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## Comparing Self and Maternal Reports of Adolescents' General Health in a Nationally Representative Survey: Do Self and Proxy Reports Differ in Their Relationships with Covariates?

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### Abstract

**Purpose**—Given that mothers often—but do not always—report children's health status in surveys, it is essential to gain an understanding of whether the relationship between children's general health status and relevant covariates depends on who reports children's general health status.

**Methods**—Using data from the first wave of the National Longitudinal Study of Youth 1997 cohort (N=6,466), a nationally representative sample of adolescents in the United States aged 12 to 17 in 1997, the study examines the concordance between self and maternal reports of adolescents' general health status. Then, self and maternal reports of adolescents' general health status are each regressed on health-relevant covariates and tests of differences across coefficients are estimated.

**Results**—Self and maternal reports of adolescents' general health status are moderately concordant. Furthermore, the association of adolescents' general health status with adolescent BMI and the adolescent being female significantly differs across reporters such that the negative relationships are even more negative with self compared to maternal reports of adolescents' general health status. The association of adolescents' general health status with measures of adolescents' health limitations, maternal self-rated health, and sociodemographic covariates such as adolescent age, race, ethnicity, and household net worth differ across reporters in that each have greater relationships with maternal compared to self reports of adolescents' general health status.

**Conclusion**—The results are important for interpreting research on the causes and consequences of child and adolescent health, as results across studies may not be comparable if the reporter is not the same.

### Keywords

self-rated health; general health status; adolescent health; proxy reports; surveys

## Background and Literature

Proxy reporting is ubiquitous in surveys. One respondent is often asked to report about members of their family or household across several domains of interest, such as labor force participation, relationship status, and health. Common wisdom about proxy reports dictates that the best information about someone will come from that person directly, with the exception of young children and those who are too mentally or physically incapacitated to respond [1]. Adult proxies often report on a wide range of child measures, and the literature is equivocal on whether adults tend to overestimate, underestimate, or report similar values as do children. The literature is also equivocal on whether children's reports can be used as a criterion for comparison [2-4].

Child and adolescent health are important causes and consequences of a variety of individual and familial health and socioeconomic factors. However, there are differences across parents and children in the level of child health reported, and the size and direction of these differences depends on the particular health domain in question, the population, and the age of the child [5-8]. Overall, comparisons across parents and children in the level of child health reported demonstrate that self and proxy reports are different on average but do not reveal potentially offsetting biases and the magnitude of these biases [1]. Most studies of child and adolescent health, including this one, focus on maternal reports in particular because mothers are more likely to be the parent interviewed in parent-child data collection efforts and proxy reports may vary depending on who is the proxy reporter [7].

The general health question—e.g., “would you say your health in general is excellent, very good, good, fair, or poor?”—summarizes information about health across several domains and is widely used to measure health status because of its ability to predict morbidity and mortality [9]. Measures of general health status are perceptions, requiring respondents to draw on diverse and sometimes disparate sets of information to map their answer onto the response option provided, such as several domains of current health status, past experiences, future prospects, and comparison to relevant others [9-14]. Thus, mothers and adolescents may draw on different sets of salient information in reporting on adolescents' general health status. Both parties could be contributing valid information, reporting on what is most salient to them [15], yet relying on one type of report will only partially inform health practitioners, researchers, and policy makers of the level of general health experienced by children and adolescents [16-17].

In addition, the relationship between a measure of health and its relevant covariates may depend on who is reporting the measure. However, given the dearth of data collected from multiple reporters on a measure of interest, many studies concerned with the causes and consequences of adolescent health are not able to contend with how the results may vary depending on the reporter. Previous research has demonstrated a variety of health-relevant covariates—including demographic factors, socioeconomic status, and additional measures of maternal and child health—that are associated with either self or parental reports of adolescents' general health status [7, 13-14]. This prior work demonstrates which associations are significantly different from zero, but it does not allow for conclusions that

the association between health-relevant covariates and adolescents' general health status are different across reporter.

The aims of this study are two-fold. The first aim is to examine the concordance between self and maternal reports of adolescents' general health status in a general population study. The second aim of this study is to examine whether the relationship between adolescents' general health status and health-relevant covariates depends on who reports adolescents' general health status, examining differences in coefficients across models that predict self and maternal reports of adolescents' general health status.

## Methods

### Data

This study uses data from the first round (1997) of the National Longitudinal Survey of Youth 1997 Cohort (NLSY97), the only round containing both adolescent and parental reports. The NLSY97 is an ongoing, nationally representative panel study of 8,984 youth aged 12 to 17 years in 1997, documenting the transition to adulthood through self-administered questionnaires. The sample consists of a nationally representative sample of 6,748 youth born between January 1, 1980, and December 31, 1984, and oversamples 2,236 Hispanic and non-Hispanic black youth born during the same period. The data and additional documentation are available from the Bureau of Labor Statistics at <http://www.bls.gov/nls/nlsy97.htm>. The response rate to the initial interview screener was 83% for all housing units sampled (AAPOR RR1) and 94% for the eligible housing units that were eligible to be interviewed. Additional details about the sample selection procedures following the initial household screener are located in a Technical Sampling Report provided by the National Opinion Research Center [18].

