Examining the Influences of Gender, Class, Race, Social Capital and Linguistic Assimilation on the Subjective Health and Well-being of Adolescents

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Abstract

The authors investigate the relative influences of gender, race, SES, adolescent development, parental support, social capital, and aspects of assimilation on adolescent self-assessed health, based upon survey data from a sample comprised of the pooled 2000, 2002, and 2003 senior from several private and public high schools in Washington State (N=4641). Because all of the high schools sampled draw from an urban area with a relatively large concentration of immigrant and refugee families, the authors also examine the role of linguistic dissonance (Portes and Hao, 2002) on self-assessed health in a subsample of adolescents from immigrant families (N=1466). The robust negative effect of gender on self-assessed health is unmodified by demographic, developmental, social capital, and parental support variables. In addition, there are negative effects of Cambodian and Vietnamese origin on the self-reported health of adolescents that persist despite controls for gender, SES, adolescent development, social capital and parental support. The findings also provide mixed support for the role of linguistic dissonance on adolescent health, and the suggestion of a negative effect on the self-reported health among immigrants with longer durations of U.S. residency. Of the social capital dimensions considered in this analysis (friendship bonds, interconnections among parents in friendship networks, positive school affiliation and a safe school learning environment), only the school context dimensions of social capital appear unequivocally relevant to self-reported health.

A common and enduring feature of post-demographic transition societies is the SES/Health Status gradient, that is, the positive linear relationship between individual SES and various measures of morbidity and mortality risk. Some of this relationship can be explained through health behaviors associated with low SES, differential access to healthcare, and the influence of individual health on the attainment of education, occupation and income. However, there is a significant component of individual health that is mediated by the social environment in complex ways that are independent of individual characteristics (Yen and Syme 1999). For a variety of reasons, the period of adolescence affords an important glimpse of the complex interplay between individual and contextual influences on health throughout the life course(Goodman 1999). In addition to being a particularly high risk period for the initiation of lifelong tobacco use, unprotected sex, substance abuse, and violent death, transition through adolescence also brings with it the foundations for future educational attainment. Finally, it is during adolescence that the acquisition of social skills essential to the lifelong task of establishing and sustaining supportive social networks takes place -interpersonal networks that are argued to be an essential mediator between various forms of social stress and health (Wilkinson, Kawachi and Kennedy 1998). For all of these reasons, investigators from a wide array of disciplines and theoretical orientations have turned to adolescent health as a point of leverage for disentangling the SES/Health Status gradient.

In this paper, we attempt to bring together three distinct lines of investigation into the self-reported health of a pooled sample of three waves of high school senior classes from 12 high schools in Washington State surveyed over the 2000-2003 period (N=4641)**.** In keeping with findings from decades of research in medical sociology, we examine the role of socioeconomic status, gender, race, and ethnicity on sample respondent's self-reported health, as well as the role

of parental involvement and support. In response to the growing body of literature in social epidemiology that emphasizes the role of social context on health, we also examine the role of adolescent social capital on the subjective health of the respondents. Finally, in response to the growing relevance of the immigrant segment of the adolescent population in the U.S., we also examine the possibility that there are aspects of assimilation that may play a significant role in the subjective health of the subsample of adolescents born to immigrant households.

Theoretical Discussion

The Interpretation of Self-reported Health in Adolescence. In this paper our primary measure of health is the self-reported health of the adolescent survey respondents on a five point scale. Self-reported health is a widely utilized measure of subjective health in public health and the social sciences that is highly correlated with more objective measures of health (Andresen et al. 2003; Idler and Benyamini 1997)**.** Morever, self-reported health is also an important predictor of longevity that also acts independently of other more objective health status indicators (Idler and Benyamini 1997). **A**mong adolescents, self-reported health also has a broader interpretation. As argued by David Mechanic (Mechanic and Hansell 1987), for adolescents the meaning of "health" extends an interpretation that encompasses a more general sense of social competence, coherence, and well-being. It is also the case that these psychological traits are highly correlated with subjective health complaints common to adolescents (Mechanic and Hansell 1987; Torsheim, Aaroe and Wold 2001), complaints which in turn are associated with socioeconomic inequalities among the adolescent population (Goodman 1999; Leveque et al. 2002). For these reasons, as well as the fact that adolescents generally have a much lower levels of morbidity relative to adults and generally limited personal experience of disease, self-reported health

among adolescents may be a particularly useful lens through which to understand the pre-adulthood emergence of the SES/health gradient.

