Factors Affecting Children's Health in the United States: Children's Engagement in Social Activities, Their Households and Neighborhood Characteristics

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ABSTRACT

The present study has two aims. First it examines the independent and joint effects of household, neighborhood characteristics, and children's engagement in social activities on their health. Second it compares the health of children from different ethnic groups relative to their engagement in social activities, their household and neighborhood characteristics. Using the dataset from the 2003 National Survey of Children's Health (NSCH), this paper examined the associations between children's household characteristics, their neighborhood characteristics, their engagement in social activities and their health status. Findings indicated that marked disparities existed in children's health status across different racial groups of White non-Hispanic, Hispanic, Black non-Hispanic, Multiracial non-Hispanic, and other non-Hispanic. Bivariate association of children's health with family background such as income, parental education, family structure, maternal health were all significant for children in all these racial groups. In addition, neighborhood characteristics and outside activities participation were also significant predictors of children's health in bivariate models for children in all these five racial groups. Yet the significant relationships in bivariate model varied greatly in multivariate models across different racial groups. These findings suggest that different strategies should be employed in achieving improvements in child health in different ethnic groups.

Keywords: Child and adolescent's health Household characteristics Neighborhood characteristics Children's social engagement Different racial groups

Children's health is a nation's wealth. So children's health is always a hot topic for researchers. In recent years more and more research has focused on the effect of social factors on children's health (Newacheck et al 1994; Starfield et al 2002; Wise 2004; Chen et al 2006; Wadsworth et al 2006; Bramlett et al 2007; Larson et al 2008). Such social factors as family socioeconomic background and community safety have already been recognized by previous research as the predictors of children's health. However, we need to study children's health within the social context to understand the impact of social factors on children's health because social factors exert their effects through complex pathways on the physical and intellectual development of children. The dynamics between children and their social surroundings, particularly children's engagement in social activities, is an important pathway to affect children. Yet to our knowledge, no study had looked at the impact of children's engagement in social activities on their health. The present research therefore aims to develop a more inclusive model to explain children's health outcomes from household characteristics, their neighborhood characteristics, as well as children's engagement in family activities and outside activities.

Previous Research

Household Characteristics and Children's Health

The relationships between children's family background and their health status have been documented in many studies. Demographic and socioeconomic factors such as income, parental educational level, and race/ethnicity have always been highlighted in studies concerning children's health (Newacheck et al 1994; Chen et al 2006; Yu et al 2006; Wadsworth et al 2006). These studies examined the disparities in children's health and found that lower family SES is

predictor of children's poor health. In addition, family structures have also been examined in accounting for the disparities of children's health status. For instance, Weitoft et al (2003) and Bramlett et al (2007) all reported that children in single-parent families have poor health relative to their counterparts in two-parent families.

Furthermore, parental health as another key predictor of children's health has been examined by several researchers. For instance, Mikail et al (1990), Drotar (1994), Armistead et al (1995), and Korneluk et al (1998) all documented the convergence of parental physical health problems and children's poor physical health. The adverse effects of parental physical or mental health impairment on the mental health of children have also been evidenced with the association of parental physical or mental health between children's behavioral problems (Weissman et al 2006), depression and substance abuse (Weil et al 1999; Schwartz et al 2006), attention-deficit/hyperactivity disorder (Lesesne et al 2003), and asthma morbidity (Weil et al 1999). Parental mental health has also been documented as a facilitator of children's behavioral problems and health problems. For example, Billings Ag et al (1982) had evidenced that children of depressed parents comparatively had more symptoms of emotional, somatic, and behavioral impairment compared with children of nondepressed parents. Weissman et al (1987) reported that among children of depressed parents there was an increased overall prevalence of major depression and substance abuse, psychiatric treatment and poor social functioning relative to children of normal parents. Maternal mental health was particularly focused. For example, Schwartz et al (1990) found a high correlation between maternal depression and child's risk of having depressive disorder, substance abuse, or conduct disorder. In a recent study, Weissman et al (2006) further reported that children of depressed mothers usually had higher rates of anxiety, disruptive and depressive disorders that may continue to impair their health into adulthood.

The influences of parenting styles on the health of children were also reported in existing literatures. For example, Rhee KE et al (2006), Golan M et al (2004), Epstein LH et al (1997), and Barlow SE et al (2007) all reported the link between parental aggravation and the risk of overweight in children. McFarlane et al (2003) reported the association between children's behavioral problems and their exposure to family violence. Whereas Doyle et al (2003) and Hill et al (2008) documented the link between children's respiratory illnesses and parental indoor smoking status.