Eighty-eight percent of the children selected to participate in the NLSY97 had a knowledgeable caregiver participate in the survey. Of those children, a total of 81% of respondents with an adult questionnaire had their biological mother as the responding parent, 11% had their biological father reporting; all of the other categories accounted for 8%. The analytic sample is restricted to cases for which mothers reported about their child's health (N=6,466).

### Measures

**Adolescents' general health status**—Adolescents and mothers were asked to report about the adolescent's general health. The general health measure is based on the question, “In general, how is (your/[name of child]'s) health?” Respondents are given 5 options for response: “excellent,” “very good,” “good,” “fair,” and “poor.” Because of the very small percentage of respondents stating that they were in “poor” health (<1% of respondents), “fair” and “poor” were combined into one category for analysis. (Question wording for all variables used in analysis available in Appendix A.)

**Health-relevant covariates**—Health-relevant covariates such as demographic factors, socioeconomic status, and additional measures of maternal and adolescent health were included in the analysis as they have been shown to be associated with either mothers' or

adolescents' reports of adolescents' general health status [5-8, 13-14, 16-17]. The health-relevant covariates are reported by mothers with the exception of adolescent BMI, which is constructed from questions in which the adolescent reports their height and weight. Demographic factors include adolescent sex, race, ethnicity, and age, maternal age when the child is born, whether the household is non-English speaking, whether the adolescent lives with both biological parents, and the number of children under age 18 in the household. Socioeconomic factors include maternal educational attainment (categorized as less than high school, high school, three years of college or less, and four or more years of college), household net worth (a categorical variable of continuous measures of net worth divided into quintiles), and a continuous measure of household income.

Mothers reported on a variety of adolescent health limitations, such as any limitation affecting the adolescent's ability to do schoolwork or other work, any limitation requiring medication, any learning or emotional problem, any sensory limitations, any physical deformity and/or missing body part, and any chronic health condition. Measures of adolescent body mass index (BMI) were constructed from adolescent-reported questions about height and weight using the Centers for Disease Control and Prevention growth reference in the United States to determine whether the adolescent is in the 85-95 percentile (overweight) or 95 percentile and above (obese) in weight, indexed by age and gender of the child [19]. Measures of maternal health status include maternal self-rated health, whether the mother is limited in her ability to work due to her health, and maternal BMI, which is a categorical variable using the cut points denoted by the Centers for Disease Control (BMI under 25 is normal weight [very few mothers were underweight], 25-29.9 is overweight, and 30 or over is obese).

### Analytic strategy

Analyses were conducted in Stata 13.0. Both the weighted and unweighted means and proportions for the analytic variables are shown in Table 2 and weighted data are shown for percent agreement in Table 4. Unweighted data are used for the kappa analysis (as weighted data are not supported in the estimation) and the regression analyses, in line with the NLSY recommendations to not use weights in regression analyses using NLSY data (available at <https://www.nlsinfo.org/content/cohorts/nlsy97/using-and-understanding-the-data/sample-weights-design-effects/page/0/0/#practical>). List-wise deletion was used for cases with item-missing data, since *kappa* and *suest* estimation procedures are not supported by the *mi* set of commands for multiply imputed data in Stata. The concordance of self and maternal reports of adolescents' general health is examined using polychoric correlations, percent agreement, and kappa (*kappa* in Stata). Cohen's kappa is a statistical measure of inter-rater agreement that is generally thought to be a more robust measure than percent agreement since it takes into account the agreement between raters that may occur by chance [20]. The formula for Cohen's kappa is

$$\kappa = (\text{Pr}(a) - \text{Pr}(e)) / (1 - \text{Pr}(e)),$$

in which  $Pr(a)$  is the relative observed agreement among raters and  $Pr(e)$  is the hypothetical probability of chance agreement, using the observed data to calculate the probabilities of each rater randomly coding each category (Cohen 1960). To calculate kappa, the observed agreement is the number of cases in which both mother and child pick the same response category for the child's health divided by the total number of mother-child pairs, or

$$Pr(\alpha) = (A+B+C+D)/E$$

in Table 1. The hypothetical probability of chance agreement is calculated by summing the probability that both mother and child pick the same response category to describe the child's health with the probability that both mother and child do not pick the same response category to describe the child's health, or

$$Pr(e) = (F/E) * (J/E) + (G/E) * (K/E) + (H/E) * (L/E) + (I/E) * (M/E)$$

in Table 1. A weighted kappa applies a weight matrix to the matrices of observed and expected scores in order to weight the seriousness of the disagreement (e.g., “excellent” vs. “fair/poor” is a greater disagreement than “excellent” vs. “very good”). Values of kappa greater than .75 indicate excellent agreement beyond chance, values between .40 and .75 indicate fair to good agreement, and values below .40 indicate poor agreement [21].

