed in the late 1980s and early 1990s, depression did not affect selection into marriage and cohabitation, but entry into marriage (not cohabitation) was associated with decreased depression, providing better support for a social causation theory of marriage and depression (Lamb, Lee, and DeMaris 2003). Another study specifically examined whether selection into marriage compared to cohabitation was due to the greater likelihood of depressed people to select into cohabitation rather than marriage, finding that selection did not account for cohabitors' greater depression compared to depression among married people (Brown 2000).

Several studies have shown that selection effects pertaining to depression may be at work for marital dissolution. One study found that among Norwegian adults, prior depression predicted divorce over a two to four year period, though the author acknowledged that marital problems within the marriage could have caused the depression in the first place (Mastekasaa 1994), and another study of US adults did not find evidence of selection effects of depression on divorce (Booth and Amato 1991). Overall, there is limited evidence that the association between depression and marriage and cohabitation may be partly attributed to selection processes, though further research is needed.

Interracial Relationships and Mental Health

As discussed above, the predominant paradigm in the sociological study of romantic relationships and mental health focuses on how romantic relationships buffer stressors that individuals experience, thus leading to improved mental health (Thoits 2011). On the other hand, romantic relationships themselves can be a source of stressors, leading to psychological distress. High stress relationships actually create more distress than no relationship at all (Umberson et al. 1996).

There is reason to believe that cross-race or cross-ethnicity relationships may be more stressful than endogamous romantic relationships, leading to increased depressive symptoms. First, despite the fact that intermarriage, especially between Whites and Blacks, has increased threefold since the early 1980s (Qian and Lichter 2011), interracial couples are still subject to social disapproval and sanctions (Kalmijn 1998) – especially when people think of their own relationships or family members' relationships, rather than relationships in general. Data from the 2013 Gallup poll show that 96% of Blacks and 84% of Whites in the US say they approve of marriage between Blacks and Whites, up from 4% of Americans in 1958 (Newport 2013). However, there is a difference between what people approve of for others compared to for themselves. Further, the social acceptability of interracial relationships and their commonness varies by the type of relationship and by gender and race.

One study found that Whites are more likely to be willing to date interracially (defined as dating either an African American or an Asian American) than to marry interracially, and that White women were particularly unwilling to date or marry

interracially in their own lives, though they may approve of these relationships for others (Herman and Campbell 2012). This may be because White women anticipate more disapproval for dating nonwhite partners than White men do, especially from their families (Miller et al. 2004). The same study also found much higher rates of rejecting interracial dating and marriage than found by Gallup poll numbers: 29% of White respondents to the 2008 Cooperative Congressional Election Study report that they reject dating and marriage relationships with Blacks and Asians (Herman and Campbell 2012). Research indicates that disapproval of interracial unions continues to exist especially among families and in friendship networks. Nonwhite men involved with White women report particularly high levels of disapproval from their partners' families (Miller et al. 2004). Another study, investigating cross-race relationships and perceived parental attitudes among high school students, found that adolescents reported that their parents were more likely to disapprove of interracial dating relationships compared to friendships, and fear of parental disapproval prevented them from bringing cross-race partners home to meet family members; participants also reported that parents expressed direct messages that cross-race dating is wrong (Edmonds and Killen 2009).

Scholars of interracial relationships note that dating might be less stigmatized because the criteria for selection into these less-serious relationships is less stringent compared to marriage (Blackwell and Lichter 2000); as Yancey puts it, "On who dates across his/her race can be seen as 'sowing wild oats' rather than making a permanent relationship with family and racial identity ramifications" (2007:915). This may especially be the case in emerging and young adulthood, the time in which

young people are transitioning from dependence on family and involvement in school to greater independence; this time period is marked by role exploration, including exploring different types of romantic relationships and determining what type of partner one might want for a long term, committed relationship (Arnett 2000, 2007). Thus, interracial dating may be even more normative in these formative years and therefore more socially acceptable.

Indeed, the prevalence of interracial dating reflects the finding that it is more socially acceptable, as it is more common than interracial marriage (Fujino 1997), and Yancey (2002) points out that it is a mistake to assume that people who are willing to interracially date are also willing to interracially marry. Marriage tends to be highly homogamous by race (Blackwell and Lichter 2000). However, among contemporary young adults, interracial dating has become more common (Joyner and Kao 2005; Wang et al. 2006), but interracial relationships are less likely than endogamous ones to progress to cohabitation or marriage (Kroeger D'Souza 2010). Further, interracial dating patterns and preferences vary by gender and race. White men are more likely to have interracially dated than White women (Yancey 2002), but White men are less likely to be willing to date Black partners compared to White women. White men tend to prefer interracial relationships with Hispanics and Asians (Feliciano 2009), perhaps indicating that these relationships are more socially acceptable for men.

The research on interracial cohabitation indicates that it may fall somewhere between dating and marriage in terms of prevalence: interracial relationships are overrepresented among cohabiters (Qian and Lichter 2011). However, there is conflicting evidence about racial homogamy in cohabitation compared to marriage in

other studies: One study found that racial endogamy is highest in marriage compared to cohabitation (Blackwell and Lichter 2000), but another found that racial endogamy is actually highest for White cohabiting couples specifically compared to both dating and marriage relationships (Blackwell and Lichter 2004).

Overall, the although the research shows clear evidence that social disapproval and stigma continue to surround interracial relationships, especially relationships between Blacks and Whites, the evidence gives contradictory insight into who is most likely to disapprove of interracial relationships. Some studies find that White women are most disapproving of interracial relationships (Mills and Daly 1995; Herman and Campbell 2012), and are also the most likely to draw a clear boundary between what they consider acceptable for others to do compared to themselves. Specifically, Herman and Campbell (2012) find that although White men and women express the believe that intermarriage is okay in general, White women are less likely than White men to say they themselves would consider interracially marrying. On the other hand, one study of college students at both historically Black universities and predominantly White universities concluded that Black college students are most disapproving of interracial relationships (Field, Kimuna, and Straus 2013), whereas another found that Black men and White women are most accepting of interracial relationships (Schoepflin 2009). These differences in findings may be due to different populations surveyed (general population compared to college students) and the year the study was conducted (we should expect attitudes to shift somewhat from a 1995 study to a 2013 student, for example). Further, Black women may be especially concerned about the implications of interracial dating: Black men

dating exogamously represents, for Black women, the fact that society devalues Blacks in general, to the point that Black men buy into the devaluation of Black women and seek partners of higher status racial groups (Childs 2005). These patterns may give insight into whose mental health could be most strongly adversely affected by involvement in an interracial relationship – if White women are more accepting of interracial relationships, for example, they might feel less stress or stigma compared to other groups if in such a relationship.

For Whites specifically, interracial relationships create awareness of racism in society that was not present before. Clearly, this is one of the benefits of less social distance between Whites and racial and ethnic minorities; however, part of this awareness is due to the fact that Whites in interracial relationships, especially marriages with Blacks, are more likely than Whites in relationships with Hispanics or Asians to experience racial discrimination, such as racial profiling by police, or racism directed at Black-White biracial children, firsthand (Yancey 2007). This finding reflects both the tenacity and severity of racism that Blacks experience compared to other racial minorities, as well as the particularly harsh stigma that Black-White relationships carry.

The fact that interracial and interethnic relationships are more prone to instability may be evidence that indeed, these relationships are more stressful than endogamous relationships. Among US adults in general, compared to endogamous White marriages, marriages between White women and Black men and White women and Asian men are more likely to end in divorce (Bratter and King 2008). A different study, examining US adults in the SIPP, also found that in general, even when

controlling for couple characteristics, interracial marriages among Blacks, Whites, Hispanics, and Asians were more likely than endogamous relationships to end in divorce, and Black husband/White wife relationships were particularly unstable (Zhang and Van Hook 2009), echoing Bratter and King's (2008) findings. However, the authors concluded that this pattern is largely attributable to racial and ethnic group differences in divorce rates rather than something about interracial marriages specifically (Zhang and Van Hook 2009). Interracial unions are not only more unstable among married adults in the general US population: Among participants in the Add Health, interracial dating relationships tend to be shorter in duration than endogamous relationships among emerging adults (Kroeger D'Souza 2010), and among adolescents, teens who date interracially are more likely to conceal their relationships from family and friends (Wang, Kao, and Joyner 2006). There is also mixed evidence that interracial relationships are characterized by lower relationship satisfaction, which could detract from the relationship's stress-buffering benefits (as asserted by a stress process model perspective of romantic relationships). In general, experiencing stigma on the basis of race or gender is linked to lower relationship quality, as tested in psychological experiments (Doyle and Molix 2014); that is, when an individual's stigmatized identity is made salient, the individual feels less satisfaction with their relationship. One study examining young adults at Wave 4 of the Add health found that overall, nonblack respondents with a Black partner reported less relationship satisfaction that nonblack respondents with a nonblack partner (Kroeger and Williams 2011) (however, another recent study contradicts these results, finding no differences in relationship quality or attachment between interracial and

monoracial couples (Troy, Lewis-Smith, and Laurenceau 2006)). At the extreme end of the spectrum, a few studies have found that interracial couples are more likely to report interpersonal violence than monoracial couples (especially monoracial White couples), indicating that these relationships might suffer from higher levels of conflict as well as instability and lower relationship satisfaction (Fusco 2010; Martin et al. 2013).

Overall, the research suggests that there are multiple pathways by which interracial and interethnic relationships might be more inherently stressful than endogamous relationships (due to social disapproval, experiences of racism, and instability), or the stress-buffering benefits of interracial romantic relationships may be less potent than in endogamous relationships due to lower relationship satisfaction. Indeed, the existing research on interracial relationships and mental health offers evidence that interracial relationships are, in fact, more stressful and thus associated with worse mental health outcomes. Bratter and Eschbach (2006), marking the first study that directly examined the psychological distress experienced by couples of different racial and ethnic compositions (measured using the K-6 psychological distress scale, similar to the CES-D scale), found using data from the 1997-2001 National Health Interview Survey that intermarried White women, especially those with Black husbands, were at elevated risk for psychological distress, and also found that socioeconomic disadvantage of these women partly explained the association. Further, Hispanics married to other nonwhite races/ethnicities (Blacks, Asians, and Native Americans) were also at risk for psychological distress, though socioeconomic status did not explain that pattern. Second, in a study using data from young

adulthood as captured by Wave 4 of the Add Health, Kroeger and Williams (2011) examined the effect of having a Black vs. nonblack partner on depressive symptoms among nonblack respondents only. They found that having a Black partner increased depressive symptoms. Also, they concluded that relationship satisfaction partially mediated the association between partner race and depressive symptoms such that respondents with Black partners had lower relationship satisfaction than respondents with nonblack partners, and including relationship satisfaction in regression models predicting depressive symptoms partially decreased the effect of having a Black partner on depressive symptoms. The authors thus concluded that relationships with Black partners are more stressful for nonblacks than relationships with nonblack partners (of any other race/ethnicity), and lowered relationship satisfaction is one mechanism through which this fact manifests (Kroeger and Williams 2011). Finally, a third study explored the effect of being an interracial "dater" in adolescence on depressive symptoms using Wave 2 from the Add Health. The literature generally points to the fact that adolescent dating is detrimental to adolescents' mental health due to its tumultuous nature (Soller 2014), and Miller (2014) expanded on this to posit that interracial dating in adolescence would be extra stressful and thus detrimental to mental health. Indeed, teens who had had one or more interracial relationships in adolescence reported more depressive symptoms at Wave 2 than those who had not.

These three studies provide a strong foundation from which to continue to investigate the question of whether and how couple racial composition affects mental health. The results from these studies indicate that indeed, romantic relationships

likely bring varying levels of stress and accompanying distress based on their composition. However, these studies have left several crucial gaps that I seek to fill with this study. First, studies of the association between interracial relationships and depression have not specifically focused in on how relationship type might moderate the association, despite compelling reasons to believe this might be the case, as discussed above. Further, all of the studies discussed here on this association have assumed a causal pathway from being exogamously partnered to mental health: that is, exogamous relationships cause stress or are less efficacious at buffering stress, and are more prone to dissolution and lower relationship satisfaction, and thus affect mental health. However, much of the literature on interracial relationships in general focuses on how people come to be interracially partnered, given the relative rarity of these relationships and their lower likelihood of advancing to marriage (Kroeger D'Souza 2010; Qian and Lichter 2011). Typically, theory and research on selection into interracial partnerships has focused on socioeconomic status, particularly education (e.g., Fu 2001; Gullickson 2006), but it stands to reason that the robust association seen between interracial partnerships and depression could also be a function of selection processes.

*Research Questions*

Overall, the literature reviewed here shows that despite the fact that marital status and race/ethnicity are well-established bases of inequalities in mental health, and the fact that the racial composition of couples has been shifting toward greater diversity in the past several decades, more research is needed regarding the link between relationship racial composition and depression. Several gaps stand out in the current literature.

First, prior studies that have established that there is a positive association between being in an interracial or interethnic relationships and depression or psychological distress are all cross-sectional in nature[9], and therefore unable to make inferences about the direction of causality, despite theoretical debates in the literature on health and relationships that indicate that direction of causality is an important open question (e.g., Lillard and Panis 1996). Second, prior studies have either only examined one type of romantic relationship (e.g., only marriage or only dating [Bratter and Eschbach 2006 and Miller 2014, respectively]), or have not considered whether relationship type moderates the association between partner race and depression. Finally, there is only one prior study that specifically investigates the association between exogamous relationships and depression in young adulthood, omitting early young adulthood (Kroeger and Williams 2011). The present study combines two waves of data that represent White young adults aged 19-32, a period during which romantic relationships are explored and take on increasing commitment, and a period during which depression levels fluctuate as individuals mature (Arnett 2000; 2007).

To address these gaps, I will answer the following research questions.

1. What is the association between the racial composition of married, cohabiting, and dating relationships and depression for White young adults?

[9] Kroeger and Williams (2011) use two waves of data from the Add Health, but the analysis remains cross-sectional. They look at the cross-sectional association between having a Black partner and depression in Wave 4 of Add Health, using a lagged dependent variable model specification that treats Wave 1 depression as a control variable. This treatment does not account for any change in depression over time, and lagged dependent variables are found to suppress or completely alter the association of the primary independent and dependent variable, or bias the coefficients of explanatory variables if residual autocorrelation occurs (Achen 2000; Keele and Kelly 2006).

Prior cross-sectional research focusing on adolescence and young adulthood find that respondents in interracial relationships report more depressive symptoms (Kroeger and Williams 2011, Miller 2014). Thus I hypothesize reporting a current romantic relationship with a partner of a different race or ethnicity will be associated with more depressive symptoms compared to reporting a current romantic relationship with a partner of the same race or ethnicity for White young adults in current relationships from the period of 2001 to 2008.

2. What is the evidence for selection vs. causation processes in the association between the racial/ethnic composition of married, cohabiting, and dating relationships and depression in young adulthood?
    a. Does depression prior to entering a new dating, married, or cohabiting relationship affect the likelihood of partnering with a same- or different-race/ethnicity partner for White young adults?
    b. Does the racial composition of marriage, cohabiting, and dating relationships affect depression trajectories over time for White young adults who are continuously partnered with exogamous partners?

Research question 2 sets up competing hypotheses to explain any association between partner race/ethnicity and depression. Although prior research has looked solely to explanations of the association between exogamous relationships and depression that focus on stigma and stress associated with these relationships, it is also possible that any association can be attributed to selection processes. A status exchange theory of interracial and interethnic relationships suggests that racial minorities trade desirable traits, such as education or, as I suggest in this dissertation,

health attributes, for White partners; conversely, White partners with less desirable health attributes may be more likely to partner with racial and ethnic minorities. I refer to this as the *selection hypothesis*. On the other hand, evidence for increasing depression over time for Whites in long term relationships with exogamous partners would provide stronger support for a stress process theory of interracial and interethnic relationships, suggesting that greater stress and stigma leads to declines in mental health. I refer to this as the *stress hypothesis*.

3. Does the association between partner race/ethnicity and depression differ by relationship type for White young adults? That is, does having an exogamous dating partner compared to exogamous marriage or marriage-like relationship moderate the association between partner race/ethnicity and depression?

With research question 3, I test two competing hypotheses. On the one hand, the empirical literature on public opinion and interracial relationships suggests that interracial marriages are subject to greater social disapproval than interracial dating (Herman and Campbell 2012). Further, interracial dating relationships that do not progress to marriage or cohabitation are more common, especially among young adults (Joyner and Kao 2005). Because young adulthood, particularly early young adulthood (also called "emerging adulthood"), is characterized by normative exploration in romantic relationships as emerging adults try to figure out what type of partner they would want in the long term (Arnett 2000), it may be the case that interracial dating (compared to marriage or cohabitation) is less stressful and stigmatized because it is seen as normal exploration. Thus, interracial dating may be more normative among young adulthoods than more committed, marriage-like

relationships. These patterns suggest that exogamous dating relationships, being more common and socially acceptable, may also be less prone to stress than more committed cohabiting and marriage relationships, thus resulting in less depression. I refer to this as the *social acceptability hypothesis,* that more acceptable interracial dating relationships are less detrimental to depression levels compared to more committed relationships. Conversely, the theory on the link between marriage and health suggests that marriage and cohabitation are uniquely able to protect health due to the greater commitment, stability, and shared resources experienced in these types of relationships; thus, a competing hypothesis would be that exogamous marriage and cohabitations are better able to protect mental health and buffer stress compared to dating relationships, resulting in a smaller penalty for the mental health of Whites who partner exogamously. I refer to this as the *commitment hypothesis.*

4. Does the association between partner race/ethnicity and depression differ by gender for White young adults?

Finally, with research question 4, I examine whether the association of depression and partner race is moderated by gender. In general, research indicates that women are more likely to experience emotional distress and express distress in the form of depression (Mirowsky and Ross 1995; Simon 2002), and women are more vulnerable to experiencing mental distress as the result of stressful events (Kessler and McLeod 1984). Prior research has found that White women with Black spouses are particularly likely to report psychological distress, whereas White men with interracial spouses in general do not report elevated distress (Bratter and Eschbach

2006). Thus I hypothesize that White women will be more likely than White men to experience depression associated with having a nonwhite partner as the result of greater vulnerability to mental health consequences of the stress of interracial relationships, and greater likelihood of expressing that distress in the form of depression.

## *Data and Methods*

### Data

To examine the association between partner race/ethnicity and depression among Whites in the U.S. who were enrolled in middle and high school in the mid-1990s, I use data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), with a focus on depressive symptoms in waves 3 and 4. Add Health is a nationally representative, longitudinal study of adolescents who were enrolled in 7$^{th}$ through 12$^{th}$ grade in the 1994-5 school year (Chen and Chantala 2014; Harris 2013). Please reference Chapter Three, "Data" section, of this dissertation for more details on the population represented by Add Health and how the survey was designed and administered.

The Add Health has several advantages as a data source for answering the research questions presented above. First, the Add Health tracks relationships beyond marriage and cohabitation to include all current relationships, including dating relationships. At Waves 3 and 4, respondents were asked about their current romantic partners regardless of marriage or cohabitation status. This is key for the present study, given the theoretical reasons to believe that interracial dating relationships may

be more or less problematic for mental health compared to more committed relationships. Second, the Add Health is longitudinal and has measured the dependent variable, depressive symptoms, at all four waves uniformly, allowing for the same measure to be used across time. I use depression and partner race at both Waves 3 and 4, allowing for an examination of selection into relationships on the basis of depression, and change in depression over time among young adults who are partnered with the same partner over time. This represents a more conservative test of the effect of partner race on depression compared to prior studies, including those that used Add Health data. Third, Add Health surveys contemporary young adults, as described in greater depth in Chapter Three of this dissertation. In the context of increasing rates of interracial partnering, especially between Blacks and Whites (Qian and Lichter 2011), it is important to know whether and how interracial and interethnic relationships affect mental health outcomes in the contemporary social context.

### Analytic Sample

The analytic sample for this study is drawn from Wave 3 and Wave 4 in-home sample respondents who reported being in a current marriage, cohabiting, or dating relationship at the time of the interviews in 2001 (W3) and 2008 (W4). Because of sample size restrictions discussed in greater depth in Chapter Three of this dissertation, I restrict the analytic sample only to White men and women who report having Hispanic, Black, Asian, and White partners (see Appendix Table 4.1 for the breakdown of sample size for each partnership racial and ethnic combination).

Based on this sample of only White men and women in current relationships at Waves 3 and 4, I constructed three data sets for three steps of the analysis. The first

of these three data sets is a person-wave data set for the *cross-sectional* analysis. This data set pools White respondents in current relationships at Wave 3 and Wave 4. The analytic sample consists of those respondents in opposite-sex relationships only, who identify as White and identify their partners as White, Black, Hispanic, or Asian and who are not missing data on any analysis variables (skin tone measured at Wave 3, being multiracial at Wave 1, household composition variables, education level, age, and depressive symptoms reported at wave). The resulting sample consists of 3,987 White male and 5,280 White female person-wave observations.

Second, I constructed a person-wave data set for the *selection* analysis that reflects White men and women who report current relationships with new partners since prior observation. For details on how this subsample was constructed, please see Chapter Three, "Analytic Sample" section of this dissertation. This sample consists of 3,126 White male and 3,800 White female person-wave observations. In all analyses using the cross-sectional and selection samples, statistical tests and standard errors are adjusted for clustering within individual.

Third, I constructed a person-level data set for the *depression change* analysis that represents White men and women who report current relationships with a partner with the same race and ethnicity and age across Waves 3 and 4, here interpreted to be the same partner. This process of defining the same-partner sample for the change analysis is described in greater detail in Chapter Three of this dissertation. This sample consists of 685 White men and 1,130 White women.

