



PERGAMON

Social Science & Medicine 50 (2000) 517–529

SOCIAL
SCIENCE
&
MEDICINE

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Over the limit: the association among health, race and debt

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Abstract

This research responds to the call for more research on the conceptualization and measurement of socio-economic status that moves beyond merely considering education, occupation and income variables. Credit card usage and credit card debt is a growing phenomenon in developed countries. Using data from a 1997 representative sample of more than 900 adults in Ohio, we explored how credit card debt and stress regarding debt is associated with health. We found that both credit card debt and stress regarding debt are associated with health. In addition, health behaviors and risks explain part of this association. © 2000 Published by Elsevier Science Ltd. All rights reserved.

Keywords: Debt; Credit; Socio-economic status; Race; Health

Introduction

This paper responds to the call for more research on the conceptualization and measurement of socio-economic status that moves beyond merely measuring education, occupation and income variables (Williams, 1990; Adler et al., 1994; Anderson and Armstead, 1995; Oliver and Shapiro, 1995; Williams and Collins, 1995; Hummer, 1996). Traditional measures of socio-economic status including education, income and occupation have been recently criticized for underestimating wealth and the differences between the financial well-being among subgroups of the population (Adler et al., 1994; Anderson and Armstead, 1995; Oliver and Shapiro, 1995; Williams and Collins, 1995; Hummer,

1996). In this paper, we test whether financial debt, as another aspect of socio-economic status and financial well-being, is associated with health. Specifically, we examine whether credit card debt and stress regarding overall debt is related to health. We then assess to what extent is the race difference in health between blacks and whites explained by differences in debt and stress regarding debt.

Socio-economic status, other indicators of financial well-being and health

Previous research finds that socio-economic status is strongly associated with health and mortality (Kitagawa and Hauser, 1973; Townsend et al., 1988; Mirowsky and Ross, 1989; Smith et al., 1990; Williams, 1990; Feinstein, 1993; Ross and Wu, 1995; Williams and Collins, 1995; Elo and Preston, 1996; Lantz et al., 1998;). However, by not including other dimensions of financial well-being, researchers greatly

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underestimate deeply-embedded inequality (Oliver and Shapiro, 1995). In general, we know little about other measures that tap into well-being such as economic hardship, debt, assets and wealth (but see Ross and Huber, 1985; Anderson and Armstead, 1995). One example of research on wealth is the case of middle-class blacks in the United States. Middle-class blacks earn 70 cents for every dollar earned by middle-class whites — *but* they possess only 15 cents for every dollar of wealth held by middle-class whites. Thus, other measures of financial status may help us understand inequality and its health consequences (Oliver and Shapiro, 1995).

To our knowledge, no one has studied the association of credit card debt and stress regarding debt with health; yet credit card debt is growing in the United States (Edelberg, 1997; Yoo, 1997) as well as in the European markets (Wallace, 1998). The lack of research in the area is partially due to a lack of data on individual credit card debt and other financial well-being measures, but also due to the narrow conceptualization of socio-economic status as education, income and occupation.

Credit card debt in the United States

Credit card debt is another way of tapping into one's financial well-being because at times people use credit cards as a way of purchasing goods and services they could otherwise not afford (Schor, 1998). Credit card debt may be a more sensitive barometer of financial well-being than income because it may tap into more long-term deprivation. Families often use credit during difficult financial times, so that while income is measured at one time point, credit card debt has likely accumulated over time (Williams and Collins, 1995).

Credit card debt is an increasing problem among Americans in the United States (Edelberg, 1997; Yoo, 1997); and the explosion of credit cards has been documented in Europe and especially in England as well (Wallace, 1998). Credit card debt is part of the mounting problem of increased consumption in the last half-century in modern society. This phenomenon, called 'the new consumerism' by Juliet Schor, shows Americans are aspiring to have more, although they have not been earning proportionally more. Therefore, while in the past Americans used to match their life style with others in their local reference group, such as their neighbors, they now choose reference groups of people whose incomes are three, four or five times their own salary. Schor (1998) argues this 'relentless ratcheting up of standards' has caused many to incur massive debt and stress.

Credit card debt is also associated with an increase in bankruptcy cases in the United States (Cocheo, 1997; Schor, 1998). Credit card debt is unlike debt

acquired from the purchase of home and cars for two reasons. First, almost all credit card debt is unsecured debt — meaning that there is no collateral secured against the debt. This may lead to more aggressive collection tactics described later in this paper. Second, credit card debt is nonnormative as compared to 'normative debt' such as a home mortgage. While debt incurred from a home and car are deemed necessities in US society, credit card debt is frequently viewed as 'excessive' debt taken on by those with prodigal habits. While in reality those in severe credit card debt are often those who have experienced a recent job loss and/or health problems (Cocheo, 1997), the social view on these people is that they are spending more than they earn, and that this is shameful. Alternatively, normative debt, such as purchasing a home is associated with stability, responsibility and being a tax-paying member of a community. For both of these reasons, we believe credit card debt is especially stressful and may lead to health problems.