Social Capital, Social Cohesion, and Adolescent Health . Central in much of the thinking in social epidemiology, in some respects almost an organizing principle of the field, has been the role of social cohesion as a determining attribute of the social environment throughout the life course. Although conceptually elusive and contested, a socially cohesive environment is argued to be one characterized by egalitarian relationships, mutual trust, and reciprocity (Wilkinson 1999). In social environments marked by a high level of social cohesion, it is argued to be more common for individuals to have access to social capital in the form of interpersonal networks characterized by reciprocity, trust, mutual aide and beneficial collective action (Lochner, Kawachi and Kennedy 1999). In contrast, social environments that are characterized by extreme status inequalities, distrust, weak affiliations and distrust are argued to have deleterious health effects both through the internalization of low status, weakened defenses against stress, and at the macro level a weakened commitment to investment in human capital (Kaplan et al. 1996; Wilkinson et al. 1998).

The literature on the linkages between social cohesion, social capital, and health can be described as intriguing and contentious. To its proponents (Kaplan et al. 1996; Kawachi et al. 1997; Wilkinson 1999), the theoretical and empirical linkages between social capital, social cohesion, and various measures of income inequality is central to the problem of social structure and health. To its critics, this line of theory is a conceptually muddy distraction from the more compelling and empirically justified linkage between class structure and absolute material deprivation (Finch 2003; Forbes and Wainwright 2001; Muntaner and Lynch 1999; Muntaner et al. 2002). Clearly, one way of sorting out this controversy is to take advantage of individual level

studies of health outcomes that have measures both of social class and access to social capital at various points throughout the lifecourse-including and in particular studies of adolescent health for reasons previously argued. Although there are many studies that link the etiologies and management of specific adolescent health risks to various dimensions of social environment, there are actually relatively few studies that explicitly examine the role of social cohesion, and social capital to broad measures of adolescent health (Gold et al. 2002; Konu, Lintonen and Rimpela 2002; Torsheim and Wold 2001).

Gender and Adolescent Health. One hallmark of post-transition mortality regimes is the longevity advantage for women. However, gender differences in morbidity are more complex. Although it is generally contended that that women suffer higher rates of morbidity across an array of conditions over the life course despite their mortality advantage (Green and Pope 1999), other recent investigations have revealed that gender differences in morbidity vary in direction and magnitude depending on the dimension of health being considered and the phase of the life course (Macintyre, Hunt and Sweeting 1996). There is some evidence to suggest that while structural factors (age group, family structure, SES, and social capital) are important for both men and women, structural effects on health are stronger for women than men across both subjective and objective measures of health (Denton and Walters 1999). For the adolescent population, there has been generally less research devoted to gender and class disparities in general health (Rahkonen and Lahelma 1992). There is some evidence to suggest that health disparity paradigms applicable to the adult population differ in adolescence, including and in particular the effects of gender (Goodman 1999; Goodman et al. 1997; Hetland, Torsheim and Aaro 2002). A significant question of this paper is whether and in what direction there is a gender effect in adolescence on self-reported health when other mediating factors are considered.

Self-esteem, Self Efficacy, and Adolescent Competency. A prevailing theme throughout adolescence is the pursuit and retention of self esteem (Mechanic and Hansell 1987). Moreover, to the extent that subjective health reflects overall psychological well-being, we should expect that both self-esteem and self-efficacy will covary with self-reported health. Indeed, this is the prevailing pattern in other research on adolescent health (Ge et al. 2001; Grubbs et al. 1992; Haugland et al. 2001; Konu et al. 2002; Mechanic and Hansell 1987; Torsheim and Wold 2001). Another dimension of adolescent development that appears critical to adolescent health is described as adolescent competence, that is, the adolescent's ability to fulfill the various activities and role expectations of adolescence that are prescribed and mutually reinforced by parents and schools. These expectations include participation in athletic and non-athletic school activities, devotion to homework, achieving acceptable grades, and earning money through part-time work. The conceptual pioneers of adolescent competence, Mechanic and Hansell (1987), found in a large survey sample of high school students that adolescent competence (measured as participation in sports and other school activities, doing homework, and GPA achievement) had a substantial contribution to self-reported health that was independent of other aspects psychological well-being and physical health.