Key Variables

***Depression.*** This study uses a nine-item version of the Center for Epidemiological

Studies depression scale (CES-D). The original CES-D scale has 20 items; each item asks for the frequency at which the respondent experienced a depressive symptom in the past seven days (ranging from 0, "never or rarely," to 3, "most of the time or all of the time"). Thus the original scale is scored out of 60 points. The abbreviated version asked across all four waves of the Add Health has nine items. Cronbach's alpha for the nine-item scale at all four waves is .78 or higher. Respondents were asked how often they experienced the following: you were bothered by things that usually don't bother you; you could not shake off the blues, even with help from your family and your friends; you felt that you were just as good as other people (reverse); you had trouble keeping your mind on what you were doing; you were depressed; you were too tired to do things; you enjoyed life (reverse); you were sad; you felt that people disliked you.

The sociology of mental health typically argues for avoiding diagnostic categories for depression, as are used in clinical settings. The rationale for this is that using diagnostic categories conceals or ignores that people can experience distress in their daily lives regardless of meeting diagnostic criteria. Sociologists argue for assessing the full range of psychological distress symptoms, not just the extremes that justify clinical attention; further, using cutoff points can cause researchers to lose information if someone is not deemed "mentally ill" (Mirowsky and Ross 2002). Additionally, a social constructionist perspective to mental health, one of the sociology of mental health's major theoretical frameworks, asserts that diagnostic categories are arbitrary social constructions (Aneshensel et al. 2013; Scheff 1970).

However, responses to the CES-D scale are often right-skewed and therefore

may not be appropriate for all analyses. Some studies have handled this skewness by assigning diagnostic cutoffs; this approach is most commonly taken in the depression literature outside of sociology (e.g., Radloff 1991; Weissman et al. 1977). Another way to adjust for the non-normal distribution of depression as measured by the CES-D scale is to use the log transformation of the variable, as done by some researchers (e.g., Achat et al. 2000; Cole et al. 2000; Springer et al. 2007). Transforming the depression variable used here follows statisticians' recommendations to generally log-transform continuous positive data measured on an interval scale (Keene 1995). I thus use a log-transformed depression scale, based off of the nine items that were asked consistently across all waves, in all analyses.

***Race/ethnicity.*** In my coding of race, I account for both racial and ethnic identification, as Hispanic ethnicity has been found to be an important facet of racial identity (Vaquera and Kao 2006). Race and ethnicity were asked at waves one and three. I use responses from wave one to construct a race variable, using self-identified race in the case of respondents who reported more than one racial category, as described in Chapter Three of this dissertation. Respondents who indicated they are of Hispanic origin were coded as Hispanic. For the present study, I restrict respondent race to Whites only, including multiracial Whites who indicated that they most identify as White.

***Partner race/ethnicity.*** Partner race and ethnicity was reported by the Add health respondent. Respondents were asked whether their partner was of Hispanic origin, and asked to select one racial category (Black, Asian, Native American, or White) for their partner. For this study, I restrict partner race to non-Hispanic White, Black,

Asian, and Hispanic. In the cross-sectional analysis, I used both a four-category partner race variable as well as a binary White/nonwhite specification, in which I combined Hispanics, Blacks, and Asians into the nonwhite category (note that this means that Hispanic partners who were reported as White were coded as nonwhite for the analysis). More details on how different partner race variable specifications were used are given below.

***Control Variables.*** *Gender* is coded dichotomous (0=male, 1=female) and was asked at each wave. *Age* is a continuous variable asked at each wave (age range at wave 3 was 18-26, age range at wave 4 was 24-32). *Union type* is a three-category variable to capture whether the respondent is or has been in a marriage, cohabiting, or dating relationship with their current partner. I code relationship type as "married" if the respondent is or was ever married to the partner, "cohabitation" if the respondent currently or previously cohabited with their partner but was never married to the partner, and "dating" if the respondent did not report ever marrying or cohabiting with the partner. *Educational attainment* is coded as a four-category variable. Educational attainment is correlated both with lower risk of depression (Kessler and Cleary 1980; Schnittker and McLeod 2005; Thoits 2010) and also with a greater likelihood of dating across race (Miyawaki 2015; Qian and Lichter 2007). *Multiracial* identifies respondents who identify with more than one race at Wave 1. *Biological children* measures whether or not the respondent lives with one or more of their own biological children. *Living arrangements* measures whether the respondent reports living in their parents' home, their "own place," or another living arrangement (not specified by Add Health). Together, these household composition variables capture a

dimension of where in the transition from being dependent on parents to being more independent a young adult is, which may have an impact on how influential a person's partner is for his or her mental health. *Skin tone* was rated by the interviewer at Wave 3, and higher values indicate lighter skin tone. *Foreign born* is coded 0 for US-born and 1 for born outside of the US. Relationship duration measured in years. For more details on the specification of these variables, please see Chapter Three, "Key Variables" in this dissertation.

Because of the complex, multilevel sampling design of the Add Health (described in Chapter Three of this dissertation), I use sample weights, school cluters, and region (a poststratification variable) with the *depression change* sample, which represents a person-level data set (Chen and Chantala 2014). Because the samples for the cross-sectional and selection analyses consist of person-wave observations, I use individual-level clustering to adjust standard errors.

### Data Analysis

The analysis starts with a *cross-sectional* ordinary least squares regression model estimating the multivariate association between log-transformed depression and partner race/ethnicity (Hispanic, Black, or Asian). I then estimate models whose respective purposes are: (1) to predict the likelihood of partnering with a White, Black, Hispanic, or Asian partner on the basis of prior log-transformed depression in a *selection model*; and (2) to estimate the causal effect of partner's race/ethnicity on depression change over time in a *depression-change* model. Because the *cross-sectional* and *depression-change* models are most similar in their statistical form and outcome variables, I present them first, though I conduct my analyses and describe

their results in the above order. Note that because of overlap in the model specification between this chapter and the models described for Chapter Three, I reference Chapter Three's data analysis when applicable.

*Cross-sectional Model*

The first step of the analysis is the *cross-sectional model,* to establish whether there is a statistically significant and substantively significant association between partner race and depressive symptoms (in its log-transformed form) for Whites. Formally, I denote depressive symptoms, a continuous, log-transformed variable, by D. In the cross-sectional model, depressive symptoms at time $t$ (defined as Waves 3 and 4) is a function of a main explanatory variable of partnership race/ethnicity $P$ at wave $t$, $P_t$, and additional explanatory variables specified in vector $Z_t$. Vector $Z_t$ consists of skin tone, multiracial identification, relationship type (cohabiting or dating, with reference category married), living arrangement, having biological children in the household, education level, and age. Treating the log-transformed scale variable $D_t$ as a continuous variable, $E[D_t|P_t,Z_t]$ is estimated by OLS regression, representing the association as a linear function $F$ as follows:

$$E[D_t|P_t,Z_t] = F(\beta_0+\beta_1 P_t + \beta_2 Z_t) \quad (1)$$

This model was estimated separately for White men and women. Additionally, this model was estimated using two different specifications of partner race $(P_t)$ to see whether the effects of partner race/ethnicity on depression varied across specific partner racial and ethnic minority groups, or whether having a nonwhite partner of any type would affect depression. Prior research with the Add Health specifically has

shown that having a Black partner is cross-sectionally associated with depression for non-Blacks (including Whites and other non-Black racial minorities) (Kroeger and Williams 2011), which would suggest that using a multi-category partner race variable that allows for the effects of a Black partner to come out clearly would be preferable. However, the theoretical framework typically used in studies of the association of mental health and interracial partnering suggests that interracial relationships in general cause stress, which suggests that having a nonwhite partner of any racial or ethnic background would be associated with greater depression for Whites. The status exchange theoretical framework would also align with a White/nonwhite partner race specification, as this framework typically treats White as the racial category that is high status, compared to nonwhite races (Kalmijn 2010). Model 1 for men and women treats partner race as a binary White/nonwhite variable. Model 2 for men and women treats race as a four category variable, with White as the reference category. I compared the fit of the White models with alternate partner race/ethnicity coding using Akaike's information criterion (AIC) and Bayesian information criterion (BIC) statistics, and used Wald tests to see whether coefficients for Hispanic, Black, and Asian partners differed from each other. Next, I estimated the same models for White men and women, but with the sample split into two relationship type categories: married and cohabiting pooled together, compared to dating. I separated the groups in this way because prior research on attitudes toward interracial relationships usually focuses on dating compared to marriage, and given that cohabitation most resembles marriage in its commitment and sharing of resources, I consider it to be a marriage-like relationship and thus group it with

marriage. Again, I estimated models for men and women using both a White/nonwhite partner race and four-category partner race predictor variable and used Wald tests to test the difference between partner race coefficients. I also separately estimated a cross-sectional model with relationship types pooled, with the addition of an interaction effect between relationship type and partner race, to test whether or not the effect of partner race on depression statistically significantly differs between men and women in dating compared to marriage and cohabitation relationships.[10]

For this *cross-sectional* model analysis, I used the person-wave dataset of all individuals reporting current relationships at waves 3 and 4. Because the same individual frequently contributes more than one wave of depression while partnered, "clustering" of observations within individuals is adjusted for in estimating the standard errors.

*Depression Change Model*

The next step of the analysis is the depression change model. The outcome variable is depressive symptoms measured at Wave 4, specified as a log-transformed continuous scale variable. The main explanatory variable is partner race/ethnicity for Whites among those who are partnered with the "same" partner at both waves 3 and 4. The model includes additional explanatory variables skin tone, multiracial identity, relationship type, relationship duration, living arrangement, biological children in the

[10] For all models in this study, I additionally estimated models with gender interactions on all covariates in order to ascertain whether or not the effect of each predictor variable depression differed by gender. However, there were no statistically significant gender interaction effects in any model, indicating that the effects of partner race/ethnicity on depression and vice versa do not differ by gender. I do not discuss these results in detail in this dissertation.

household, education level, and age.. However, as described in Chapter Three of this dissertation, the objective of the depression change model is different than for the cross-sectional model, and thus focuses on only White men and women in long term relationships with partners of the same race/ethnicity and age. Restricting the analysis to only those White young adults who are in relationships with partners assumed to be the same person across waves is especially important when analyzing the effect of partner race/ethnicity on depression, because interracial relationships are more prone to dissolution than endogamous relationships (Joyner and Kao 2005; Kroeger-D'Souza 2010), suggesting that some of the previous effects of interracial relationships on depression found in primarily cross-sectional analyses could be due to relationship instability specifically. Miller (2014) explicitly examined whether experiencing a breakup moderated the effect of dating relationship racial composition on depression and found that same-race daters were more adversely affected in terms of depression than interracial daters. Overall, these findings suggest that in order to test the potential causal impact of interracial relationships on depression, examining individuals in same relationships over time is a preferred approach. For this group, the depression change model predicts depression at Wave 4 using predictors at the prior wave, including partner race/ethnicity and depression. I follow again what Allison (1990) refers to as the regressor-variable method, described in greater detail in both Chapters Two and Three of this dissertation. Note that this approach is distinct from the lagged dependent variable approach to including prior measurement of the dependent variable in models, as used by Kroeger and Williams (2011) in their examination of having a Black partners and depression using Add Health data

primarily from Wave 4. Lagged dependent variable models are typically used to account for selection into the condition specified by the primary independent variable. However, this approach may bias the coefficients in the model downward, or even cause the signs to change, and is not always theoretically defensible, as shown by, for example, Achen (2000) and Keele and Kelly (2006). Further, I separately examine selection (described below), focusing in on selection as a process in its own right that should be tested.

The period of time over which depression change is measured is approximately seven years, from approximately 2001 to 2008. Because the waves are a full seven years apart, which is a long time period to examine how stress might be expressed in the form of depression specifically, and it is less likely that individuals in dating relationships are in fact still dating the same partner seven years later, I restrict the change analysis to only those White men and women who are in cohabiting and marriage relationships in Wave 4 (retaining daters, cohabitors, and married individuals at Wave 3). This relationships thus also represent a higher level of commitment compared ot long term dating relationships, which is considered to be the key characteristic of relationships in terms of their ability to provide mental health benefits (Ross 1995; Umberson and Montez 2010). See Appendix Table 4.2 for the matrix of relationship type from Wave 3 to 4. The equation used to estimate the effect of partner race on depression change for Whites is as follows:

$$E[D_{t+1}|P_t, D_t, Z_t] = F(\beta_0 + \beta_1 P_t + \beta_2 D_t + \beta_3 Z_t) \qquad (2)$$

In this equation, the estimated value of depression (logged) at time *t+1* (wave 4) is a linear function of partner race at time *t* (wave 3), depression at time *t*

(measured continuously and logged), and vector *Z,* which represents the variables described above measured at time *t* (wave 3). I control for relationship type at Wave 3, including dating relationships.

I estimated the above equation (2) as a linear regression model. I estimated this equation separately for White men and women, and additionally estimated the models using both a binary White/nonwhite predictor partner race variable, and a four-category partner race variable (not all results are presented – see below). I also estimated a second model which adds an interaction effect between dating at Wave 3 and partner race at Wave 3, to determine whether depression change over time is moderated by the type of relationship at Wave 3. This provides a test of the *commitment* versus *social acceptability* hypotheses described above, in that interracial dating in emerging adulthood may be more socially acceptable than early marriage or cohabitation (Harris et al. 2010), especially across racial or ethnic lines. These models are estimated from person-level Add Health data set of respondents who were observed with partners of consistent age, gender, and race/ethnicity from waves 3 to 4 (the "same partner" sample). To account for Add Health's complex sampling design, I use school-based clusters and post-stratification region strata to adjust standard errors.

*Selection Model*

The "selection model" is designed to investigate to what extent the associations between partner race and being depressed established in the "cross-sectional model" might be attributed to selection processes whereby individuals select into endogamous vs. exogamous relationships on the basis of depressive symptoms reported before the start of the relationship. This represents an improvement over

prior cross-sectional treatments of the association between partner race and depression that have used a lagged dependent variable to "control" for selection processes, rather than examining them directly (Kroeger and Williams 2011). To examine the evidence for selection processes, I first determined which relationships formed between wave 2 and 3, and wave 3 and 4, respectively, formally denoted above as times *t* (waves 3 and 4) and *t-1* (waves 2 and 3). I then predict partner race of a new cohabiting, dating, or married partner at wave 3 and 4 (time *t)* by depression, measured as a continuous, log-transformed scale, approximately seven years prior at waves 1 and 3 (time *t-1)*. Because Wave 2 represents a smaller sample size than Wave 1 (because Wave 1 respondents who were no longer enrolled in high school were not observed at Wave 2), I use Wave 1 depression to predict partner race and ethnicity at Wave 3. Note again that the sample used for the selection model pools waves 3 and 4, and thus some individuals who were observed with new partners at both waves 3 and 4 contribute two person-wave observations.

Consider the following BMI selection model into endogamous vs. exogamous relationships for Whites:

$$E[P_t|D_{t-1}, Z_t] = F(\beta_0 + \beta_1 D_{t-1} + \beta_2 Z_t) \quad (3)$$

In the above model, the expected value of partner race at time *t* in a newly formed married, dating, or cohabiting partnership is a function of depression measured at time *t – 1* and characteristics $Z_t$, which represents being multiracial, relationship type, relationship duration, living arrangement, biological children in the

household, education, and age measured at time $t$.[11] Again, I used two distinct specifications of partner race – a binary White/nonwhite specification, and a four-category race specification. Binary logistic regression was used to estimate this model for the likelihood of having a nonwhite partner compared to a White partner, whereas multinomial logistic regression is used to estimate this model for Hispanic, Black or Asian partners, with non-Hispanic White partner as the base outcome.

For the analysis models, I first predicted partner race by prior depression for White men and women separately who were in any type of relationship. Second, I estimated these same models, but split into two groups by relationship type: married and cohabiting, and dating relationships. Second, I tested whether selection into exogamous compared to endogamous relationships on the basis of depression is moderated by what type of relationship a person enters into (dating versus married or cohabiting) by including an interaction effect between prior depression and relationship type.

*Results*

Descriptive statistics for the cross-sectional analysis population, representing all White men and women in the US cohort who was in high school in the mid-1990s who reported current dating, marriage, and cohabiting relationships, are reported in Table 4.1. Gender differences were tested using t-tests for continuous variables and chi-squared tests for categorical variables, and p-values are shown in the "Men v.

[11] Note that skin tone was removed as a control variable for the selection analysis. In the multinomial logistic regression models predicting partner race as a four-category outcome variable, the addition of skin tone caused problems with model convergence, likely due to the lack of variation in the variable's distribution.

Women" column. Table 4.1 indicates that among White young men and women, most are partnered endogamously with other Whites, with 89.5% of men and 87.9% of women partnering endogamously. For men, Black partners are least frequently reported in this population (1.4%), whereas for women, having an Asian partner is least common, at only 2.8% of White women. Partner race statistically significantly differs by gender in current relationships ($p<.001$). Skin tone for both White men and women has a mean of 4.95 on a 5-point scale, indicating light skin tone. About 2% of White men and women who report that they most identify as White also report other races in addition to White. The population is most frequently married compared to other relationship types (40.9% of White men and 47.7% of White women), but relationship type differs by gender ($p<.001$), as women are more likely to be married compared to men, and men are more likely to report current dating relationships. Relationships are reported to be about three to four years long on average, and women report longer relationship duration than men ($p<.001$). Most of the population of White men and women in current relationships report living in their own place – about three-quarters of both White men and women – though women are more likely to live in their own place compared to men, and men are more likely to report living with parents or in another living arrangement ($p<.01$). Women more frequently report living with their biological children than men (45% compared to 29.8%, $p<.001$). Education level varies by gender ($p<.001$), with tending to have lower educational attainment compared to women. Women report more depression than men, which is consistent with prior research findings (Mirowsky and Ross 1995; Simon 2002; Thoits 2010).

[TABLE 4.1 ABOUT HERE]

Table 4.2 displays the results from the cross-sectional depression regression model, which estimates the cross-sectional association between partner race and depression for young White men and women in all current dating, marriage, and cohabiting relationships. For White men and women, two models are displayed: Model 1 treats partner race as a binary White/nonwhite variable, and Model 2 treats partner race as a four-category variable. White is the reference category in both cases. The goal of this analysis is twofold: first, this analysis establishes whether prior findings on the association of partner race and depression can be replicated using this data, providing an association that will then be deconstructed further into selection and causal analyses, and second, to determine what specification for the partner race variable is most appropriate.

[TABLE 4.2 ABOUT HERE]

The key findings from Table 4.2 are as follows. First, having a nonwhite partner is associated with increased depression for both White men and women, regardless of the type of the relationship. For White men, having a nonwhite partner is associated with a 15% predicted increase in depression, and for White women, having a nonwhite partner is associated with a 9% increase in depression, as reported in Model 1. In Model 2, partner race is disaggregated into four categories. The results show that for White men, having a Hispanic partner, Black partner, or Asian partner are all associated with more depression compared to having a White partner (Wald tests indicate that there are no differences among non-White partners for White men's depression). For the White men models, both the AIC and BIC statistics clearly

indicate that Model 1, with a binary partner race specification, is the better fitting model. However, for White women, only a Black current partner is associated with a statistically significant increase in average estimated depression, and the coefficient for Black partner is substantively quite a bit larger compared to the coefficients for Hispanic partner and Asian partner, being twice as large as the Hispanic coefficient and sixteen times as large as the Asian partner coefficient. This suggests that the effect on depression of partner race estimated for White women may be driven by greater depression among White women with Black partners. The AIC and BIC statistics are not as clear-cut for comparing the fit of Models 1 and 2 in the case of White women: they are virtually identical with regard to the AIC, and the BIC for the White/nonwhite partner specification is slightly lower than the BIC for the four-category race model (shown in Table 4.2). However, because the analyses conducted throughout this study consistently revealed only an effect on depression for White women with Black partners, I elected to present the results for White women from the four-category partner race models for women, and from the White/nonwhite partner race models for men.[12] No statistically significant gender interactions were observed (results not shown), suggesting that the effect of partner race on depression does not vary by gender. Thus, the results seen here partially replicate other cross-sectional results: like Bratter and Eschbach (2006) and Kroeger and Williams (2011) found,

[12] Note that I examined results from all models used in this study (including the cross-sectional analysis, selection analysis, and depression change analysis) using both partner race variable specifications for both men's and women's models. I show additional results from these models in appendix tables where appropriate. The main results presented in this chapter, however, will focus on White/nonwhite partners for men and Black partners for women, as the cross-sectional associations to be explained.

having a Black partner is associated with greater depression for Whites. However, unlike in these prior studies, I find that having any nonwhite partner is associated with greater depression for White men specifically.

Also in Table 4.2, higher education level is associated with lower average depression, such that each increased level of education compared to having less than a high school degree predicts lower depression. Age is also a statistically significant predictor of depression, such that depression increases with age for White men and women.

Table 4.3 shows the cross-sectional results of the association of partner race and gender, broken down by type of relationship. Table 4.3 also displays results from the interaction effect of partner race times relationship type (dating versus cohabiting/married), to test whether or not the effect of partner race on depression varies by relationship type (full results from the models including the interaction term are shown in Appendix Table 4.4). Table 4.3 shows the results from the White/nonwhite partner model for White men and the four-category partner race model for White women. Full results from models using both alternate partner race specifications, broken down by relationship type and gender, are available in Appendix Table 4.3. The key findings from Table 4.3 are as follows. First, White men who are in marriage or marriage-like cohabiting relationships with nonwhite partners report more depression compared to White men in marriage or cohabiting relationships with White partners. There is weaker evidence that having a nonwhite dating partner is associated with depression for White men ($p<.10$). The interaction effect between partner race and relationship type was not statistically significant for

men, meaning that there is no empirical support that depression levels in interracial marriages and cohabitations compared to dating relationships for men differs. Thus, for men, I do not find strong evidence in support of either the *social acceptability* or *commitment* hypotheses in the cross-sectional results; that is, it is unclear from this analysis whether relationship type moderates the effect of partner race on depression, though the effect of having a nonwhite partner on depression appears to be slightly greater in magnitude in married and cohabiting relationships compared to dating relationships for White men.