Ordinary least squares multiple regression and seemingly unrelated estimation (*regress* and *suest* in Stata, respectively) are used to examine whether the relationship between adolescents' general health status and health-relevant covariates depends on who reports adolescents' general health status. The regression of adolescents' general health status on the set of covariates treats adolescents' general health status as linear (excellent =5, very good=4, good=3, fair=2, poor=1), such that the distance between a category of general health status and the subsequent category is the same. Analyses using varying distances between categories of general health status demonstrate results that are nearly identical to those reported here in terms of statistical and substantive significance (these results are available upon request). The varying distances between categories include those used by Perneger and colleagues [22] as well as Krosnick's distances based on averages across studies of the scaling of verbal labels as presented at the 2012 conference on the Future of Survey Research (available at <https://iriss.stanford.edu/content/future-survey-research-nsf>).

Using multiple regressions, each dependent variable (self and maternal reports of adolescents' general health status) is regressed on demographic and socioeconomic factors. The sample includes multiple children from the same mothers, so the standard errors are adjusted to account for this nonindependence using the *vce(cluster)* option in Stata. The coefficients across these two sets of models are compared using seemingly unrelated estimation, which combines the parameter estimates and variance-covariance matrices from each of the models into a single parameter vector and variance-covariance matrix of the sandwich/robust type to allow for a Wald chi-square test of whether coefficients are different across the two models, commonly referred to as the Chow test for equality of

coefficients across linear regression models [23]. The multiple regressions and tests for equality across coefficients are replicated in a series of models in which self and maternal reports of adolescents' general health status are regressed on each measure of adolescent and maternal health status net of the demographic and socioeconomic controls. (Given collinearity across these measures of adolescent and maternal health, they are not entered into the model simultaneously.)

Out of the 6,466 cases comprising the analytic sample, between 4,248 and 4,461 cases had no item-missing data and were included in the final regression analyses presented in Tables 5 and 6. Item-missing data is the largest for household income (18%), net worth (17%), maternal BMI (7%), and adolescent BMI (5%).

## Results

### Descriptive statistics

Descriptive statistics of the variables used in the study are presented in Table 2, using the wave 1 panel weights provided by the NLSY 1997 to adjust for oversampling of black and Hispanic respondents as well as the complex sampling design. According to Table 2, mothers have more positive ratings of their children's health than do their children; a smaller proportion of adolescents rate their general health as “excellent” compared to the maternal reports.

### Measures of concordance

Whether self and maternal reports of adolescents' general health status are indeed different from one another is examined using correlations, kappa, and percent agreement. Self and maternal reports of adolescents' general health are moderately correlated (polychoric correlation  $\rho = 0.44$ ), and the correlation is slightly larger with female adolescents compared to male ( $\rho = 0.48$  and  $\rho = 0.39$ , respectively). Table 3 shows the percent agreement and kappa for self and maternal reports of adolescents' general health status. While percent agreement alone indicates moderate concordance between self and maternal reports of adolescents' health, the unweighted and weighted kappa statistics indicate low interrater reliability among self and maternal reports of adolescents' general health status. The gender disparity in kappa between self and maternal reports appears to be driven by the non-black, non-Hispanic adolescents (the majority of whom are white and will henceforth be referred to as white non-Hispanic), as mother-child concordance is similar across gender for Hispanic and black adolescents (Table 3).

Table 4 displays the percent agreement of self and maternal reports of adolescents' general health by response category. In general, agreement is higher with better health status. For example, when mothers reported their child was in “excellent” health, 52% of their children agreed with them, while when mothers reported that their child was in “fair” or “poor” health, 32% of their children agree with them. Percent agreement is about the same across gender when mothers reported their child was in “excellent” health, while percent agreement is lower with male adolescents as mothers reported lower health statuses for their children.

## Does the association between adolescents' general health status and its covariates vary across reporters?

Table 5 shows that there are several associations of adolescents' general health status with demographic and socioeconomic factors that are statistically significant for both the self and maternal reports of adolescents' general health status, including adolescents' sex (female vs. male), less than high school and high school education for mothers (compared to 4 years of college or more), living with both biological parents (vs. all other household structures), maternal age at child's birth, the number of children in the household under 18, and the three lowest quintiles of household net worth (vs. the highest quintile). In addition, there were other demographic and socioeconomic factors that were significantly associated with maternal reports of adolescents' general health status and not self reports, including adolescents' race, ethnicity, age, the fourth quintile of household net worth, and household income. As evidenced by the  $R^2$  values, more of the variance in maternal reports of adolescents' general health status is explained by these demographic and socioeconomic covariates compared to adolescents' self-reports of their general health status.

Tests of whether the coefficients vary across reporter indicate that the association of adolescents' general health status with adolescent sex significantly differs across reporters such that the negative relationship between the adolescent being female and adolescents' general health status is even more negative with self compared to maternal reports of adolescents' general health status. In addition, the association of adolescents' general health status with adolescents' race and ethnicity significantly differs across reporter; the coefficients are negative and significant when adolescents' general health status is maternal-reported yet positive and nonsignificant when self-reported. Finally, the association of adolescents' general health status with adolescent age and the lowest quintile of household net worth (vs. the highest quintile) significantly differ across reporters such that the negative relationships are even more negative with maternal compared to self reports of adolescents' general health status.

