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Gender and Health Behavior Clustering among U.S. Young Adults

Julie Skalamera Olson[*],
Population Research Center and Department of Sociology, University of Texas at Austin

Robert A. Hummer, and
Carolina Population Center and Department of Sociology, University of North Carolina at Chapel Hill

Kathleen Mullan Harris
Carolina Population Center and Department of Sociology, University of North Carolina at Chapel Hill

Abstract

U.S. trends in population health suggest alarming disparities among young adults who are less healthy across most measureable domains than their counterparts in other high-income countries; these international comparisons are particularly troubling for women. To deepen our understanding of gender disparities in health and underlying behavioral contributions, we document gender-specific clusters of health behavior among U.S. young adults using nationally representative data from the National Longitudinal Study of Adolescent to Adult Health. We find high levels of poor health behavior, but especially among men; 40 percent of men clustered into a group characterized by unhealthy behavior (e.g., poor diet, no exercise, substance use), compared to only 22 percent of women. Additionally, women tend to age out of unhealthy behaviors in young adulthood more than men. Further, we uncover gender differences in the extent to which sociodemographic position and adolescent contexts inform health behavior clustering. For example, college education was more protective for men, whereas marital status was equally protective across gender. Parental drinking mattered for health behavior clustering among men, whereas peer drinking mattered for clustering among women. We discuss these results in the context of declining female advantage in U.S. health and changing young adult social and health contexts.

Introduction

Recent health and mortality trends among U.S. young adults suggest some troubling patterns. Early life mortality rates (i.e., before age 50) are higher than any other high income country in the world (National Research Council and Institute of Medicine [NRC/IOM] 2013, 2014). Behaviorally related causes of death such as homicides, accidents, and cardiovascular diseases are important contributors to the U.S. disadvantage relative to other

[*]Direct all correspondence to: Julie S. Olson, Population Research Center, University of Texas at Austin, 305 East 23rd Street, G1800, Austin, TX 78712-1699, julie.skalamera@utexas.edu.

high income countries (NRC/IOM 2013, 2014). Further, recent steep increases in deaths due to drug and alcohol poisonings among U.S. young adults has heightened concern over behaviorally related causes of premature death (Case and Deaton 2015). Thus, documenting current patterns of health behavior among U.S. young adults may help in understanding the poor overall U.S. position relative to its high income counterparts and identify potential behavioral domains for intervention.

Troubling health and mortality trends appear to be particularly critical among U.S. young women (Kindig and Cheng 2013), whose improvement in life expectancy has slowed in recent years relative to men. Thus, it is extremely important that scholars pay close attention to health behavior among U.S. young women, as behavioral trends may underlie their deteriorating health. Though substantial evidence points to health behaviors as a critical mechanism through which health and mortality patterns are realized (Pampel, Krueger, and Denney 2010; Ford et al. 2011), most scholarship on gender differences in health behavior highlights advantages for women (Courtenay, Mccreary, and Merighi 2002). Indeed, women are less inclined than their male counterparts to engage in risk-taking (Byrnes, Miller, and Schafer 1999). Thus, it is equally important to address young men's health behavior patterns. The complexity of gender differences in health behavior deserves increasing attention, particularly for younger cohorts of Americans for whom trends in health and mortality are most troubling and whose most productive years of work and family life are ahead of them.

Importantly, adolescence and the transition to adulthood is a critical period for establishing health behaviors (Harris et al. 2006). During adolescence and young adulthood, individuals are faced with many opportunities to engage in risky behaviors while simultaneously gaining independence from their parents, settling into adult roles, and establishing health trajectories that implicate later well-being (Harris 2010; Bauldry et al., 2012). Health behavior *clustering* may be particularly important during young adulthood because individuals are moving beyond a developmental period of experimentation and into a life course stage during which behaviors become more habitual. Further, young men and women may differentially group into clusters of health behaviors in ways that matter for long-term health and mortality patterns. For example, although we expect that many young women might exhibit positive behavior patterns (e.g., healthy diet, regular check-ups), the subset of women who develop risky patterns (e.g., no exercise, substance use) may be at particular disadvantage because it is non-normative and places them at risk for poor later life health. In an effort to advance knowledge of how and why gender differences in health and mortality emerge in mid-life, the first goal of this study is to identify clusters of health behavior for U.S. young women and men.

Additionally, we consider the contexts young people traverse as they transition into adulthood. Social, demographic, and environmental contexts likely inform the clustering of health behaviors; and, these characteristics may matter in similar or different ways for the health behavior patterns of women and men. As one example, while marriage promotes healthier lifestyles for both women and men, the benefit for men is due in part to increased social control encouraged by marriage (Umberson 1992). As such, marital benefits for men's health are more immediate, whereas marital benefits for women's health are more gradual

(Lillard and Waite 1995). There has been less research, however, on the health effects of early marriage and whether young men experience the immediate health protection of marriage compared to young women; given changes in the health profiles of young adults noted above, the results are more mixed (e.g., Harris et al. 2010; The and Gordon-Larsen 2009). Thus, while we expect that marital status in young adulthood may be more strongly associated with health behavior clustering among men than among women, our research is among the first to examine differential clustering of health behaviors by marital status for young adults.

Research has long understood that parents and peers influence health behavior from adolescence to adulthood (e.g., Lau, Quadrel, and Hartman 1990), and this influence likely extends to health behavior clustering in ways that may vary by gender. For example, adolescent girls are more vulnerable to peer influences (such as with drinking and smoking), particularly in their friendships with boys (Gaughan 2006). Thus, we expect that peer contexts of achievement and health behaviors will inform behavior patterns of women more so than men. Psychosocial characteristics also matter for health behaviors in complex, gendered ways. For example, delinquency is linked to problematic health behaviors (Elliott 1993; Junger and Stroebe 2001); and, young boys are more likely than girls to engage in delinquent behaviors (Goodkind et al. 2009). Given that adolescent delinquency is less normative for girls, we might expect it to be more strongly associated with health behavior clustering among women than among men. Together, contexts and characteristics may contribute to health behavior clustering in different ways for women and men. Thus, our second goal is to assess the extent to which an important set of demographic, social, contextual, and social psychological characteristics matter for understanding health behavior clustering among U.S. women and men.