For White women, on the other hand, I find evidence of the *commitment* hypothesis among White women with a Black partner. The key findings from Table 4.3 for White women are that White women in dating relationships with Black partners report greater depression on average than White women with White, Hispanic, or Asian dating partners. Further, the statistically significant interaction effect between having a Black partner and relationship type indicates that White women with Black dating partners are more depressed than White women with Black spouses or cohabiting partners. This finding suggests that perhaps dating relationships with Blacks are less suited for buffering stress than more committed relationships with Black partners; on the other hand, this association could be evidence that depressed women are more likely to select into dating relationships with Black men but not into relationships that become more committed and turn into married and cohabiting relationships with Black men. I look to the selection and change analyses for evidence suggesting selection or causal processes underlying this association.

[TABLE 4.3 ABOUT HERE]

Table 4.4 shows descriptive statistics for White young men and women who are in new relationships within the prior seven years or so. Again, both men and women overwhelmingly tend toward endogamous White partners (89.1% of men and 87.2% of women). Partner race/ethnicity, however, is statistically significantly between men and women ($p<.001$). In particular, women more frequently report Black partners (4.1% of women compared to 1.4% of men) whereas White men more often report Asian partners (3.8% of men compared to 2.9% of women). Among newly formed relationships since the last observation, marriages are most common for women (36.9%) compared to other types of relationships, whereas dating relationships are most common for men (37.4% of relationships), and relationship type differs by gender ($p<.001$). Again, White women are less likely to live in their parents' home compared to White men (19.6% versus 22.1%, $p<.05$), and women more frequently report living with biological children than men (35.6% versus 20.7%, $p<.001$). Again, White women report more depression than White men ($p<.001$). It is interesting to note that compared to the full population of all White men and women in current relationships (Table 4.1), those reporting new relationships report slightly higher depression.

[TABLE 4.4 ABOUT HERE]

Table 4.5 shows the results for the selection models, modeling the extent to which prior depression affects selection into a married, dating, or cohabiting relationship with a partner of a particular race/ethnicity. In order to present the results as clearly as possible, I limit the results in the table to only nonwhite versus White partners for White men (shown to be the best model fit in the cross-sectional analysis)

and show the effects among men in all types of relationships together, then married or cohabiting, and dating, in the next columns. I limit the results in this table for White women to the results from the multinomial logistic regression predicting partner race as a four-category variable (base outcome White), and show only effects for White women in all types of relationships pooled, and in dating relationships, in keeping with a framework that seeks to explain the association observed from the cross-sectional analysis. The results for White women in married and cohabiting relationships are available in Appendix Table 4.5. The key findings from Table 4.5 are as follows. First, for White men in new relationships, the results show evidence that the cross-sectional association of depression and having a nonwhite partner among men in married and cohabiting relationships may be partly due to selection: White men who reported higher levels of depression prior to all new relationships are more likely to partner with a nonwhite partner. When relationship type is disaggregated into married and cohabiting versus dating, we see that the selection effect of more depressed White men partnering with nonwhites holds for married and cohabiting relationships only. However, the interaction effect between prior depression and relationship type was not statistically significant, indicating that I cannot conclude that the selection process for entering a married or cohabiting relationship with a nonwhite partner is different compared to entering a dating relationship with a nonwhite partner. Thus, overall, there is evidence in favor of a *selection hypothesis* of the association of depression and having a nonwhite partner for White men, both among all relationship types, but particularly driven by depression selection into married and cohabiting relationships.

For White men, living in one's own place compared to a parent's place decreases the likelihood of partnering with a nonwhite partner, especially among new dating relationships. It is also noteworthy that there is no statistically significant effect of White men's education on entering a relationship with a nonwhite versus White partner, which suggests a lack of status exchange on the basis of education for White men's relationship formation. This finding is in line with prior research that finds that educational status exchange is most common among White women who partner with nonwhite men (e.g., Torche and Rich 2016).

Among White women, the selection analysis shows that there is no selection effect of prior depression on partner race when all relationship types are aggregated. However, there is an effect among White women in dating relationships with Black partners, such that being more depressed prior to the formation of a relationship increases the likelihood that a White woman will have a new dating Black partner compared to a new White dating partner. This finding suggests evidence for the *selection hypothesis* for White women with Black dating partners – that is, at least some of the cross-sectional association observed is due to more depressed White women entering new dating relationships with Black men.

Among White women in all new relationships, being in a new cohabiting relationships increases the likelihood of being partnered with a Black or Asian partner compared to a White partner, and being in a dating relationships increases the likelihood that a new partner is Black compared to White. These findings support prior research that finds that interracial relationships are less likely to advance to marriage (Joyner and Kao 2005), and supports the idea that interracial dating is more

common, perhaps due to greater social acceptability than interracial marriage (Herman and Campbell 2012). Unlike in the White men models, there is evidence of educational status exchange among White women in interracial and interethnic partnerships. White women with higher levels of education – particular a Bachelor's degree or greater education – significantly lower the likelihood of having a Black partner or Hispanic partner compared to White partner.

[TABLE 4.5 ABOUT HERE]

Finally, I look to the results of the depression change analysis to determine whether or not the findings provide support for a social causation hypothesis of the relationship of depression and romantic relationships, informed by the stress process model theoretical framework. Table 4.6 displays descriptive statistics for young adults in relationships with a current relationship with a partner reported ot have the same race/ethnicity and age characteristics across a seven-year period, interpreted here to be the same person across time points. This approach allows the most conservative examination of social causation and the stress process in the Add Health cohort, compared to prior studies (e.g., Kroeger and Williams 2011; Miller 2014). Table 4.6 shows that the "same partner" group has higher rates of endogamy compared to the populations represented in Tables 3.1 and 3.4: 93.8% of White men and 93.4% of White women report having White partners. This pattern is consistent with prior findings that show that interracial pairings tend to be shorter in duration than endogamous relationships (Kroeger D'Souza 2010). Among the same partner group, partner race does not vary by gender, unlike among young White adults in all current relationships or all new relationships. Relationship type (measured at Wave 3

– recall that this group is restricted to those in married and cohabiting relationships by Wave 4) again varies by gender ($p<.05$), with women more likely to be in marriages compared to men (42.4% of women compared to 34.8% of men). Women report longer relationship durations as of the first observation in Wave 3 ($p<.001$) and are more likely to live with biological children ($p<.001$). At both observation points, women report greater depression compared to men ($p<.001$), and both men and women appear to report more depression at the second observation point than the first, which is consistent with prior research that shows that depression decreases from adolescence to emerging adult before increasing in young adulthood (Arnett 2007; Collins 2006).

[TABLE 4.6 ABOUT HERE]

Table 4.7 displays the results from the depression change analysis. Again, the group of interest here is limited to only those White men and women who were observed with the "same" partner over a period of about seven years (a partner of the same race/ethnicity and age characteristics), and is limited to those who reported a marriage or cohabitation relationship at the second time point. Restricting the population of interest thusly allows for a more conservative analysis of the causal impact of partner race on depression by focusing only on long term relationships that represented greater levels of commitment at the second observation point. This is in line with the idea that romantic relationships provide stress buffering and support through greater levels of attachment and commitment, as well as shared resources, and thus is more suited to test the hypothesis that interracial relationships are not as able to buffer stress due to their vulnerability to social stigma and disapproval.

Further, the use of the regressor-variable method in these models by controlling for depression at the first point in time while predicting depression at the second point in time represents an improvement over prior similar studies in terms of my ability to draw inferences about the potential causal impact of partner race on depression.

The key finding from the depression change analysis is that White women in long term cohabiting and marriage relationships with Black partners are predicted to experience adverse impacts on depression over time, compared to White women in long term relationships with White partners, shown by Model 1. White women with Black partners see about a 33% increase in depression over time, or an increase of approximately 1.4 points on the depression scale. This effect is substantial, comparable in magnitude to the effect prior depression has on later depression. The association holds after controlling for relationships type at the first point of observation, skin tone, being multiracial, education level, and household composition variables, as well as prior depression. Thus, we see support for the *stress hypothesis* of having a Black partner for White women's depression compared to having an endogamous White partner. Having lighter skin tone is also associated with increased depression across the observation period. For both White men and women, increasing levels of education are associated with lower depression scores. Not surprisingly, being depressed at the first observation is associated with greater depression at the second observation for both men and women. For White men, no effect of having a nonwhite partner on depression over time was observed, thus showing no support for the *stress hypothesis* of interracial relationships and depression for men.

Model 2 adds an interaction effect between partner race and relationship type at the first observation point to test whether or not being in a dating relationship at the earlier time point in the relationship compared to a more committed cohabiting or marriage relationship moderates the association of partner race with depression over time. This effect was not statistically significant for men or women, indicating that there is no discernible difference in terms of partner's effect on depression over time based on relationship type early in the relationship. Thus, I cannot draw conclusions from the results regarding whether and how relationship type might moderate the long term effects of partner race and ethnicity on depression.

*Discussion*

The sociology of mental health looks to social structure and social statuses to understand how mental health is patterned and why inequalities exist (Aneshensel 2013; Thoits 2010). Central to the sociological study of mental health are two findings. First, that mental health is patterned by race, ethnicity, and gender; and second, that social relationships, particularly romantic relationships, represent a key social context in which individuals are embedded and which either expose or buffer stress and thus affect mental health (Milkie 2010; Ross 1995; Umberson and Montez 2010). Drawing on these broad themes in the literature, a small number of studies have recently asked the question: Are interracial and interethnic romantic relationships harmful to mental health? Given that interracial relationships have increased in prevalence over the past several decades (Qian and Lichter 2011; Torche and Rich 2016), especially among young people (Joyner and Kao 2005), it is an

important question to ask, and a question that has ramifications both for the mental health of the young adult population as well as for the meaning and persistence of racial boundaries in US societies.

Prior studies have established that there is an association between interracial relationships and mental health, particularly depression. Specifically, White women married to Black spouses experience more psychological distress (Bratter and Eschbach 2006), interracial daters are more likely to be depressed than endogamous daters in adolescence regardless of race and gender (Miller 2014), and non-Black young adults with Black partners report more depressive symptoms regardless of type of relationship (Kroeger and Williams 2011). However, to date, we cannot conclude that this effect is necessarily uniform across groups nor across relationship types. Further, these studies, despite using primarily cross-sectional methods of analysis that do not allow for drawing conclusions about the direction of causality, have all focused on how partner race and ethnicity might affect depression. This interpretation is in line with dominant theoretical paradigms in the sociology of mental health and depression. The sociology of mental health has its roots in the social structure and personality framework, best exemplified by the stress process model, pioneered by Leonard Pearlin (1989). This groundbreaking framework looks to an individual's location within social structure, including ascribed statuses, meso-level environments, and social interaction and relationships, to explain exposure and vulnerability to stress and how that stress results in experiencing psychological distress, often defined empirically as depressive symptoms (Aneshensel 2013; Pearlin 1999). This interpretation makes intuitive sense when considering interracial and interethnic

romantic relationships and mental health, given that interracial relationships continue to be stigmatized and are less socially acceptable than endogamous relationships, especially in the case of marriage (Herman and Campbell 2012; Yancey 2002, 2007).

However, sociological studies on the robust association of romantic relationships and better health have long contended with a fundamental question: to what extent is the observed association between romantic relationships and health due to causal effects, or the selection of the healthy into relationships (Lillard and Panis 1996)? In this study, I build on prior studies of the association between exogamous romantic relationships and mental health, and extend the state of current knowledge on the topic in several key ways, focusing on depression among White men and women in their late teens to early 30s. To do so, I addressed four research questions. First, I sought to replicate prior findings that interracial and interethnic relationships are cross-sectionally associated with greater depression, focusing on Whites who represent the full range of early young adulthood and young adulthood, an age range previously not considered in studies using the Add Health cohort. Second, I asked whether and how relationship type, specifically, dating relationships representing less commitment and seriousness compared to coresidential marriage and marriage-like relationships, moderate the association between partner race and ethnicity and depression for White young adults. Third, I used the longitudinal design of the Add Health to ask whether the observed associations might be due to selection or causal processes. Finally, I asked whether the association of partner race and ethnicity and depression varies by gender.

In the first part of the analysis presented here, the cross-sectional analysis, I found that both White men and women throughout young adulthood with nonwhite partners, on average, report more depressive symptoms compared to White men and women with endogamous partners. However, when disaggregating partner race into multiple race and ethnicity categories rather than looking at all nonwhite partners together, I found that although nonwhite partners of all groups were associated with greater depressive symptoms for White men, only having a Black partner was associated with greater depressive symptoms for White women. These findings largely replicate the cross-sectional findings of other scholars on the topic, particularly with regard to greater depression associated with a Black partner (Bratter and Eschbach 2006; Kroeger and Williams 2011). Prior explanations for this finding about Black partners in particular have focused on the fact that Blacks in the US are still the most discriminated against nonwhite group, thus Black-White relationships will be the most stigmatized and therefore stressful (Kroeger and Williams 2011), which is confirmed to a degree by qualitative research indicating that Whites with Black partners learn through through partners' experiences about the realities of harsh racism (Yancey 2007) and the finding that Blacks are particularly isolated on the interracial dating market (McClintock 2010). The results also suggest that studying the effects of a nonwhite partner for White men's depression is more appropriate, whereas the effects of partner race on White women's health are limited to having a Black partner. One possible explanation for this is that Black partners are more stigmatized for White women; this is supported by some literature indicating that because Black women are not likely to partner with White men, the Black community

is especially resistant to Black men and White women partnering (Childs 2005). It may also be the case that Black partners' depression effects for White men are similarly strong, but it is not observable in this data source due to small sample sizes of White men in relationships with Black women. However, at this point, this finding is exploratory, and future studies should attempt to replicate the effect of partner race, comparing nonwhite partners to specific partner race categories, using another data source.

With the cross-sectional analysis, I further extended the prior research to ask whether or not the type of relationship, and its attendant level of commitment, moderates the association observed. On the one hand, relationships are thought to represent a continuum of social attachment, with more committed relationships offering greater support and therefore mental health benefits (Ross 1995). On the other hand, research on attitudes and public opinion suggests that interracial dating is much more socially acceptable and normative than marriage or cohabitation (Blackwell and Lichter 2004; Herman and Campbell 2012; Yancey 2002). When White young men and women were disaggregated into married and cohabiting relationships compared to dating relationships, the results showed that the depression effect for White men was largely driven by men in married and cohabiting relationships with nonwhite partners, whereas the depression effect for White women was driving by dating relationships with Black partners. The interaction effects between partner race and relationship type showed support for a *commitment hypothesis* of partner race and depression for White women with dating partners. That is, there is evidence that White women who date Black partners report on average

greater depression than White women with married or cohabiting Black partners. Indeed, the results showed that White women with Black dating partners report 35% more depression than White women with White dating partners, a statistically significant and substantively significant disparity. One possible interpretation of this finding is that interracial relationships with Black partners are indeed more stressful, as prior research has suggested (Bratter and Eschbach 2006; Kroeger and Williams 2011; Solsberry 1994; Yancey 2002), but that dating relationships, due to their lesser degree of commitment as well as fewer psychosocial and economic supports offered (Ross 1995; Ross and Mirowsky 2013; Umberson and Montez 2010), are less suited for buffering that stress. These results do not support a *social acceptability* hypothesis, which would suggest that interracial dating relationships, being more casual, are considered less significant for crossing racial boundaries and blending families of different backgrounds (Yancey 2007), especially among young adults who are in a phase of life where exploring partnership options is considered healthy and normal (Arnett 2000). However, this interpretation assumes a causal pathway from having a Black dating partner to experiencing depressive symptoms, which is impossible to conclude from the cross-sectional analysis alone, despite this being the predominant explanation offered in the literature thus far.

The depression change analysis presented in this study provides a more stringent look at the possibility of a causal interpretation of the association, as is suggested above. By limiting the analysis presented here to only White men and women who report partners of the same race/ethnicity and age at two points in time, restricting to only those who report marriages and cohabitations at the second point in

time, and using a regressor-variable method of looking at depression change over time (Allison 1990), I took a more conservative look at possible causal pathways than done in prior studies of partner race and depression (Bratter and Eschbach 2006; Kroeger and Williams 2011; Miller 2014). The results suggest that only White women with Black partners experience a long term adverse impact of partner race on depressive symptoms, which suggests that prior accounts of the causal link between partner race, interracial dating, and interracial marriage have perhaps been overstated. No support was found for the hypothesis that men and women would see statistically significantly different effects of partner race on depression over time (though no effect of partner race on depression over time was observed for White men). Thus, I find support for the *stress hypothesis* of interracial relationships for White women in dating relationships with Blacks only. This result supports what Kroeger and Williams (2011) refer to as a "Black exceptionalism" explanation for the link between having a Black partner and experiencing depression – that is, that because Blacks are the most discriminated against and stigmatized group, interracial relationships involving Blacks are the most stressful. Interpreting this within the stress process model (Pearlin 1989), dominant in explanations of stress and mental health in sociology, this suggests that stress experienced within these relationships translates to depression outcomes. It also draws attention to the importance of social structures and statuses in understanding the link between stressors and mental health outcomes. Further, the stress process model's focus on social status draws our attention to the fact that not only is one's own race a status cue, but partner race may also be a status cue, and this effect is strongest for White women (Miller et al. 2004). Interracial

relationships do not cause stress within a social vacuum. Rather, it is the social status ascribed to both partners, and the feedback from significant others such as family and friends in social interaction (Edmonds and Killen 2009), that affects each step of the stress process, from exposure to the stress in first place to experiencing the adverse mental health outcome (Pearlin 1999).

Although the results presented for this study provide some evidence of a *stress hypothesis* of interracial relationships and depression for White women in dating relationships with Black partners, the results also provide support for the *selection hypothesis* – that is, it appears that White men and women may select into relationships with exogamous partners on the basis of depression. Specifically, the results here suggest that White men who report more depressive symptoms are more likely to select into romantic relationships with nonwhite partners compared to nonwhite partners, and this is particularly true of White men entering marriage and cohabiting relationships with nonwhites. Further, the selection analysis shows that at least some of the association between having a Black dating partner and depression for White women is due to White women who are more depressed to begin with entering these relationships with Black partners. There was no evidence that relationship type moderated selection effects into exogamous or endogamous partnerships on the basis of depression. It is well known that people select into romantic relationships on the basis of other health statuses aside from mental health. For example, people who are obese are less likely to marry, as are people with worse self-rated health (Fu and Goldman 1996; Schwartz 2013; Wilson 2002). It stands to reason that on dating and marriage markets, people who suffer from depression may

be less desirable partners, and there is some limited evidence that this is true (Kim and McHenry 2002; Mastekasaa 1992). The selection effect seen in the present study may also be the result of status exchange processes on the interracial dating and marriage market, specifically. A dominant theory in the study of how and why people partner across racial and ethnic lines is status exchange theory, which posits that people with lower racial status (nonwhites) trade some other type of status – usually education or other socioeconomic resources – in order to "trade up" for a White partner (Davis 1941; Fu 2001; Gullickson 2006; Kalmijn 2010). Trading racial status for education status continues to be a strong pattern in interracial marriage and cohabitation formation today, even as people are more likely to enter interracial unions (Torche and Rich 2016), suggesting that although people are more likely to espouse acceptance for interracial relationships now compared to decades ago (Herman and Campbell 2012), this doesn't necessarily translate into race losing its salience as a status marker for relationships formation. Although selection arguments have not been much used in the literature on romantic relationships and depression, it may be the case that integrating a selection argument of mental health with status exchange theory on interracial partnering is an appropriate and fruitful lens for interpreting White men and women's entry into interracial relationships on the basis of depression. The results here suggest that Whites with low "mental health status" - that is, greater rates of depression – may be penalized on the dating and marriage market for their mental health, and thus have trouble partnering with a similarly high racial status White partner. This is an avenue that future research should explore in greater depth, particularly by incorporating nonwhites who partner with Whites into

the analysis. If depression does indeed act as a status marker for relationships formation, then we should expect to see that less depressed nonwhites are more likely to partner with White partners than more depressed nonwhites. Further, future research should examine the dynamics of nonwhites' mental health and partner race. Recent research finds that both Blacks *and* Whites "trade" higher education status for a White partner, rather than less-educated Whites partnering with more-educated Blacks (Torche and Rich 2016). Thus, it should be explored whether nonwhites with less depression partner with Whites with more depression, or whether White and nonwhites with less depression are both more likely to partner with Whites.

Future research should also continue to explore whether and how relationship type moderates the association between partner race and depression, and the evidence for this happening at the point of union formation (indicating selection) compared to change in depression over time. This should be done with additional data sources aside from the Add Health, if possible. The results presented here suggest that at least for White women with Black partners, having a dating relationship is worse for depression outcomes compared to being married or cohabiting. The results are inconclusive for White men. Though a greater effect of partner exogamy on depression was seen for White men in married and cohabiting relationships with nonwhites, this effect was not statistically significant. Future research should attempt to replicate these results with new data sources, and also should consider the trajectories of relationships and mental health simultaneously – that is, are dating relationships with Black partners more strongly linked to depression because they are more likely to break up, causing stress, or do these relationships progress to marriage

and cohabitation, suggesting instead that social stigma for intermarriage may be the mechanism at play for causing depression? More research is needed.

Overall, the results from this study advance the current state of knowledge on interracial relationships and depression in three key ways. First, the results suggest the potential importance of attending to interracial dating compared to more committed types of relationships, which makes sense given the more casual nature of dating, especially in young adulthood, and because people who interracially date are not necessarily those who interracially marry or cohabit (Yancey 2007). Second, the results here suggest that the causal impact of interracial relationships for depression may be overstated in prior literature. Although there is evidence for a causal link between having a Black partner and depression over time for White women, suggesting that a stress process model interpretation of interracial relationships may be supported in some cases, it seems that this effect is not uniform by gender or across partner racial combinations. Finally, this study introduces the idea that selection effects may in fact drive some of the prior association between partner race and depression, and I offer a theoretical framework- status exchange theory – for interpreting this effect. Selection and causal processes should not be considered mutually exclusive in the association of relationships and depression and should be considered to work in tandem (Mastekasaa 1992), and therefore, researchers in the sociology of mental health may do well to consider the conditions under which selection arguments as well as social causation arguments hold water.