We argue credit card debt can impact health for several reasons. (1) Credit card debt can be associated with both short-term and long-term financial difficulties. Having a lot of credit card debt may be indicative of a financial crisis — such as one who experiences job loss, and has no income or savings. In such cases, families may charge basic necessities (from food, medicine, clothing and shelter to school tuition) on their credit cards. Since credit card debt accumulates over time, and interest is generally high, it is also indicative of extended financial hardship. (2) High debt may lead individuals to not spend as much on 'quality' goods and services associated with their own health. If individuals are having trouble paying for their needs, they may cut corners in terms of health care. For instance, one may buy inexpensive mass-produced magnifying glasses or walking canes rather than prescription reading glasses and custom-fitted canes. People may buy less expensive food as well, such as canned fruits and vegetables, rather than fresh produce. (3) Finally, the stress of owing money, and knowledge that one is paying high interest rates, may lead to increased stress resulting in worsening health. Collection agencies are known to harass those who have defaulted on their debt using such tactics as threatening letters, calling at home or work and so on. While consumer interest groups, as well as the Fair Debt Collection Practices Act in the US have tried to limit harassment by collection agencies, the illegal tactics to collect from those in default do still occur. In addition, unfair collection tactics are more likely to happen among disadvantaged groups who are less likely to know and exercise their rights (Dietz and Langer, 1996; Gray, 1997). All of these reasons may cause additional stress.

Race differences in health

It is well established that in contemporary American society blacks, as a group, have worse health on average and have a lower life expectancy than do whites as a group (Williams, 1990; Rogers, 1992; Williams and Collins, 1995; Hummer, 1996; Schoenbaum and Waidmann, 1997). For instance, blacks are more likely to have hypertension, diabetes, cancer, arthritis, mental disorders, disabling conditions and activity limitations (Mutchler and Burr, 1991; Schoenbaum and Waidmann, 1997). In addition, they are more likely to be overweight, which is associated with chronic health problems and mortality (Dortch, 1997). These race differences show some signs of increasing rather than decreasing since 1960 (Williams and Collins, 1995).

One possible reason for these race differences may be the difference in wealth and financial well-being among blacks and whites. The disparity in debt may provide evidence as to why blacks have higher rates of disease and disability. Furthermore, understanding more about the race gap in health and life expectancy may aid in closing it. Wealth of the black middle-class is tenuous, residing mostly in income, a house and cars (Oliver and Shapiro, 1995; Williams and Collins, 1995). Blacks rarely have additional income-producing resources to draw upon should they lose their job or suffer another financial crisis. This translates into 65% of middle-class whites in the United States being able to maintain their present standard of living for a month if their income stopped, but only 27% of blacks could do the same (Oliver and Shapiro, 1995, p. 97). Thus, it is possible that blacks carry proportionally more debt, and that this may explain part of the relationship between race and health.

Health risks and health behaviors

One of the ways socio-economic status affects health is through health risks and health behaviors (Berkman and Breslow, 1983; USDHHS, 1990; Adler et al., 1994; Patterson et al., 1994). In the case of debt, it is plausible that financial hardship and stress as indicated by incurring credit card debt, paying high interest rates, and so on may be associated with nonhealthy behaviors such as excessive drinking, smoking or being overweight (Berkman and Breslow, 1983; USDHHS, 1990; Adler et al., 1994; Patterson et al., 1994).

In sum, building on existing literature explaining the importance of socio-economic indicators of well-being (Ross and Huber, 1985; Mirowsky and Ross, 1989; USDHHS, 1990; Williams, 1990; Anderson and Armstead, 1995), we explore how credit card debt and debt stress are associated with physical health. Specifically, we will compare the health of blacks to health of whites in the United States using income,

several indicators of credit card debt, and the stress one experiences surrounding debt.

We investigate the following hypotheses:

H1: credit card debt and stress regarding debt will be inversely associated with health.

H2: credit card debt may have a stronger effect than income on the dependent variables.

H3: part of the effect of credit card debt and stress regarding debt on health will be explained by health risks and behaviors.

H4: credit card debt and stress regarding debt will explain part of the relationship between race and health.

H5: the effect of having credit card debt or stress regarding debt on health may be stronger for blacks than whites.

Methodology

This study is based on two random-digit dialing telephone surveys of adult Ohioans conducted in June, 1997; one survey was statewide and the other sampled zipcodes within the state with a high concentration of black residents. Each survey used a questionnaire that contained a number of economic variables (including many indicators of household debt), several types of personal health variables, and a host of demographic and background variables. The questionnaire took approximately 20 min, on average, to administer. All interviews were conducted by the Center for Survey Research of the Ohio State University College of Social and Behavioral Sciences at its centralized CATI facility.