Our investigation focuses on gender differences in the clustering of risky health behaviors among young adults and considers a broad range of contexts and characteristics that may predict clustering differentially by gender. Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), we identify gender-specific clusters of health behaviors among a nationally representative sample of young adults. We evaluate patterns of behaviors rather than individual behaviors because the co-occurrence of behaviors is of increasing concern, particularly when these clusters vary in systematic ways across population subgroups (Kesse-Guyot et al. 2014; Spring, Moller, and Coons 2012; Jiang and Zack 2011; Leech, McNaughton, and Timperio 2014). Further, we consider sociodemographic characteristics, parental and peer contexts, and social psychological factors that may matter for health behavior clustering in similar or different ways by gender. Overall, our first hypothesis is that we expect to find variation in health behaviors consistent with young women's advantage. Second, we expect that at least some of the associations between sociodemographic factors, adolescent contexts, and social psychological characteristics with patterns of health behavior will vary by gender given that these contexts and characteristics help to differentiate young men's and women's lives.

Methods

Data and Analytic Sample

Add Health is a nationally representative survey of adolescents in grades 7–12 who have been followed into adulthood through four waves of data collection to date (Harris et al. 2009). Add Health applied a stratified school-based sampling design such that the schools included were selected on region, urbanicity, school size, school type, and racial composition. In-school data collection in 1994 was used to generate a nationally representative sample of over 20,000 adolescents. These respondents and their parents participated in an in-home interview in 1995, and additional interviews of the respondents were conducted in 1996 (Wave II), 2001–2002 (Wave III), and 2008 (Wave IV).

Our analytic sample includes 14,338 young adults (7,404 women and 6,934 men) who participated in in-school data collection and Waves I (ages 12–18) and IV (ages 24–32), have valid sampling weights, and provided information on gender and the health behaviors assessed. Women who were pregnant or had given birth in the six months prior to the Wave IV interview were excluded.

Measures

Health behaviors—Gender-specific patterns of health behaviors were identified via latent class analysis, as described below. Ten behaviors measured at Wave IV were included and each was dichotomized such that a value of 1 represented the less healthy form of the behavior. The behaviors were binge drinking (i.e., consuming 5 or more alcoholic beverages at one time in the last week), cigarette smoking in the past 30 days, use of other tobacco products such as chewing tobacco or snuff in the past 30 days, no participation in physical activity in the past 7 days, any use of marijuana in the past 30 days, visit to the doctor for preventive care in the past year, visit to the dentist for preventive care in the past year, eating at a fast food restaurant 3 or more times in the past 7 days, using illegal drugs 5 or more times during their lifetime to date, and ever abusing prescription drugs.

Sociodemographic characteristics—Sociodemographic characteristics of respondents were measured using data from Waves I and IV. Wave I *age* ranged continuously from 11 to 21. *Race/ethnicity*, reported at Wave I, was categorized as non-Hispanic White (referent), non-Hispanic Black, non-Hispanic Asian, Hispanic, and other/multi-racial. Respondent's *region* of residence was categorized as Northeast (referent), Midwest, South, and West. *Educational attainment* was categorized as the respondent's highest attainment at Wave IV, at which point the majority of respondents had completed their education, and included: less than high school, high school graduate or equivalence (referent), some college, college graduate, and post-baccalaureate degree earners. Respondent's *marital status* was captured at Wave IV and categorized as never married/never cohabited (referent), ever married, or ever cohabited/never married.

Adolescent parental context—Family background was measured using data on parent's education, income, and behaviors. Highest *parental education* from Wave I was categorized as less than high school, high school, some secondary, bachelor's and post-college degrees;

parent's income (in thousands) at Wave I was operationalized continuously. Parents also reported on their smoking and drinking behaviors at Wave I. Their responses were used to create binary indicators of *parent smoker* and *parent binge drinker*. Further, *family structure* was dichotomized as 1 if the young adult lived with both biological parents at Wave I. During the parent interview, the parent completing the survey was also asked whether he or she was born in the United States. *Parent US-born* was dichotomized as 1 if the respondent's parent reported being born in the U.S.

Adolescent peer contexts—During Add Health in-school data collection, students nominated up to 10 peers in their school. Using these nominations, we calculated the *number of friends* an adolescent reported having and the *proportion of male friends*. Because some respondents do not nominate any peers, we also created an indicator for people who did not nominate any friends (i.e., *no friends*) at Wave I. Further, adolescents' friend nominations were used in conjunction with the in-school questionnaire to calculate several indicators of peer contexts. Specifically, for each respondent, we averaged their nominated peers' responses to questions on: *grade point average*, *smoking*, *drinking*, *taking a dare*, and *lying*. Peer grade point average ranged from 1 to 4 with higher values indicating higher academic achievement. Smoking and drinking indicators were based on peers' report of frequency of smoking cigarettes and drinking beer, wine, or liquor in the past twelve months; each ranged from 0 (never) to 6 (every day). Peer daring was the report of how often in the past the respondent did something dangerous because they were dared to, and lying was the report of how frequently in the past twelve months respondents lied to parents or guardians; each ranged from 0 (never) to 6 (every day).

Social psychological characteristics—Respondents' *religiosity* in adolescence was measured at Wave I and ranged from 1 (religion is not at all important to you) to 4 (religion is very important to you). Adolescent *delinquency* was also captured at Wave I by creating a scale of nonviolent delinquent behaviors that the respondent reported participating in (i.e., stealing or vandalizing) ranging from 0 to 9 (Powell, Perreira, and Harris 2010). The Big Five *personality* characteristics (extraversion, neuroticism, agreeableness, conscientiousness, and openness) were measured in Wave IV and ranged from 4 to 20.