This study has a few important limitations. First, as discussed previously, though I assume here for the sake of the depression change analysis that having a

partner of the same race, gender, and age across two waves is the same partner, there is no actual way to determine whether or not this is true using Add Health's data structure. Future research using longitudinal data sources should endeavor to track exogamous and endogamous partnerships over time in conjunction with partners' depression, perhaps by using a household-based survey rather than a person-based survey. Further, assuming that indeed the sample used for the depression change analysis represents people who were continuously partnered with the same partner over a seven-year period, this subgroup may have unique characteristics that are not shared by people whose partnerships do not last for such a long period of time. This may introduce a selection bias into the analyses. For example, it may be the case that people who are more depressed experienced relationship dissolution and thus were excluded from the depression change analysis presented here. Thus, the results from the change analysis should be interpreted as representing the effects of being continuously partnered with an endogamous partner compared to being continuously partnered with an exogamous partner. They will not necessarily represent the effects of being in shorter-term exogamous versus endogamous relationships.

Second, due to the cross-sectional results, I restricted the results presented here to Black partners for White women and nonwhite partners for White men. It is possible that these results are simply because the sample size for White men partnered with Black women is quite small. The conclusion that these partner race categorizations are the most appropriate for analyses of exogamy and depression should be considered exploratory until replicated with other data sources. Finally, restricting the mental health outcome to only depression may bias the study's results

in favor of seeing more effects for women. There is ample research suggesting that men and women express psychological distress through different outcomes: women are more likely to experience depression, whereas men are more likely to experience anger or express distress through alcohol and substance abuse (Denton et al. 2004; Mirowsky and Ross 1995; Rosenfield 2012; Rosenfield et al. 2005; Simon 2002). Future research should consider additional outcome measures that may operationalize psychological distress, and examine whether and how partner race is associated with these outcomes.

# Chapter 5: Conclusion

In this dissertation, I presented three studies that address an understudied social context for health inequalities: the racial and ethnic composition of romantic relationships. Using two large, nationally representative data sources, I examined three health outcomes – self-rated health, overweight and obesity, and depression – in the context of endogamous and interracial and interethnic romantic relationships, including dating, cohabiting, and married relationships.

*Summary of Findings*

In the first paper, detailed in Chapter Two, I examined the association between self-rated health and partner race among White and nonwhite adults in the United States using public use data from the SIPP. Only one prior study to date has examined this association, finding that Whites with nonwhite partner suffer a self-rated health penalty, while racial minorities with White partners experience a health benefit (Miller and Kail 2016). However, prior research had not examined this association using longitudinal data. In Chapter Two, I pushed this line of inquiry further by examining not only a cross-sectional association, but the evidence for selection processes compared to self-rated health change over time. My findings showed a cross-sectional association between exogamy and self-rated health, such that White women with nonwhite partners reported lower self-rated health than White women in endogamous cohabitations and marriages, and that White women experienced an additional health "penalty" with exogamy compared to White men. Both nonwhite men and women in partnerships with Whites had better self-rated health, and again,

gendered processes were in play: nonwhite women's health "premium" with White partners was greater compared to nonwhite men's. The results showed support for selection processes into exogamous and endogamous partnerships on the basis of self-rated health for women: both White and nonwhite women were more likely to enter a marriage or cohabitation with a nonwhite partner if their own self-rated health was worse. The results also lent support to treating self-rated health as affected by partner race. White women partnered with nonwhite men were found to experience self-rated health decline over time compared to White women endogamously partnered, and this penalty was greater compared to White men with nonwhite partners. Further, nonwhites with White partners, both men and women, experienced a health premium over time compared to nonwhites with other nonwhite partners.

In Chapter Three, I examined the association between being overweight and obese and partner race among White young adults in the Add Health cohort, representing young adults in the US who were in high school in the mid-1990s. The existing literature indicates that although romantic relationships, particularly marriage and cohabitation, are typically protective of health, BMI tends to be an exception to this pattern. That is, entry into romantic relationships is associated with increases in BMI and incidence of overweight and obesity (The and Gordon-Larsen 2009). Further, BMI and obesity are stratified by race, ethnicity, and gender (Ailshire and House 2011). I extended these literatures by incorporating partner race into an analysis of romantic relationships and likelihood of overweight and obesity among White young adults. The findings showed that White women with Hispanic and Black partners are more likely to be overweight and obese compared to normal BMI, and

White women experience this BMI association with having a Black partner more strongly compared to White men with Black partners. I found evidence that being overweight or obese increases the likelihood that White women will enter new relationships with Black partners. I also found evidence of change over time in overweight and obesity for White women with Black partners, such that having a Black partner over a period of about seven years is associated with a 15 times greater odds of being overweight or obese at the end of the seven-year interval compared to White women with White partners over the same time period, controlling for BMI at the start of the interval.

Finally, in Chapter Four, I built on prior research that asserts that interracial relationships are inherently more stressful than endogamous relationships, especially those with Black partners, and thus are associated with greater depression and psychological distress (Bratter and Eschbach 2006; Miller 2014; Kroeger and Williams 2011). I contributed to this existing work by considering also whether and how different types of relationships moderate this association with depression for White young adults in the Add Health cohort, as is suggested by research that shows that more committed interracial relationships – particularly ones that imply family ties and having children - are considered less socially acceptable (Herman and Campbell 2012). I additionally contributed to this literature by applying more stringent criteria for examining the association of partner race and depression longitudinally. The result from this chapter showed that having a nonwhite partner is associated with greater depression for White men and women, but that dating relationships with Black partners come with a greater mental health penalty for White

women compared to marriage or cohabiting relationships with Black partners. I found evidence that the cross-sectional results are at least in part due to selection, with more depressed White men more likely to have new nonwhite partners and more depressed White women more likely to have new Black partners. I also found evidence of a long-term effect of having a Black partner on increased depression for White women.

*Contributions and Future Directions*

Theoretically, I make several important contributions with this dissertation, supported by the findings detailed above. First, with this dissertation, I make a pioneering first attempt at expanding the scope of the status exchange theory of interracial relationships to include health statuses as a basis for partner selection. Status exchange theory typically looks to socioeconomic resources – particularly education levels – to explain how race, as a status marker, is "traded" or exchanged in partnership formation (Kalmijn 2010). However, socioeconomic status and race are clearly not the only criteria people use when selecting a dating, cohabiting, or marriage partner. Indeed, research indicates that in general, health statuses – including self-rated health and obesity – are predictive of entry into romantic relationships (Conley and Glauber 2006; Fu and Goldman 1996; Joung et al. 1998; Schwartz 2013; Waldron et al. 1996). I combine these literatures on status exchange based on socioeconomic status and health selection into romantic relationships to suggest that health may also be something that is "traded" for other partner attributes, such as partner race. The results from all three empirical chapters of this dissertation support this theoretical prediction. I showed that White women and nonwhite men and women are more likely to enter new marriages and cohabitations with White

partners if they have better self-rated health in Chapter Two, suggesting a pattern that is similar to that of educational status exchange observed by Torche and Rich (2016). Torche and Rich (2016) find that educational status exchange in Black/White couples functions such that higher education levels among both Blacks and Whites is predictive of having a White marriage or cohabitation partner, rather than less educated Whites pairing with more educated Blacks (a phenomenon known as "hypergamy"). The results shown in Chapter Two suggest that self-rated health status exchange in interracial and inter-ethnic relationships does not resemble hypergamy, but rather having better self-rated health in general is linked with entering a cohabitation or marriage with a White partner.

Further evidence for expanding the scope of status exchange theory to include health statuses was shown in Chapter Three. It is well-known in the empirical literature that being overweight and obese is a barrier for entering romantic relationships, particularly for women (Ali et al. 2014; Averett et al. 2008; Conley and Glauber 2006; Fu and Goldman 1996). Expanding this empirical insight to racially and ethnically exogamous relationships and drawing on status exchange theory as well is an obvious next step, especially given theoretical and empirical evidence for racialized and gendered standards of beauty revolving around women's body size. White men are found to be particularly discriminating against heavy women, whereas nonwhite men are more accepting of heavier bodies (Ali et al. 2013; Glasser et al. 2009; Jackson and McGill 1996). The results shown here suggest that overweight and obese White women may "exchange" racial status for partners that are more accepting of heavier body types, especially Black partners. Interestingly, this pattern

more closely mirrors a "hypergamy" pattern of status exchange (Torche and Rich 2016), in which a White partner with less desirable characteristics (here, larger body size) partners with a Black partner. However, the results presented here only focus on Whites' BMI. In order to establish how status exchange works in terms of "hypergamy" or lack thereof, nonwhites' BMI needs to be considered as well. This limitation is also present in Chapter Four's analysis, focusing on depression. The literature on romantic relationships and depression is quite light on selection arguments and supporting results. Only a handful of studies have examined selection into relationships on the basis of mental health, and those that have find mixed results (Kim and McHenry 2002; Mastekasaa 1992; Simon 2002). In Chapter Four, I suggest that the previously observed association between interracial relationships and depression could be attributed to selection as well as causation processes, which is a novel concept for this area of study. I suggest that status exchange processes could be at work for depression, and the results show some support for this. Specifically, White women who are more depressed are more likely to enter relationships with Black dating partners, and White men with greater depression are more likely to enter marriage and cohabiting relationships with nonwhite partners generally. Further research is needed that considers the possibility that mental health is a status marker that makes a person more or less desirable to potential romantic partners, and thus may explain some of the association of interracial partnerships and depression. Again, future research also needs to consider the mental health of nonwhites who partner with Whites. Evidence from future studies that nonwhites with less depression are

more likely to enter new relationships with Whites would lend further support to a status exchange theory of mental health and partner race.

Future research building on the idea that status exchange theory should expand in its scope to include health statuses should also work to further disentangle the effects of socioeconomic status and health. It is a robust and well-known finding that socioeconomic status is a determinant of health, such that lower socioeconomic status predicts worse health on many outcomes. In fact, this is such a universally observed phenomenon that socioeconomic status is considered a "fundamental cause" of health (Link and Phelan 1995; Phelan et al. 2010). Of course, socioeconomic status is also a predictor of interracial partnership formation, as posited by status exchange theory and shown empirically. Although all analyses presented in this dissertation controlled for education level, a marker of socioeconomic status that is closely linked with both health and interracial partnering, future research should look more closely at the independent and joint effects of various health statuses and socioeconomic status, including education and income, to determine whether and how they predict interracial partnership formation.

Additionally, the results from this dissertation contribute to prior theoretical and empirical work that suggests that interracial relationships are more stressful, and this is the root of their link to worse health (Kroeger and Williams 2011; Miller 2014). Although empirical work has provided good reason to believe that interracial relationships are indeed more stressful, due to stigma and lack of social acceptance (Herman and Campbell 2012), real and perceived disapproval from friends and family (Childs 2005; Field et al. 2013), and stressful experiences related to racial

discrimination (Yancey 2002), there is hardly definitive evidence at this point that it is this stress and stigma that actually "gets under the skin" and creates health outcomes. However, this perspective is logical given the predominance of the stress process model in sociological studies of health and mental health inequalities, and the results presented in Chapters Three and Four of this dissertation lend support to the theory that stress in these relationships leads to worse health outcomes – specifically, depression and greater BMI - for Whites. However, I push the state of the field on interracial relationships and health outcomes forward by offering an additional theoretical framework for considering the effect of interracial relationships on health outcomes: social status and health. This perspective draws on status exchange theory as well: given that status exchange of education for partner race is consistently observed in interracial pairings, it is clear that partner race acts as a status cue. Limited empirical work in psychology supports the idea that one's partner's race acts as a status cue to others (Miller et al. 2004). The social psychology of health literature looks to social status, as perceived through processes like social comparisons and reflected appraisals, to explain health disparities that mirror other ascriptive statuses, such as gender, socioeconomic status, and race (Schnittker and McLeod; Thoits 2010; Wolff et al. 2010). I suggest that this is an alternative theoretical explanation for a causal link between partner race and health outcomes that results in different predictions compared to a stress process perspective. Whereas a stress perspective would posit that interracial relationships, being stressful to all involved, should also result in worse health for all involved, a social status perspective predicts that Whites who partner with nonwhites experience a status penalty and thus a health penalty,

whereas nonwhites who partner with Whites experience a status boost and thus a health boost. Although this explanation is not used in the existing literature on interracial relationships and health, others' empirical findings could be interpreted as supporting this perspective. For example, Bratter and ESchbach (2006) find that interracial marriage is associated with psychological distress for White women who partner with Black men, but does not find an effect for Black men's psychological distress; Kroeger and Williams (2011) find that having a Black partner – the racial category that they argue to be the lowest status – is associated with depression for all "higher status" racial categories; and Miller and Kail (2016) find better self-rated health for racial minorities married and cohabiting with Whites, whereas Whites with nonwhite spouses or cohabitation partners report worse self-rated health, cross-sectionally. The results I report in Chapter Two of this dissertation also give support to a social status perspective, suggesting that over time as well as cross-sectionally, having a White partner is linked to better self-rated health over time compared to having a nonwhite partner for both Whites and nonwhites, and having a nonwhite partner is linked to worse self-rated health over time for White women. This suggests that being in an interracial relationship is *not* linked to worse health for racial minorities, which is better predicted by a social status perspective than a social stress perspective.

However, testing these competing perspectives against one another was not possible in Chapters Three and Four of this dissertation, due to limited sample sizes and my decision to thus restrict the analyses to Whites only. Next steps in pursuing empirical support for these competing hypotheses of the impact of partner race on

health will need to consider the BMI status and depression of nonwhites who are partnered exogamously and endogamously as well. Findings that nonwhites partnered with Whites experience lower risk of overweight, obesity, and depression would provide support for a social status perspective, whereas findings that nonwhites partnered with Whites experience worse outcomes with respect to BMI and depression would suggest a stress perspective. Thus, it is possible that future research will not bear out the proposition that the stress process model is the most appropriate theoretical framework for studying the health effects of interracial relationships, but rather, perhaps we must look to other frameworks to interpret the results as this literature grows. Along these lines, future research should also empirically identify other mechanisms by which the racial composition of relationships might affect health outcomes, drawing on the existing literature on race/ethnicity and health, and romantic relationships and health, respectively. For example, does marital quality and marital strain affect health outcomes for individuals in different types of relationships differently? Do health behaviors mediate the association between relationship racial composition and health outcomes? How do household resources affect health outcomes for mixed race/ethnicity households vs. same race/ethnicity households?

Finally, this dissertation contributes to the existing theory and research on interracial partnerships and health by incorporating a gendered perspective throughout. I suggest that in expanding the scope of status exchange theory to include health statuses, gender must be considered as a moderating variable. It has been found in various studies that women are held to different standards for mate selection compared to men. Men are already privileged with regards to entering romantic

relationships in many ways, including older men being able to partner with much younger women in a way that older women cannot (England and McClintock 2009), and evidence that men still typically dictate the tempo of relationships, such as initiating first contacts in online dating (Kreager et al. 2014) or when couples move in together (Lamont 2013; Sassler and Miller 2010). Women being more vulnerable to discrimination on the basis of health statuses on the dating and marriage market comes as no surprise, but I push this idea further by suggesting that gender discrimination intersects with status exchange processes to result in women selecting into interracial partnerships on the basis of health in ways that differ from men. The results from Chapter Three particularly strongly support this assertion, with the finding that White women select into relationships with Black partners on the basis of being overweight or obese more than White men do. I interpret this as evidence of a sort of inverse status exchange process on the basis of body size for White women, in which White women with less desirable body types select into relationships with lower racial status partners. I additionally build on theoretical work that suggests that women are more prone to stress and distress when it comes to health: women are both more exposed to stress, and are more vulnerable to its effects on health (Kessler and McLeod 1984; Mirowsky and Ross 1995). I thus argue that gender must be considered as a moderating factor in terms of the effects of stress or social status in interracial relationships on health, because women may be more vulnerable to these effects. Interestingly, this hypothesis does not find support with regards to depression, despite the fact that it is well-known that women are more susceptible to depression and are more likely than men to react to stressful relationship transitions with

depression (Simon 2002). However, the results from Chapters Two and Three suggest that White women are indeed more vulnerable to poor health outcomes, specifically worse self-rated health and being overweight or obese, in exogamous relationships compared to White men. Future research on relationship racial composition and health outcomes should therefore continue to make gender a key component of the theory and analysis.

Another important avenue for future research on the association of exogamous romantic relationships and health outcomes is to consider the possible contextual effects of various aspects of social life, such as neighborhoods, educational environments (including universities), and even religious organizations. The racial and ethnic composition of neighborhoods and schools is predictive of the likelihood of interracial relationships, including marriage (Harris and Ono 2005) and even friendships (Joyner and Kao 2000). In general, greater contact between Whites and racial minorities predicts more favorable attitudes toward interracial marriage among Whites (Johnson and Jacobson 2005). Additionally, these structural contexts, particularly neighborhoods, affect health outcomes. Indeed, residential racial segregation is considered a fundamental driving force in racial health disparities (Williams and Collins 2001). Taken together, it stands to reason that neighborhoods or other structural contexts may represent what Pearlin (1999) refers to as a "meso-level" aspect of the stress process in predicting health outcomes for individuals in interracial relationships. These contexts may both influence who is likely to partner endogamously, and how endogamous partnerships are received by friends, family, or

neighbors, possibly leading to more or less stress and thus to health outcomes. Future research should pursue this possibility.

Overall, this dissertation represents an attempt to further understand the interpersonal aspects of racial, ethnic, and gender inequalities in health outcomes. How do significant others' characteristics alter individual health statuses and health trajectories? This dissertation addresses a broader theoretical question of whether and how relationship compositional factors affect health outcomes. This is a generally understudied topic. We already knew, for example, that spousal education affects self-rated health (Brown et al. 2014), and the studies reviewed here indicate that racial composition is important for mental health (Bratter and Eschbach 2006; Kroeger and Williams 2011; Miller 2014). This dissertation provides further evidence that relationship composition factors should be a topic of greater focus in sociological health literature.

Additionally, this dissertation has several other substantive implications. The upward trend in interracial marriage between Black men and nonblack women, especially more educated Black men, means that Black women are feeling a particularly strong marriage market "squeeze" in which their pool of marriage partners is diminished (Crowder and Tolnay 2000). Given that Black women are already disadvantaged when it comes to health outcomes, and marriage is generally protective of health, the changing racial composition of romantic relationships could have a further detrimental impact on Black women's health specifically. Further, another substantive implication of this dissertation has to do with the health of multiracial individuals. Increased intermarriage, especially between Blacks and

Whites, means an increased multiracial population in the next generation. Current research on multiracial individuals indicates that the health of multiracial individuals is distinct from the health of monoracials – for example, biracial Black-White individuals have a health advantage over monoracial Blacks, whereas part-Native American individuals show a health disadvantage similar to monoracial Native Americans (Bratter and Gorman 2011). Understanding the health dynamics of endogamous versus interracial relationship pairings will provide a substantive foundation for future research on the health of multiracial Americans, as I expect this topic will grow in importance and popularity as the US population becomes more diverse.

Substantively, these findings, and the findings of future studies that I hope continue to build on this work, have implications for how interracial and interethnic relationships are considered. The results suggest that interracial relationships are, on the whole, not beneficial to Whites' health. From a sociological perspective, the reduction of social distance and social boundaries between racial and ethnic groups is generally considered to be a positive thing; but these changes may also introduce stress or social status processes that could negatively impact health because of the persistence of racial discrimination and status and resource inequalities along race and gender lines. My results indicate that we as a society need to think about what we can do to prevent stress, address social status disparities, and mitigate negative health consequences for couples of every type and composition. For example, decreasing socioeconomic disadvantage for racial and ethnic minorities, improving the health outcomes of vulnerable and disadvantaged groups, and reducing stigma associated

with relationships that are not endogamous are all broader implications of this research that are also oriented toward a social justice perspective. The results presented here provide further evidence that race and ethnicity continue to be major axes of inequality in the US when it comes to both social relationships and health outcomes.

# Appendices

*Appendix 2.1: Detailed race/ethnic partnership samples and cross-sectional analysis*

I show in Appendix Table 2.1 the sample numbers that break down nonwhites into Black, Hispanic, and Asian. This serves both to show the racial/ethnic composition of nonwhites who are either partnered with other nonwhites or with whites and to illustrate why analyses that further break down the "nonwhite" group were not feasible, especially for new relationships. Pooling across the 1996, 2001, 2004, and 2008 samples of the SIPP allows for adequate sample sizes when the racial groups are condensed to White and nonwhite, including among those in new relationships. For example, there are 379 nonwhite men and 336 nonwhite women observed in new partnerships with Whites, and 329 White men and 395 White women observed in new partnerships with nonwhites. In both the all-relationships and new-relationships samples, White-with-Hispanic was easily the most common White-with-nonwhite combination, at more than double the next most frequent combination, which was respectively White-with-Black for women and White-with-Asian for men. When considering other specific nonwhite groups, however, only 27 White men were observed in a new relationship with a Black woman and only 43 White women were observed in a new relationship with an Asian man. The combinations of nonwhite with nonwhite of a different race/ethnicity in every case numbered fewer than 30, the highest being 25 Hispanic women in a new relationship with a Black man.