The sampling approach used in each survey was a traditional random-digit dialing (or RDD) sampling frame whereby households are randomly selected within a the geographic area of interest (e.g. the state of Ohio) regardless of whether the household has a listed or an unlisted telephone number (cf. Lavrakas, 1993, pp. 33–48). Specifically for these two surveys, telephone numbers were generated in a manner whereby in theory any household within the respective geographic area of interest could have been sampled. Since minority US residents, especially blacks, are known to be less likely than whites to list their home telephone numbers (Lavrakas, 1993, p. 34), it is especially important that an RDD sampling frame be used in any telephone survey purporting to represent minorities within a given population.

For each household that was randomly selected via the RDD technique, one English-speaking adult resident of the household was randomly designated as the 'eligible respondent' using a variation of the 'last birth-

day' within-household respondent selection technique (cf. Lavrakas, 1993, pp. 111–113).

The first survey was conducted statewide and interviewed 861 Ohioans. Of these respondents, 734 were white, 76 were black, and 51 were of another race or chose not to provide their race. For this survey, 2991 telephone numbers were processed, of which 1554 were known to reach a household with an eligible adult. From these households, interviews were completed in 55% of the cases. Among those households in which interviewers actually spoke with the eligible adult, interviews were completed in 84% of the cases.

The second random sampling was concentrated in zipcodes in the Ohio cities of Cincinnati and Cleveland and was meant to oversample blacks, so as to raise the sample size of the black cohort. This sample included 175 Ohioans, of whom 76 were white, 84 were black, and 15 were of another race or chose not to provide their race. For this survey, 770 telephone numbers were processed, of which 414 were known to reach a household with an eligible adult. From these households, interviews were completed in 42% of the cases. Among those households in which interviewers actually spoke with the eligible adult, interviews were completed in 76% of the cases.

For the purposes of the present study, we combined the black and white respondents from these two samples which yielded a database with 970 respondents, 810 of whom were white and 160 were black.

Dependent variables

Own health

We use two dimensions of health including self-reported (subjective) health and functional impairment (Liang, 1986; Gibson, 1991).¹ Debt may affect each aspect of health in a different manner, thus we test each health outcome. Researchers find self-reported health is correlated with physicians' assessments. In addition, self-reported health strongly predicts mortality (Idler and Kasl, 1991). Self-reported health was based on a scale formed by the following two questions: "Overall, would you say your health is 1 very poor, 2 poor, 3 satisfactory, 4 good, or 5 very good?" and "Compared to most other people your age would you say your health is 1 very poor, 2 poor, 3 satisfactory, 4 good, or 5 very good?" These two items correlated with each other at $r = 0.736$. We added the responses of each question together to form a two-item scale

¹ We do not include a measure of chronic illness, a commonly used measure of health because our data do not allow us to distinguish between illnesses of the respondent versus illnesses of their spouse.

which ranged from 2 to 10; a higher number indicates better self-reported health.

Impairment

We use a standard scale of physical functioning, adapted from Nagi's (1976) physical performance scale. This scale rates physical functioning by measuring difficulty in performing everyday activities. Respondents were asked the following questions: How much difficulty do you have climbing stairs? How much difficulty do you have kneeling or stooping? Lifting or carrying objects weighing less than ten pounds, like a bag of groceries? Preparing meals, cleaning house or doing other household work? Shopping or getting around town? Seeing, even with glasses? Hearing? Responses were coded 1 no difficulty, 2 some difficulty, 3 great difficulty. Alpha reliability = 0.83.

Both health indicators were logged to reduce skewness.

Health risks and behaviors

Body mass index

We use the body mass index (BMI) for determining weight and being overweight. Ninety-seven percent of respondents reported their weight outright. The other 3% were asked a series of questions which allowed us to estimate their weight ranges within 25 pound intervals. Then, these respondents were assigned the mean in each 25 pound weight range from those respondents in the range who did provide their weight. All respondents reported their height. To attain the BMI for each respondent, we took body weight (in kg) divided by height squared (in m). This is considered a reliable way to judge overweight in community samples and has been shown to strongly correlate with height and weight measured by a researcher using a standard rule and scale (Stewart et al., 1987). Generally, a BMI over 27 means one should take steps to reduce weight (NIH, 1985).

Smoking

This variable was coded 1 for Yes, and 0 for No, to indicate whether or not the person had smoked any cigarettes in the past week prior to the interview.

Drinking

This variable is the number of alcoholic drinks in the past week.

Independent variables

We measure debt using five separate indicators of credit card debt. For all questions, if the individual had no credit cards ($n = 214$), they were represented

as having no (i.e. zero) credit card debt in the following measures. All measures were coded so that a higher number indicates more debt. We did not combine the debt items into an index because we want to assess what it is about debt and how different aspects of debt are associated with health.