Neighborhood Characteristics and Children's Health

With the increasing popularity of social capital and social networks theoretical perspectives, researchers realized that household-based explanations of the causes of poor health in children were insufficient. So more and more studies began to put the individuals in a larger social context and began to integrate the characteristics of neighborhood with household characteristics in examining the health of individuals (Kawachi & Berkman 2003). The influences of specific neighborhood characteristics, particularly such neighborhood disadvantages as limited social capital, high rates of crime and violence on residents' health have already been documented. For example, Wright and his co-authors (Wright et al 2004) reported that exposure to violence was linked to more care-taker-reported asthma symptoms in children aged 5-12 in seven US inner cities. Singh et al (2008) examined the effects of neighborhood characteristics on physical inactivity among US children and adolescents and found a negative association between neighborhood social support and inactivity among US children and adolescents. A recent study by Larson et al (2008) evidenced that unsafe neighborhoods increased the odds for less than good health among US children.

Social Networks, Social Integration and Children's Health

People are socially connected with each other, and such social connectedness should be an inevitable aspect in examining individual's health and well-being. Early at the beginning of the 20th century, our founding father of sociology, the French sociologist Emile Durkheim, already employed social integration perspectives in his study on suicide (Durkheim 1923), which concludes that the underlying reasons for suicide was associated to the level of an individual's social integration. Since 1970s with the growing popularity of social capital theories (Bourdieu 1975; Coleman 1988; Putnam 1990), social capital and social networks' effects on individual's health have been increasingly drawing the attention from researchers. Based on these theoretical perspectives, researchers have already examined the influence of social networks and social support on health from these dimensions: social support; social influence; person-to-person contact; and access to resources (Berkman & Glass 2000). The profound influences of social networks and social support on individual's physical and mental health have been widely acknowledged in previous research (Berkman 1979 2000; Kawachi 1997 1999; White 2003; Kana'laupun et al 2005; Keating 2007; Nahouraii et al 2008). For example, Kawachi et al (1997; 1999) reported the association between social capital and mortality as well as the association between neighborhood social capital and self-rated health. Kana'iaupun et al (2005) reported the positive relationship between children's health and social support and interaction with extended kinship.

However, most existing research on the association between social integration and health mainly focused on adults' membership and their health status (Kawachi et al 1997 1999; White et al 2003). In exploring the associations between social network, social support and child health, the often-examined dimensions of social network and social capital were the provision of material and emotional aid, information spread, network size, kinship roles, kin interactions

(Kana'iaupun et al 2005; Nahouraii et al 2008). According to British psychiatrist John Dowlby (1988), attachment of children plays an important role in their healthy development. Some children development researches already recognized the positive role of children attachment in improving academic performance (Parcel et al 2001) and in decreasing delinquency behaviors (Kreager et al 2004). To our knowledge, effects of children's attachment and integration to the social context on their health were rarely reported in existing literature. The present research therefore aims to examine the effects of children's social integration together with their household and neighborhood characteristics as well as a comparison of these effects across different racial/ethnic groups in the United States.

METHODS

Data Source

We analyzed data from the 2003 National Survey of Children's Health (NSCH), a module of the state and local area integrated telephone survey conducted by the Centers for Disease Control and Prevention's national Center for Health Statistics from January 2003 to July 2004. NSCH was designed to comprehensively assess multiple aspects of children's physical, emotional, and behavioral health at national level, and one key aspect was the social and family contexts where children grow and develop (Blumberg et al 2005). With a stratified random-digit-dial sampling method, altogether 102 353 parents or guardians who knew the most about the child's health and health care experiences were interviewed through telephone. And the overall weighted response rate was 55.3%. Designed to produce both national and state-specific prevalence estimates for children's health and health care experiences, the NSCH sampling weights were adjusted for households' status and households eligibility as well as non-response

bias, so estimates based on sampling weights can also be generalized to the institutionalized population of children nationwide. The public use data file for the 2003 NSCH, along with relevant background information and documentation can be obtained online at **www.cdc.gov/nchs/about/major/slaits/nsch.htm.** Additional information and results from the NSCH are available in the DRC at **www.childhealthdata.org**.

Sample Characteristics

The average age of the children in this analysis was 8.79 (ranged in age from 0 to 17 years). Most of them (63.8%) had excellent health condition, only 0.3% of them reported poor health. Males (51.6%) were slightly overrepresented than females. They were mostly White (68.5%), 13.2% as Hispanic, 9.5% as Blacks, 3.9% as Multi-racial, and 3.9% as Others. They lived mostly in metropolitan statistical area (72.7%). Over half (64.7%) lived with two parents, while one fifth of them (20.2%) lived with a single mother without a father. Almost three fourths (74.3%) had a parent with at least high school education. Over one third (32.8%) lived in households with annual income between 200%-399% Federal Poverty Level, whereas nearly one third (28.6%) lived in households with annual income at or above 400% Federal Poverty Level.

Variables and Measures

Children's Health Status. The overall health status of child was not based on a clinical diagnosis but was assessed by parent or guardian who knew the child best with three categories – (1) "excellent/very good" (2) "good" and (3) "fair/poor". In our analysis, we dichotomized the parent/guardian's assessment to two categories as (1) at least good and (2) less than good.