[APPENDIX TABLE 2.1 ABOUT HERE]

# Tables

Table 1.1 Availability of Dependent Variables Self-Rated Health, Body Mass Index (BMI), and Depressive Symptoms in the Survey of Income and Program Participation (SIPP) & the National Longitudinal Study of Adolescent to Adult Health (Add Health), by Wave

| | Wave* | | | |
|---|---|---|---|---|
| **SIPP: Self-Rated Health (H)** | | | | |
| Panel | 3 (4) | 6 (7) | 9 (10) | 12 |
| 1996 | H | H | H | H |
| 2001 | H | H | H | x |
| 2004 | H | H | x | x |
| 2008 | H | H | H | x |
| **Add Health:Body Mass Index (BMI) & Depressive Symptoms (DS)** | | | | |
| | 1 | 2** | 3 | 4 |
| | BMI*** | BMI | BMI | BMI |
| | DS | DS | DS | DS |

Source: National Longitudinal Study of Adolescent to Adult Health (Add Health) and Survey of Income and Program Participation (SIPP)

*SIPP 2008 panel waves are in parentheses

**Add Health Wave 2 is a subsample, by design

***Only self-reported BMI available

Table 2.1 Characteristics of Married and Cohabiting Men and Women aged 18-59, 1996-2011 (Weighted % unless otherwise indicated)

| | White | Nonwhite | White v. Nonwhite[±] |
|---|---|---|---|
| ***Self-Rated Health*** | | | |
| Mean Self-Rated Health | 3.91 | 3.75 | *** |
| *Self-Rated Health Categories* | | | *** |
| Poor | 1.9 | 2.3 | |
| Fair | 5.9 | 8.1 | |
| Good | 23.0 | 28.4 | |
| Very Good | 37.6 | 35.0 | |
| Excellent | 31.6 | 26.2 | |
| ***Own Race/Ethnicity*** | | | |
| Hispanic | -- | 53.6 | |
| Black | -- | 29.8 | |
| Asian | -- | 16.6 | |
| ***Partner Race*** | | | *** |
| White | 96.1 | 12.2 | |
| Nonwhite | 4.0 | 87.8 | |
| ***Union Type*** | | | *** |
| Married | 92.1 | 90.2 | |
| Cohabiting | 7.9 | 9.8 | |
| ***New Relationship*** | 4.1 | 4.9 | *** |
| ***Education*** | | | *** |
| <High School | 6.4 | 25.8 | |
| High School Degree | 28.5 | 27.7 | |
| Some College | 31.3 | 26.3 | |
| Bachelor's Degree or More | 33.9 | 20.2 | |
| ***Gender*** | | | |
| Male | 48.6 | 49.5 | |
| Female | 51.4 | 50.5 | |
| ***Age (Mean)*** | 41.8 | 39.7 | *** |
| Total N | 228,599 | 70,466 | |

Source: SIPP 1996, 2001, 2004, 2008 Panels

[±]Group differences from chi-squared and t-tests, *** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

Table 2.2 Cross-sectional OLS Regression of Self-rated Health among White men and women age 18-59 in cohabiting and married relationships, 1996-2011

| | Model 1 | | | Model 2 | | |
|---|---|---|---|---|---|---|
| | Men | Women | Men v. Women | Men | Women | Men v. Women |
| Nonwhite Partner | -0.0002 | -0.066** | * | -- | -- | |
| | (0.020) | (0.022) | | -- | -- | |
| *Nonwhite Partner race/ethnicity*[b] | | | | | | |
| Hispanic | -- | -- | | 0.012 | -0.063* | * |
| | -- | -- | | (0.026) | (0.028) | |
| Black | -- | -- | | 0.010 | -0.106* | |
| | -- | -- | | (0.066) | (0.044) | |
| Asian | -- | -- | | -0.029 | 0.003 | |
| | -- | -- | | (0.037) | (0.061) | |
| Age | -0.020*** | -0.015*** | *** | -0.020*** | -0.015*** | *** |
| | (0.001) | (0.000) | | (0.001) | (0.000) | |
| Age squared[a] | -0.019*** | -0.022*** | | -0.02*** | -0.021*** | |
| | (0.004) | (0.004) | | (0.004) | (0.004) | |
| Cohabiting | -0.179*** | -0.164*** | | -0.179*** | -0.163*** | |
| | (0.019) | (0.017) | | (0.019) | (0.017) | |
| High School | 0.379*** | 0.422*** | | 0.379*** | 0.422*** | |
| | (0.020) | (0.020) | | (0.020) | (0.020) | |
| Some College | 0.505*** | 0.558*** | ! | 0.505*** | 0.558*** | ! |
| | (0.020) | (0.020) | | (0.020) | (0.020) | |
| Bachelor's Degree or Higher | 0.834*** | 0.875*** | | 0.835*** | 0.875*** | |
| | (0.019) | (0.020) | | (0.019) | (0.020) | |
| New Relationship | 0.013 | -0.032* | * | 0.013 | -0.032* | * |
| | (0.016) | (0.015) | | (0.016) | (0.015) | |
| Constant | 3.50*** | 3.40*** | *** | 3.502*** | 3.397*** | |
| | (0.019) | (0.019) | | (0.019) | (0.019) | |
| Observations | 110,767 | 117,832 | | 110,767 | 117,832 | |
| R-squared | 0.107 | 0.094 | | 0.107 | 0.094 | |
| BIC Statistic | 295015.7 | 317568 | | 295037.1 | 317586.6 | |
| AIC Statistic | 294929.2 | 317480.9 | | 294931.3 | 317480.2 | |

Source: 1996, 2001, 2004, 2008 SIPP Panels

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[a]Coefficient & standard error multipled by 100

[b]Wald tests were conducted for differences between partner race coefficients for White models; no differences were found

Standard errors in parentheses

Table 2.3 Cross-sectional OLS Regression of Self-rated Health among nonwhite men and women age 18-59 in cohabiting and married relationships, 1996-2011[±]

| | All Nonwhites | | | Hispanics | | | Blacks | | | Asians | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Men | Women | M v. W | Men | Women | M v. W | Men | Women | M v. W | Men | Women | M v. W |
| White Partner | 0.105*** | 0.177*** | * | 0.087** | 0.124*** | | 0.094* | 0.120! | | 0.149* | 0.264*** | |
| | (0.022) | (0.022) | | (0.029) | (0.031) | | (0.046) | (0.070) | | (0.065) | (0.038) | |
| Other Nonwhite Partner^ | -- | -- | | -0.101 | 0.118! | ! | 0.048 | 0.048 | | 0.080 | 0.099 | |
| | -- | -- | | (0.092) | (0.064) | | (0.083) | (0.092) | | (0.128) | (0.082) | |
| Observations | 34,223 | 36,243 | | 17,337 | 17,973 | | 11,302 | 11,337 | | 5,584 | 6,933 | |
| R-squared | 0.082 | 0.101 | | 0.069 | 0.090 | | 0.105 | 0.123 | | 0.081 | 0.092 | |

Source: 1996, 2001, 2004, 2008 SIPP Panels

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[±]All models control for age, age squared, union type, education level, and whether the relationship is new. Full model results in Appendix Table 1.2.

^ for Hispanics, either Black or Asian; for Blacks, either Hispanic or Asian; for Asians, either Hispanic or Black

Standard errors in parentheses

Table 2.4 OLS Regression predicting self-rated health change over a one-year period for men and women aged 18-59 in married and cohabiting relationships, 1996-2011

| | Whites | | | Nonwhites | | |
|---|---|---|---|---|---|---|
| | Men | Women | Men v. Women | Men | Women | Men v. Women |
| Nonwhite Partner | 0.012 | -0.036* | * | -- | -- | |
| | (0.016) | (0.018) | | -- | -- | |
| White Partner | -- | -- | | 0.073*** | 0.090*** | |
| | -- | -- | | (0.020) | (0.020) | |
| *Self-Rated Health 1 Year Prior* | | | | | | |
| Fair | 0.689*** | 0.663*** | | 0.733*** | 0.633*** | |
| | (0.041) | (0.036) | | (0.064) | (0.064) | |
| Good | 1.40*** | 1.38*** | | 1.29*** | 1.19*** | |
| | (0.038) | (0.034) | | (0.060) | (0.062) | |
| Very Good | 1.85*** | 1.857*** | | 1.67*** | 1.53*** | |
| | (0.038) | (0.034) | | (0.060) | (0.062) | |
| Excellent | 2.28*** | 2.30*** | | 2.00*** | 1.89*** | |
| | (0.038) | (0.034) | | (0.061) | (0.062) | |
| Age | -0.011*** | -0.008*** | *** | -0.015*** | -0.014*** | |
| | (0.000) | (0.000) | | (0.001) | (0.001) | |
| Age squared[a] | -0.091** | -0.007* | | -0.025*** | -0.018** | |
| | (0.003) | (0.003) | | (0.007) | (0.006) | |
| Cohabiting | -0.075*** | -0.050*** | | -0.067** | -0.118*** | |
| | (0.016) | (0.013) | | (0.024) | (0.025) | |
| High School | 0.150*** | 0.192*** | * | 0.045* | 0.083*** | |
| | (0.015) | (0.015) | | (0.019) | (0.018) | |
| Some College | 0.215*** | 0.260*** | * | 0.060** | 0.144*** | ** |
| | (0.015) | (0.015) | | (0.019) | (0.018) | |
| Bachelor's Degree or Higher | 0.382*** | 0.407*** | | 0.191*** | 0.262*** | * |
| | (0.015) | (0.015) | | (0.020) | (0.019) | |
| New Relationship | -0.012 | -0.024 | | -0.003 | -0.007 | |
| | (0.019) | (0.017) | | (0.035) | (0.031) | |
| Constant | 1.95*** | 1.87*** | *** | 2.23*** | 2.21*** | *** |
| | (0.038) | (0.034) | | (0.059) | (0.061) | |
| Observations | 66,685 | 71,308 | | 19,918 | 21,439 | |
| R-squared | 0.34 | 0.344 | | 0.257 | 0.26 | |

Source: 1996, 2001, 2004, 2008 SIPP Panels
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
[a]Coefficient & standard error multipled by 100
Standard errors in parentheses

Table 2.5 Characteristics of Adults in New Marriage or Cohabiting Relationships aged 18-59, 1996-2011 (Weighted % unless otherwise indicated)

| | White | Nonwhite | White v. Nonwhite[±] |
|---|---|---|---|
| ***Own Race/Ethnicity*** | | | |
| Hispanic | -- | 56.1 | |
| Black | -- | 32.8 | |
| Asian | -- | 11.1 | |
| ***Partner Race*** | | | *** |
| White | 93.6 | 17.1 | |
| Nonwhite | 6.4 | 82.9 | |
| ***Union Type*** | | | *** |
| Married | 57.2 | 67.6 | |
| Cohabiting | 42.8 | 32.5 | |
| ***Education*** | | | *** |
| <High School | 8.0 | 22.6 | |
| High School Degree | 30.9 | 33.7 | |
| Some College | 32.9 | 28.7 | |
| Bachelor's Degree or More | 28.2 | 15.0 | |
| ***Gender*** | | | |
| Male | 49.4 | 52.3 | |
| Female | 50.6 | 47.7 | |
| ***Age (Mean)*** | 32.3 | 32.4 | |
| Total N | 12,282 | 4,172 | |
| ***Self-Rated Health One Year Prior*** | | | |
| Mean Self-Rated Health | 3.99 | 3.83 | *** |
| *Self-Rated Health Categories* | | | *** |
| Poor | 1.4 | 2.2 | |
| Fair | 5.5 | 5.8 | |
| Good | 21.9 | 27.2 | |
| Very Good | 34.9 | 35.9 | |
| Excellent | 36.3 | 28.9 | |
| Total N | 4,545 | 1,555 | |

Source: SIPP 1996, 2001, 2004, 2008 Panels

[±]Group differences from chi-squared and t-tests, *** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

Table 2.6 Logistic Regression of Likelihood of Having a Nonwhite Spouse or Cohabiting Partner among Men and Women in New Marriage or Cohabiting Relationships aged 18-59, 1996-2011

| | Men | | Women | | |
|---|---|---|---|---|---|
| | Main Model | Race Interaction Model | Main Model | Race Interaction Model | Men v. Women (Main model) |
| Health t-1[a] | -0.063 | -0.095 | -0.133* | -0.128 | |
| | (0.074) | (0.096) | (0.062) | (0.081) | |
| Female | -- | -- | -- | -- | |
| | -- | -- | -- | -- | |
| Nonwhite (White) | 4.21*** | 5.73*** | 4.27*** | 6.41*** | |
| | (0.097) | (0.561) | (0.092) | (0.524) | |
| Cohabiting (Married) | -0.567*** | -0.028 | -0.283** | 0.005 | * |
| | (0.107) | (0.138) | (0.099) | (0.122) | |
| Age | 0.010* | 0.003 | -0.015*** | -0.030*** | *** |
| | (0.005) | (0.007) | (0.004) | (0.006) | |
| **Education (<High School)** | | | | | |
| High School | -0.592*** | -0.023 | -0.494*** | -0.056 | |
| | (0.128) | (0.269) | (0.122) | (0.215) | |
| Some College | -0.443** | 0.371 | -0.702*** | -0.075 | |
| | (0.138) | (0.269) | (0.124) | (0.207) | |
| Bachelor's Degree or Higher | -0.477** | 0.463 | -1.26*** | -0.354 | *** |
| | (0.168) | (0.297) | (0.153) | (0.232) | |
| Constant | -1.82*** | -2.62*** | -1.40*** | -2.21*** | *** |
| | (0.290) | (0.384) | (0.229) | (0.320) | |
| Race Interaction Model Coefficients | | | | | |
| Nonwhite x Health t-1[a] | | -0.007 | | -0.073 | |
| | | (0.134) | | (0.114) | |
| Nonwhite x Cohabiting | | -0.967*** | | -0.699*** | |
| | | (0.198) | | (0.194) | |
| Nonwhite x Age | | 0.012 | | 0.032** | |
| | | (0.010) | | (0.010) | |
| **Education** | | | | | |
| Nonwhite x High School | | -0.810* | | -1.05** | |
| | | (0.337) | | (0.382) | |
| Nonwhite x Some College | | -1.234*** | | -1.55*** | |
| | | (0.343) | | (0.368) | |
| Nonwhite x Bachelor's Degree+ | | -1.61*** | | -2.09*** | |
| | | (0.379) | | (0.385) | |
| Observations | 8,133 | 8,133 | 8,321 | 8,321 | |

Source: 1996, 2001, 2004, 2008 SIPP Panels

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[a]Health at t-1 was multiply imputed from health at time t for those with no observed health at t-1 - see text for details

Standard errors in parentheses

Appendix Table 2.1 Partnership Racial Composition by Gender

*Frequencies, Married and Cohabiting Relationships among Men and Women Age 18-59*

| | Total Sample (Person-Year) | | | | | New Relationship Subsample | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **MEN** | | | | | | | | | | |
| | Partner Race | | | | | Partner Race | | | | |
| | Hispanic | Black | White | Asian | Total | Hispanic | Black | White | Asian | Total |
| Hispanic | 14,612 | 85 | 2,538 | 102 | 17,337 | 826 | 24 | 227 | 5 | 1,082 |
| Black | 217 | 9,952 | 1,026 | 107 | 11,302 | 23 | 638 | 114 | 7 | 782 |
| White | 2,436 | 368 | 106,703 | 1,260 | 110,767 | 211 | 27 | 5,711 | 91 | 6,040 |
| Asian | 86 | 28 | 475 | 4,995 | 5,584 | 7 | 1 | 38 | 183 | 229 |
| **WOMEN** | | | | | | | | | | |
| | Partner Race | | | | | Partner Race | | | | |
| | Hispanic | Black | White | Asian | Total | Hispanic | Black | White | Asian | Total |
| Hispanic | 15,125 | 228 | 2,534 | 86 | 17,973 | 809 | 25 | 214 | 7 | 1,055 |
| Black | 101 | 10,821 | 394 | 21 | 11,337 | 23 | 677 | 27 | 0 | 727 |
| White | 2,569 | 1,086 | 113,695 | 482 | 117,832 | 228 | 124 | 5,847 | 43 | 6,242 |
| Asian | 104 | 119 | 1,356 | 5,354 | 6,933 | 7 | 9 | 95 | 186 | 297 |

Source: 1996, 2001, 2004, 2008 SIPP Panels

Appendix Table 2.2 Cross-sectional OLS Regression of Self-rated Health among nonwhite men and women age 18-59 in cohabiting and married relationships, 1996-2011

| | All Nonwhites | | | Hispanics | | | Blacks | | | Asians | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Men | Women | M v. W | Men | Women | M v. W | Men | Women | M v. W | Men | Women | M v. W |
| White Partner | 0.105*** | 0.177*** | * | 0.087** | 0.124*** | | 0.094* | 0.120! | | 0.149* | 0.264*** | |
| | (0.022) | (0.022) | | (0.029) | (0.031) | | (0.046) | (0.070) | | (0.065) | (0.038) | |
| Other Nonwhite Partner^ | -- | -- | | -0.101 | 0.118! | ! | 0.048 | 0.048 | | 0.080 | 0.099 | |
| | -- | -- | | (0.092) | (0.064) | | (0.083) | (0.092) | | (0.128) | (0.082) | |
| Age | -0.024*** | -0.023*** | | -0.022*** | -0.023*** | | -0.027*** | -0.026*** | | -0.018*** | -0.017*** | |
| | (0.001) | (0.001) | | (0.001) | (0.001) | | (0.002) | (0.001) | | (0.003) | (0.002) | |
| Age squared[a] | -0.001*** | -0.035*** | ! | -0.048*** | -0.038*** | | -0.057*** | -0.029* | | -0.048* | -0.038* | |
| | (0.007) | (0.007) | | (0.010) | (0.009) | | (0.013) | (0.012) | | (0.020) | (0.016) | |
| Cohabiting | -0.154*** | -0.184*** | | -0.139*** | -0.160*** | | -0.152*** | -0.175*** | | -0.148 | -0.233** | |
| | (0.026) | (0.026) | | (0.035) | (0.037) | | (0.042) | (0.042) | | (0.107) | (0.076) | |
| High School | 0.102*** | 0.181*** | ** | 0.105*** | 0.169*** | ! | 0.248*** | 0.355*** | | 0.242** | 0.298*** | |
| | (0.020) | (0.020) | | (0.026) | (0.025) | | (0.050) | (0.049) | | (0.083) | (0.060) | |
| Some College | 0.185*** | 0.267*** | ** | 0.190*** | 0.245*** | | 0.342*** | 0.498*** | * | 0.268** | 0.315*** | |
| | (0.021) | (0.020) | | (0.027) | (0.027) | | (0.051) | (0.049) | | (0.083) | (0.061) | |
| Bachelor's Degree or Higher | 0.370*** | 0.524*** | *** | 0.349*** | 0.491*** | ** | 0.516*** | 0.789*** | *** | 0.517*** | 0.542*** | |
| | (0.022) | (0.020) | | (0.036) | (0.033) | | (0.055) | (0.051) | | (0.074) | (0.055) | |
| New Relationship | -0.009 | -0.049! | | 0.010 | -0.033 | | -0.046 | -0.087* | | 0.063 | 0.024 | |
| | (0.026) | (0.025) | | (0.037) | (0.035) | | (0.044) | (0.043) | | (0.068) | (0.065) | |
| Constant | 3.75*** | 3.53*** | *** | 3.782*** | 3.566*** | | 3.575*** | 3.275*** | | 3.598*** | 3.486*** | |
| | (0.017) | (0.016) | | (0.019) | (0.019) | | (0.048) | (0.047) | | (0.073) | (0.054) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Observations | 34,223 | 36,243 | 17,337 | 17,973 | 11,302 | 11,337 | 5,584 | 6,933 |
| R-squared | 0.082 | 0.101 | 0.069 | 0.090 | 0.105 | 0.123 | 0.081 | 0.092 |

Source: 1996, 2001, 2004, 2008 SIPP Panels

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[a]Coefficient & standard error multipled by 100

Standard errors in parentheses

^ for Hispanics, either Black or Asian; for Blacks, either Hispanic or Asian; for Asians, either Hispanic or Black

Appendix Table 2.3 Cross-sectional OLS Regression with gender interactions of self-rated health among men and women age 18-59 in cohabiting and married relationships, 1996-2011

| Whites | | Nonwhites | |
|---|---|---|---|
| Nonwhite partner | -0.0002 | Nonwhite Partner | -- |
| | (0.020) | | -- |
| White Partner | -- | White partner | 0.105*** |
| | -- | | (0.022) |
| Female | -0.106*** | Female | -0.223*** |
| | (0.027) | | (0.023) |
| Nonwhite partner x Female | -0.066* | White partner x Female | 0.071* |
| | (0.030) | | (0.032) |
| Age | -0.020*** | Age | -0.024*** |
| | (0.001) | | (0.001) |
| Age x Female | 0.005*** | Age x Female | 0.001 |
| | (0.001) | | (0.001) |
| Age squared[a] | -0.019*** | Age squared* | -0.001*** |
| | (0.004) | | (0.007) |
| Age squared x Female | -0.026 | Age squared x Female | 0.016! |
| | (0.005) | | (0.010) |
| Cohabiting | -0.179*** | Cohabiting | -0.154*** |
| | (0.019) | | (0.026) |
| Cohabiting x Female | 0.015 | Cohabiting x Female | -0.030 |
| | (0.025) | | (0.037) |
| HS | 0.379*** | HS | 0.102*** |
| | (0.020) | | (0.020) |
| HS x Female | 0.043 | HS x Female | 0.079** |
| | (0.029) | | (0.028) |
| Some College | 0.505*** | Some College | 0.185*** |
| | (0.020) | | (0.021) |
| Some College x Female | 0.053! | Some College x Female | 0.082** |
| | (0.028) | | (0.029) |
| BA+ | 0.834*** | BA+ | 0.370*** |
| | (0.019) | | (0.022) |
| BA+ x Female | 0.041 | BA+ x Female | 0.154*** |
| | (0.028) | | (0.030) |
| New Relationship | 0.013 | New Relationship | -0.009 |
| | (0.016) | | (0.026) |
| New Relationship x Female | -0.045* | New Relationship x Female | -0.041 |
| | (0.022) | | (0.036) |
| Constant | -0.100*** | Constant | -0.220*** |
| | (0.019) | | (0.017) |
| Observations | 228,599 | Observations | 70,466 |
| R-squared | 0.101 | R-squared | 0.093 |

Source: 1996, 2001, 2004, 2008 SIPP Panels
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
[a]Coefficient & standard errors multipled by 100
Standard errors in parentheses