Debt/income ratio

This ratio measures the amount of credit card debt owed to one's total family income. Respondents were asked: "Right now, approximately what is the total amount you (and your spouse/partner) owe on all your credit cards after your most recent payments?" Since the impact of debt is relative to one's income, we then divided debt by income to get the proportion of debt to income. Thus, for example \$5000 of debt is different for those earning \$15000/yr compared to those earning \$60000/yr. The ratio should more accurately reflect economic hardship than debt alone.

Carrying an unpaid balance

This variable indicates whether respondents paid off their most recent credit card bill in entirety or not. If respondents carried over an unpaid balance on their credit cards they were coded 1. If they paid their debt in full, they were coded 0, for having no balance.

Amount of credit line used

This variable is the ratio of the total amount owed to the household's total line of credit from all cards.

Charging on more than two cards

This measure is computed so that those who charged on three or more cards were coded 1, and those who charged on two or fewer cards were coded 0.

Default

This computed variable is the number of times one missed paying the minimum required payment on at least one card in the last six months. Default ranges from zero months (indicating not being in default) to all six months.

Overall, about 47% ($n = 453$) of the sample indicated they had some credit card debt, whereas 43% ($n = 418$) had no credit card debt. Finally, an additional 10% refused to answer the credit card debt questions. Those with missing values on the debt indicators were dropped from the analysis because imputing values on our main variables of interest would not be a conservative test of our hypotheses.

Debt stress index

This index was based on *overall* debt, including any that is on credit cards, store credit, a mortgage or home equity loan, a car loan, or any other outstanding loan the respondent (or his/her spouse/partner) may

have. Respondents were asked the following: (1) Overall, how often do you worry about the total amount you (and your spouse/partner) owe in overall debt? Would you say you worry ... 0 not at all, 1 hardly ever, 2 some of the time, 3 most of the time, or 4 all of the time? (2) How much stress does the total debt you are carrying cause to you (and your spouse/partner)? It is ... 0 no stress at all, 1 not very much, 2 somewhat, 3 quite a bit, or 4 a great deal of stress? (3) How concerned are you that you (and your spouse/partner) never will be able to pay off these debts? Are you ... 0 not at all concerned, 1 not very concerned, 2 somewhat concerned, 3 quite concerned, or 4 very concerned? An index was computed by adding these three questions together and multiplying them by 8.3 to obtain a scale of 0–100 points where a high number indicates more stress ($\alpha = 0.861$). Respondents who answered they had no debt to worry about (question 1) were assigned zero on these three questions.

Control variables

Socio-economic background control variables include **race**, **sex** and **age**. Race is coded so that 1 is for those who say their race is black or African-American and 0 for those who report their race as white. **Female** is coded 1 for female and 0 for male. **Age** is their number of years old.

We measure the traditional indicators of socio-economic status using **education**, the number of years of schooling, **income**, total household income from all sources before taxes for 1996, and **having a job**, coded 1 if the respondent is employed and 0 if s/he is not.

In addition, we add family status variables since both marriage and children affect financial resources and may affect health status as well. **Marital status** is coded 1 if the respondent is married or cohabiting and 0 if not. **Number of children** includes the number of children living in the household. Missing values on control variables were coded to the mean.

Analytic plan

OLS hierarchical regression analysis was used to assess how credit card debt was associated with physical health. Specifically, we compared blacks to whites using income, debt measures and stress regarding debt, controlling for socio-demographic background characteristics and family background characteristics. We then added three health behavior and risk indicators to test whether some of the effect of debt on health is through health behaviors and risks. In addition, interactions were tested to examine whether the effect of debt and the stress of debt on health were different for blacks and whites. In addition, we tested whether the effect of debt on health varied by income levels.

Table 1
Means and S.D. values by race

	Race					
	Black Mean	S.D.	White Mean	S.D.	Total Mean	S.D.
Impairment	1.32*	0.46	1.21	0.34	1.23	0.37
Self-reported health	7.78*	1.78	8.20	1.66	8.13	1.69
Body mass index	27.42*	6.17	25.90	5.07	26.15	5.29
Percent who smoke	39.38*	0.49	27.65	0.48	29.59	0.46
No. of alcoholic drinks	0.88	1.53	1.11	1.79	1.07	1.74
Percent female	70.63*	0.46	59.88	0.49	61.65	0.49
Age	42.16*	16.29	45.86	17.10	45.25	17.02
Percent married	27.50*	0.45	59.51	0.49	54.23	0.50
No. of children	1.13*	1.52	0.77	1.11	0.83	1.19
Education (yr)	12.63*	2.19	13.00	2.12	12.94	2.13
Percent with job	59.38	0.49	62.59	0.48	62.06	0.49
Family income (in 1996 US dollars)	30 230*	21 222	45 965	44 962	43 370	42 377
US family income in quartiles (in 1996 US dollars) ^a						
Lowest 20th percent (0–14 768)	25.00*	0.43	8.40	0.28	11.13	0.31
21–50% (14 769–35 492)	31.25	0.47	28.89	0.45	29.28	0.46
51–80% (35 493–68 015)	38.75	0.49	46.79	0.50	45.46	0.50
81–100% (68 016–highest)	5.00*	0.22	15.93	0.37	14.12	0.35
Average credit card debt	1290	2562	1457	3983	1428	3780
Debt/income ratio	0.06	0.06	0.04	0.10	0.04	0.11
Percent who carry balance forward	16.98	0.38	19.70	0.40	19.25	0.39
Amount of credit used	0.23*	0.39	0.12	0.23	0.14	0.27
Percent with three or more cards	2.52*	0.16	7.45	0.26	6.64	0.25
Default	0.37	1.04	0.22	0.84	0.24	0.87
Overall debt stress index	35.42*	28.24	26.99	26.12	28.38	26.65
N	160		810		970	