Race/Ethnicity. We used the 5 categories of race/ethnicity in NSCH data: (1) "Hispanic", (2) "White Non-Hispanic" (called White in this paper), (3) "Black non-Hispanic "(called Black), (4) "Multiracial non-Hispanic" (called Multiracial), and (5) "Other non-Hispanic" (called Others).

Household Characteristic Variables. The following aspects of household characteristics were examined in this study: parent educational level; household income; household smoking status; family structure; maternal physical health status; and maternal mental health status. Parent education was measured as: (1) less than high school; (2) high school; and (3) more than high school. Household smoking status was measured as: (1) "no one in household smokes tobacco" and (2) "someone in household smokes tobacco". Household income was tapped with four categories: (1) "Household income 0-99% FPL", (2) "Household income 100-199% FPL", (3) "Household income 200-399% FPL", and (4) "Household income 400% FPL or greater". Family structure was categorized as: (1) "2-parent household (biological/adoptive)", (2) "2-parent household with at least one step-parent", and (3) "mother-only household with no father of any type". Both mother's physical and mental health status were measured as: (1) "excellent" (2) "very good" (3) "good" (4) "fair" and (5) "poor".

Neighborhood Characteristic Variables. Neighborhood characteristic was examined by parent's perception of neighborhood support and community safety. Parent's perception of neighborhood support was dichotomized as: (1) "does not live in a supportive neighborhood" and (2) "live in a supportive neighborhood". Parent's perception of neighborhood safety was measured as: (1) "never" (2) "sometimes" and (3) "usually or always".

Children's Engagement in Social Activities. Children's engagement in social activities was measured by children's frequency of joining family activities, their frequency of attending religious services**,** and their participation in organized activities outside of school. Children's frequency of attending religious services was classified into four categories – (1) "never" (2) "once or non per year, less than once per month" (3) "once or more per month, less than once per week" and (4) "once or more per week or daily". Children's participation in the organized

activities outside school was adapted from children's participation in one or more organized activities outside of school, such as sports teams or lessons, clubs, or religious groups and was dichotomized into (1) "did not participate in organized activities" and (2) "participated in organized activities". Family activities was measured by the days all family members living in the household eating a meal together with four categories – (1) "no days" (2) "1-3 days" (3) "4-6 days" and (4) "every day".

Control variables. Gender and age of children were controlled for in this study. Gender was coded 0 for female and 1 for male, while children's age was measured in years.

Statistical Analysis

Analytic Strategy. The statistical analyses were performed in several steps. First, mean and standard error of the variables used in the analysis for each racial/ethnic group were processed to examine the differences in prevalence of variables used in the analysis across these 5 racial groups. Then frequency distributions of household characteristics, neighborhood characteristics and children's participation in outside activities by racial/ethnic group were examined. Mean and standard error of all the variables used in the analyses were summarized in Table 1. And the frequency distributions of some key variables were provided in Table 2.

Two models for logistic regression analysis were processed to predict the probability that a child would have a less than good health status– first a bivariate logistic model for each measure of their household characteristics, neighborhood characteristics, and their engagement in social activities; then a multivariate model for all predictor variables was used to examine the association between the likelihood of having less than good health according to the covariates used in our analysis. Table 3 summarized regression analyses results from bivariate logistic models. While Table 4 summarized regression analyses results from multivariate logistic model.

Odds ratio, significance value, 95% confidence interval were presented. In order to retain the full sample design information while appropriately analyzing the targeting specific subpopulation, subpopulation procedure in SPSS 16.0 Complex Samples was used in all statistical analyses.

RESULTS

Univariate Analyses

Table 2 provides the percentage distributions of some key variables. There were differences in parent's reported health status of children across different racial groups. Hispanic children on average had the worst health status (estimate was 1.94 for a Likert scale measure with "1" indicating "excellent" and "3" "poor/fair"), followed by Black children (estimate was 1.25). Whereas White children on average had the best health status (estimate was 1.11).

Slight differences existed in the mean age of children participants across these five racial groups – Hispanics (estimate was 7.85) and Multiracial (estimate was 7.92) were relatively younger than Whites (8.81), Blacks (8.86) and Others (8.33).

There were substantial differences as regards to the highest parental education attainment and household income across children from different racial groups. For example, 27% of Hispanic children's parents did not finish a high school, compared with 2% for White, 7% for Black, 4% for Multiracial, and 2% for Others. Almost 75% White children's household income were above 200% FPL, compared with 66% for Others, 60% for Multiracial, 40% for Blacks, and 29% for Hispanics. Moreover, only about 35% of Black children lived with both of their two parents (either biological or adoptive), compared with almost 70% of Others. The self-reported maternal health of these children differed only slightly across these five ethnic groups, with Hispanic children's parents reported relatively worse health status than children from the other

four ethnic groups. Children from Hispanic and Black households had more meals with their family members than children from other three ethnic groups, and children from Hispanic and Black households participated in religious services more frequently than children from other ethnic groups. White children participated most in outside activities among these five ethnic groups, whereas Hispanic children participated the least in organized outside activities.