Cultural Assimilation and Adolescent Health. A significant and increasing proportion of the U.S. adolescent population is comprised of immigrants or children born to immigrant families (U.S Census Bureau 2002). Despite this fact, few studies of adolescent health consider the role of nativity unless through the lens of specific diseases or reproductive health –or as a control variable sans theoretical interpretation. It makes intuitive sense however, to consider that children from immigrant families negotiating the dual processes of cultural assimilation and transition through adolescence to adulthood might express various forms of psychological and

physical distress. There is also a body of research that suggests that children born to refugee families, a substantial minority of the sample in this study, may express the sequela of direct and indirect trauma in somatic terms many years after the migration experience (Rousseau, Drapeau and R.Platt 1999; Sack et al. 1993; Sack et al. 1994) . It is also the case that children from some immigrant families may express poorer levels of health as a reflection of cultural beliefs about the meaning of good health (Uehara 2001). There is also another theoretical thread that speaks of the role of assimilation dissonance in adolescent health. Briefly stated, it is the idea that adolescents who must perform the duty of language and cultural translator for their non-English speaking parents confront a fundamental and distressing conflict between their subordinate role as a child and their role as family mediator with the dominant culture (Portes and Hao 2002). It is speculated that this fundamental role conflict, compounded with the immigrant adolescent experience of living daily two different worlds, will express itself in somatic terms (Portes and Hao 2002). Finally, it is also noted that various studies of immigrant populations suggest assimilation into American culture degrades immigrant health -although the evidence is difficult to evaluate given the lack of consistent theoretical specificity and different measures of health (Salanta and Lauderdale 2003).

Parent Involvement and Support. It is well established that parental support, involvement, and monitoring collectively reduce the likelihood that adolescents will engage in a variety of behaviors that undermine health (Atkins et al. 2002; Hawkins et al. 1999; Li, Stanton and Feigelman 2000). Not surprisingly, the general state of adolescent health is also influenced by the quality of parenting involvement and support, both through direct and indirect paths(Mellin et al. 2002; Ransom and Fisher 1995). Presumably, the availability of parent

involvement and support will remain an important factor in adolescent help even where gender, race, SES, and other forms of social capital outside the family are considered.

Methods and Analysis

This is an exploratory study which seeks to examine the relative contributions of gender, race, ethnicity, socioeconomic status, adolescent social development, parental support, and social capital on the self-reported health of a typical cross-section of American adolescents. In addition, we also evaluate the extent to which aspects of cultural assimilation may play a role in the self-reported health of adolescents from a sub-sample of immigrant families. The data employed in our sample are drawn from the pooling of three survey waves of senior class cohorts from twelve high schools in Washington State, covering the period between 2000 and 2003 (N=4641). Nine of the twelve high schools participating in the study are public schools, two are parochial high schools and one an independent private high school. It should be noted that only five public high schools participated in all three waves of the study, with the balance of the sample including students from the class of 2003 from the seven additional high schools. Because the survey waves were concentrated over four year period (2000, 2002, and 2003) and school context variables are included in the analysis, we do not anticipate that these aspects of the sampling design will significantly bias the results. All student surveys were completed during the eight weeks preceding high school graduation, with 73% of the senior class cohorts completing the survey.

Independent Variables. All children participating in the study were from 17-19 years of age, so age was not included as an independent variable. Gender was verified from school records and

variables for race and ethnicity were triangulated from multiple items asking about racial and ethnic origin and identity. Notably, the pooled sample employed in our analysis has a large immigrant population from S.E. Asia, reflecting different waves of immigration from S.E. Asia beginning with the early 1970's. Socioeconomic status is measured through parental education, which we deem to be more reliable and valid than adolescent descriptions of parental occupation. Regrettably, the consent requirements for the original survey precluded questions pertaining to somatic complaints or specific illness conditions, so the only somatic health measure available is the body mass index calculated from self-reported height and weight.