We descriptively examined gender differences in health behaviors, sociodemographic characteristics, adolescent parental contexts, adolescent peer contexts, and social psychological characteristics (Table 1), using t-tests to determine significant differences. Young women reported healthier behaviors across 9 of the 10 behaviors considered, with the modest exception being exercise (13 percent of men versus 17 percent of women reported not exercising in the past week). Women were more highly educated (35 percent completed college or more, compared to 28 percent of men), more likely to be married (52 percent versus 46 percent of men), more likely to have had adolescent peers with higher grade point averages, less likely to have had adolescent friends who drank and took dares, less prone to delinquent behaviors in adolescence and reported higher average levels of extraversion, neuroticism, agreeableness, and conscientiousness. Thus, women generally reported much healthier behaviors than men and somewhat more advantaged contexts and characteristics.

Analytic Strategy

Our analysis plan includes two steps. First, we determined health behavior clustering using latent class analysis (LCA). LCA is a type of structural equation modeling that classifies individuals into meaningful subpopulations based on a set of indicators. Here, LCA grouped individuals according to their reported engagement in ten health behaviors. Using Mplus (Muthen and Muthen 2006), we determined the appropriate number of female and male clusters by considering fit statistics including a log-likelihood test, Bayesian information criteria (BIC), and sample-size-adjusted BIC (ABIC). For these measures of fit, smaller absolute values indicate better model fit, and the relative change from the *k* class to *k-1* class is also important in assessing fit. Additionally, we evaluated the Lo-Mendell Rubin (LMR) adjusted likelihood ratio test; a significant LMR *p*-value suggests that the *k* class model fits better than the *k-1* class model.

Once we identified health behavior clusters, the second step was to estimate the association between sociodemographic characteristics, adolescent contexts, and social psychological characteristics with gender-specific health behavior clusters in a series of models. Because we identified three clusters among women and three clusters among men, we used multinomial logistic regression in Stata to estimate these associations. We report results using relative risk ratios. In all analyses, we applied longitudinal sampling weights to account for differential attrition and sampling design, and accounted for missingness using multiple imputation.

Results

Health Behavior Clusters

According to LMR *p*-values and relative changes in log-likelihood, BIC, and ABIC values, a three-cluster model was the most adequate fit of the data for both women and men, which is consistent with previous research on gender-specific health behavior clustering in the Add Health sample (Skalamera and Hummer 2016). Table 2 provides the fit statistics used to make this determination. In addition to model fit, the identified clusters presented substantively meaningful subpopulations with suitable numbers of respondents. Similar patterns emerged across genders, although the frequencies and composition of the clusters varied. We labeled the health behavior clusters as Healthy (28 percent of women; 27 percent of men), Mixed (50 percent of women; 32 percent of men), and Unhealthy (22 percent of women; 40 percent of men).

Panel A of Table 3 presents descriptive statistics of health behaviors for each female cluster. The female Healthy cluster included women who reported negligible percentages of no physical activity or no dentist and doctor visits, and the lowest percentages of current cigarette smoking, binge drinking, marijuana use, fast food eating, prescription drug use, and illegal drug use. Although containing negligible proportions of women who binge drink and use marijuana, the female Mixed cluster included a moderate level of cigarette smoking (24 percent) and the highest female-specific proportions of fast food eating (43 percent) and no physical activity (27 percent). Women in the Unhealthy cluster had very high proportions of cigarette smoking (71 percent), binge drinking (48 percent), marijuana use (70 percent),

prescription drug abuse (32 percent) and illegal drug use (38 percent), along with moderately high levels of fast food eating (31 percent), no preventive care (46 percent for doctor, 52 percent for dentist), and no physical activity (15 percent).

Panel B of Table 3 presents descriptive statistics for each male cluster. The smallest male cluster was the Healthy group. This group had relatively low proportions of current cigarette smoking (10 percent), binge drinking (15 percent), marijuana use (8 percent), and other tobacco use (9 percent). Few had not visited a doctor or dentist in the past year, and they contained the lowest male-specific proportion of fast food eating. The Mixed cluster of men had a moderate proportion of cigarette smoking (29 percent) and high proportions of fast food eating (51 percent), no physical activity (25 percent), and no preventive care (53 percent no doctor, 68 percent no dentist), but negligible proportions of binge drinking and marijuana use. Male Mixed and Healthy clusters had comparable prescription drug abuse (10 percent and 12 percent), and illegal drug use (12 percent for both clusters). The largest male group (40 percent of all men) was the Unhealthy cluster. They had high proportions of binge drinking (55 percent), marijuana use (62 percent), cigarette smoking (71 percent), fast food eating (44 percent), other tobacco use (13 percent), prescription drug abuse (31 percent), and illegal drug use (40 percent).

Notably, the Unhealthy cluster was the smallest among women, whereas the Unhealthy cluster was the largest group of young men. Comparing male and female Healthy clusters, moreover, suggests that the female Healthy cluster is the most exemplary group, whereas the male Healthy cluster had more variability in the degree to which these men engaged in consistently positive health behaviors. Together, our descriptive results support our first expectation that patterns in health behaviors are consistent with female advantage.

Differential Determinants of Health Behavior Patterns

Our second step was to elucidate gender variation in the associations among sociodemographic position, adolescent parental and peer contexts, social psychological characteristics, and clusters of health behaviors. To this end, we ran a series of gender-specific multinomial regression analyses predicting cluster membership. The female and male Healthy clusters were the reference groups for women and men, respectively.

Table 4 presents results for risk of Mixed cluster membership as compared to Healthy cluster membership for women and men, respectively. The association between sociodemographic characteristics and cluster membership exhibit some variation by gender. First, in Model 1 for women, non-Hispanic Black women had significantly greater risk of membership in the Mixed cluster as compared to the Healthy cluster; the same was not true for non-Hispanic Black men. Further, while cohabiting women had significantly lower risk of Mixed cluster membership as compared to Healthy cluster membership, the association between cohabitation and male Mixed cluster membership was not statistically significant. Beyond these sociodemographic differences, associations between adolescent contexts and Mixed cluster membership did not emerge for either gender in Models 2 and 3. Further, in Model 4, female and male respondents higher on extraversion and conscientiousness had lower risk of Mixed cluster membership, whereas women higher on neuroticism and men higher on openness had higher risk of Mixed cluster membership as compared to Healthy cluster

membership. In sum, race and marital status mattered more for distinguishing Mixed and Healthy clusters among women than among men; but, patterns of Mixed cluster membership, adolescent contexts, and social psychological characteristics were generally consistent across genders.