Table 6 shows the results of a series of models in which self and maternal reports of adolescents' general health status are regressed on each measure of adolescent and maternal health status, net of the demographic and socioeconomic controls. Each of these adolescent and maternal health measures is significantly associated with both self and maternal reports of adolescents' general health status, with the exception of the association of maternal-reported adolescent general health status with adolescents' overweight (vs. normal weight) status and maternal overweight (vs. normal weight) status.

Tests of whether the coefficients vary across reporter indicate that the association of adolescents' general health status with adolescent limitations in school and work, requiring medication, learning or emotional problem, and chronic condition significantly differs across reporters; the negative relationships are even more negative with maternal compared to self reports of adolescents' general health status. However, the association of adolescents' general health status with adolescents' overweight and obese status (vs. normal weight) significantly differs across reporters such that the negative relationships are even more negative with self compared to maternal reports of adolescents' general health status.

Finally, the association of adolescents' general health status with each category of maternal self-rated health (vs. excellent) significantly differs across reporters such that the negative relationships are even more negative with maternal compared to self reports of adolescents' general health status.

## Discussion

This study demonstrates moderate concordance between self and maternal reports of adolescents' general health status in a nationally representative sample of adolescents aged 12 to 17 in 1997 with respect to correlations and percent agreement. While the kappa estimates indicate low interrater reliability among self and maternal reports of adolescents' general health status, this is likely due to mothers and children being disproportionately more likely to report that adolescents' general health is “excellent” than any other category, which leads to a larger correction of chance than would be expected if there were more children in worse health in the sample and pushes kappa into the poor agreement range even with moderate agreement according to other indicators [24].

Importantly, this study finds evidence of significant differences across reporter in the association between adolescents' general health status and health-relevant covariates such as demographic factors, socioeconomic status, and additional measures of maternal and child health. These differences across reporter provide context for interpreting the salient life factors associated with self and maternal reports of adolescents' general health. The negative association between adolescents' general health status and adolescents' overweight status may be greater for self-reported adolescent general health status compared to maternal reports because adolescents are particularly body-conscious, aware of how they compare to others in their peer groups, and aware of their peers' perceptions, thus making it a more salient factor in their health assessments. For example, Bucchianeri and colleagues [25] find that perceived harassment based on weight was reported by 35% of adolescents in their sample. In addition, they find that weight-based harassment is more common for girls than boys, which may explain in part why the negative association between adolescents' general health status and being female is greater for self reports compared to maternal reports in that these peer factors may be particularly salient for girls. Similarly, the negative association of adolescents' general health status with adolescent health limitations may be greater for maternal reports compared to self reports of adolescents' general health because these factors are particularly salient to mothers given their implications for caregiving burden, such as picking up and administering medication or monitoring and treatment of chronic conditions [26]. There are additional sociodemographic factors—adolescents' age, race, ethnicity, and net worth—that have greater relationships with mothers' reports of adolescents' general health compared to the adolescents' reports. Through life experience, adult mothers may be more likely and better situated to take into account, for example, their child's future health prospects and how their health compares to certain groups based on race, ethnicity, age, and socioeconomic status.

One limitation of the current study is that while it is able to discern the existence of differences in how self and proxy reports are related to relevant covariates, it cannot discern whether these differences are substantive or inflated by common method bias of the same



respondent reporting both measures [27-29]. Given that the mother is most often the reporter for covariates of interest, this may explain why the  $R^2$  for each model predicting maternal reports of adolescents' general health status is larger than that for the model predicting adolescents' reports of their general health status in Tables 5 and 6. For example, the greater relationship between adolescents' general health status and maternal self-rated health for maternal reports of adolescents' general health status compared to self reports is consistent with the notion of a common rater bias because the mother is reporting on both measures of interest; the particularly large  $R^2$  is likely due to the fact that these questions are identical except for their referent. However, these associations may have a substantive explanation as well, in that mothers are more likely to take into account the implications of their own health when thinking and reporting about their children's health than are their children.

While the methods used here cannot sort out whether the differences in the relationships between adolescents' general health status and health-relevant covariates are due to substantive differences across reporters or common rater bias, they can reveal whether such differences exist, with implications for how to interpret past research and where to focus future research. In addition, future research should continue to examine the extent to which common rater bias is driving the results of studies. Dealing with the potential common method bias of deriving measures from the same rater often falls by the wayside in substantive research efforts, as the gold standard methods to ascertain such biases—multitrait multimethod matrices—require advanced planning for data collection efforts and complex methodology [27-29]. Directly measuring the latent method factor is another promising avenue suggested by Podsakoff and colleagues [29], although it controls only for those sources of bias identified and measured in the study design, such as measuring negative affect to control for the tendency to report positively or negatively to survey items.