The independent variables representing adolescent development included scales for adolescent competency, self-esteem, and locus of control as a measure of self-efficacy. The scale for adolescent competency, described previously as the fulfillment of activities and roles socially prescribed for adolescents, is a composite measure that combines items pertaining to social skills with GPA, total hours of weekly homework, hours per week spent in school sponsored sports and other extracurricular activities, and hours per week of paid employment. Both the self-esteem scale and the locus of control scales are constructed from items originally included in the survey as well established subscales of these dimensions.

As previously mentioned, our analysis includes scales for social capital and parental involvement and support. The four scales for social capital are derived from a PC factor analysis of items related to each distinct dimension of social capital. Two social capital scales capture the "local opportunity structure" of an adolescent's school environment (Baum and Ziersch 2003), positive school affiliation and the adolescent's perception of a safe learning environment. The two other social capital scales concern network cohesion(Baum and Ziersch 2003; Wilkinson 1999), derived from survey items related the adolescent's awareness and involvement with the

aspirations of their friends (knowledge of friends after high school plans) and items related to interconnections among the parents of a friendship network.

In order to identify the latent constructs for parental support, exploratory factor analysis was performed on the nine survey items related to parental involvement in the daily life of the adolescent. The two orthogonal parental support dimensions that emerged from this analysis are the extent to which the communication with parents is described as frequent and supportive (talks to parents for guidance) and parental involvement with homework and time management (parent help with homework). Consistent with the other scales employed in our analysis we estimated effects through factor regression scores. The factor loadings and reliability coefficients for these scales, as well as the scale for adolescent popularity employed as a component of the adolescent competency measure, are provided in the appendix.

Five sets of dummy variables will be included in a second step of the analysis pertaining to different dimensions of assimilation: speaking a foreign language in the home, bilingual proficiency, use of foreign language with parents, use of foreign language with friends, and duration of residence/immigrant generation. Collectively these variables permit an explicit test of the linguistic dissonance theory advanced by Portes and Hao (2002).

[Table 1 About Here]

The first four tables show the descriptive statistics of the variables employed in the analysis. Table 1 shows the distribution on the dependent variable, self-reported health, by gender. Table 1 also provides a comparison with the in-school survey of high school seniors derived from the Adolescent Health Study(Sieving et al. 2001) public use sample. Notably, the distributions of the dependent variable across genders between our sample and the Adolescent Health Study sample are nearly identical. It can be seen that while most adolescents report their

health as very good to excellent, females generally rate their health as poorer. In general though, a very small proportion of adolescents across both samples report their health as poor. For this reason, we collapsed the lowest two categories of this scale to create a four level scale.

[Table 2 and Table 3 About Here]

Table 2 shows the descriptive statistics on the variables that are derived directly from items in the survey instrument, rather than measured as latent constructs. It can be seen immediately that a large proportion of the sample belongs to a racial minority group, and that 18% of the sample is Asian. It is also the case that 32% (N=1466) of the sample are first or second generation immigrants, thus proving us with an unusual opportunity to examine the role of assimilation on the self-reported health of adolescents from immigrant families. Parent education is measured as the maximum educational attainment of either parent, in effect providing a 3 level ordinal measure of social class with substantial representation across all three levels.

Table 3 shows the distribution of item scores on survey items utilized to derive the latent construct measures for self-esteem, locus of control, adolescent competency, measures of social capital, and the two measures of parent support. The measures for self-esteem and locus of control are simply the mean of the items placed into the survey as established subscales of these dimensions, while Adolescent Competency Scale is the summed standard scores on all items used in the scale (cumulative GPA, hours/week of homework, hours/week of school activities, hours/week employment) plus the factor score for the items loading on a construct representing adolescent popularity. This resulted in a normally distributed global measure of adolescent competency. All other latent construct measures shown on Table 3 are expressed as factor scores derived through PC factor analysis (see appendix for factor loadings and reliability estimates). A

cursory examination of the statistics on this table provides a general sense of the sample characteristics in terms of social and psychological dimensions, as well as the logic of the latent constructs. It can be seen, for example, that the average pattern for adolescents is a ratio of over two hours of paid employment for every hour spend doing homework (see items under Adolescent Competency Scale) and that the average GPA for the sample is a "B" or 3.07. Adolescents in the sample also share a generally high level of self-esteem and tend not to be fatalistic (see items under Self-Esteem and Locus of Control).