Table 5 presents results for multinomial logistic regression predicting risk of Unhealthy cluster membership as compared to Healthy cluster membership for women and men. In Model 1, two notable patterns emerged. First, a significant, negative association between female age and Unhealthy cluster membership (not apparent among men) suggested a stronger pattern of aging out of negative health behaviors among women. Second, male respondents with post-secondary education but no additional degree had significantly reduced risk of Unhealthy cluster membership as compared to Healthy cluster membership. This reduced risk was weaker among women of similar attainment. In Model 2, parental contexts mattered for cluster membership, but in different ways by gender. For men, having binge-drinking parents increased the risk for Unhealthy cluster membership. For women, having native-born parents increased risk, but living in a two-biological parent household during adolescence reduced risk for Unhealthy cluster membership as compared to Healthy cluster membership. The association between peer contexts and Unhealthy cluster membership also varied by gender. Though peer contexts were not associated with male Unhealthy cluster membership, having greater proportion of male friends and having drinking peers increased risk for Unhealthy cluster membership among women. In Model 4, social psychological characteristics were similarly associated with male and female unhealthy behavior clustering.

Discussion

Increasing premature mortality (i.e., before age 50) for behaviorally related causes of death (e.g., suicide, poisonings, liver disease/cirrhosis) and worsening health among young adults (Case and Deaton 2015; NRC/IOM 2013, 2014; Nguyen et al. 2011; Harris et al. 2006) has led to heightened awareness of troubling trends in health outcomes that are currently playing out in the U.S. When investigating these trends, researchers have consistently illuminated gender disparities (Kindig and Cheng 2013). Indeed, life expectancy declined among *all* U.S. women between 2013 and 2014 (Arias 2016), which has fortunately been very rare in American society since high-quality, valid data have been available. Health behaviors—and increasingly, the patterning of health behaviors (Ford et al. 2011; Kesse-Guyot et al. 2014; Spring, Moller, and Coons 2012; Jiang and Zack 2011; Leech, McNaughton, and Timperio 2014)—are a commonly considered explanation for increasing mortality and worsening health. Thus, better understanding of gender differences in clustering of risky health behaviors may shed light on how and why women are becoming more disadvantaged. The aims of the current study, therefore, were to consider gender disparities in the clustering of risky health behaviors among a nationally representative sample of young adults and to assess the extent to which demographic, social, contextual, and psychosocial characteristics matter for understanding health behavior clustering among women and men.

Our latent class analysis identified three clusters of health behavior—Mixed, Healthy, and Unhealthy—among women and men with the highest proportion of male respondents (40

percent) grouping into the Unhealthy cluster and the majority of female respondents (50 percent) grouping into the Mixed cluster. Despite variability in the degree to which women and men across clusters engaged in healthy behaviors, the female Healthy cluster stood out as the most exemplary group, whereas the male Healthy cluster was less consistently positive. Indeed, though general patterns were consistent across genders, higher frequencies of men grouped into more problematic behavior clusters. We therefore found support for our first expectation that the clustering of behaviors by gender is consistent with advantage among women.

Additionally, we provide evidence for complex gender variation in the extent to which contexts and characteristics matter for health behavior clustering, as consistent with our second expectation. Race/ethnicity and marital status mattered more for distinguishing Mixed and Healthy clusters among women. Educational attainment and parental contexts mattered for distinguishing Unhealthy and Healthy clusters among women and men, but in different ways; peer contexts mattered only for women when distinguishing the Unhealthy and Healthy clusters. We also document significant associations between social psychological characteristics and health behavior clustering that were generally similar for women and men such that: extraversion and conscientiousness were associated with lower risk of Mixed cluster membership; adolescent religiosity was associated with lower risk of Unhealthy cluster membership; adolescent delinquency was associated with higher risk of Unhealthy cluster membership; and, extraversion, neuroticism, and openness were associated with higher risk and conscientiousness was associated lower risk of Unhealthy cluster membership as compared to Healthy cluster membership. Extending past research on gender and health behaviors allowed us to probe how and why gender differences in patterns of risky health behavior favor young women.

Our results raise questions for future research. First, how might we reconcile women’s advantage in health behavior clusters in young adulthood with their worsening health and increasing mortality risk by middle adulthood? Importantly, only 28 percent of women grouped into the female Healthy cluster. Thus, while men had more frequent membership in riskier clusters, a majority of women (72 percent) did not cluster into the healthiest group. Perhaps, therefore, women who group into risky clusters are exceptionally disadvantaged; that is, they may represent the subset of women driving the emergent gendered trends in health and mortality risk. If so, that pattern would be consistent with research documenting increasing mortality rates among low educated white women (Montez and Zajacova 2013). Consistent with this idea, only about 26 percent of women in the Unhealthy cluster had completed college education or higher, as compared to approximately 35 percent in the full sample. Further, nearly 60 percent of female respondents in the Unhealthy cluster were White, as compared to 52 percent in the full sample. Certainly, these patterns complement previous literature.

Further, men and women may vary in the degree to which they remain in health behavior clusters across the life course. Indeed, our multinomial logistic regression results point to a significant aging out of Unhealthy cluster membership among women, but not among men. Past research has shown that men tend to be more experimental and risky in their behaviors across adolescence into young adulthood, though the gender gap may be shrinking (Byrnes

et al. 1999). Though aging out appears stronger among women in our sample, prevalent stresses and responsibilities among women emerge from young adulthood to mid-life and include childbearing, taking care of children and aging parents, and the declining economic position of men. These life changes—still developing among our sample—may contribute to women's increasing midlife mortality risk. One limitation of our analyses is that we do not examine changes in patterns of health behaviors over time. Instead, we restrict analysis to young adult behaviors such that we can hone in on the patterns most prevalent at this important life course stage. A next step, however, should be to consider the expected dynamic nature of these clusters. Certainly, gender variation in cluster membership might develop and/or desist with time in ways that contribute to differential health and mortality risk as the life course unfolds.