Table 1 Descriptive Statistics of Variables Used in the Analysis by Racial/Ethnic Groups (The 2003 NSCH)

Measure	Estimates and Standard Errors for Each Racial/Ethnic Group									
	Hispanic		Non-Hispanic White		Non-Hispanic Black		Non-Hispanic Multiracial		Non-Hispanic Other	
	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE	Estimate	SE
Children's Health Status	1.44	.011	1.11	.002	1.25	.009	1.15	.012	1.15	.013
Gender	.52	.008	.51	.003	.50	.008	.49	.015	.51	.019
Age	7.85	.080	8.81	.031	8.86	.083	7.92	.150	8.33	.185
Parental Education	.365	.007	.748	.003	.566	.008	.731	.013	.832	.013
Household Income	1.95	.016	2.97	.006	2.19	.017	2.70	.037	2.85	.042
Family Structure	.61	.008	.72	.003	.34	.008	.56	.015	.65	.019
Smoking Status	.21	.007	.33	.003	.28	.008	.35	.014	.20	.014
Maternal Physical Health	3.51	.018	4.05	.006	3.64	.019	3.83	.032	3.97	.040
Maternal mental Health	3.69	.017	4.13	.006	3.86	.019	3.96	.0298	4.12	.034
Neighborhood Support	.74	.007	.87	.002	.68	.008	.77	.013	.80	.016
Neighborhood Safety	.067	.004	.012	.001	.062	.005	.028	.005	.032	.009
Religious Service Participation	2.09	.020	2.02	.008	2.36	.018	1.80	.039	1.87	.050
Family Activities	2.30	.015	2.16	.005	2.08	.016	2.17	.030	2.43	.029
Organized Activities	.63	.010	.87	.003	.74	.009	.84	.016	.80	.020

Bivariate Analyses

Table 2 summarized the bivariate associations between each predictor and the child health status derived from the bivariate logistic regression in SPSS 16.0 Complex Samples.

Children's Health Status and Their Household Characteristics across Different Racial Groups

Household income, household structure, maternal physical health, and maternal mental health were all significantly related to children's health for children from these five racial groups. Family income had a strong impact on children's health status. Children in the poorest families (<100% FPL) were most likely to have poorer health compared with their peers from wealthier families. For example, the odds ratios of having less than good health for children from Hispanic, White, Black, Mutliracial, and Others with a household income below 99% FPL were 2.28, 3.65, 2.04, 2.56, and 3.22 respectively. Compared with children whose families earned 400% of the FPL or greater, every lower level of families income conferred higher risk of children to have less than good health. Family structure also significantly affected children's health. Children living with single mothers had greater probabilities to have less than good health compared to those from 2-parents households. Children's mothers' health – both physical and mental health condition – also significantly influenced children's health status across all the 5 racial groups. Every lower level of maternal physical and mental health conferred a higher risk of children having poorer health compared to excellent maternal physical and mental health. However, for Hispanic children, those whose mothers' physical health and mental health were "fair" had the highest risk of having less than good health. For children of Multiracial and Other ethnicities, those whose mothers had "fair" mental health had the highest risk of having poor health. Parental

education was a significant predictor of health for children of Hispanic, White non-Hispanic, Black non-Hispanic, and Other non-Hispanic, but not a significant predictor for children in Multiracial non-Hispanic families. In addition, maternal physical and mental health were also significant predictors of children's health status – children whose mothers' physical health were poor usually had higher probabilities to have poor health than those whose mothers' physical health were excellent. Children whose parents had lower education had less than good health compared to their counterparts from household with a parent who had more education than high school (the odds ratio for Hispanic, White, Black, Mutliracial, and Others were 2.18, 3.37, 2.63, 3.80 respectively). For children from White, Black, Other non-Hispanic families, their household smoking status were significantly related to their health. Those in households where someone used tobacco had higher probabilities to have poor health. But the relationship was not significant for Hispanic and Multiracial groups.

Children's Health Status and Their Neighborhood Characteristics across Different Ethnic Groups

Living in unsafe and unsupportive neighborhoods increased the odds for children to have less than good health across the five racial groups. However, no statistical significance was found between child's health and neighborhood support for Hispanic and Multiracial groups, and between child's health and neighborhood safety for Other non-Hispanic children. Nevertheless, neighborhood safety had greater magnitude than neighborhood support on child's health. Additionally, the effects of neighborhood characteristics were significantly lower than that of household characteristics.

Children's Health Status and Their Engagement in Social Activities across Different Ethnic Groups

Children's participation in outside activities was also significantly related to their health status across the five racial groups. Children who did not participate in any outside activities were more likely to have less than good health relative to those who participated in one or more outside activities. Statistical significances were found for the correlates of child's health with frequency of having meals with all family members in Hispanic, White non-Hispanic, and Black non-Hispanic, but not for Multiracial non-Hispanic and Other non-Hispanic.