[Table 4 About Here]

Table 4 shows the distribution of self-reported health by bilingual proficiency for the subsample of adolescents in the survey that are either first or second generation immigrants, as well as their language use patterns when among either parents or friends. The language proficiency measures are constructed from four items related to language skill (Portes and Rumbaut 2001). It can be seen that immigrant adolescents that characterize their language as "limited bilingual" tend to report lower levels of health, while all other language proficiency patterns are roughly equivalent in their relationship to self-reported health. Most of the immigrant adolescents that are first generation speak their native tongue with parents far more prevalently than with friends, and that for those who have been in the U.S. 10 years or more, there is a marked decrease in the use of native language with parents. It will be of interest to discover, in the context of multivariate analysis, whether the benefits of language assimilation on self-reported health are enhanced or offset by the duration of U.S. residency.

Plan of Analysis We divide the analysis into two steps, In the first step, we test models with the full sample that include the variables for gender, race/ethnicity, parental education, the adolescent development, social capital, and parent support. In the second part of the analysis, we

retest these models with the subsample of adolescents from immigrant families and add the variables related to assimilation. Although the limited range and distribution of the dependent variable lends itself to an ordered logit rather than a least-squares approach (see Table 1), the data fails to meet the parallel slopes assumption required for this procedure (Borooah 2001). Therefore, each step the analysis involves a series of ordered dichotomous regressions, with the effects of the independent variables expressed as odds ratios. We favor this strategy is favored over multinomial logistic regression because we are able to both retain the inherent order within the dependent variable and also show the effects of the independent variables at different thresholds of self-reported health. As previously mentioned, we also collapsed "poor" and "fair" health into a single category, thus yielding four basic models of subjective health at different levels of the dependent variable: the transition from poor/fair health to at least good health, the transition from good health to at least very good health, the transition from very good health to excellent health, and a contrast of extremes between those in the poor/fair health category and those in the very good/excellent health category.

[Table 5 About Here]

Multivariate Results

As shown on Table 5, there is a strong negative effect for female gender on self-reported health across all thresholds of health that holds despite adjustments for race, social class, adolescent competency, psychological indicators, social capital and parent support. Adolescent females simply rate their health lower than adolescent males across a wide variety of other social characteristics. A second remarkable feature of Table 5 is the robust negative effect of either Vietnamese or Cambodian origin on self-reported health, largely driven by the tendency of these adolescents to rate their health poorly in relative to adolescents from all other racial and ethnic

backgrounds. Although Hispanic adolescents show a marginal tendency to rate their health lower, the effect appears quite weak and largely confined to the contrast with the lowest threshold of subjective health.

As expected, there is also a strong social class effect on self-reported health, particularly in the contrast between poor health and excellent health. Consistent with the findings of Mechanic and Hansell (1987), adolescent competency has a modest positive effect on self-reported health, despite what we suspect are robust mediating effects of self-esteem and locus of control. Above average weight and self-reported health appears to have a modest effect of self-reported health that is largely confined to threshold between "good health" and "very good to excellent health", which makes intuitive sense. The psychological indicators, self-esteem and locus of control, appear to have the most uniformly powerful effects across all levels of self-reported health, with an incremental change in either of these scales corresponding to a multifold increase in the odds of yielding a higher level of subjective health.

Relative to the psychological variables, the dimensions of social capital we were able to employ in our models show very modest effects on self reported health. However, it is worth noting that school environment (positive school affiliation and a safe learning environment) appear to matter, particularly at the lowest threshold of self-reported health. In order to make sure that this was not an artifact of the private school students included in our sample, we also ran these models with a private school dummy variable –with no evidence of private school effect. This finding to some extent buttresses other cross-national evidence that school context has independent effects on the self-reported health of adolescents (Konu et al. 2002). The only other social capital measure that has the suggestion of an effect on adolescent health is the

variable representing the ties between parents within friendship networks. While the effect is in the expected direction it is quite weak.

Probably the most puzzling relationships shown on Table 5 are those pertaining to the role of parent support. At the lowest threshold of subjective health, it is clear that the availability and use of parental guidance is important discriminator of health. However, this relationship appears to reverse as the threshold from "very good" to "excellent" health is considered. One possible explanation for this paradox is that adolescents who are the most confident of their general health and well-being also move away from parental sources of emotional dependence.