Appendix Table 2.4 OLS Regression with Gender Interactions Predicting Health Change over one year period for men and women aged 18-59 in married and cohabiting relationships, 1996-2011

| | Whites | Nonwhites |
|---|---|---|
| Nonwhite Partner | 0.012 | -- |
| | (0.016) | -- |
| Nonwhite Partner x Female | -0.049* | -- |
| | (0.024) | -- |
| White Partner | -- | 0.073*** |
| | -- | -0.02 |
| White Partner x Female | -- | 0.017 |
| | -- | -0.028 |
| Female | -0.081 | -0.019 |
| | (0.051) | (0.085) |
| Fair Health | 0.689*** | 0.733*** |
| | (0.041) | (0.064) |
| Fair Health x Female | -0.026 | -0.100 |
| | (0.055) | (0.090) |
| Good Health | 1.40*** | 1.29*** |
| | (0.038) | (0.060) |
| Good Health x Female | -0.017 | -0.100 |
| | (0.051) | (0.086) |
| V. Good Health | 1.85*** | 1.67*** |
| | (0.038) | (0.060) |
| V. Good Health x Female | 0.012 | -0.140 |
| | (0.051) | (0.086) |
| Excellent Health | 2.28*** | 2.00*** |
| | (0.038) | (0.061) |
| Excellent Health x Female | 0.021 | -0.107 |
| | (0.051) | (0.087) |
| Age | -0.011*** | -0.015*** |
| | (0.000) | (0.001) |
| Age x Female | 0.003*** | 0.001 |
| | (0.001) | (0.001) |
| Age squared[a] | -0.091** | -0.025*** |
| | (0.003) | (0.007) |
| Age Squared x Female | 0.002 | 0.008 |
| | (0.004) | (0.009) |
| Cohabiting | -0.075*** | -0.067** |
| | (0.016) | (0.024) |
| Cohabiting x Female | 0.025 | -0.052 |
| | (0.021) | (0.035) |
| HS | 0.150*** | 0.045* |
| | (0.015) | (0.019) |
| HS x Female | 0.042* | 0.038 |
| | (0.021) | (0.026) |
| Some College | 0.215*** | 0.060** |
| | (0.015) | (0.019) |
| Some College x Female | 0.045* | 0.084** |
| | (0.021) | (0.026) |
| BA+ | 0.382*** | 0.191*** |
| | (0.015) | (0.020) |

| | | |
|---|---|---|
| BA+ x Female | 0.025 | 0.070* |
| | (0.021) | (0.027) |
| New Relationship | -0.012 | -0.003 |
| | (0.019) | (0.035) |
| New Relationship x Female | -0.012 | -0.004 |
| | (0.026) | (0.047) |
| Constant | -0.080*** | -0.020*** |
| | (0.038) | (0.059) |
| Observations | 137,993 | 41,357 |
| R-squared | 0.342 | 0.260 |

Source: 1996, 2001, 2004, 2008 SIPP Panels
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
[a]Coefficient & SE multipled by 100
Standard errors in parentheses

Appendix Table 2.5 Logistic Regression of Likelihood of Having a New Nonwhite Spouse or Cohabiting Partner, 1996-2011, with gender interactions (Men and Women Ages 18-59, Whites and nonwhites combined)

| Gender Interaction Model | |
|---|---|
| Health t-1[a] | -0.049 |
| | (0.068) |
| Female x Health t-1[*] | -0.082 |
| | (0.082) |
| Female | 0.461 |
| | (0.328) |
| Nonwhite (White) | 4.21*** |
| | (0.097) |
| Female x Nonwhite | 0.053 |
| | (0.134) |
| Cohabiting (Married) | -0.567*** |
| | (0.107) |
| Female x Cohabiting | 0.287* |
| | (0.146) |
| Age | 0.010* |
| | (0.005) |
| Female x Age | -0.025*** |
| | (0.006) |
| **Education (<HS)** | |
| HS | -0.596*** |
| | (0.128) |
| Female x HS | 0.098 |
| | (0.176) |
| Some College | -0.449** |
| | (0.138) |
| Female x Some College | -0.256 |
| | (0.184) |
| BA+ | -0.489** |
| | (0.166) |
| Female x BA+ | -0.766*** |
| | (0.224) |
| Constant | -1.86*** |
| | (0.275) |
| Observations | 16,454 |

Source: 1996, 2001, 2004, 2008 SIPP Panels

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[a]Health at t-1 was multiply imputed from health at time t for those with no observed health at t-1 - see text for details

Standard errors in parentheses

Table 3.1 Descriptive statistics for the cross sectional analysis, non-Hispanic White[i] men and women in dating, married, and cohabiting relationships in 2001 and 2008; weighted percentages unless otherwise noted

| | Men | Women | Men v. Women |
|---|---|---|---|
| **Partner Race** | | | *** |
| Hispanic | 5.6 | 5.2 | |
| Black | 1.3 | 4.2 | |
| White | 89.4 | 87.9 | |
| Asian | 3.6 | 2.8 | |
| Skin Tone[±] | 5.0 | 5.0 | |
| Multiracial (wave 1) | 2.7 | 2.4 | ! |
| Foreign Born (wave 1) | 0.7 | 1.1 | ! |
| **Relationship Type** | | | *** |
| Married | 41.1 | 47.5 | |
| Cohabiting | 27.6 | 27.3 | |
| Dating/Other | 31.3 | 25.2 | |
| Relationship Duration (years) | 3.3 | 3.9 | *** |
| **Living Arrangement** | | | * |
| Parents' home | 18.9 | 16.9 | |
| Own place | 73.6 | 76.4 | |
| Other | 7.5 | 6.7 | |
| Biological Children in Household | 30.1 | 45.9 | *** |
| **Education** | | | *** |
| Less than high school | 11.5 | 8.8 | |
| High school | 24.2 | 20.3 | |
| Some College | 41.6 | 41.9 | |
| Bachelors' Degree or more | 22.7 | 29.0 | |
| Age | 25.6 | 25.2 | *** |
| BMI[a] | 27.9 | 27.0 | *** |
| Overweight/obese (%) | 62.2 | 50.2 | *** |
| N | 3,897 | 5,034 | |

Source: Add Health waves 1, 3 and 4, person-wave observations from waves 3 and 4

[i]Non-Hispanic White includes multiracial Whites who most identify as White

[±]Skin tone is measured on a scale with values 1-5; 1 is darkest, 5 is lightest; interviewer-rated at Wave 3

[a]BMI measured at Wave 3 and 4

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

Table 3.2. Descriptive statistics for the selection analysis, non-Hispanic White[i] men and women in new dating, married, and cohabiting relationships in 2001 and 2008; weighted percentages unless otherwise noted

| | Men | Women | Men v. Women |
|---|---|---|---|
| **Partner Race** | | | *** |
| Hispanic | 5.6 | 5.8 | |
| Black | 1.4 | 4.2 | |
| White | 89.2 | 87.2 | |
| Asian | 3.8 | 2.9 | |
| Skin Tone± | 4.95 | 4.95 | |
| Multiracial | 2.5 | 2.6 | |
| Foreign Born | 0.7 | 1.3 | |
| **Relationship Type** | | | *** |
| Married | 32.5 | 37.0 | |
| Cohabiting | 30.1 | 31.8 | |
| Dating/Other | 37.4 | 31.3 | |
| Relationship Duration (years) | 2.1 | 2.3 | *** |
| **Living Arrangement** | | | * |
| Parents' home | 22.1 | 19.5 | |
| Own place | 70.0 | 72.8 | |
| Other | 7.8 | 7.7 | |
| Biological Children in Household | 20.7 | 35.7 | *** |
| **Education** | | | *** |
| Less than high school | 10.4 | 8.2 | |
| High school | 23.1 | 18.9 | |
| Some College | 42.4 | 41.4 | |
| Bachelors' Degree or more | 24.0 | 31.5 | |
| Age | 25.2 | 24.6 | *** |
| BMI at prior observation[a] | 24.7 | 23.8 | *** |
| Overweight/obese (%) at prior observation | 46.8 | 37.6 | *** |
| N | 3,123 | 3,798 | |

Source: Add Health waves 1 - 4, person-wave observations pooled from waves 3 and 4

[i]Non-Hispanic White includes multiracial Whites who most identify as White

[a]BMI measured at Wave 2 and 3

[±]Skin tone is measured on a scale with values 1-5; 1 is darkest, 5 is lightest; interviewer-rated at Wave 3

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

Table 3.3. Descriptive statistics for non-Hispanic White[i] men and women in continuing dating, married, and cohabiting relationships from 2001 to 2008; weighted percentages unless otherwise noted

| | Men | Women | Men v. Women |
|---|---|---|---|
| **Partner Race** | | | |
| Hispanic | 3.4 | 3.0 | |
| Black | 0.4 | 2.8 | |
| White | 94.3 | 93.2 | |
| Asian | 2.0 | 1.1 | |
| Skin Tone[±] | 4.96 | 4.96 | |
| Multiracial (wave 1) | 3.1 | 1.9 | |
| Foreign Born (wave 1) | 0.5 | 0.7 | |
| **Relationship Type** | | | ! |
| Married | 33.4 | 39.6 | |
| Cohabiting | 29.6 | 27.6 | |
| Dating/Other | 37.0 | 32.8 | |
| Relationship Duration at W3 (years) | 2.9 | 3.3 | *** |
| **Living Arrangement** | | | ! |
| Parents' home | 25.1 | 22.3 | |
| Own place | 67.3 | 69.3 | |
| Other | 7.6 | 8.4 | |
| Biological Children in Household | 20.1 | 33.4 | *** |
| **Education** | | | |
| Less than high school | 12.9 | 10.9 | |
| High school | 32.3 | 28.9 | |
| Some College | 39.1 | 40.4 | |
| Bachelors' Degree or more | 15.7 | 19.8 | |
| Age | 22.3 | 21.9 | *** |
| BMI (Wave 3) | 26.7 | 26.1 | * |
| Overweight/obese (%) (Wave 3) | 55.4 | 43.3 | *** |
| BMI (Wave 4) | 29.4 | 28.4 | * |
| Overweight/obese (%) (Wave 4) | 71.3 | 60.6 | *** |
| N | 703 | 1,058 | |

Source: Add Health waves 1, 3, and 4

[i]Non-Hispanic White includes multiracial Whites who most identify as White

[±]Skin tone is measured on a scale with values 1-5; 1 is darkest, 5 is lightest; interviewer-rated at Wave 3

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

Table 3.4 Logistic Regression of likelihood of being overweight/obese on partner race/ethnicity among non-Hispanic White men and women in current dating, cohabiting, and married relationships

| | Men | Women | Men v. Women |
|---|---|---|---|
| **Partner Race (White)** | | | |
| Hispanic Partner | 0.072 | 0.386* | |
| | (0.205) | (0.160) | |
| *Odds Ratio* | 1.08 | 1.47 | |
| Black Partner | -0.401 | 0.761*** | ** |
| | (0.364) | (0.210) | |
| *Odds Ratio* | 0.67 | 2.14 | |
| Asian Partner | -0.083 | -0.248 | |
| | (0.245) | (0.223) | |
| *Odds Ratio* | 0.920 | 0.780 | |
| Skin Tone | -0.097 | -0.201 | |
| | (0.214) | (0.170) | |
| Multiracial | 0.053 | 0.290 | |
| | (0.314) | (0.289) | |
| Foreign Born | -1.299* | -0.606 | |
| | (0.567) | (0.432) | |
| **Relationship Type (Married)** | | | |
| Cohabiting | -0.263* | -0.215* | |
| | (0.121) | (0.102) | |
| Dating | -0.498*** | -0.362** | |
| | (0.134) | (0.121) | |
| Relationship Duration (years) | -0.004 | 0.037* | ! |
| | (0.019) | (0.015) | |
| **Living Arrangement (Parents' Home)** | | | |
| Own Place | -0.278* | -0.225! | |
| | (0.130) | (0.120) | |
| Other | -0.413* | -0.411* | |
| | (0.190) | (0.175) | |
| Biological Children in Household | 0.134 | 0.318*** | |
| | (0.119) | (0.096) | |
| **Education (Less than high school)** | | | |
| High School | 0.156 | 0.394* | |
| | (0.173) | (0.171) | |
| Some College | 0.295! | -0.096 | ! |
| | (0.167) | (0.164) | |
| Bachelors' Degree or Higher | 0.084 | -0.528** | |
| | (0.188) | (0.180) | |
| Age | 0.114*** | 0.097*** | |
| | (0.014) | (0.012) | |
| Constant | -1.641 | -1.303 | |
| | (1.138) | (0.898) | |
| Log Likelihood | -4780709 | -5566216 | |
| Observations | 3,897 | 5,034 | |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
Source: Add Health Waves 1, 3, and 4; wave 3 and 4 person-wave observations pooled

Statistical analyses adjust for clustering within individual in the case of observation in a relationship in waves 3 and 4

Table 3.5 Multinomial Logistic Regression Predicting Partner Race among non-Hispanic White men and women in new dating, married, and cohabiting relationships in 2001 and 2008

| | HISPANIC PARTNER | | | BLACK PARTNER | | | ASIAN PARTNER | | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | Women | Men v. Women | Men | Women | Men v. Women | Men | Women | Men v. Women |
| Prior Overweight/ Obese[a] | 0.272 | 0.236 | | -0.202 | 0.823*** | ! | -0.363 | -0.253 | |
| | (0.200) | (0.210) | | (0.513) | (0.243) | | (0.266) | (0.265) | |
| *Odds Ratio* | 1.31 | 1.27 | | 0.817 | 2.28 | | 0.700 | 0.777 | |
| Skin Tone (Wave 3) | -0.543* | -0.467* | | -0.354 | -0.852*** | | 0.288 | -0.570** | |
| | (0.245) | (0.223) | | (0.653) | (0.210) | | (0.473) | (0.213) | |
| Multiracial (Wave 1) | 0.513 | 0.336 | | -1.360 | 0.959! | | -0.392 | 0.584 | |
| | (0.566) | (0.458) | | (0.945) | (0.516) | | (0.791) | (0.565) | |
| Foreign Born (Wave 1) | -3.852*** | 0.348 | *** | 2.620** | -20.731*** | | -0.231 | 0.606 | |
| | (1.065) | (0.682) | | (0.816) | (0.548) | | (1.059) | (0.721) | |
| **Relationship type (Married)** | | | | | | | | | |
| Cohabiting | 0.277 | 0.234 | | 0.578 | 1.305*** | | 0.212 | 0.794** | |
| | (0.277) | (0.256) | | (0.666) | (0.311) | | (0.313) | (0.304) | |
| Dating | -0.528 | 0.261 | | 0.062 | 1.604*** | | 0.001 | 0.620 | |
| | (0.374) | (0.314) | | (0.722) | (0.393) | | (0.309) | (0.410) | |
| Relationship duration (years) | 0.002 | 0.075 | | 0.079 | 0.015 | | -0.021 | 0.163* | |
| | (0.068) | (0.050) | | (0.159) | (0.075) | | (0.081) | (0.075) | |
| **Living Arrangement (Parents' home)** | | | | | | | | | |
| Own Place | -0.656* | -0.240 | | -0.809* | -0.230 | | -0.428 | 0.195 | |
| | (0.314) | (0.259) | | (0.380) | (0.328) | | (0.344) | (0.384) | |
| Other | 0.109 | 0.215 | | -0.117 | 0.093 | | -0.681 | 0.490 | |
| | (0.430) | (0.359) | | (0.645) | (0.426) | | (0.533) | (0.415) | |
| Biological Children in Household | 0.200 | 0.206 | | -1.151! | 0.671* | * | 0.270 | -0.051 | |
| | (0.272) | (0.268) | | (0.668) | (0.268) | | (0.369) | (0.291) | |
| **Education (Less than high school)** | | | | | | | | | |
| High School | -0.388 | -0.577 | | 0.712 | -0.510 | | -0.311 | -0.650 | |
| | (0.401) | (0.396) | | (0.696) | (0.370) | | (0.423) | (0.421) | |
| Some College | -0.123 | -0.577 | | 0.301 | -1.024** | | -0.651! | -0.571 | |
| | (0.366) | (0.377) | | (0.743) | (0.360) | | (0.375) | (0.393) | |
| Bachelors' or Higher | -0.695! | -0.928* | | -1.178 | -1.835*** | | -0.048 | -0.865! | |
| | (0.420) | (0.431) | | (1.084) | (0.498) | | (0.443) | (0.473) | |
| Age | 0.026 | 0.017 | | 0.043 | 0.027 | | 0.011 | -0.055 | |
| | (0.030) | (0.028) | | (0.055) | (0.036) | | (0.049) | (0.037) | |
| Constant | -0.155 | -0.573 | | -3.358 | -0.213 | | -4.126 | 0.350 | |
| | (1.341) | (1.339) | | (3.027) | (1.307) | | (2.651) | (1.524) | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Observations** | 3,123 | 3,714 | 3,123 | 3,714 | 3,123 | 3,714 |

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[a]BMI at prior observation was multiply imputed from measured BMI and self-reported BMI at Wave 1 for those with no observed BMI at prior observation - see text for details

Source: Add Health, Waves 1-4; person-wave observations. Partner race at Waves 3 and 4 predicted from BMI at Waves 2 and 3; control variables observed at Wave 3 or 4 unless otherwise noted

Statistical analyses adjust for clustering within individual in the case of observation in a relationship in waves 3 and 4

Table 3.6 Logistic Regression of the Likelihood of Being Overweight/Obese by Prior BMI and Partner Race among non-Hispanic White men and women in dating, cohabiting, and married relationships with the same partner from 2001 to 2008

| | Men | Women | Men vs. Women |
|---|---|---|---|
| **Partner Race (White)** | | | |
| Hispanic Partner | -0.050 | 1.173! | |
| | (0.640) | (0.638) | |
| *Odds Ratio* | 0.951 | 3.23 | |
| Black Partner | -0.457 | 2.685* | ! |
| | (1.512) | (1.186) | |
| *Odds Ratio* | 0.633 | 14.7 | |
| Asian Partner | 0.783 | -0.645 | |
| | (1.245) | (0.543) | |
| *Odds Ratio* | 2.19 | 0.525 | |
| Skin Tone | 0.457 | 0.171 | |
| | (0.636) | (0.471) | |
| Multiracial (Wave 1) | -1.276! | 1.828* | ** |
| | (0.688) | (0.778) | |
| Foreign Born (Wave 1) | 0.110 | 0.632 | |
| | (1.504) | (1.397) | |
| **Relationship Type (Married)** | | | |
| Cohabiting | 0.379 | 0.060 | |
| | (0.415) | (0.337) | |
| Dating | 0.235 | -0.153 | |
| | (0.518) | (0.352) | |
| Relationship Duration (years) | 0.004 | 0.008 | |
| | (0.078) | (0.050) | |
| **Living Arrangement (Parents' Home)** | | | |
| Own Place | -0.082 | -0.025 | |
| | (0.408) | (0.253) | |
| Other | 0.268 | -0.538 | |
| | (0.656) | (0.334) | |
| Biological Children in Household | 0.385 | -0.598* | ! |
| | (0.409) | (0.297) | |
| **Education (Less than high school)** | | | |
| High School | 0.776 | 0.139 | |
| | (0.534) | (0.409) | |
| Some College | 0.776 | -0.286 | |
| | (0.570) | (0.438) | |
| Bachelors' Degree or Higher | -0.191 | -0.937* | |
| | (0.706) | (0.429) | |
| Age | -0.239* | 0.000 | ! |
| | (0.106) | (0.083) | |
| Wave 3 BMI (Continuous) | 0.736*** | 0.538*** | * |
| | (0.082) | (0.047) | |
| Constant | -14.684*** | -12.899*** | |

| | | |
|---|---|---|
| | (4.182) | (3.169) |
| Observations | 703 | 1,058 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
Source: Add Health, waves 1, 3 & 4; predictor variables measured at Wave 3 unless otherwise noted

Appendix Table 3.1 Frequencies of partnership racial combinations in pooled Wave 3 & Wave 4 sample, by gender

| Opposite sex current dating, married, and cohabiting relationships | | | | | |
|---|---|---|---|---|---|
| | PARTNER RACE | | | | |
| | Hispanic | Black | White | Asian | Total |
| MEN | | | | | |
| Hispanic | 756 | 38 | 300 | 52 | 1,146 |
| Black | 92 | 920 | 146 | 35 | 1,193 |
| White | 221 | 49 | 3,487 | 140 | 3,897 |
| Asian | 46 | * | 80 | 294 | 422 |
| Total | 1,115 | 1,009 | 4,013 | 521 | 6,658 |
| WOMEN | | | | | |
| Hispanic | 896 | 107 | 269 | 47 | 1,319 |
| Black | 69 | 1,531 | 58 | 24 | 1,682 |
| White | 295 | 198 | 4,389 | 152 | 5,034 |
| Asian | 49 | 29 | 126 | 325 | 529 |
| Total | 1,309 | 1,865 | 4,842 | 548 | 8,564 |

Source: Add Health waves 3 & 4

*Fewer than 10 cases

Appendix Table 3.2 Relationship type transitions from wave 3 to 4 among non-Hispanic White[i] men and women in relationships with stable characteristics across waves

*Unweighted frequencies*

| Wave 3 relationship type | Wave 4 relationship type | | | |
|---|---|---|---|---|
| | Married | Cohabiting | Dating/ Other | Total |
| Married | 667 | 13 | * | 687 |
| Cohabiting | 356 | 109 | 21 | 486 |
| Dating/Other | 431 | 99 | 58 | 588 |
| Total | 1,454 | 221 | 86 | 1,761 |