Another potential explanation is that we do not consider internalizing behaviors. Stress researchers have documented differences in how men and women respond to stress. Men are more likely to externalize their response to stress, whereas women are more likely to internalize (Hill and Needham 2013). In this way, men and women with similar sociodemographic, background, and psychosocial profiles might engage in different types of unhealthy behaviors, particularly in the face of stress. Therefore, although women appear to have an advantage in terms of health behaviors, they may not necessarily have a mental and emotional health advantage. Internalizing behaviors—such as anxiety and depressive symptomatology—also matter for long-term health and mortality (Cuijpers and Smit 2002). A strength of our analytic approach was the ability to identify clusters using a range of health behaviors. In doing so, we captured variability in the degree to which young adults engage in positive and negative health behaviors. At the same time, we only considered externalizing behaviors. Patterns of internalizing behaviors, therefore, may tell a stronger story of female disadvantage. Future research should: consider how internalizing behaviors systematically cluster in ways that complement and/or stand apart from clusters of externalizing behaviors; determine how membership in these clusters differ by gender; and, highlight how internalizing versus externalizing health behavior clusters implicate mortality risk and health outcomes.

A second question that emerges from our research is: why might characteristics and contexts matter differently for young adult health behavior clusters by gender? The sociodemographic patterns we find are consistent with previous research on racial disparities and educational gradients in health behaviors. First, we find that Black women were significantly more likely to group into Mixed behavior clusters than Healthy behavior clusters. Past literature supports a number of possible explanations. For example, experiences of racial discrimination as a form of chronic stress are particularly salient among young Black women (e.g., Geronimus et al. 2006); and, such stresses are known to impact health indirectly through behaviors (Newman and Adler 2002). As such, discriminatory stress may contribute to Black women's increased risk for Mixed cluster membership as compared to Healthy cluster membership. We also find reduced risk for Unhealthy behavior clustering among men with "some college," but not among women. This finding is consistent with previous research that documents an anomaly in the education-health gradient, given that individuals with "some college" gain little in terms of health as compared to their high school graduates (Zajacova and Johnson-Lawrence 2016). Future research, therefore, should consider gender differences

in these patterns. Certainly, our findings suggest the anomaly may be stronger among women.

Finally, we document gender variation in the extent to which adolescent contexts mattered for behavior clustering, but only when comparing the Healthy and Unhealthy clusters. Having binge-drinking parents was associated with higher risk for men, whereas having native-born parents was associated with higher risk for women. Parents can influence the behaviors of their adolescents in multiple ways, including by modeling behaviors, providing permissive environments, and influencing personal development. Our results suggest potentially different mechanisms by which young boys and girls experience parental influence, and more research is needed to unpack this variation. Peer contexts—such as having greater proportion of male friends and/or having drinking peers—also increased risk for Unhealthy cluster membership, but only among women. This finding corroborates past research suggesting that peer influences on unhealthy behaviors may last well into adulthood, particularly for girls (e.g., Gaughan 2006).

Conclusion

We document clear gender disparities in the clustering of health behaviors among U.S. young adults that highlight heightened risk for unhealthy patterns among men. Nonetheless, only 28 percent of women and 27 percent of men were classified as having Healthy behavior in young adulthood. Further, we demonstrate substantial gender variability in how health behaviors cluster among young adults and document ways that sociodemographic position and adolescent contexts differentially predict behavior clustering among women and men. Looking forward, we encourage study in how this variability develops across the life course and how variability in a broader set of health behaviors (e.g., both internalizing and externalizing behaviors) might contribute to gender gaps in health and mortality.

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Table 1

Descriptive statistics by gender

	Women (*n* = 7,404) Mean (SD)/ %		Men (*n* = 6,934) Mean (SD)/ %		
Health behavior					
Binge drinker	13.82		26.49		***
Cigarette smoker	32.08		40.66		***
Marijuana user	17.38		27.35		***
Other tobacco user	0.12		9.45		***
No exercise	16.96		13.19		***
No doctor visit	28.44		50.56		***
No dentist visit	38.61		48.50		***
Fast food eater	28.92		40.12		***
Abused prescription drugs	14.03		19.22		***
Illegal drug user	14.53		23.60		***
Sociodemographic characteristics					
Age (Wave I)	15.53	(1.73)	15.71	(1.72)	***
Race/ethnicity					
Non-Hispanic White	51.97		53.84		*
Non-Hispanic Black	21.62		18.72		***
Hispanic	15.78		16.17		
Non-Hispanic Asian	5.16		6.24		**
Other/multi-racial	5.47		5.03		
Region					
Northeast	13.21		12.99		
Midwest	25.23		25.53		
South	38.44		38.20		
West	23.12		23.28		
Educational attainment (WIV)					
Less than high school	6.32		9.43		***
High school graduate	13.71		19.14		***

	Women (n = 7,404) Mean (SD)/ %		Men (n = 6,934) Mean (SD)/ %		
Post high school/ some college	44.67		43.53		
College graduate	20.58		18.51		**
Post-baccalaureate	14.71		9.38		***
Marital status (WIV)					
Ever married	51.97		45.84		***
Ever cohabiting (never married)	32.57		35.30		***
Never married nor cohabited	15.46		18.86		***
Adolescent parental context					
Parent's income (in thousands, WI)	46.91	(56.14)	46.40	(46.35)	
Parent's education					
Less than high school	13.75		11.30		***
High school graduate	29.17		29.89		
Some higher education	22.18		20.93		+
College graduate	22.34		24.94		***
Post-college degree-earner	12.55		12.93		
Live with two-bio parents (WI)	50.99		54.11		***
Parent binge drinker	12.35		12.30		
Parent smoker	28.57		27.23		
Adolescent peer contexts					
Number of friends (WI)	2.97	(2.52)	3.01	(2.57)	
No friends (WI)	5.15		5.80		+
Proportion of friends male (WI)	0.43	(0.20)	0.59	(0.22)	***
Peer GPA (WI)	2.87	(0.70)	2.85	(0.71)	***
Peer smoking (WI)	1.19	(1.26)	1.23	(1.31)	
Peer drinking(WI)	1.10	(1.72)	1.16	(1.77)	***
Peer dare (WI)	0.77	(1.15)	0.90	(1.26)	***
Peer lie (WI)	2.11	(1.52)	2.11	(1.53)	
Social psychological					
Adolescent religiosity	3.13	(1.03)	3.00	(1.06)	***
Adolescent delinquency	0.88	(1.46)	1.29	(1.80)	***