* An asterisk indicates a significant difference between groups $p < 0.05$, two-tailed tests.

^a Quartiles are based on 1996 census household income figures (US Bureau of the Census, 1997), means and S.D. values represent the percent of respondents in each of these categories.

Results

Review of descriptive statistics

Table 1 shows that blacks, as a group, are consistently less well-off than whites across a host of health and other social measures. In terms of health, blacks have higher levels of impairment, lower self-reported health, are more likely to be overweight, and more likely to smoke cigarettes than do whites. Blacks also

are much less likely to be married. They have more children, have attained less education, have lower household incomes, and experience more stress due to the overall debt they have taken on in life compared to whites. They are also more likely to be in the lowest 20th percentile for median family income, and are much less likely to be in the highest quartile. Blacks also use more of their credit line on average than whites. However, blacks are less likely to have three or more credit cards. This last fact may be due to discriminatory practices of financial institutions, possibly including both statistical discrimination as well as 'address discrimination' (Braddock and McPartland, 1987, pp. 12–17; Kirschenman and Neckerman, 1990, pp. 215–217; Oliver and Shapiro, 1995).²

Table 2 shows the mean levels of each variable across three groups: those who have no credit card debt; those whose proportion of debt is up to half of their income; those who owe more than half of their income. First, it should be noted that those without credit card debt are significantly older than those with

² Statistical discrimination is when individuals and institutions use negative group images rather than direct assessments of individuals in their attitudes, opinions and decisions (see Braddock and McPartland, 1987, p. 5). Address discrimination is when individuals and institutions recognize an address as located in a primarily minority neighborhood, and then make negative assumptions about financial resources or the work ethic of those from that neighborhood (see Kirschenman and Neckerman, 1990, pp. 216–217).

Table 2

Mean levels of each variable across three groups: those who have no credit card debt; those whose proportion of debt is up to half of their income; those who owe more than half of their income

	Proportion of debt to income		
	Zero	Up to half	More than half
Impairment	1.28*	1.16	1.21
Self-reported health	78.61*	85.19	81.63
Body mass index	25.69*	25.82	27.73
Percent who smoke	0.34*	0.25	0.28
No. of alcoholic drinks	1.05	1.14	0.88
Percent female	0.61	0.62	0.64
Percent black	0.17*	0.13	0.23
Age	47.76*	42.20	42.31
Percent married	0.47*	0.56	0.61
No. of children	0.79	0.89	0.94
Education (yr)	12.50*	13.33	13.38
Percent with job	0.50*	0.70	0.75
Family income (in 1996 US dollars)	40 075*	48 694	41 457
US median family income in quartiles (in 1996 US dollars) ^a			
Lowest 20th percent (0–14 768)	0.17*	0.06	0.09
21–50% (14 769–35 492)	0.31*	0.24	0.37
51–80% (35 493–68 015)	0.41*	0.52	0.39
81–100% (68 016–highest)	0.11*	0.18	0.15
Average Credit Card Debt (in US dollars)	0*	844	6231
Debt/income ratio	0*	0.02	0.18
Percent who carry balance forward	0*	0.26	0.44
Amount of credit used	0*	0.18	0.49
Percent with three or more cards	0.05*	0.08	0.10
Default	0*	0.45	0.52
Overall debt stress index	21.87*	30.15	41.09
<i>N</i>	418	293	160

* An asterisk indicates a significant difference between groups $p < 0.05$, two-tailed tests.

^a Quartiles are based on 1996 census household income figures (US Bureau of the Census, 1997), means and S.D. values represent the percent of respondents in each of these categories.

debt. This in itself helps explain many of the other differences among the groups. Being younger as a group, those with credit card debt are generally healthier than those without debt: they have lower impairment levels, higher self-reported health, and are less likely to smoke cigarettes. Those who owe more than half of their income are more likely to be overweight than those with no credit card debt or less debt. Also those who have debt, likely due to their age, are more likely to be married, are more likely to have a job on average and have higher household incomes. As would be expected, those with credit card debt have markedly higher levels of debt stress than those without credit card debt.