Sources: Add Health waves 3 & 4
*Fewer than ten cases

[i]Non-Hispanic White includes multiracial Whites who most identify as White

Appendix Table 3.3. Gender interaction model - Logistic regression of likelihood of overweight/obese on partner race among non-Hispanic White men and women in current dating, cohabiting, and married relationships

| | |
|---|---|
| **Partner Race (White)** | |
| Hispanic | 0.072 |
| | (0.205) |
| Black | -0.401 |
| | (0.364) |
| Asian | -0.083 |
| | (0.245) |
| Female | 0.338 |
| | (1.449) |
| Hispanic Partner x Female | 0.314 |
| | (0.260) |
| Black Partner x Female | 1.162** |
| | (0.420) |
| Asian Partner x Female | -0.166 |
| | (0.331) |
| Skin Tone | -0.097 |
| | (0.214) |
| Skin Tone x Female | -0.104 |
| | (0.273) |
| Multiracial | 0.053 |
| | (0.314) |
| Multiracial x Female | 0.237 |
| | (0.427) |
| Foreign Born | -1.299* |
| | (0.567) |
| Foreign Born x Female | 0.693 |
| | (0.713) |
| **Relationship Type (Married)** | |
| Cohabiting | -0.263* |
| | (0.121) |
| Dating | -0.498*** |
| | (0.134) |
| Cohabiting x Female | 0.048 |
| | (0.158) |
| Dating x Female | 0.136 |
| | (0.181) |
| Relationship Duration (years) | -0.004 |
| | (0.019) |
| Relationship Duration x Female | 0.041! |
| | (0.024) |
| **Living Arrangement (Parents' home)** | |
| Own Place | -0.278* |
| | (0.130) |
| Other | -0.413* |
| | (0.190) |

| | |
|---|---|
| Own Place x Female | 0.053 |
| | (0.177) |
| Other x Female | 0.002 |
| | (0.259) |
| Biological Children in Household | 0.134 |
| | (0.119) |
| Biological Children x Female | 0.184 |
| | (0.153) |
| **Education (Less than high school)** | |
| High School | 0.156 |
| | (0.173) |
| Some College | 0.295! |
| | (0.167) |
| Bachelors' Degree or Higher | 0.084 |
| | (0.188) |
| High School x Female | 0.238 |
| | (0.243) |
| Some College x Female | -0.392! |
| | (0.234) |
| Bachelors'+ x Female | -0.612* |
| | (0.260) |
| Age | 0.114*** |
| | (0.014) |
| Age x Female | -0.017 |
| | (0.018) |
| Constant | 0.338 |
| | (1.138) |
| Log Likelihood | -10346925 |
| Observations | 8,931 |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
Source: Add Health Waves 1, 3, and 4; person-year observations
Statistical analyses adjust for clustering within individual in the case of observation in a relationship in waves 3 and 4

Appendix Table 3.4 Gender Interaction Model - Logistic Regressions Predicting Partner Race by Overweight/Obese, among non-Hispanic White men and women in new dating, cohabiting, and marriage relationships

| | Hispanic Partner | Black Partner | Asian Partner |
|---|---|---|---|
| Overweight/Obese at prior observation[a] | 0.304 | -0.212 | -0.401 |
| | (0.198) | (0.511) | (0.273) |
| Female | -1.355 | 2.883 | 3.847 |
| | (1.869) | (3.191) | (2.984) |
| Overweight/Obese x Female | -0.108 | 1.037! | 0.100 |
| | (0.289) | (0.569) | (0.386) |
| Skin tone | -0.545* | -0.300 | 0.356 |
| | (0.241) | (0.633) | (0.459) |
| Skin tone x Female | 0.270 | -0.443 | -0.727 |
| | (0.325) | (0.665) | (0.503) |
| Multiracial | 0.543 | -1.390 | -0.423 |
| | (0.562) | (0.941) | (0.786) |
| Multiracial x Female | -0.330 | 2.283* | 0.899 |
| | (0.720) | (1.071) | (0.964) |
| Foreign Born | -3.995*** | 2.691*** | -0.307 |
| | (1.050) | (0.803) | (1.054) |
| Foreign Born x Female | 4.366*** | --[i] | 0.939 |
| | (1.257) | -- | (1.281) |
| **Relationship Type (Married)** | | | |
| Cohabiting | 0.262 | 0.548 | 0.180 |
| | (0.277) | (0.665) | (0.313) |
| Dating | -0.523 | 0.091 | 0.022 |
| | (0.374) | (0.720) | (0.309) |
| Cohabiting x Female | -0.124 | 0.703 | 0.544 |
| | (0.377) | (0.734) | (0.435) |
| Dating x Female | 0.673 | 1.462! | 0.506 |
| | (0.487) | (0.820) | (0.511) |
| Relationship Duration (years) | 0.001 | 0.079 | -0.022 |
| | (0.068) | (0.159) | (0.081) |
| Relationship duration x female | 0.067 | -0.077 | 0.179 |
| | (0.084) | (0.175) | (0.110) |
| **Living Arrangement (Parents' Home)** | | | |
| Own Place | -0.621* | -0.750* | -0.375 |
| | (0.313) | (0.377) | (0.341) |
| Other | 0.139 | -0.103 | -0.690 |
| | (0.429) | (0.643) | (0.532) |
| Own Place x Female | 0.396 | 0.531 | 0.606 |
| | (0.406) | (0.500) | (0.513) |
| Other x Female | 0.057 | 0.150 | 1.164! |
| | (0.559) | (0.770) | (0.673) |
| Biological Children in Household | 0.205 | -1.177! | 0.269 |
| | (0.272) | (0.668) | (0.368) |
| Biological Children x Female | -0.036 | 1.831* | -0.368 |
| | (0.381) | (0.719) | (0.468) |
| **Education (Less than high school)** | | | |

| | | | |
|---|---|---|---|
| High school | -0.386 | 0.764 | -0.294 |
| | (0.400) | (0.697) | (0.422) |
| Some College | -0.101 | 0.348 | -0.643! |
| | (0.366) | (0.745) | (0.376) |
| Bachelors' Degree or Higher | -0.683 | -1.134 | 0.001 |
| | (0.419) | (1.091) | (0.444) |
| High School x Female | -0.107 | -1.190 | -0.266 |
| | (0.561) | (0.789) | (0.597) |
| Some College x Female | -0.352 | -1.287 | 0.201 |
| | (0.524) | (0.827) | (0.543) |
| Bachelors'+ x Female | -0.100 | -0.587 | -0.705 |
| | (0.602) | (1.199) | (0.649) |
| Age | 0.024 | 0.041 | 0.009 |
| | (0.030) | (0.055) | (0.049) |
| Age x Female | -0.009 | -0.014 | -0.069 |
| | (0.041) | (0.065) | (0.061) |
| Constant | -0.214 | -3.758 | -4.536! |
| | (1.323) | (2.924) | (2.575) |
| Observations | 6,837 | 6,792 | 6,837 |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[i]Foreign born omitted for Black partner model; foreign born x female predicts that black partner=0 perfectly. 35 observations dropped.

[a]BMI at prior observation was multiply imputed from measured BMI and self-reported BMI at Wave 1 for those with no observed BMI at prior observation - see text for details

Source: Add Health, waves 1-4

Statistical analyses adjust for clustering within individual in the case of observation in a relationship in waves 3 and 4

Appendix Table 3.5 Gender interaction models - Logistic Regression of Likelihood of Being Overweight/Obese by Prior BMI and Partner Race among non-Hispanic White men and women in dating, cohabiting, and married relationships with the same partner from 2001 to 2008

| | |
|---|---|
| **Partner Race (White)** | |
| Hispanic Partner | -0.050 |
| | (0.640) |
| Black Partner | -0.457 |
| | (1.512) |
| Asian Partner | 0.783 |
| | (1.245) |
| Female | 1.785 |
| | (4.826) |
| Hispanic Partner x Female | 1.223 |
| | (0.924) |
| Black Partner x Female | 3.142! |
| | (1.884) |
| Asian Partner x Female | -1.428 |
| | (1.312) |
| Skin tone | 0.457 |
| | (0.636) |
| Skin tone x Female | -0.285 |
| | (0.728) |
| Multiracial (Wave 1) | -1.276! |
| | (0.688) |
| Multiracial x Female | 3.104** |
| | (1.023) |
| Foreign born (Wave 1) | 0.110 |
| | (1.504) |
| Foreign born x Female | 0.522 |
| | (2.066) |
| **Relationship Type (Married)** | |
| Cohabiting | 0.379 |
| | (0.415) |
| Dating | 0.235 |
| | (0.518) |
| Cohabiting x Female | -0.319 |
| | (0.558) |
| Dating x Female | -0.388 |
| | (0.568) |
| Relationship Duration (years) | 0.004 |
| | (0.078) |
| Relationship duration x Female | 0.005 |
| | (0.098) |
| **Living Arrangement (Parents' house)** | |
| Own Place | -0.082 |
| | (0.408) |
| Other | 0.268 |
| | (0.656) |

| | |
|---|---|
| Own Place x Female | 0.057 |
| | (0.469) |
| Other x Female | -0.806 |
| | (0.732) |
| Biological Children in HH | 0.385 |
| | (0.409) |
| Biological Children x Female | -0.983! |
| | (0.508) |
| **Education (Less than high school)** | |
| High school | 0.776 |
| | (0.534) |
| Some College | 0.776 |
| | (0.570) |
| Bachelors' Degree or Higher | -0.191 |
| | (0.706) |
| High School x Female | -0.637 |
| | (0.714) |
| Some College x Female | -1.062 |
| | (0.757) |
| Bachelors'+ x Female | -0.746 |
| | (0.856) |
| Age | -0.239* |
| | (0.106) |
| Age x Female | 0.239! |
| | (0.128) |
| Wave 3 BMI (Continuous) | 0.736*** |
| | (0.082) |
| Wave 3 BMI x Female | -0.198* |
| | (0.091) |
| Constant | -0.557 |
| | (4.182) |
| Observations | 1,761 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
Source: Add Health, waves 1, 3 & 4; predictor variables measured at Wave 3 unless otherwise noted

Table 4.1 Descriptive statistics for the cross-sectional analysis, non-Hispanic White men and women in married, dating, and cohabiting relationships in 2001 or 2008; weighted percentages unless otherwise noted

| | Men | Women | Men v. Women |
|---|---|---|---|
| **Partner Race** | | | *** |
| White | 89.5 | 87.9 | |
| Hispanic | 5.6 | 5.3 | |
| Black | 1.4 | 4.1 | |
| Asian | 3.6 | 2.8 | |
| Skin Tone[i] | 4.95 | 4.95 | |
| Multiracial (Wave 1) | 2.7 | 2.3 | ! |
| **Relationship Type** | | | *** |
| Marriage | 40.9 | 47.7 | |
| Cohabitation | 27.7 | 27.2 | |
| Dating/Other | 31.4 | 25.1 | |
| Relationship Duration (years) | 3.25 | 3.83 | *** |
| **Living Arrangement** | | | ** |
| Parents' Home | 19.3 | 17.1 | |
| Own Place | 73.2 | 76.4 | |
| Other | 7.5 | 6.6 | |
| Biological Children in the Household | 29.8 | 45.0 | *** |
| **Education** | | | *** |
| Less than high school | 12.0 | 9.0 | |
| High School | 24.1 | 20.8 | |
| Some College | 41.3 | 41.4 | |
| Bachelors' Degree or More | 22.7 | 28.8 | |
| Age | 25.57 | 25.09 | *** |
| Depression (0-27 point scale) | 3.92 | 4.91 | *** |
| Depression (Log transformed) | 1.34 | 1.52 | *** |
| N | 3,987 | 5,280 | |

[i]Skin tone is measured on a scale with values 1-5; 1 is darkest, 5 is lightest; interviewer-rated at Wave 3

Source: Add Health waves 1, 3, and 4; person-wave observations at wave 3 and 4, pooled

Table 4.2 Cross-sectional associations between partner race and depression among non-Hispanic White men and women in current marriage, dating, and cohabiting relationships, 2001 and 2008

| | Men[b] | | Women | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| Nonwhite partner | 0.155** | -- | 0.093* | -- |
| | (0.049) | -- | (0.040) | -- |
| **Partner Race Categories**[a] | | | | |
| Hispanic Partner | -- | 0.133* | -- | 0.086 |
| | -- | (0.065) | -- | (0.055) |
| Black Partner | -- | 0.224* | -- | 0.163* |
| | -- | (0.107) | -- | (0.072) |
| Asian Partner | -- | 0.164* | -- | 0.010 |
| | -- | (0.082) | -- | (0.074) |
| Skin Tone | 0.113 | 0.112 | -0.028 | -0.022 |
| | (0.075) | (0.075) | (0.038) | (0.039) |
| Multiracial | 0.064 | 0.065 | 0.161! | 0.160! |
| | (0.084) | (0.084) | (0.085) | (0.086) |
| **Relationship Type (Married)** | | | | |
| Cohabiting | 0.048 | 0.047 | 0.032 | 0.030 |
| | (0.042) | (0.042) | (0.034) | (0.034) |
| Dating | 0.072 | 0.071 | 0.026 | 0.023 |
| | (0.047) | (0.047) | (0.042) | (0.042) |
| Relationship Duration | -0.001 | -0.001 | -0.008 | -0.008 |
| | (0.006) | (0.006) | (0.005) | (0.005) |
| **Living Arrangement (Parents' home)** | | | | |
| Own Place | -0.074! | -0.074! | -0.053 | -0.053 |
| | (0.044) | (0.044) | (0.041) | (0.041) |
| Other | -0.022 | -0.021 | 0.057 | 0.058 |
| | (0.067) | (0.067) | (0.060) | (0.060) |
| Biological Children in Household | -0.026 | -0.025 | 0.052 | 0.049 |
| | (0.041) | (0.041) | (0.033) | (0.033) |
| **Education (Less than high school)** | | | | |
| High School | -0.173** | -0.174** | -0.168** | -0.168** |
| | (0.061) | (0.061) | (0.055) | (0.055) |
| Some College | -0.226*** | -0.226*** | -0.317*** | -0.315*** |
| | (0.058) | (0.059) | (0.052) | (0.052) |
| Bachelors' Degree + | -0.327*** | -0.328*** | -0.482*** | -0.480*** |
| | (0.065) | (0.065) | (0.058) | (0.058) |
| Age | 0.031*** | 0.031*** | 0.036*** | 0.036*** |
| | (0.005) | (0.005) | (0.004) | (0.004) |
| Constant | 0.214 | 0.218 | 1.074*** | 1.052*** |
| | (0.405) | (0.403) | (0.223) | (0.225) |
| Observations | 3,987 | 3,987 | 5,280 | 5,280 |
| R-squared | 0.033 | 0.033 | 0.057 | 0.058 |
| **AIC** | 8790.162 | 8793.449 | 11665.39 | 11665.5 |
| **BIC** | 8878.234 | 8894.102 | 11757.39 | 11770.65 |

Source: Add Health waves 1, 3, and 4

[a]Wald tests were conducted to test between 3 non-white partner race categories; no significant differences were found

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[b]Note that gender interactions were tested on all covariates. Because gender interactions were not statistically significant on the predictor of interest (partner race), gender interactions are not shown
Statistical tests adjust for clustering within individuals in the case of observation in a relationship at both waves 3 and 4
Source: Add Health waves 1, 3, and 4; wave 3 and 4 person-wave observations pooled

Table 4.3 Cross-Sectional Associations of Partner Race and Depression among non-Hispanic White men and women in current relationships in 2001 and 2008, by Relationship Type and Gender

| | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | Married/ Cohabiting | Dating | Relationship Interaction | Married/ Cohabiting | Dating | Relationship Interaction |
| Nonwhite partner | 0.159** | 0.139! | | | | |
| | (0.060) | (0.076) | | | | |
| **Partner Race Categories** | | | | | | |
| Hispanic Partner | | | | 0.085 | 0.070[a] | |
| | | | | (0.059) | (0.116) | |
| Black Partner | | | | 0.066 | 0.349*** | * |
| | | | | (0.095) | (0.098) | |
| Asian Partner | | | | 0.053 | -0.142[b] | |
| | | | | (0.088) | (0.132) | |
| Skin tone | 0.140 | 0.092 | | 0.000 | -0.058 | |
| | (0.096) | (0.107) | | (0.053) | (0.051) | |
| Multiracial | 0.094 | -0.055 | | 0.183! | 0.031 | |
| | (0.090) | (0.131) | | (0.094) | (0.140) | |
| **Relationship Type (Married)** | | | | | | |
| Cohabiting | 0.039 | -- | | 0.024 | -- | |
| | (0.043) | -- | | (0.035) | -- | |
| Relationship Duration | 0.004 | -0.018 | | 0.001 | -0.040* | |
| | (0.007) | (0.014) | | (0.005) | (0.018) | |
| **Living Arrangement (Parents' home)** | | | | | | |
| Own Place | -0.145* | -0.014 | | -0.125* | -0.005 | |
| | (0.063) | (0.065) | | (0.058) | (0.059) | |
| Other | 0.006 | -0.121 | | 0.083 | -0.042 | |
| | (0.092) | (0.095) | | (0.082) | (0.091) | |
| Biological Children in Household | -0.028 | 0.024 | | 0.019 | 0.210* | |
| | (0.043) | (0.156) | | (0.035) | (0.085) | |
| **Education (Less than high school)** | | | | | | |
| High School | -0.190** | -0.044 | | -0.158** | -0.155 | |
| | (0.067) | (0.133) | | (0.058) | (0.122) | |
| Some College | -0.240*** | -0.109 | | -0.302*** | -0.199! | |
| | (0.064) | (0.125) | | (0.057) | (0.107) | |
| Bachelors' Degree + | -0.342*** | -0.214 | | -0.462*** | -0.369** | |
| | (0.073) | (0.133) | | (0.063) | (0.122) | |
| Age | 0.029*** | 0.034*** | | 0.030*** | 0.040*** | |
| | (0.006) | (0.008) | | (0.005) | (0.009) | |
| Constant | 0.194 | 0.222 | | 1.126*** | 1.078** | |
| | (0.520) | (0.562) | | (0.288) | (0.355) | |
| Observations | 2,801 | 1,186 | | 4,026 | 1,254 | |
| R-squared | 0.038 | 0.036 | | 0.053 | 0.094 | |

Source: Add Health waves 1, 3, and 4

[a]Different from Black partner, p<.05

[b]Different from Black partner, p<.01

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

Statistical tests adjust for clustering within individuals in the case of observation in a relationship at both waves 3 and 4
All results from cross-sectional models for men and women shown in Appendix Table 3.3; Full results from the relationship type interaction models shown in Appendix Table 3.4
Source: Add Health waves 1, 3, and 4; wave 3 and 4 person-wave observations pooled

Table 4.4 Descriptive statistics for the selection analysis, non-Hispanic White men and women in new married, dating, and cohabiting relationships in 2001 or 2008; weighted percentages unless otherwise noted

| | Men | Women | Men v. Women |
|---|---|---|---|
| **Partner Race** | | | *** |
| White | 89.1 | 87.2 | |
| Hispanic | 5.6 | 5.8 | |
| Black | 1.4 | 4.1 | |
| Asian | 3.8 | 2.9 | |
| Multiracial (Wave 1) | 2.5 | 2.6 | |
| **Relationship Type** | | | *** |
| Marriage | 32.5 | 36.9 | |
| Cohabitation | 30.1 | 31.7 | |
| Dating/Other | 37.4 | 31.3 | |
| Relationship Duration (years) | 2.07 | 2.32 | *** |
| **Living Arrangement** | | | * |
| Parents' Home | 22.1 | 19.6 | |
| Own Place | 70.0 | 72.7 | |
| Other | 7.8 | 7.7 | |
| Biological Children in the Household | 20.7 | 35.6 | *** |
| **Education** | | | *** |
| Less than high school | 10.4 | 8.2 | |
| High School | 23.1 | 18.9 | |
| Some College | 42.4 | 41.4 | |
| Bachelors' Degree or More | 24.0 | 31.5 | |
| Age | 25.20 | 24.63 | *** |
| Depression at prior observation (0-27 point scale) | 4.14 | 5.32 | *** |
| Depression at prior observation (Log transformed) | 1.40 | 1.59 | *** |
| N | 3,126 | 3,800 | |

Source: Add Health waves 1, 3, and 4; person-wave observations at wave 3 and 4, pooled

Table 4.5 Logistic regression predicting the likelihood of having a Nonwhite partner for White men and Multinomial logistic regression predicting having a Black, Hispanic, and Asian partner among White women in new marriage, dating, and cohabiting relationships in 2001 and 2008

| | Men | | | Women[i] | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | All Relationships | Married/ Cohabiting | Dating Only | All Relationships | | | Dating Only | | |
| | Nonwhite Partner | | | Hispanic Partner | Black Partner | Asian Partner | Hispanic Partner | Black Partner | Asian Partner |
| Prior depression | 0.246* | 0.290* | 0.101 | 0.148 | 0.205 | 0.077 | 0.060 | 0.554* | 0.212 |
| | (0.110) | (0.138) | (0.184) | (0.132) | (0.153) | (0.147) | (0.213) | (0.250) | (0.276) |
| Multiracial | 0.085 | -0.126 | 0.613 | 0.311 | 0.930! | 0.614 | 0.298 | 0.904 | 1.063 |
| | (0.483) | (0.516) | (0.635) | (0.452) | (0.481) | (0.559) | (1.061) | (0.830) | (1.088) |
| **Relationship Type (married)** | | | | | | | | | |
| Cohabiting | 0.256 | 0.302 | | 0.155 | 1.284*** | 0.840** | | | |
| | (0.201) | (0.211) | | (0.252) | (0.310) | (0.303) | | | |
| Dating | -0.275 | | | 0.205 | 1.738*** | 0.668! | | | |
| | (0.243) | | | (0.306) | (0.392) | (0.400) | | | |
| Relationship Duration | -0.002 | 0.039 | -0.132 | 0.059 | 0.034 | 0.168* | 0.112 | 0.223! | 0.225 |
| | (0.052) | (0.065) | (0.084) | (0.050) | (0.076) | (0.074) | (0.104) | (0.116) | (0.156) |
| **Living Arrangement (Parents' home)** | | | | | | | | | |
| Own Place | -0.588** | -0.372 | -0.754** | -0.243 | -0.252 | 0.196 | 0.187 | 0.776! | 0.801 |
| | (0.214) | (0.346) | (0.292) | (0.255) | (0.314) | (0.382) | (0.346) | (0.413) | (0.492) |
| Other | -0.145 | 0.230 | -0.586 | 0.213 | 0.037 | 0.550 | 0.208 | 0.794 | 0.020 |
| | (0.312) | (0.458) | (0.502) | (0.368) | (0.425) | (0.417) | (0.527) | (0.534) | (0.777) |
| Biological Children in Household | 0.100 | 0.096 | -0.176 | 0.162 | 0.703** | -0.033 | 0.271 | 0.635 | -0.455 |
| | (0.211) | (0.226) | (0.819) | (0.262) | (0.257) | (0.282) | (0.524) | (0.457) | (0.733) |
| **Education Level (Less than high school)** | | | | | | | | | |
| High School | -0.229 | -0.377 | -0.051 | -0.560 | -0.319 | -0.658 | -1.912* | 0.181 | -0.043 |
| | (0.280) | (0.318) | (0.544) | (0.397) | (0.345) | (0.435) | (0.813) | (0.543) | (1.211) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Some College | -0.210 | -0.157 | -0.374 | -0.564 | -0.997** | -0.527 | -1.410* | -1.093* | 0.506 |
| | (0.259) | (0.303) | (0.485) | (0.368) | (0.353) | (0.404) | (0.667) | (0.522) | (1.054) |
| Bachelors' + | -0.400 | -0.291 | -0.674 | -0.904* | -1.910*** | -0.831! | -1.615* | -3.198*** | -0.524 |
| | (0.307) | (0.352) | (0.545) | (0.419) | (0.484) | (0.485) | (0.650) | (0.839) | (1.205) |
| Age | 0.027 | 0.010 | 0.049 | 0.039 | 0.067* | -0.056 | 0.045 | 0.037 | -0.003 |
| | (0.024) | (0.030) | (0.037) | (0.027) | (0.032) | (0.037) | (0.056) | (0.057) | (0.063) |
| Constant | -2.529*** | -2.465** | -2.773** | -3.470*** | -5.516*** | -2.738** | -2.773! | -4.501*** | -4.525** |
| | (0.662) | (0.831) | (0.958) | (0.764) | (0.830) | (0.934) | (1.553) | (1.166) | (1.728) |
| Log likelihood | -2068268.8 | -1373475 | -682532 | -3285047 | -3285047 | -3285047 | -1052080 | -1052080 | -1052080 |
| Observations | 3,126 | 2,016 | 1,110 | 3,800 | 3,800 | 3,800 | 1,145 | 1,145 | 1,145 |

Source: Add Health waves 1, 3, and 4; wave 3 and 4 person-wave observations pooled
Note: Gender interactions were tested for all covariates; there were no statistically significant interaction effects between gender and prior depression, so these results are not shown.