Multivariate Analyses

Household Characteristics and Children's Health Outcome

Table 3 presents the results of multivariate logistic regression. Household smoking status, household structure were no longer significant predictors of children's health outcome, but parental educational level, maternal physical health, maternal mental health remain significantly related to children's health outcome in all the five racial groups, although with some variations across different subpopulations.

Specifically, Hispanic children whose parents had less than high school education were 2.21 times more to have less than a good health compared to their peers with a parent whose educational level was higher than high school. Children from the poorest Hispanic families reported poor health outcome compared to those from household with an income at 400% FPL or greater (Odds ratio =1.44). But no significant difference was found for the other two levels – children from 100-199% FPL and from 200-399% FPL. Maternal physical health and maternal mental health were still significant predictors of Hispanic children's health outcomes.

For White non-Hispanic children, their household income level was still a significant predictor of their health outcome – children from household with an income less than 100% FPL were 1.78 times more than those from household with an income at 400% FPL or greater level to have less than good health. Maternal physical health was also a significant predictor of White children's health outcome. Compared with children whose mothers' physical health were excellent, children whose mother's physical health were less than excellent had higher risks of having less than a good health.

For Black non-Hispanic children, parental educational level, and maternal physical health were still significant predictors of their health. Black children whose parents had less than high school education were 2.34 times more to have less than good health compared to their counterparts whose parents had more than high school education. Black children whose mothers' physical health was excellent were less likely to have less than a good health themselves relative to those whose mother's physical health was less than good, particularly children whose mothers' health were just fair had greater risk of having less than good health (odds ratio=4.80). But no differences were found for children whose maternal physical health were good in comparison to those whose maternal physical health were excellent.

Among Multiracial non-Hispanic children, it seemed that their parent's lower education did not increase their probabilities for a worse health condition. But children from poorer families had more risks of having less than good health. Household structure other than 2-parents (either biological or adoptive) increased their risks of having less than good health. And children from single-mother household had greater risks of having less than good health (odds ratio=2.65) compared to children from 2-parents households. Only those children whose mothers' physical health was poor were more likely to have less than good health (odds

ratio=3.15) compared to their peers whose maternal physical health was excellent. However, children whose maternal physical health were “fair” “good” and “very good” were all less likely to have poor health than those with excellent maternal physical health. Multiracial children whose maternal mental health were fair had the greatest likelihood to have less than good health outcome in comparison to their peers with excellent maternal mental health (odds ratio=4.22).

For children from Other non-Hispanic families, their parent education, their maternal physical health and their maternal mental health were significant predictors of their health status. Compared with children whose parents had more education than high school, those whose parents had less than high school education had greater probabilities to have less than a good health, but there was no difference between children whose parents finished high school and those whose parents had more education than high school. Household structures other than 2-parents (either with step father or other or just single mother) no longer increased children’s risks of having less than good health compared to 2-parents household structures. Children whose mothers’ physical health were less than good were more likely to have less than good health themselves (odds ratios for “poor” and “fair” were 9.55 and 2.37 respectively). And children whose maternal mental health were “fair” comparatively had the highest probabilities to have less than good health compared to their peers whose maternal mental health were excellent.

Neighborhood Characteristics and Children’s Health

For Hispanic and Multiracial children, not having neighborhood support increased their odds of having less than good health outcome (the odds ratio for Hispanic and Multiracial were 1.09 and 1.75 respectively) compared to those with neighborhood support. However, not having neighborhood support did not increase the odds of having less than good health for White, Black

non-Hispanic and Others non-Hispanic children. In addition, less neighborhood safety increased the odds of having less than good health outcomes for children in all the racial groups compared to those who always felt their neighborhoods were safe. For those who never felt their neighborhoods were safe, the odds ratios of having less than good health for Hispanic, White, Black, Multiracial, and Others were 1.32, 1.94, 1.34, 5.51, and 7.24 respectively.

Children's Social Engagement and their Health Outcome

Not having meals together with family members every day increased the odds of having less than a good health for Hispanic, Black non-Hispanic and Multiracial non-Hispanic children, although the relationship was not significant. However, for White non-Hispanic and Other non-Hispanic children, less frequency of having meals with family members did not significantly increase their probabilities of having less than good health outcomes. Less religious services participation did not significantly influence children's health. But for White non-Hispanic children, those who never participated in any religious services were less likely to have less than good health outcome compared to their peers who participated in religious services every day. Children's participation in outside activities did not increase their odds of having good health, particularly for White-Hispanic, Black-Hispanic and Other non-Hispanic children. For children in these three racial groups, those who never participated in outside activities did not have higher odds of having less than good health compared to those who participated in one or more outside activities.