Regression results

The regression analyses that were conducted compared five different models. Model 1 used age, race, and gender as predictors. Model 2 added the three tra-

ditional SES variables. Model 3 added our set of debt indicators. Model 4 added the debt stress index. Model 5 added the set of health risks and behavior variables.

Physical impairment

The regression analyses that used physical impairment as the dependent variable are shown in Table 3. Model 1 shows that age, race and gender explain 18% of the variance in physical impairment, with all three variables being significant. In model 2, with the SES variables added (all three are significant), the adjusted *R*-squared increases to 24%. Model 3 shows that the debt to income ratio is significantly associated with higher levels of impairment. None of the other debt indicators were significantly associated with debt. In model 4, the debt stress index is added to the equation and this found to be significant. A higher number on the debt stress index was associated with greater impairment and, of note, slightly weakened the relationship between the debt/income ratio and impair-

Table 3
Regression of physical impairment (logged) by sociodemographics, SES and debt, and health risks and behaviors ($N = 784$)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	Beta	b	Beta	b	Beta	b	Beta	b	Beta
<i>Sociodemographics</i>										
Age	0.006*** (0.001)	0.394	0.005*** (0.001)	0.305	0.005*** (0.001)	0.302	0.005*** (0.001)	0.331	0.005*** (0.001)	0.309
Black	0.107*** (0.024)	0.145	0.082*** (0.024)	0.111	0.082*** (0.024)	0.111	0.079*** (0.024)	0.106	0.061*** (0.023)	0.083
Female	0.058*** (0.019)	0.101	0.038** (0.018)	0.066	0.036** (0.018)	0.063	0.028* (0.019)	0.049	0.041** (0.019)	0.072
<i>SES</i>										
Education			-0.022*** (0.004)	-0.166	-0.022*** (0.004)	-0.167	-0.022*** (0.004)	-0.162	-0.017*** (0.004)	-0.126
Job			-0.079*** (0.021)	-0.137	-0.085*** (0.021)	-0.147	-0.086*** (0.021)	-0.150	-0.086*** (0.020)	-0.150
Income			-4.8E-07*** (0.000)	-0.077	-4.4E-07*** (0.000)	-0.071	-4.1E-07*** (0.000)	-0.066	-3.3E-07** (0.000)	-0.053
<i>Debt</i>										
Debt/income				0.310*** (0.115)		0.105	0.277*** (0.115)	0.094	0.219*** (0.112)	0.074
Carry balance forward				-0.004 (0.025)		-0.005	-0.009 (0.025)	-0.012	-0.021 (0.024)	-0.028
Amount of credit used				-0.035 (0.043)		-0.033	-0.043 (0.043)	-0.041	-0.051 (0.042)	-0.048
Three or more cards				-0.012 (0.036)		-0.011	-0.010 (0.036)	-0.009	0.0009 (0.035)	0.001
Default				0.003 (0.011)		0.009	-0.001 (0.011)	-0.003	0.002 (0.011)	0.006
Debt stress index							0.0009*** (0.000)	0.088	0.0006** (0.000)	0.062
<i>Health risks and behaviors</i>										
BMI									0.012*** (0.002)	0.228
Smoking									0.038** (0.019)	0.063
Drinking									-0.005 (0.005)	-0.032
Constant	-0.153		0.284		0.284		0.238		-0.124	
Adj. R^2	0.180		0.238		0.241		0.246		0.296	

*** $p < 0.01$, one-tailed tests (S.E. in parentheses).

** $p < 0.05$.

* $p < 0.10$.

Table 4
Regression of self-reported health (logged) by sociodemographics, SES and debt, and health risks and behaviors (N = 784)