Note: Alternate model specifications also tested for an interaction effect between relationship type and prior depression. There were no statistically significant interaction effects. These results not shown.
Statistical tests adjust for clustering within individuals in the case of observation in a relationship at both waves 3 and 4
[i]Results for White women in married and cohabiting relationships not shown; see Appendix Table 3.5

Table 4.6 Descriptive statistics for the depression change analysis, non-Hispanic White men and women in continuing married, dating, and cohabiting relationships from 2001 or 2008; weighted percentages unless otherwise noted

| | Men | Women | Men v. Women |
|---|---|---|---|
| **Partner Race** | | | |
| White | 93.8 | 93.4 | |
| Hispanic | 3.8 | 3.2 | |
| Black | 0.4 | 2.4 | |
| Asian | 2.0 | 1.0 | |
| Skin Tone[i] | 4.95 | 4.96 | |
| Multiracial (Wave 1) | 3.1 | 1.9 | |
| **Relationship Type** | | | * |
| Marriage | 34.8 | 42.4 | |
| Cohabitation | 31.1 | 27.4 | |
| Dating/Other | 34.1 | 30.2 | |
| Relationship Duration (years) | 3.01 | 3.44 | *** |
| **Living Arrangement** | | | ! |
| Parents' Home | 24.1 | 21.7 | |
| Own Place | 68.0 | 70.1 | |
| Other | 8.0 | 8.2 | |
| Biological Children in the Household | 21.0 | 34.2 | *** |
| **Education** | | | |
| Less than high school | 14.9 | 11.6 | |
| High School | 31.4 | 29.3 | |
| Some College | 37.4 | 39.2 | |
| Bachelors' Degree or More | 16.3 | 19.9 | |
| Age | 22.3 | 22.0 | *** |
| Wave 3 Depression (0-27 point scale) | 3.50 | 4.24 | *** |
| Wave 3 Depression (Log transformed) | 1.25 | 1.39 | *** |
| Wave 4 Depression (0-27 point scale) | 4.04 | 4.94 | *** |
| Wave 4 Depression (Log transformed) | 1.38 | 1.56 | *** |
| N | 685 | 1,130 | |

[i]Skin tone is measured on a scale with values 1-5; 1 is darkest, 5 is lightest; interviewer-rated at Wave 3

Source: Add Health waves 1, 3, and 4; characteristics measured at wave 3 unless otherwise noted

Table 4.7 OLS Regression of Depression by prior depression and partner race among White men and women in married and cohabiting relationships in 2008 with the same partner for the prior approximately 7 years[i]

| | MEN[b] | | WOMEN | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| Nonwhite partner | 0.127 | 0.008 | -- | -- |
| | (0.110) | (0.116) | -- | -- |
| **Partner Race Categories[a]** | | | | |
| Hispanic Partner | -- | -- | -0.023 | -0.023 |
| | -- | -- | (0.121) | (0.138) |
| Black Partner | -- | -- | 0.331* | 0.334! |
| | -- | -- | (0.163) | (0.195) |
| Asian Partner | -- | -- | 0.035 | 0.092 |
| | -- | -- | (0.093) | (0.190) |
| Skin Tone | 0.026 | 0.034 | 0.210** | 0.204* |
| | (0.105) | (0.107) | (0.070) | (0.088) |
| Multiracial | 0.146 | 0.140 | 0.204 | 0.199 |
| | (0.114) | (0.110) | (0.124) | (0.126) |
| **Relationship Type (Wave 3)** | | | | |
| Cohabiting | -0.033 | -- | -0.084 | -- |
| | (0.085) | -- | (0.058) | -- |
| Dating | 0.038 | 0.039 | -0.159! | -0.104 |
| | (0.102) | (0.093) | (0.083) | (0.073) |
| Relationship Duration | 0.021 | 0.023 | 0.000 | 0.004 |
| | (0.015) | (0.015) | (0.009) | (0.009) |
| **Living Arrangement (Parents' home)** | | | | |
| Own Place | -0.081 | -0.074 | -0.079 | -0.067 |
| | (0.081) | (0.081) | (0.080) | (0.078) |
| Other | 0.010 | 0.010 | 0.003 | 0.001 |
| | (0.123) | (0.123) | (0.082) | (0.082) |
| Biological Children in Household | 0.087 | 0.095 | -0.030 | -0.024 |
| | (0.083) | (0.085) | (0.060) | (0.060) |
| **Education Level (Less than high school)** | | | | |
| High School | -0.278* | -0.278* | -0.179! | -0.170! |
| | (0.108) | (0.110) | (0.098) | (0.098) |
| Some College | -0.404*** | -0.396*** | -0.211* | -0.201* |
| | (0.109) | (0.111) | (0.091) | (0.092) |
| Bachelors' + | -0.444*** | -0.451** | -0.297** | -0.291** |
| | (0.132) | (0.138) | (0.101) | (0.101) |
| Age | 0.001 | 0.001 | 0.027! | 0.028! |
| | (0.022) | (0.022) | (0.015) | (0.015) |
| Prior Depression | 0.376*** | 0.374*** | 0.354*** | 0.354*** |
| | (0.046) | (0.046) | (0.029) | (0.029) |
| Constant | 1.029 | 0.974 | -0.250 | -0.317 |
| | (0.719) | (0.702) | (0.505) | (0.560) |
| **Model 2 Interaction Terms** | | | | |
| Dating x Nonwhite Partner | -- | 0.340 | -- | -- |
| | -- | (0.211) | -- | -- |
| Dating x Hispanic Partner | -- | -- | -- | -0.001 |
| | -- | -- | -- | (0.226) |
| Dating x Black Partner | -- | -- | -- | -0.104 |
| | -- | -- | -- | (0.299) |
| Dating x Asian Partner | -- | -- | -- | -0.113 |

| | | | | |
|---|---|---|---|---|
| | -- | -- | -- | (0.216) |
| Observations | 685 | 685 | 1,130 | 1,130 |
| R-squared | 0.212 | 0.215 | 0.210 | 0.208 |
| **AIC** | 1338.453 | **1336.139** | **2177.832** | 2184.574 |
| **BIC** | 1406.394 | **1404.08** | **2263.342** | 2280.144 |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

[i]All covariates measured at Wave 3; Sample restricted to those who were observed with partners of the same race and age at Waves 3 and 4, who were in a dating, married, or cohabiting relationship at Wave 3 and a married or cohabiting relationship at Wave 4

[a]Wald tests were conducted to test between 3 non-white partner race categories; no significant differences were found

[b]Note that gender interactions were tested on all covariates. Because gender interactions were not statistically significant on the predictor of interest (partner race), gender interactions are not shown
Statistical tests adjust for Add Health's multilevel sampling design
Source: Add Health Waves 1, 3, and 4

Appendix Table 4.1 Unweighted frequencies of partnership racial combinations in pooled Wave 3 and Wave 4 sample, by gender

*Opposite sex current dating, married, and cohabiting relationships*

| | PARTNER RACE | | | | |
|---|---|---|---|---|---|
| | Hispanic | Black | White | Asian | Total |
| MEN | | | | | |
| Hispanic | 769 | 39 | 306 | 54 | 1,168 |
| Black | 93 | 952 | 152 | 38 | 1,235 |
| White | 226 | 50 | 3,568 | 143 | 3,987 |
| Asian | 48 | * | 82 | 304 | 436 |
| Total | 1,136 | 1,043 | 4,108 | 539 | 6,826 |
| WOMEN | | | | | |
| Hispanic | 942 | 110 | 282 | 50 | 1,384 |
| Black | 70 | 1,639 | 63 | 24 | 1,796 |
| White | 316 | 206 | 4,595 | 163 | 5,280 |
| Asian | 51 | 30 | 127 | 347 | 555 |
| Total | 1,379 | 1,985 | 5,067 | 584 | 9,015 |

Source: Add Health waves 3 & 4
*Fewer than 10 cases

Appendix Table 4.2 Relationship type transitions from wave 3 to 4 among non-Hispanic White men and women in relationships with stable characteristics across waves

*Unweighted frequencies*

| | Wave 4 relationship type | | | |
|---|---|---|---|---|
| Wave 3 relationship type | Married | Cohabiting | Dating/ Other | Total |
| Married | 730 | 16 | * | 753 |
| Cohabiting | 387 | 118 | 21 | 526 |
| Dating/Other | 460 | 104 | 61 | 625 |
| Total | 1,577 | 238 | 89 | 1,904 |

Sources: Add Health waves 3 & 4
*Fewer than ten cases

Appendix Table 4.3 Cross-Sectional Associations of Partner Race and Depression among non-Hispanic White men and women in current relationships, by Relationship Type and Gender

| | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | Model 1 | | Model 2 | | Model 1 | | Model 2 | |
| | Married/ Cohabiting | Dating | Married/ Cohabiting | Dating | Married/ Cohabiting | Dating | Married/ Cohabiting | Dating |
| Nonwhite partner | 0.159** | 0.139! | | | 0.071 | 0.125! | | |
| | (0.060) | (0.076) | | | (0.047) | (0.075) | | |
| **Partner Race Categories** | | | | | | | | |
| Hispanic Partner | | | 0.122 | 0.147 | | | 0.085 | 0.070[a] |
| | | | (0.075) | (0.134) | | | (0.059) | (0.116) |
| Black Partner | | | 0.235 | 0.194! | | | 0.066 | 0.349*** |
| | | | (0.148) | (0.117) | | | (0.095) | (0.098) |
| Asian Partner | | | 0.197! | 0.109 | | | 0.053 | -0.142[b] |
| | | | (0.109) | (0.096) | | | (0.088) | (0.132) |
| Skin tone | 0.140 | 0.092 | 0.137 | 0.094 | 0.001 | -0.095! | 0.000 | -0.058 |
| | (0.096) | (0.107) | (0.096) | (0.108) | (0.052) | (0.049) | (0.053) | (0.051) |
| Multiracial | 0.094 | -0.055 | 0.095 | -0.054 | 0.183! | 0.054 | 0.183! | 0.031 |
| | (0.090) | (0.131) | (0.090) | (0.131) | (0.094) | (0.146) | (0.094) | (0.140) |
| **Relationship Type (Married)** | | | | | | | | |
| Cohabiting | 0.039 | -- | 0.038 | | 0.023 | | 0.024 | |
| | (0.043) | -- | (0.043) | | (0.035) | | (0.035) | |
| Relationship Duration | 0.004 | -0.018 | 0.004 | -0.018 | 0.001 | -0.039* | 0.001 | -0.040* |
| | (0.007) | (0.014) | (0.007) | (0.014) | (0.005) | (0.018) | (0.005) | (0.018) |
| **Living Arrangement (Parents' home)** | | | | | | | | |
| Own Place | -0.145* | -0.014 | -0.147* | -0.013 | -0.125* | -0.001 | -0.125* | -0.005 |
| | (0.063) | (0.065) | (0.063) | (0.065) | (0.058) | (0.059) | (0.058) | (0.059) |
| Other | 0.006 | -0.121 | 0.006 | -0.121 | 0.081 | -0.036 | 0.083 | -0.042 |
| | (0.092) | (0.095) | (0.092) | (0.095) | (0.082) | (0.092) | (0.082) | (0.091) |
| Biological Children in Household | -0.028 | 0.024 | -0.028 | 0.023 | 0.019 | 0.223** | 0.019 | 0.210* |
| | (0.043) | (0.156) | (0.043) | (0.157) | (0.035) | (0.086) | (0.035) | (0.085) |
| **Education (Less than high school)** | | | | | | | | |
| High School | -0.190** | -0.044 | -0.192** | -0.046 | -0.157** | -0.143 | -0.158** | -0.155 |
| | (0.067) | (0.133) | (0.067) | (0.133) | (0.058) | (0.122) | (0.058) | (0.122) |
| Some College | -0.240*** | -0.109 | -0.240*** | -0.112 | -0.302*** | -0.215* | -0.302*** | -0.199! |
| | (0.064) | (0.125) | (0.064) | (0.126) | (0.057) | (0.109) | (0.057) | (0.107) |
| Bachelors' Degree + | -0.342*** | -0.214 | -0.343*** | -0.216 | -0.462*** | -0.387** | -0.462*** | -0.369** |
| | (0.073) | (0.133) | (0.073) | (0.133) | (0.063) | (0.124) | (0.063) | (0.122) |
| Age | 0.029*** | 0.034*** | 0.029*** | 0.034*** | 0.030*** | 0.040*** | 0.030*** | 0.040*** |
| | (0.006) | (0.008) | (0.006) | (0.008) | (0.005) | (0.009) | (0.005) | (0.009) |
| Constant | 0.194 | 0.222 | 0.212 | 0.215 | 1.124*** | 1.272*** | 1.126*** | 1.078** |
| | (0.520) | (0.562) | (0.520) | (0.566) | (0.288) | (0.355) | (0.288) | (0.355) |
| Observations | 2,801 | 1,186 | 2,801 | 1,186 | 4,026 | 1,254 | 4,026 | 1,254 |
| R-squared | 0.038 | 0.036 | 0.038 | 0.036 | 0.053 | 0.086 | 0.053 | 0.094 |
| **AIC** | **6200.371** | **2594.453** | 6203.27 | 2598.263 | **8768.364** | 2863.783 | 8772.211 | **2857.077** |
| **BIC** | **6277.561** | **2655.393** | 6292.336 | 2669.359 | **8850.271** | **2925.392** | 8866.719 | 2928.955 |

Source: Add Health waves 1, 3, and 4

[a]Different from Black partner, p<.05

[b]Different from Black partner, p<.01

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
Statistical tests adjust for clustering within individuals in the case of observation in a relationship at both waves 3 and 4
Source: Add Health waves 1, 3, and 4; wave 3 and 4 person-wave observations pooled

Appendix Table 4.4 Cross-sectional Association of Partner Race and Depression among White men and women in current relationships: Relationship Type Interaction Models

| | Men | | Women | |
|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| Nonwhite Partner | 0.167** | -- | 0.077! | -- |
| | (0.060) | -- | (0.047) | -- |
| **Partner Race Categories** | | | | |
| Hispanic Partner | -- | 0.133! | -- | 0.089 |
| | -- | (0.076) | -- | (0.058) |
| Black Partner | -- | 0.247! | -- | 0.072 |
| | -- | (0.149) | -- | (0.095) |
| Asian Partner | -- | 0.199! | -- | 0.069 |
| | -- | (0.110) | -- | (0.087) |
| Dating | 0.047 | 0.047 | -0.003 | -0.006 |
| | (0.041) | (0.041) | (0.040) | (0.040) |
| Hispanic Partner x Dating | -- | 0.002 | -- | -0.008 |
| | -- | (0.149) | -- | (0.122) |
| Black Partner x Dating | -- | -0.059 | -- | 0.285* |
| | -- | (0.190) | -- | (0.127) |
| Asian Partner x Dating | -- | -0.099 | -- | -0.205 |
| | -- | (0.145) | -- | (0.159) |
| Nonwhite Partner x Dating | -0.038 | | 0.067 | |
| | (0.096) | | (0.082) | |
| Skin Tone | 0.113 | 0.112 | -0.026 | -0.013 |
| | (0.075) | (0.075) | (0.038) | (0.039) |
| Multiracial | 0.063 | 0.064 | 0.162! | 0.160! |
| | (0.084) | (0.084) | (0.085) | (0.085) |
| Relationship Duration | -0.002 | -0.002 | -0.010! | -0.009! |
| | (0.006) | (0.006) | (0.005) | (0.005) |
| **Living Arrangement (Parents' home)** | | | | |
| Own Place | -0.077! | -0.077! | -0.057 | -0.059 |
| | (0.044) | (0.044) | (0.041) | (0.041) |
| Other | -0.022 | -0.022 | 0.057 | 0.054 |
| | (0.067) | (0.067) | (0.060) | (0.060) |
| Biological Children in Household | -0.037 | -0.036 | 0.046 | 0.045 |
| | (0.040) | (0.040) | (0.032) | (0.032) |
| **Education (Less than high school)** | | | | |
| High School | -0.175** | -0.177** | -0.172** | -0.174** |
| | (0.061) | (0.061) | (0.055) | (0.055) |
| Some College | -0.232*** | -0.233*** | -0.320*** | -0.317*** |
| | (0.058) | (0.058) | (0.052) | (0.052) |
| Bachelors' Degree + | -0.335*** | -0.336*** | -0.488*** | -0.484*** |
| | (0.065) | (0.064) | (0.058) | (0.058) |
| Age | 0.030*** | 0.030*** | 0.036*** | 0.035*** |
| | (0.005) | (0.005) | (0.004) | (0.004) |
| Constant | 0.264 | 0.271 | 1.105*** | 1.045*** |
| | (0.399) | (0.398) | (0.218) | (0.222) |
| Observations | 3,987 | 3,987 | 5,280 | 5,280 |
| R-squared | 0.032 | 0.033 | 0.057 | 0.059 |

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1
Statistical tests adjust for clustering within individuals in the case of observation in a relationship at both waves 3 and 4
Source: Add Health waves 1, 3, and 4; wave 3 and 4 person-wave observations pooled

Appendix Table 4.5. Multinomial logistic regression predicting partner race for White women in new married and cohabiting relationships

| | Married/Cohabiting | | |
|---|---|---|---|
| | Hispanic | Black | Asian |
| Prior depression | 0.159 | 0.025 | -0.014 |
| | (0.161) | (0.205) | (0.178) |
| Multiracial | 0.250 | 1.111* | 0.601 |
| | (0.495) | (0.511) | (0.642) |
| **Relationship Type (married)** | | | |
| Cohabiting | 0.057 | 1.224*** | 0.775* |
| | (0.257) | (0.324) | (0.312) |
| Relationship Duration | 0.061 | -0.042 | 0.168! |
| | (0.060) | (0.087) | (0.086) |
| **Living Arrangement (Parents' home)** | | | |
| Own Place | -0.679* | -1.280*** | -0.307 |
| | (0.313) | (0.347) | (0.457) |
| Other | -0.044 | -0.968 | 0.565 |
| | (0.495) | (0.687) | (0.532) |
| Biological Children in Household | 0.132 | 0.837** | 0.053 |
| | (0.295) | (0.322) | (0.313) |
| **Education Level (Less than high school)** | | | |
| High School | -0.235 | -0.720! | -0.671 |
| | (0.404) | (0.431) | (0.474) |
| Some College | -0.212 | -0.931* | -0.620 |
| | (0.385) | (0.441) | (0.497) |
| Bachelors' + | -0.652 | -1.357* | -0.686 |
| | (0.468) | (0.573) | (0.569) |
| Age | 0.018 | 0.085! | -0.077! |
| | (0.036) | (0.045) | (0.045) |
| Constant | -2.819** | -4.646*** | -1.666! |
| | (0.924) | (1.151) | (0.950) |
| Log Likelihood | -2165189.2 | -2165189.2 | -2165189.2 |
| Observations | 2,655 | 2,655 | 2,655 |

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, ! p<0.1

Statistical tests adjust for clustering within individuals in the case of observation in a relationship at both waves 3 and 4

Source: Add Health waves 1, 3, and 4; wave 3 and 4 person-wave observations pooled

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