Significant differences were found regarding the impacts of family background, neighborhood characteristics, and social integration of children on children's health across the five racial groups. In fact, the multivariate logistic models showed the independent and joint

effects of these measures on children's health outcome. For Hispanic children, the largest threat of their health was their mother's mental health, followed by their mother's physical health and their parent education. For White non-Hispanic children, the number one threat of their health was their mothers' physical health, followed by their neighborhood safety and their household income. For Black non-Hispanic children, the greatest factor influencing their health was their mother's physical health followed by their parents' education. For Multiracial non-Hispanic children, only their parents' education significantly influenced their health outcome. For other non-Hispanic children, their maternal physical health exerted most influence on their health, followed by neighborhood safety, and parent educational level.

Discussion

This study explored the independent and joint effects of children's household characteristics, their neighborhood characteristics, and their social integration on their health as well as differences of these effects across different racial/ethnic groups in the United States. Statistical analyses provided several interesting findings. First, this study further confirmed the marked disparities of children's health across different racial groups as observed in previous studies (Newacheck et al 1994; Chen et al 2006; Yu et al 2006; Wadsworth et al 2006). Hispanic children had the worst health while White had the best health among the five racial groups. Minority children had poorer health compared to their White counterparts possibly because they usually had inadequate access to preventive and/or curative care services or poor nutrition (Wood 2003). Another possible reason was that compared with parents who were not poor, parents who were poor were more likely to rate their children's health as "poor" or "fair" (Dawson 1991). Our univariate analyses revealed marked disparities as regards to these children's family backgrounds. For example, almost one third of Hispanic children's parents did

not have a high school diploma, compared to only 2% of White children. Two thirds of White children's household incomes were greater than 200% FPL, compared to only one third of Hispanic children. Hispanic and Black children participated in more religious services, but White children participated in more outside activities. Second, this study revealed the independent and joint effects of household characteristics, neighborhood characteristics, and social engagement of children on children's health outcome. The findings indicated that parental educational level, household income level, family structure, maternal physical and mental health all significantly influenced children's health, which was consistent with previous studies (Newacheck et al 1994; Wadsworth et al 2006; Weissman et al 2006; Mikail et al 1990). Our analyses also furthered the significant influence of neighborhood safety on children's health outcome. However, contrary to our hypothesis, it seemed that children's participation in religious service and in outside activities did not significantly influence their health outcome. This opens the possibility that children with less than good health could not participate in these activities as their healthy peers or that some other viable variables should be used to measure children's social engagement. Third, similarities and differences of these independent and joint effects across different racial groups were compared in this study. Parental education was a significant predictor of health for Hispanic, Black non-Hispanic, Multiracial non-Hispanic and Other non-Hispanic children, but not for White non-Hispanic. Maternal physical health was significant in influencing children's health for Hispanic, White non-Hispanic, Black non-Hispanic, and Other non-Hispanic, but not for Multiracial non-Hispanic. Neighborhood safety and family activities were important to White non-Hispanic and Other non-Hispanic children. For Multiracial non-Hispanic and Other non-Hispanic children, religious service participation did influence their health, though not in a significant way.

Limitations

As always, this study has some limitations. First, children's health status in this analysis was based on their parent's or guardian's report with just three categories, so it may not accurately and truly reflect children's health status. Second, no further questions were available as regards to the neighborhood characteristics. Some neighborhood characteristics such as the SES index of the neighborhood or the ethnic composition of the neighborhoods may account for some differences across different racial/ethnic groups. Third, not so many questions about children's social integration were available in the 2003 NSCH data. Fourth, lack of moderating effects test, which may indicate some indirect effects between the test predictors thus provide other interesting findings.

Table 2. Odds Ratio for Children to Have Less Than Good Health by Selected Demographic, Household, Neighborhood Characteristics and Their Participation in Outside Activities: The 2003 NSCH

	Odds Ratio & 95% CI of Having Less Than Good Health for Children in Each Ethnic Group									
Predictors	Hispanic		White non-Hispanic		Black non-Hispanic		Multiracial non-Hispanic		Other non-Hispanic	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Gender										
Female	--------		--------		--------		--------		--------	
Male	1.04	.76-1.42	1.23*	.96-1.58	1.19	.77-1.84	.79	.33-1.91	1.09	.43-.81
Age	1.05***	1.02-1.08	1.03**	1.01-1.05	1.02	.99-1.06	.99	.91-1.08	1.08*	.99-1.19
Highest Parental Education										
<High School	2.18***	1.60-2.97	3.37***	2.03-5.62	2.63***	1.36-5.09	1.30	.23-7.39	3.80*	.99-14.55
High School	1.13	.82-1.55	1.49***	1.15-1.93	1.61**	1.06-2.44	1.91	.84-4.35	2.18*	.86-5.51
>High School	--------		--------		-------		--------		--------	
Household Income										
0-99% FPL	2.28***	1.68-3.09	3.65***	2.69-4.96	2.04**	1.33-3.12	2.56**	1.09-5.98	3.22**	1.28-8.11
100-199% FPL	.65**	.45-.93	1.54**	1.16-2.05	.98	.63-1.54	2.49**	1.03-6.03	1.63	.55-4.86
200-399% FPL	.29***	.18-.48	.61***	.47-.78	.65*	.35-1.23	.53	.19-1.46	.95	.31-2.87
400% FPL or Greater	--------		--------		--------		--------		--------	
Household Structure										
2 Parents with step father or other	--------		--------		--------		--------		--------	
	.69	.39-1.22	1.18	.88-1.58	1.29	.71-2.39	1.51	.57-4.01	1.22	.27-5.53
Single Mother	1.24*	.90-1.71	2.09***	1.58-2.76	1.35*	.88-2.06	4.35***	1.97-9.59	2.37*	.92-6.09
Household Smoking Status										
No One Used Tobacco	--------		--------		--------		--------		--------	
Someone Used Tobacco	1.05	.72-1.53	2.22***	1.73-2.82	1.42*	.92-2.19	1.56	.72-3.39	2.07*	.77-5.61
Maternal Physical Health										
Poor	2.19*	.95-5.07	7.70***	4.73-12.55	4.46***	1.86-10.68	8.17***	2.57-25.57	17.48***	4.19-72.91
Fair	5.82***	4.22-8.03	5.14***	3.74-7.05	4.40***	2.71-7.14	1.89	.62-5.82	5.28**	2.03-13.70
Good	.76	.54-1.06	1.75***	1.34-2.28	.74	.47-1.16	.97	.42-2.27	.86	.31-2.36