The first wave of the NLSY 1997 data was used for this analysis precisely because it is one of the only data collection effort in the US that contains reports from both adolescents and parents about the focal adolescent's general health status for the general population rather than a sample of children with a specific health condition. However, focusing on a general population sample does limit the external validity of the findings to particular subgroups of children and adolescents with specific health conditions or diseases, since the association between health status and health-relevant covariates may vary across reporters in distinct ways across these important subgroups. Furthermore, the length of time elapsed between the data collection and the current study may elicit concerns about the relevance of the particular findings. Indeed, given the increasing prevalence and diagnoses of certain adolescent health conditions [30], it is plausible that the relationships between adolescents' general health status and health-relevant covariates for both self and maternal reports have changed over time, redefining for both groups what adolescent health status means and the components of health considered as part of this evaluation. The results of the study should be interpreted with this caveat in mind and draw attention to the need for more current data gathered from multiple reporters about a focal family member's health status in both general population studies as well as subgroups in the population with specific health conditions and limitations. Finally, the results of this study may be driven by selection bias. The mechanisms that produced item nonresponse are not able to be accounted for in order to use

the seemingly unrelated estimation procedure to compare how the association between adolescents' general health and health-relevant covariates varies across reporters, and the regression results should be interpreted with this caveat in mind.

Self and maternal reports of adolescents' general health status should not be considered substitutes of one another; the fact that they are at best moderately concordant and that the association between adolescents' general health status and several health-relevant covariates varies across who reports adolescents' general health status indicates a bit of disagreement between the two. The analytic methods used in this study can be extended to other research areas to determine whether the relationship between a measure of interest and its covariates depends on whether the reporter is a self or proxy reporter. This is particularly important for fields of research in which there is variation across studies in who reports on the measure of interest. Conflicting results in past research in the size and significance of associations between a measure of interest and its covariates may be due to differences in reporter in addition to the usual factors contributing to differences across studies. Although increasingly limited research funding may preclude collecting data from multiple reporters within a study, this study demonstrates that such endeavors must be promoted, particularly in areas of research in which more than one type of reporter is common across studies. In this field and others, the results for any given study could be contingent on the reporter, and the results across studies may not be comparable if the reporter is not the same.

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### Appendix A

#### Question Wording for Analysis Variables, NLSY 1997 Wave 1

Self reports of adolescents' general health	Now, I'd like to ask you some questions about your general state of health. In general, how is your health? Excellent, very good, good fair, or poor?
Maternal reports of adolescents' general health	Now I'd like to ask you some questions about [this youth]'s general state of health. In general, how is [his/her] health? Excellent, very good, good fair, or poor?
Adolescent limitation affecting school/work (1=yes)	(Excluding pregnancy), does [this youth] have or has [he/she] ever had any physical, emotional, or mental condition that limits or has limited [his/her] ability to attend school regularly, do regular school work, or work at a job for pay?
Adolescent requires medication (1=yes)	Does [this youth] regularly take any medicine or prescription drugs related to achronic condition?
Adolescent learning or emotional problem (1=yes)	Does [this youth] now have or has [he/she] ever had a learning or emotional problem that limits or has limited the kind of schoolwork or other daily activities [he/she] can perform, the amount of time [he/she] can spend on these activities or [his/her] performance in these activities?

Adolescent sensory limitation (1=yes)	Does [this youth] now have or has [he/she] ever had trouble seeing, hearing or speaking?
Adolescent physical deformity (1=yes)	Does [this youth] now have or has [he/she] ever had a part of [his/her] body that (is/was) deformed or missing?
Adolescent chronic condition (1=yes)	Does [this youth] now have or has [he/she] ever had any other chronic health condition or life threatening disease such as asthma, heart condition, anemia, diabetes or cancer?
Adolescent BMI	Constructed from the following questions: Can you tell me approximately what your height is? Can you tell me approximately what your weight is?
Maternal self-reported health	Now I'd like to ask you some questions about your general state of health. In general, how is your health? Is it excellent, very good, good fair, or poor?
Maternal limitation in work due to health (1=yes)	Do you have any long-term health problem or condition that limits the type or amount of employment you can accept?
Maternal BMI	Constructed from the following questions: Can you tell me approximately what your height is? Can you tell me approximately what your weight is?
Adolescent is female (vs. male)	Let's discuss [NAME]: What is [NAME]'s sex?
Adolescent race/ethnicity	Constructed from the following questions: Is [NAME] one of the following: Hispanic, Latino, or of Spanish origin? Which one of the following is [NAME]? White, black or African American, American Indian, Eskimo, or Aleut, Asian or Pacific Islander, something else? [SPECIFY]
Maternal education	What is the highest grade of schooling that you have completed?
Non-English speaking household (1=yes)	Do you now speak any language other than English at home?
Adolescent lives with both biological parents (1=yes)	<i>Constructed from household roster information on relationships to selected child.</i>
Maternal age at child's birth (13-54 years)	Constructed from the following questions: What is [(your/[NAME]'s)] date of birth?
Adolescent age (12-17 years)	Constructed from the following questions: What is [(your/[NAME]'s)] date of birth?
Number of children in the household (1-4 children, top coded)	<i>Constructed from household roster information on ages of household members.</i>
Quintiles of net worth	<i>Constructed from several questions about assets in income and assets section of the interview.</i>
Household income	<i>Constructed from several questions about assets in income and assets section of the interview.</i>

Italicized information is of considerable length to include individual items. Additional documentation is available at <http://nlsinfo.org/content/cohorts/nlsy97/other-documentation/questionnaires>.