	Women (n = 7,404) Mean (SD)/ %		Men (n = 6,934) Mean (SD)/ %		
Extraversion	13.34	(3.07)	13.09	(3.06)	***
Neuroticism	10.96	(2.77)	9.87	(2.62)	***
Agreeableness	15.83	(2.20)	14.57	(2.48)	***
Conscientiousness	14.86	(2.76)	14.39	(2.62)	***
Openness	14.25	(2.40)	14.80	(2.49)	***

Note: N = 14,338;

+ $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$

Table 2

Criteria to determine appropriate number of gender-specific health behavior clusters using latent class analysis

	1 class	2 class	3 class	4 class
PANEL A: WOMEN				
Loglikelihood	−28575	−27961	−27855	−27801
Parameters	8	17	26	35
BIC	57221	56073	55942	55914
ABIC	57196	56019	55859	55803
LMR p-value		0.0000	0.1127	0.0363
Distribution of classes		75%, 25%	22%, 50%, 28%	12%, 27%, 19%, 42%
PANEL B: MEN				
Loglikelihood	−32106	−31459	−31353	−31309
Parameters	8	17	26	35
BIC	64283	63068	62936	62927
ABIC	64258	63014	62853	62816
LMR p-value		0.0000	0.0529	0.6477
Distribution of classes		60%, 40%	32%, 40%, 27%	21%, 33%, 37%, 9%

Table 3

Frequencies of health behaviors across male and female behavior clusters

	%		
PANEL A: WOMEN			
	Unhealthy (*n* = 1,653)	**Mixed (*n* = 3,694)**	**Healthy (*n* = 2,057)**
Binge drinker	47.67	0.60	10.38
Cigarette smoker	71.38	23.70	15.40
Other tobacco user	0.54	0.00	0.00
No physical activity	14.53	27.49	0.00
Marijuana user	70.44	0.00	5.98
No doctor visit	46.19	35.34	1.75
No dentist visit	51.97	53.15	1.75
Fast food eater	30.91	43.10	1.85
Abused prescription drugs	32.12	9.28	7.96
Illegal drug user	37.95	7.88	7.61
PANEL B: MEN			
	Unhealthy (*n* = 2,802)	Mixed (*n* = 2,250)	Healthy (*n* = 1,882)
Binge drinker	55.46	0.00	15.11
Cigarette smoker	70.52	29.08	9.72
Other tobacco user	13.32	5.33	8.61
No physical activity	12.21	25.20	0.32
Marijuana user	62.05	0.00	8.46
No doctor visit	65.01	53.29	25.77
No dentist visit	65.31	68.13	0.00
Fast food eater	44.18	50.53	21.63
Abused prescription drugs	31.11	10.44	11.89
Illegal drug user	40.24	12.13	12.39

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Table 4

Multinomial regression analyses predicting risk of membership in the Mixed behavior cluster as compared to the Healthy behavior cluster

	RRR (SE)							
	WOMEN				**MEN**			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 1**	**Model 2**	**Model 3**	**Model 4**
Sociodemographic Covariates								
Age	1.00	1.00	0.98	0.97	1.00	1.00	1.01	1.01
	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Race/ ethnicity (ref: NH White)								
Hispanic	1.28 +	1.36 +	1.36 +	1.37 +	1.15	1.00	1.01	1.00
	(0.18)	(0.23)	(0.23)	(0.23)	(0.16)	(0.17)	(0.17)	(0.17)
Non-Hispanic Black	1.38 **	1.35 **	1.31 *	1.32 *	1.21	1.16	1.17	1.22
	(0.15)	(0.15)	(0.15)	(0.16)	(0.16)	(0.15)	(0.16)	(0.17)
Non-Hispanic Asian	1.52 +	1.75 *	1.77 *	1.72 *	0.98	0.89	0.89	0.86
	(0.33)	(0.41)	(0.42)	(0.41)	(0.23)	(0.23)	(0.23)	(0.21)
Other/ multi-racial	0.76	0.78	0.76	0.75	1.43	1.39	1.39	1.43
	(0.14)	(0.15)	(0.14)	(0.14)	(0.32)	(0.31)	(0.31)	(0.32)
Region (ref: Northeast)								
Midwest	1.28 +	1.25 +	1.30 *	1.34 *	1.43 *	1.43 *	1.43 *	1.47 *
	(0.16)	(0.16)	(0.16)	(017)	(0.22)	(0.22)	(0.22)	(0.23)
South	2.01 ***	1.97 ***	2.01 ***	2.07 ***	1.41 *	1.40 *	1.40 *	1.43 *
	(0.24)	(0.23)	(0.24)	(0.26)	(0.20)	(0.21)	(0.21)	(0.21)
West	1.02	1.01	1.05	1.06	1.19	1.24	1.24	1.29
	(0.15)	(0.15)	(0.15)	(0.16)	(0.20)	(0.21)	(0.21)	(0.21)
Educational attainment (ref: HS)								
Less than HS	1.52 +	1.48	1.47	1.46	1.18	1.13	1.13	1.06
	(0.37)	(0.37)	(0.37)	(0.36)	(0.25)	(0.24)	(0.24)	(0.23)
Post HS/ some college	0.80	0.82	0.84	0.92	0.51 ***	0.55 ***	0.54 ***	0.53 ***
	(0.11)	(0.12)	(0.12)	(0.13)	(0.07)	(0.07)	(0.07)	(0.07)
Bachelor's degree	0.55 ***	0.60 **	0.64 **	0.74 +	0.34 ***	0.40 ***	0.39 ***	0.38 ***
	(0.08)	(0.10)	(0.10)	(0.12)	(0.05)	(0.06)	(0.06)	(0.06)