	Model 1		Model 2		Model 3		Model 4		Model 5	
	b	Beta	b	Beta	b	Beta	b	Beta	b	Beta
<i>Sociodemographics</i>										
Age	-0.004*** (0.001)	-0.235	-0.002*** (0.001)	-0.119	-0.002*** (0.001)	-0.111	-0.002*** (0.001)	-0.151	-0.002*** (0.001)	-0.137
Black	-0.063*** (0.024)	-0.091	-0.034* (0.023)	-0.049	-0.035* (0.024)	-0.051	-0.031* (0.024)	-0.045	-0.010 (0.023)	-0.015
Female	-0.006 (0.019)	-0.001	0.019 (0.018)	0.036	0.018 (0.018)	0.034	0.028* (0.019)	0.052	0.016 (0.019)	0.029
<i>SES</i>										
Education			0.025*** (0.004)	0.202	0.025*** (0.004)	0.196	0.024*** (0.004)	0.189	0.017*** (0.004)	0.136
Job			0.102*** (0.020)	0.190	0.104*** (0.021)	0.193	0.106*** (0.021)	0.196	0.106*** (0.020)	0.196
Income			5.060E-07*** (0.000)	0.087	4.755E-07*** (0.000)	0.082	4.371E-07** (0.000)	0.075	3.428E-07** (0.000)	0.059
<i>Debt</i>										
Debt/income			-0.230** (0.114)	-0.083	-0.188* (0.114)	-0.083	-0.188* (0.114)	-0.068	-0.130 (0.109)	-0.047
Carry balance forward			0.017 (0.025)	0.025	0.024 (0.025)	0.025	0.024 (0.025)	0.034	0.036* (0.024)	0.051
Amount of credit used			0.037 (0.043)	0.037	0.047 (0.043)	0.037	0.047 (0.043)	0.048	0.052 (0.041)	0.052
Three or more cards			0.027 (0.036)	0.026	0.026 (0.036)	0.026	0.026 (0.036)	0.024	0.010 (0.034)	0.010
Default			0.005 (0.011)	0.015	0.010 (0.011)	0.015	0.010 (0.011)	0.031	0.006 (0.010)	0.019
Debt stress index					-0.001*** (0.000)			-0.121	-0.0008* (0.000)	-0.084
<i>Health risks and behaviors</i>										
BMI									-0.012*** (0.002)	-0.251
Smoking									-0.076*** (0.019)	-0.135
Drinking									0.009** (0.005)	0.060
Constant	4.541		4.029	4.032	4.032	4.093	4.093		4.500	
Adj. R ²	0.056		0.149	0.148	0.148	0.158	0.158		0.230	

*** p < 0.01, one-tailed tests (S.E. in parentheses).

* p < 0.05.

** p < 0.10.

ment. This indicates that some of the relationship between having a large debt to income ratio and more impairment is explained by stress regarding debt. Finally, in model 5, we added BMI, smoking and drinking. Both a higher BMI and smoking were associated with more impairment. In addition, health risks and behaviors decreased the strength of the association between debt/income ratio and impairment further.

In model 5 which includes all the variables, all socio-demographic controls were associated with impairment in the expected directions. Those who are older, women and blacks had more impairment, and having a job, higher income and education were associated with less impairment. In a comparison of the standardized coefficients (see model 5), among sociodemographic and SES variables, age has the strongest association with physical impairment, and then years of education and having a job. One's debt to income ratio is the next strongest predictor of impairment — even stronger of an effect than income. The effect of being African American, although remaining significant, diminished across the models. That is, debt did not explain away the relationship between race and health.

Self-reported health

As shown in model 1 in Table 4, age, race and gender explained only 6% of the variance in self-reported health, with gender not being a significant predictor. By adding the SES variables, the adjusted *R*-squared increased to 15%, as shown in model 2; adding the SES variables also decreased the strength of the relationship between race and health. In model 3, the debt/income ratio is significantly associated with worse health. None of the other indicators of credit card debt was associated with self-reported health. In model 4 debt stress also is found to be significantly associated with worse health. In addition, the stress associated with debt explained away some of the association between the debt/income ratio and self-reported health. In model 5, adding the set of health risk and behavior variables increased the adjusted *R*-squared to 0.230. In doing so, the strength of the relationship between the debt/income ratio and health was decreased and became nonsignificant. However, the effect of debt stress on health remained significant. Unexpected, and

in the opposite direction as expected, model 5 shows a marginally significant effect associated with carrying forward a credit card balance and health. This finding should be interpreted with caution since it was marginally significant at the $p < 0.10$ level.

In sum, and as expected, being older was associated with worse self-reported health, as were all the SES indicators. However, within the full multivariate context, neither race nor gender was significant. Among the debt variables, debt stress was the only one that remained significant.

Interaction effects

We also tested interactions of race and each of the six debt variables to investigate whether the effect of debt or stress on the health outcomes was different for blacks and whites (not shown). None of the interactions were significantly associated with self-reported health, and while the effect of the debt/income ratio on impairment was worse for blacks compared to whites, the effect of using more of your credit limit and having three or more credit cards had less of an impact on physical impairment for blacks than whites. These last two interactions are in the opposite direction than expected and somewhat counterintuitive. However, there are few people, for example, who use three or more cards (about 7% of the total sample); and testing an interaction by race reduces the number further and diminishes the power of the statistical test. In addition, the finding that minorities at times score higher on well-being measures is not completely new. For instance, in a study on generalized anxiety, while African Americans and Hispanics were more likely to have generalized anxiety disorder (GAD), as compared to whites, there is some evidence that it varies by age, and among older minorities, there is less GAD as compared to whites (see Blazer et al., 1991).³

Finally, we tested interactions effects of each of the debt variables by income to assess whether the effect of debt on health varies by different income levels. The interaction terms were not significant in neither the physical impairment nor the self-reported health regression analyses (results not shown).