Very Good	.29***	.18-.49	.59***	.45-.79	.43**	.25-.73	.98	.35-2.77	.34*	.11-1.09
Excellent	--------		--------		--------		--------		--------	
Maternal Mental Health										
Poor	2.98*	.87-10.25	5.97***	2.74-13.04	5.75**	1.79-18.49	.90	.15-5.27	7.78***	1.69-35.89
Fair	6.26***	4.37-8.96	4.18***	3.02-5.77	3.16***	1.89-5.26	8.15***	3.21-20.69	14.79***	4.81-45.45
Good	1.38**	1.01-1.88	2.25***	1.73-2.93	1.18	.74-1.89	1.18	.47-2.97	2.20	.78-6.21
Very Good	.32***	.20-.52	.66**	.51-.87	.57**	.34-.95	.35**	.14-.91	.50	.19-1.33
Excellent	--------		--------		--------		--------		--------	
Neighborhoods Support										
No	.79*	.56-1.12	.51***	.39-.68	.57**	.37-.89	.50	.19-1.28	.31*	.11-.84
Yes	--------		--------		--------		---------		---------	
Neighborhoods Safety										
Never	1.42	.82-2.47	2.77***	1.48-5.17	2.45**	1.08-5.55	5.32**	.81-34.85	.21	.38-11.64
Sometimes	1.55***	1.12-2.15	2.26***	1.63-3.12	1.34	.86-2.09	1.42	.53-3.80	2.03	.73-5.61
Always	---------		--------		---------		---------		--------	
Family Had Meals Together										
Never	1.38*	.97-1.97	1.05	.77-1.44	.70**	.43-1.16	.65	.26-1.65	1.31	.38-4.51
1-3 Days	.54*	.35-.83	.63**	.48-.83	1.02	.56-1.85	.50	.22-1.17	1.14	.43-3.03
4-6 Days	1.03	.76-1.40	1.14	.90-1.45	1.21	.79-1.83	1.72	.74-4.02	.41	.17-1.00
Everyday	----------		---------		----------		----------		----------	
Religious Service Participation										
Never	.61	.33-1.13	.72	.45-1.15	.68	.27-1.68	.43	.09-2.07	1.57	.40-6.19
At Least Once a Year	.97	.63-1.50	.89	.63-1.27	1.01	.59-1.69	1.41	.54-3.67	.81	.23-2.85
At Least Once a Week	.99	.73-1.30	.83	.66-1.06	.76	.49-1.16	1.23	.54-2.81	.98	.39-2.44
Once a Week or More	----------		----------		----------		----------		----------	
Outside Activities Participation										
No Participation	.57***	.43-.78	.33***	.26-.43	.32***	.21-.47	.56	.26-1.23	.29*	.12-.71
1 or More Participation	----------		----------		----------		----------		----------	

Note: -------- reference group. +p<.10, *p<.05, **p < .01, ***p < .001 for two tailed test.

Table 3. Odds Ratios for Children to Have Less Than Good Health by Their Household Characteristics, Their Neighborhood Characteristics, and Their Participation in Outside Activities across Different Ethnic Groups: NSCH 2003