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**Table 1**  
**Frequency of Agreement between Mothers' and Adolescents' Reports of Adolescents' General Health for Each Response Category, Used for Computing Kappa**

Children's reports of their health	Mothers' Reports of Children's General Health					Total
	Excellent	Very good	Good	Fair/poor	Total	
Excellent	A Number of children in which both mother and child assigned the child's health as "excellent"	N	N	N	J	Total number of children rating themselves in "excellent" health
Very good	N Number of children in which both mother and child assigned the child's health as "very good"	B	N	N	K	Total number of children rating themselves in "very good" health
Good	N Number of children in which both mother and child assigned the child's health as "good"	N	C	N	L	Total number of children rating themselves in "good" health
Fair/poor	N Number of children in which both mother and child assigned the child's health as "fair" or "poor"	N	N	D	M	Total number of children rating themselves in "fair" or "poor" health
Total	F Total number of children mothers rated in "excellent" health	G Total number of children mothers rated in "very good" health	H Total number of children mothers rated in "good" health	I Total number of children mothers rated in "fair" or "poor" health	E Total number of mother-child pairs	

Table 2

Descriptive Statistics of Variables, NLSY97 (N=6,466)<sup>a</sup>

	Mean or Proportion (Weighted)	S.D.	Mean or Proportion (Un-weighted)	S.D.	N
Self reports of adolescents' general health					6463
Fair/poor	0.04		0.05		
Good	0.21		0.22		
Very good	0.36		0.34		
Excellent	0.39		0.38		
Maternal reports of adolescents' general health					6431
Fair/poor	0.02		0.03		
Good	0.15		0.18		
Very good	0.28		0.28		
Excellent	0.55		0.51		
Adolescent limitation affecting school/work (1=yes)	0.08		0.07		6431
Adolescent requires medication (1=yes)	0.11		0.10		6432
Adolescent learning or emotional problem (1=yes)	0.11		0.10		6427
Adolescent sensory limitation (1=yes)	0.18		0.17		6432
Adolescent physical deformity (1=yes)	0.02		0.01		6432
Adolescent chronic condition (1=yes)	0.11		0.11		6432
Adolescent BMI					6147
Normal weight	0.77		0.75		
Overweight	0.13		0.14		
Obese	0.10		0.11		
Maternal self-reported health					6466
Fair/poor	0.02		0.03		
Good	0.09		0.11		
Very good	0.26		0.28		
Excellent	0.63		0.58		
Maternal limitation in work due to health (1=yes)	0.15		0.15		6462
Maternal BMI					6060
Normal weight	0.50		0.45		

	Mean or Proportion (Weighted)	S.D.	Mean or Proportion (Un-weighted)	S.D.	N
Overweight	0.27		0.29		
Obese	0.23		0.26		
Adolescent is female (vs. male)	0.49		0.49		6466
Adolescent race/ethnicity					
Non-black, non-Hispanic/Latino	0.72		0.53		6466
Black	0.16		0.26		
Hispanic/Latino	0.12		0.21		
Maternal education					6280
Less than high school	0.17		0.23		
High school	0.36		0.36		
Three years of college	0.26		0.24		
Four or more years of college	0.21		0.18		
Non-English speaking household (1=yes)	0.14		0.20		6466
Adolescent lives with both biological parents (1=yes)	0.57		0.52		6455
Maternal age at child's birth (13-54 years)	25.84	5.19	25.57	5.32	6243
Adolescent age (12-17 years)	14.97	1.42	14.96	1.40	6466
Number of children in the household (1-4 children, top coded)	2.26	0.96	2.34	1.00	6466
Quintiles of net worth <sup>b</sup>					5365
Negative net worth to \$3,744	0.16		0.21		
\$3,750 to \$18,872	0.18		0.21		
\$18,891 to \$57,205	0.19		0.19		
\$57,500 to \$143,001	0.22		0.19		
\$143,500 to \$600,000 (top coded)	0.25		0.19		
Household income (US dollars, 0 to 246,474 top coded)	51044.77	43598.71	45045.74	41002.61	5305
Household income (log transformed US dollars, 0 to 12.42)	10.38	1.47	10.16	1.66	5305

NLSY97 = National Longitudinal Study of Youth 1997 Cohort; S.D. = standard deviation; BMI = body mass index

<sup>a</sup>Proportions may not sum to 1.0 due to rounding

<sup>b</sup>Note quintiles determined with unweighted data



**Table 3**  
**Percent Agreement, Kappa, and Weighted Kappa as Measures of Concordance in Self**  
**and Maternal Reports of Adolescents' General Health, NLSY97**