	RRR (SE)															
	WOMEN								MEN							
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4	
Post-baccalaureate degree	0.39	***	0.43	***	0.45	***	0.54	***	0.27	***	0.32	***	0.32	***	0.30	***
	(0.06)		(0.07)		(0.08)		(0.09)		(0.05)		(0.06)		(0.06)		(0.06)	
Marital status (ref: never married/cohab)																
Ever married	0.62	**	0.61	***	0.61	***	0.65	**	0.66	**	0.66	**	0.66	**	0.70	**
	(0.09)		(0.08)		(0.08)		(0.09)		(0.09)		(0.09)		(0.09)		(0.09)	
Ever cohab/never married	0.67	**	0.66	**	0.65	**	0.68	**	0.81		0.80		0.80		0.85	
	(0.10)		(0.10)		(0.10)		(0.10)		(0.12)		(0.12)		(0.12)		(0.12)	
Adolescent parental context																
Parent education (ref: HS grad)																
Less than HS			1.11		1.09		1.05				1.09		1.10		1.13	
			(0.16)		(0.16)		(0.15)				(0.20)		(0.20)		(0.21)	
Post HS/ some college			1.15		1.16		1.17				0.81		0.82		0.82	
			(0.14)		(0.14)		(0.14)				(0.11)		(0.11)		(0.11)	
College graduate			0.85		0.86		0.86				0.86		0.86		0.87	
			(0.10)		(0.11)		(0.11)				(0.11)		(0.11)		(0.12)	
Post-baccalaureate degree			0.91		0.92		0.92				0.77		0.77		0.74	+
			(0.14)		(0.14)		(0.14)				(0.13)		(0.13)		(0.13)	
Parent smoker (WI)			1.02		1.01		0.99				1.01		1.02		1.00	
			(0.10)		(0.10)		(0.10)				(0.12)		(0.12)		(0.12)	
Parent binge drinker (WI)			0.88		0.86		0.86				1.14		1.14		1.17	
			(0.12)		(0.11)		(0.12)				(0.18)		(0.18)		(0.19)	
Parent US-born			1.29		1.28		1.25				0.90		0.90		0.87	
			(0.20)		(0.20)		(0.20)				(0.16)		(0.16)		(0.16)	
Two bio-parent household (WI)			1.00		1.01		1.02				0.94		0.94		0.92	
			(0.09)		(0.09)		(0.09)				(0.09)		(0.09)		(0.09)	
Family income (thousands, WI)			1.00		1.00		1.00				1.00		1.00		1.00	
			(0.00)		(0.00)		(0.00)				(0.00)		(0.00)		(0.00)	
Adolescent peer contexts																
Number of friends (WI)					0.97	+	0.97						0.99		0.99	

	RRR (SE)							
	WOMEN				MEN			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
			(0.02)	(0.02)			(0.02)	(0.02)
No friends (WI)			1.13	1.13			0.83	0.79
			(0.25)	(0.25)			(0.18)	(0.17)
Proportion of friends male (WI)			1.09	1.09			1.17	1.17
			(0.23)	(0.23)			(0.26)	(0.26)
Peer GPA (WI)			0.93	0.94			1.00	1.00
			(0.07)	(0.07)			(0.09)	(0.09)
Peer smoking (WI)			1.05	1.01			0.99	0.98
			(0.05)	(0.04)			(0.04)	(0.04)
Peer drinking(WI)			1.02	1.05			0.94	0.95
			(0.04)	(0.05)			(0.05)	(0.05)
Peer dare (WI)			0.97	0.97			1.05	1.05
			(0.05)	(0.05)			(0.05)	(0.05)
Peer lie (WI)			1.01	1.01			1.04	1.03
			(0.04)	(0.04)			(0.04)	(0.04)
Social psychological								
Adolescent religiosity				0.94				0.97
				(0.04)				(0.05)
Adolescent delinquency				1.05				1.01
				(0.04)				(0.03)
Extraversion				0.96 **				0.96 *
				(0.01)				(0.02)
Neuroticism				1.04 *				1.01
				(0.02)				(0.0)
Agreeableness				0.99				1.06 **
				(0.02)				(0.02)
Conscientiousness				0.94 ***				0.89 ***
				(0.01)				(0.02)
Openness				0.98				1.02

	RRR (SE)							
	WOMEN				MEN			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
				(0.02)				(0.02)

Note: $N = 14{,}338$;

$^{+}p < .10$,

$^{*}p < .05$,

$^{**}p < .01$,

$^{***}p < .001$; reference group is Healthy for health behavior cluster

Table 5

Multinomial regression analyses predicting risk of membership in the Unhealthy behavior cluster as compared to the Healthy behavior cluster

	RRR (SE)															
	WOMEN								**MEN**							
	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 1**		**Model 2**		**Model 3**		**Model 4**	
Sociodemographic Covariates																
Age	0.90	***	0.90	***	0.85	***	0.86	***	0.96	+	0.96	+	0.94		0.94	*
	(0.03)		(0.03)		(0.03)		(0.03)		(0.02)		(0.02)		(0.03)		(0.03)	
Race/ ethnicity (ref: NH White)																
Hispanic	0.64	*	0.84		0.85		0.80		0.78	+	0.87		0.89		0.85	
	(0.12)		(0.17)		(0.17)		(0.17)		(0.11)		(0.14)		(0.15)		(0.14)	
Non-Hispanic Black	0.72	*	0.65	**	0.69	*	0.76	+	0.56	***	0.54	***	0.58	***	0.67	**
	(0.11)		(0.10)		(0.11)		(0.12)		(0.07)		(0.07)		(0.08)		(0.09)	
Non-Hispanic Asian	0.62	+	0.92		0.99		1.02		0.64	*	0.72		0.74		0.71	
	(0.17)		(0.27)		(0.30)		(0.32)		(0.14)		(0.17)		(0.18)		(0.17)	
Other/ multi-racial	1.24		1.29		1.24		1.18		1.16		1.19		1.19		1.13	
	(0.23)		(0.25)		(0.25)		(0.25)		(0.25)		(0.26)		(0.27)		(0.26)	
Region (ref: Northeast)																
Midwest	1.32	+	1.24		1.25		1.45	*	1.58	**	1.58	**	1.55	**	1.68	***
	(0.19)		(0.18)		(0.18)		(0.22)		(0.22)		(0.22)		(0.22)		(0.24)	
South	1.19		1.17		1.21		1.52	**	1.60	***	1.65	***	1.67	***	1.88	***
	(0.1)		(0.17)		(0.17)		(0.23)		(0.21)		(0.22)		(0.23)		(0.26)	
West	1.06		0.98		1.04		1.04		1.40	*	1.39	*	1.39	*	1.56	**
	(0.18)		(0.16)		(0.18)		(0.18)		(0.22)		(0.22)		(0.22)		(0.24)	
Educational attainment (ref: HS)																
Less than HS	1.50		1.41		1.41		1.26		1.31		1.31		0.27		1.15	
	(0.41)		(0.39)		(0.39)		(0.35)		(0.26)		(0.26)		(0.26)		(0.24)	
Post HS/ some college	0.72	*	0.73	+	0.77		0.77		0.60	***	0.59	***	0.58	***	0.55	***
	(0.12)		(0.12)		(0.13)		(0.13)		(0.08)		(0.08)		(0.08)		(0.07)	
Bachelor's degree	0.41	***	0.44	***	0.50	**	0.55	**	0.31	***	0.30	***	0.29	***	0.29	***
	(0.07)		(0.09)		(0.10)		(0.11)		(0.05)		(0.05)		(0.05)		(0.05)	