Multicollinearity

We also tested whether there were problems with multicollinearity among variables in each equation. We used the collinearity diagnostic techniques of examining both condition indices and variance-decomposition proportions. When condition indices are over 30 and at least two variance proportions are high (greater than 0.50) in a row with a high condition index, we know multicollinearity has degraded estimates of coefficients. In no case were both of these conditions met, thus we are not concerned about problems with multi-

³ We also controlled for those who are married or cohabiting and having children because they could be related to both one's financial status and health (for instance, the married have better health on average than those who live alone). Surprisingly, being married and number of children were not significantly associated with impairment or self-reported health, and were omitted from the models in the interest of parsimony.

collinearity (see Belsley et al., 1980 for more information regarding this technique).

Discussion and conclusion

Overall, we find moderate support for our hypotheses. Since to our knowledge we are among the first to examine debt and the stress that goes along with debt, we tested a number of different ways to operationalize credit card debt including a debt/income ratio, carrying a balance forward, the amount of the credit line used, using three or more cards and being in default. We found that the debt/income ratio is significantly associated with worse physical health and self-reported health. In addition, having more stress regarding overall debt was associated with worse health, and explained in part the association between the debt/income ratio and self-reported health. Thus, Hypothesis 1 was partially supported. In addition, it seems the financial strain of a high debt/income ratio clearly is the stressor affecting health. None of the other credit card debt indicators were associated with health. However, only 10% of our sample was in credit card default, thus it is not maybe surprising that we found no effect of default on health — the skewness of this variable may have affected the power of the statistical test.

Hypothesis 2 predicted that debt may get more at financial strain and thus would have a stronger effect on health than income. Once again, this was partially supported, where the debt/income ratio had a stronger effect on impairment than income, though that pattern was not observed in the self-reported health analysis. Hypothesis 3 was supported, the health behaviors and risks explained part of the association among debt, stress regarding debt and health. However, while some evidence shows worse health behaviors and lack of access to quality medical care does account for some of the health differences in lower SES groups, most of the difference in SES and health has more to do with the stress, racism and lack of support, and so on, that is found in lower income groups (cf. Lantz et al., 1998).

Our last two hypotheses regarded race — and neither was supported. Neither credit card debt nor stress regarding debt explained the association between race and health. In addition, the interactions were not significant in the self-reported health analysis, and a few were in unexpected directions in the physical impairment equation. We suggest these interactions should be interpreted with caution, and suggest future replication of these results before they are interpreted with confidence.

We believe this study advances the literature in understanding more about the relationship between SES and health. Understanding debt is one way of

understanding health inequalities. We do not suggest that traditional SES indicators are not important in health surveys. However, we have found evidence that debt may help us understand financial strain and hardship compared to merely measuring income. These results provide evidence that a more robust conceptualization of socio-economic status, using indicators of debt, is important for understanding health.

However, there are limitations to this analysis. We remind the reader that we only studied credit card debt (and not total debt). It would be beneficial to have more measures of all types of debt. Furthermore, this is a cross-sectional study, and it is plausible that health problems contribute to SES problems. This ‘drift hypothesis’ would then suggest that those who are physically impaired and are in poor health would have increased stress regarding debt and more credit card debt because they are, for example, unable to work. While likely those in very poor health have financial problems, most evidence shows overwhelmingly that social class and one’s SES affect health (see Williams, 1990 for a review). In addition, it is possible that those who are so unhealthy as to not be able to work would not have as many opportunities to even have credit cards. Longitudinal data would be ideal to test causality. Furthermore, since 10% of our sample refused to answer questions regarding credit card debt, it is plausible that there is some bias associated with this group of individuals. We also acknowledge that there is a fair amount of nonresponse associated with the samples we analyzed, although the response rates in these surveys are higher than most RDD surveys in contemporary America. Regardless, the concern is not whether the response rates are ‘high’ or ‘low’ but whether there is likely to be nonresponse error (bias) in the samples (cf. Lavrakas, 1993, pp. 2–4). We believe that it is likely that those who were sampled but did not respond, as a group, are less well off financially and have poorer health than the group who did respond. If this is true, then the effect of the nonresponse in these surveys has likely suppressed the size of the correlations among the variables by truncating the range and variance, thus making our results more conservative (i.e. less strong).

Acknowledgements

This research was supported in part by a 1998 Summer Survey Research Fellowship awarded to Patricia Drentea from the Center for Survey Research, College of Social and Behavioral Sciences at The Ohio State University. Funding for data collection, which was gathered as part of the monthly *Buckeye State Poll* was provided by the College and by the *Columbus Dispatch* and *WBNS-TV*. We thank our Ohio State

University colleagues, Lucia Dunn of the Department of Economics and Catherine Ross of the Department of Sociology, for their comments and suggestions.

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