	Total	Female Adolescents	Male Adolescents
Total			
Percent agreement <sup>a</sup>	48.04%	48.74%	47.35%
Kappa <sup>b</sup>	0.22	0.25	0.19
Weighted kappa 1 <sup>c</sup> (.67, .33)	0.29	0.32	0.25
Weighted kappa 2 <sup>d</sup> (.89, .56)	0.35	0.39	0.31
White adolescents			
Percent agreement	50.03%	51.91%	48.23%
Kappa	0.22	0.27	0.17
Weighted kappa 1 (.67, .33)	0.28	0.34	0.22
Weighted kappa 2 (.89, .56)	0.35	0.42	0.28
Black adolescents			
Percent agreement	45.71%	44.72%	46.69%
Kappa	0.21	0.21	0.22
Weighted kappa 1 (.67, .33)	0.26	0.26	0.27
Weighted kappa 2 (.89, .56)	0.32	0.31	0.33
Hispanic adolescents			
Percent agreement	45.86%	45.89%	45.82%
Kappa	0.22	0.23	0.20
Weighted kappa 1 (.67, .33)	0.29	0.31	0.27
Weighted kappa 2 (.89, .56)	0.36	0.39	0.33

NLSY97 = National Longitudinal Study of Youth 1997 Cohort

<sup>a</sup>Percent agreement and each measure of kappa are not weighted using the nationally representative weights from the NLSY.

<sup>b</sup>All cells off of diagonal are unweighted, such that any disagreement is treated the same.

<sup>c</sup>Weighted kappa takes into account levels of disagreement. One cell off of diagonal is weighted .67, two cells off is .33, three cells off is 0.

<sup>d</sup>One cell off of diagonal is weighted .89, two cells off is .56, three cells off is 0.

**Table 4**  
**Percent Agreement Between Self and Maternal Reports of Adolescents' General Health Status, NLSY97<sup>a,b</sup>**

Self reports of adolescents' health	Maternal Reports of Adolescents' Health									
	Excellent	N	Very Good	N	Good	N	Fair/Poor	N	Total	N
Full sample										
Excellent	52.39%	1,731	25.94%	476	19.86%	234	11.71%	28	38.37%	2,469
Very good	32.17%	1,020	47.64%	830	28.30%	310	15.13%	32	34.15%	2,192
Good	13.22%	456	22.87%	427	41.72%	468	41.15%	80	22.25%	1,431
Fair/poor	2.22%	85	3.56%	75	10.12%	117	32.00%	59	5.23%	336
Girls										
Excellent	51.62%	809	20.56%	198	16.89%	101	6.26%	11	35.08%	1,119
Very good	32.04%	487	50.79%	442	26.25%	147	12.56%	17	34.39%	1,093
Good	14.49%	243	24.47%	236	45.37%	261	41.06%	43	24.59%	783
Fair/poor	1.84%	36	4.18%	46	11.48%	67	40.12%	40	5.94%	189
Boys										
Excellent	53.08%	922	31.49%	278	23.00%	133	18.64%	17	41.60%	1,350
Very good	32.28%	533	44.39%	388	30.47%	163	18.42%	15	33.91%	1,099
Good	12.07%	213	21.21%	191	37.84%	207	41.26%	37	19.96%	648
Fair/poor	2.56%	49	2.91%	29	8.69%	50	21.68%	19	4.53%	147

NLSY97 = National Longitudinal Study of Youth 1997 Cohort.

<sup>a</sup> N=6,435 adolescents with no missing self or maternal reports of adolescents' general health status.

<sup>b</sup> Percent agreement is weighted using the nationally representative weights from the NLSY.

**Table 5**  
**Regressions of Self and Maternal Reports of Adolescents' General Health Status on Demographic and Socioeconomic Factors, NLSY97**  
**Wave 1, N=4,461<sup>a</sup>**

	Adolescents' Reports of Adolescents' General Health Status			Mothers' Reports of Adolescents' General Health Status			Difference Across Models <sup>b</sup>		
	Coef.	s.e. <sup>a</sup>	95% CI	Coef.	s.e.	95% CI	Lower Bound	Upper Bound	Difference
Female adolescent (vs. male)	-0.160	0.027	***	-0.107	0.025	*	-0.108	-0.010	***
Adolescent race and ethnicity									
Non-black, non-Hispanic/Latino	(Reference)			(Reference)					
Black	0.038	0.038		0.112	0.038	**	-0.178	-0.027	**
Hispanic/Latino	0.011	0.054		0.117	0.054	***	-0.288	-0.076	***
Maternal education									
Less than high school	-0.243	0.052	***	-0.141	0.052	***	-0.382	-0.180	
High school	-0.089	0.042	*	-0.006	0.038	**	-0.194	-0.043	
Three years of college	-0.083	0.043		0.001	0.039		-0.096	0.057	
Four or more years of college	(Reference)			(Reference)					
Non-English speaking household (1=yes)	-0.013	0.053		0.091	0.054		-0.129	0.082	
Adolescent lives with both biological parents (1=yes)	0.142	0.032	***	0.204	0.032	***	0.079	0.205	
Maternal age at child's birth	-0.006	0.003	*	-0.001	0.003	***	-0.017	-0.006	
Adolescent age	-0.001	0.010		0.018	0.009	**	-0.040	-0.006	*
Number of children in the household	-0.051	0.016	***	-0.020	0.016	**	-0.078	-0.016	
Quintiles of net worth									
Negative net worth to \$3,744	-0.187	0.054	***	-0.080	0.055	***	-0.473	-0.256	*
\$3,750 to \$18,872	-0.189	0.051	***	-0.089	0.051	***	-0.378	-0.179	
\$18,891 to \$57,205	-0.142	0.046	**	-0.052	0.042	***	-0.299	-0.133	
\$57,500 to \$143,001	-0.057	0.042		0.024	0.038	**	-0.190	-0.042	
\$143,500 to \$600,000 (top coded)	(Reference)			(Reference)					
Household income	0.009	0.010		0.028	0.011	*	0.005	0.046	
R <sup>2</sup>	0.05			0.12					