	Odds Ratio for Children in Each Ethnic Group to Have Poor or Fair Health									
Predictors	Hispanic		White non-Hispanic		Black non-Hispanic		Multiracial non-Hispanic		Other non-Hispanic	
	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI	OR	95%CI
Gender										
Female	--------		--------		--------		--------		--------	
Male	.99	.65-1.52	1.08	.81-1.45	1.33	.79-2.24	.28**	.10-.81	1.47	.43-5.01
Age	1.03	.97-1.10	1.02	.98-1.07	.97	.90-1.04	1.25***	1.09-1.43	1.07	.91-1.25
Highest Parental Education										
<High School	2.21***	1.23-3.97	1.39	.70-2.75	2.34*	1.01-5.43	.22*	.01-4.02	5.07*	.79-32.31
High School	1.69*	.96-2.98	.94	.67-1.33	1.67+	.97-2.89	1.21	.30-4.77	.99	.31-3.12
>High School	--------		--------		--------		--------		--------	
Household Income										
0-99% FPL	1.44	.78-2.64	1.78**	1.11-2.85	1.40	.65-3.04	5.24	1.12-24.61	1.94	.34-11.00
100-199% FPL	.75	.38-1.47	1.15	.76-1.75	1.14	.51-2.58	2.89	.59-14.01	2.24	.52-9.70
200-399% FPL	.50	.22-1.14	.88	.61-1.27	1.55	.68-3.54	2.47	.55-11.13	1.74	.40-7.64
400% FPL or Greater	--------		--------		--------		--------		--------	
Household Structure										
2 Parents with step father or other	--------		--------		--------		--------		--------	
	.89	.44-1.81	.97	.67-1.42	1.47	.68-3.16	1.79	.36-8.98	.61	.12-3.08
Single Mother	.88	.54-1.43	.94	.63-1.39	.82	.44-1.53	2.65	.85-8.29	.70	.23-2.08
Household Smoking Status										
No One Used Tobacco	--------		--------		--------		--------		--------	
Someone Used Tobacco	.88	.53-1.46	1.24	.92-1.69	1.04	.61-1.79	1.18	.47-2.94	.71	.25-1.99
Maternal Physical Health										
Poor	1.04	.32-3.43	5.55***	2.71-11.40	3.36*	1.13-9.98	3.15	.55-17.88	9.55*	1.56-15.86
Fair	2.41**	1.16-5.04	3.78***	2.28-6.25	4.80***	2.09-11.04	.83	.16-4.14	2.37	.56-10.08
Good	.85	.41-1.77	1.85***	1.18-2.90	1.01	.49-2.08	.74	.16-3.37	.68	.19-2.46
Very Good	.47	.18-1.24	1.17	.75-1.82	.63	.29-1.38	.52	.16-1.76	.69	.19-2.52

Excellent	--------		--------		--------		--------		--------	
Maternal Mental Health										
Poor	4.19*	.85-20.58	1.75	.63-4.85	1.93	.43-8.62	.85	.07-10.11	1.07	.04-26.47
Fair	3.69***	1.74-7.83	1.32	.76-2.28	1.15	.44-3.00	4.22	.80-22.37	3.29***	2.17-18.55
Good	1.72	.88-3.37	1.39	.89-2.16	1.12	.52-2.38	1.68	.40-7.00	1.83	.34-9.79
Very Good	.78	.34-1.82	.99	.66-1.48	.78	.35-1.75	.93	.26-3.41	2.77	.73-10.53
Excellent	--------		--------		--------		--------		--------	
Neighborhoods Support										
No	1.09	.70-1.72	.83	.56-1.23	.77	.45-1.33	1.75	.51-5.98	.62	.15-2.56
Yes	--------		--------		--------		--------		--------	
Neighborhoods Safety										
Never	1.32	.47-3.71	1.94*	.86-4.42	1.34	.52-3.45	5.51	.35-8.60	7.24*	.98-15.52
Sometimes	1.14	.71-1.82	1.53*	.94-2.49	1.18	.66-2.10	.88	.21-3.70	.87	.25-3.03
Always	--------		--------		--------		--------		--------	
Family Had Meals Together										
Never	1.48	.54-4.04	.54*	.30-.98	1.21	.41-3.56	1.63	.13-20.4	.21**	.05-.88
1-3 Days	1.17	.40-3.39	.42***	.24-.74	1.72	.53-5.56	2.15	.23-20.52	.25*	.08-.79
4-6 Days	1.52	.57-4.03	.60*	.34-1.04	1.71	.59-4.98	2.75	.27-28.43	.04***	.01-.26
Everyday	--------		--------		--------		--------		--------	
Religious Service Participation										
Never	.64	.24-1.71	.53**	.30-.95	.35	.09-1.31	.99	.10-9.95	.28	.02-3.57
At Least Once a Year	.87	.41-1.86	.82	.51-1.32	.51+	.21-1.26	2.11	.52-8.49	1.37	.41-4.65
At Least Once a Week	.94	.53-1.66	.94	.65-1.36	.66	.31-1.43	1.87	.52-6.66	1.06	.33-3.38
Once a Week or More	--------		--------		--------		--------		--------	
Outside Activities Participation										
No Participation	.88	.55-1.40	.53***	.37-.77	.40***	.23-.70	.76	.23-2.46	.26*	.07-.97
Participation in 1 or More	--------		--------		--------		--------		--------	

Note: -------- reference group. +p<.10, *p<.05, **p < .01, ***p < .001 for two tailed test.

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