	RRR (SE)															
	WOMEN								MEN							
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4	
Post-baccalaureate degree	0.29	***	0.31	***	0.35	***	0.39	***	0.19	***	0.18	***	0.18	***	0.18	***
	(0.06)		(0.07)		(0.08)		(0.09)		(0.04)		(0.04)		(0.04)		(0.04)	
Marital status (ref: never married/cohab)																
Ever married	0.56	**	0.52	***	0.50	***	0.50	***	0.47	***	0.46	***	0.45	***	0.46	***
	(0.10)		(0.09)		(0.08)		(0.09)		(0.06)		(0.06)		(0.06)		(0.06)	
Ever cohab (never married)	1.40	+	1.30		1.22		1.11		1.31	*	1.26	+	1.22		1.18	
	(0.25)		(0.23)		(0.22)		(0.20)		(0.18)		(0.18)		(0.17)		(0.16)	
Adolescent parental context																
Parent education (ref: HS grad)																
Less than HS			1.08		1.08		1.04				0.92		0.95		0.96	
			(0.19)		(0.19)		(0.19)				(0.17)		(0.18)		(0.18)	
Post HS/ some college			1.25		1.28		1.22				1.03		1.04		1.02	
			(0.17)		(0.18)		(0.17)				(0.13)		(0.14)		(0.13)	
College graduate			1.02		1.04		1.00				1.20		1.22		1.22	
			(0.15)		(0.15)		(0.15)				(0.15)		(0.15)		(0.16)	
Post-baccalaureate degree			1.09		1.12		0.95				1.22		1.21		1.13	
			(0.19)		(0.20)		(0.17)				(0.20)		(0.20)		(0.19)	
Parent smoker (WI)			1.14		1.08		1.03				1.10		1.07		1.03	
			(0.13)		(0.13)		(0.13)				(0.13)		(0.12)		(0.12)	
Parent binge drinker (WI)			1.13		1.07		1.02				1.39	*	1.38	*	1.36	*
			(0.16)		(0.15)		(0.15)				(0.21)		(0.21)		(0.20)	
Parent US-born			1.99	**	1.91	**	1.94	**			1.17		1.15		1.09	
			(0.41)		(0.40)		(0.41)				(0.20)		(0.20)		(0.20)	
Two bio-parent household (WI)			0.69	***	0.70	**	0.76	**			0.83	+	0.84	+	0.89	
			(0.07)		(0.07)		(0.08)				(0.08)		(0.08)		(0.08)	
Family income (thousands, WI)			1.00		1.00		1.00				1.00		1.00		1.00	
			(0.00)		(0.00)		(0.00)				(0.00)		(0.00)		(0.00)	
Adolescent peer contexts																
Number of friends (WI)					1.01		1.00						1.01		1.00	

	RRR (SE)							
	WOMEN				MEN			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
			(0.02)	(0.02)			(0.02)	(0.02)
No friends (WI)			1.09	1.22			0.76	0.75
			(0.29)	(0.31)			(0.16)	(0.15)
Proportion of friends male (WI)			1.84 *	1.59 +			0.92	0.99
			(0.48)	(0.43)			(0.21)	(0.22)
Peer GPA (WI)			0.94	0.97			1.07	1.08
			(0.08)	(0.09)			(0.10)	(0.10)
Peer smoking (WI)			1.08 +	1.05			1.06	1.06
			(0.05)	(0.04)			(0.04)	(0.04)
Peer drinking(WI)			1.16 *	1.15 *			1.04	1.02
			(0.07)	(0.07)			(0.06)	(0.06)
Peer dare (WI)			1.03	1.02			1.06	1.05
			(0.06)	(0.06)			(0.05)	(0.05)
Peer lie (WI)			1.03	1.03			1.03	1.02
			(0.05)	(0.05)			(0.04)	(0.04)
Social psychological								
Adolescent religiosity				0.86 **				0.90 *
				(0.05)				(0.04)
Adolescent delinquency				1.30 ***				1.17 ***
				(0.05)				(0.03)
Extraversion				1.05 ***				1.03 +
				(0.02)				(0.02)
Neuroticism				1.11 ***				1.05 **
				(0.02)				(0.02)
Agreeableness				0.98				1.04 +
				(0.03)				(0.02)
Conscientiousness				0.93 ***				0.90 ***
				(0.02)				(0.02)
Openness				1.07 **				1.06 **

	RRR (SE)							
	WOMEN				MEN			
	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
				(0.02)				(0.02)

Note: $N = 14{,}338$;

$^{+}p < .10$,

$^{*}p < .05$,

$^{**}p < .01$,

$^{***}p < .001$; reference group is Healthy for health behavior cluster