NLSY97 = National Longitudinal Study of Youth 1997 Cohort; coef. = coefficient; s.e. = standard error.

<sup>a</sup> Robust standard errors to account for nonindependence in observations (multiple children per mother).

<sup>b</sup> A Wald chi-square test with one degree of freedom is used to determine the difference in the coefficients across models.

\* =  $p < .05$ ,

\*\* =  $p < .01$ ,

\*\*\* =  $p < .001$

**Table 6**  
**Regressions of Self and Maternal Reports of Adolescents' General Health Status on Measures of Adolescent and Maternal Health Controlling for Socioeconomic and Demographic Factors, NLSY97 Wave 1<sup>a</sup>**

	Adolescents' Reports of Adolescents' General Health Status				Mothers' Reports of Adolescents' General Health Status				Difference Across Models <sup>c</sup>					
	Coef.	s.e. <sup>b</sup>	95% CI	R <sup>2</sup>	Coef.	s.e.	95% CI	R <sup>2</sup>	Lower Bound	Upper Bound	Lower Bound	Upper Bound	R <sup>2</sup>	N
Adolescent limitation affecting school/work (1=yes)	-0.429	0.058	***	-0.542	-0.316	0.060	-0.640	0.057	***	-0.751	-0.528	0.150	4446	***
Adolescent requires medication (1=yes)	-0.412	0.047	***	-0.504	-0.320	0.070	-0.624	0.045	***	-0.712	-0.536	0.160	4446	***
Adolescent learning or emotional problem (1=yes)	-0.236	0.049	***	-0.332	-0.140	0.050	-0.389	0.045	***	-0.478	-0.300	0.130	4445	**
Adolescent sensory limitation (1=yes)	-0.081	0.037	*	-0.155	-0.008	0.050	-0.154	0.036	***	-0.224	-0.084	0.120	4446	
Adolescent physical deformity (1=yes)	-0.246	0.117	*	-0.475	-0.017	0.050	-0.408	0.112	***	-0.628	-0.189	0.120	4446	
Adolescent chronic condition (1=yes)	-0.381	0.044	***	-0.468	-0.295	0.060	-0.632	0.042	***	-0.715	-0.549	0.170	4446	***
Adolescent BMI														
Normal weight	(Reference)			0.060	(Reference)							0.120		
Overweight	-0.178	0.040	***	-0.255	-0.100		-0.035	0.037		-0.108	0.038		4248	***
Obese	-0.359	0.048	***	-0.452	-0.265		-0.249	0.044	***	-0.335	-0.163			*
Maternal self-reported health														
Fair/poor	-0.282	0.100	**	-0.478	-0.085	0.070	-0.573	0.113	***	-0.795	-0.351	0.190	4461	*
Good	-0.427	0.053	***	-0.530	-0.323		-0.599	0.055	***	-0.706	-0.491			**
Very good	-0.232	0.033	***	-0.296	-0.168		-0.491	0.033	***	-0.555	-0.427			***
Excellent	(Reference)						(Reference)							
Maternal limitations in work due to health (1=yes)	-0.153	0.043	***	-0.238	-0.068	0.050	-0.152	0.044	***	-0.239	-0.064	0.120	4459	
Maternal BMI														
Normal weight	(Reference)			0.050	(Reference)							0.120	4248	
Overweight	-0.081	0.034	*	-0.148	-0.015		-0.020	0.033		-0.086	0.045			

	Adolescents' Reports of Adolescents' General Health Status			Mothers' Reports of Adolescents' General Health Status			Difference Across Models <sup>c</sup>		
	Coef.	s.e. <sup>b</sup>	R <sup>2</sup>	95% CI Lower Bound	95% CI Upper Bound	Coef.	s.e.	95% CI Lower Bound	95% CI Upper Bound
Obese	-0.115	0.036 **		-0.186	-0.043	-0.111	0.038 **	-0.185	-0.037

NLSY97 = National Longitudinal Study of Youth 1997 Cohort; coef. = coefficient; s.e. = standard error.

<sup>a</sup> Self and maternal reports of adolescents' general health status are regressed on each measure of child and maternal health status, net of the demographic and socioeconomic controls listed in Table 5.

<sup>b</sup> Robust standard errors to account for nonindependence in observations (multiple children per mother).

<sup>c</sup> A Wald chi-square test with one degree of freedom is used to determine the difference in the coefficients across models.

\* = p<.05,

\*\* = p<.01,

\*\*\* = p<.001