[Table 6 About Here]

The final table shows the results yielded when the same series of dichotomous regression models are applied to the immigrant subsample (N=1466), modified to include variables representing language assimilation, generational, and duration of U.S. residence effects. As expected from the robust main analysis results shown on Table 5, the gender effect is equally powerful among immigrant adolescents. Also consistent with the main analysis, adolescents of Vietnamese and Cambodian origin report markedly lower subjective health relative to all other immigrant groups, although Pacific Islanders emerge as with significantly lower self-reported health as well.

The other variables that are replicated from the main analysis also show generally similar effects within the immigrant subsample, with some nuanced differences. The education effect emerges at a lower level of educational attainment, and the locus of control effect appears more important at the lowest threshold of self-reported health than in the full sample.

The analysis of assimilation effects is relevant to two separate arguments concerning the assimilation effects on the health across immigrant groups. The first is an older argument that

assimilation into American culture with its emphasis on individualism, consumption and Western dietary habits is generally detrimental to health (Marmot and Syme 1976). From this argument we should expect that the duration of residency in the U.S. will be negatively associated with self-reported health and that language assimilation should also be negatively associated with self-reported health. The second argument concerns the presence and health effects of linguistic dissonance. As discussed previously, this argument posits that adolescents who must act as the language and cultural interpreters for their family experience a distressing form of role conflict that becomes expressed in somatic terms (Portes and Hao 2002). This suggests that bilingualism and preferential use of native language with parents should be negatively associated with self-reported health.

Consistent with the first argument, duration in the U.S. is to some extent negatively associated with self-reported health. That is, immigrant adolescents that are the most recently arrivals report higher levels of subjective health. Perhaps adding to this argument is the finding that immigrant adolescents who use a foreign language in the home report higher levels of self-reported health. However, reliance upon bilingualism as opposed to English dominance is detrimental to self-reported health –to some extent undermining a simple conclusion that the duration and linguistic aspects of assimilation are consistent in their negative effects on self-reported health.

The finding that reliance on bilingualism is detrimental to self-reported health, while holding immigration duration constant, is consistent with the linguistic dissonance theory of Portes and Hao (2002). However, the non-significant odds ratios for the prevalent use of native language with parents to some extent lends some ambiguity to this conclusion. Although the non-significant effect of prevalent native language use for parents likely reflects the modest

sample size, it is clear that the parent language effect is not strong. It should also be noted that excluding the variable "Speaking a Foreign Language at Home" also failed to yield a significant effects for the use of native language with parents (analysis available from authors).

The finding that the self-reported health among the immigrant adolescents of Vietnamese and Cambodian origin is markedly lower despite controls for social class, adolescent development, school context, and assimilation effects, lends support to both cultural explanations and explanations that attribute health effects to the historical trauma shared by children and descendents of Cambodian and Vietnamese immigrants. However, both of the cultural and historical trauma arguments are to some extent made tenuous due to strong distinctions between Cambodians and Vietnamese in cultural terms and in critical aspects of their respective migration histories (Kim 2002).

The finding that Pacific Islander's emerge in the subsample analysis as having lower levels of health, at least in the contrast between the lowest and most optimal level of self-reported health, is curious. Although treated as a residual category that included American Indians in the main analysis, Pacific Islander immigrant status has becomes an identifiable characteristic when nativity is controlled. Rather than speculate on its meaning, we will merely concede this finding bears further analysis.

Discussion

This exploratory analysis of adolescent self-reported health as generally affirmed previous findings that both gender and social class are powerful predictors of health and well-being across race and other important other characteristics of context and individual development. The resilience of the gender effect in particular is remarkable. We find it

worrisome that female adolescents rate their health significantly lower, whether viewed as a measure of a global sense of well-being or as a predictor of adult morbidity.

With respect to adolescents in general, the findings of this analysis are consistent with the general trend of prior research that establishes the importance of the ability to fulfill the normative role expectations of adolescence and the powerful independent effects of self-esteem and self-efficacy on a global sense of well-being. Although the relevance of social capital in the form of friendship bonds and interconnections between parents of friends appears to have little independent importance to self-reported health, this finding may reflect the limitations of the data and measures. What is less equivocal is the relevance of school context to adolescent health and well-being, placing additional emphasis on the importance of policy initiatives aimed at creating schools that feel safe and well connected to the lives of students.

The findings that most clearly direct us to further exploration concern the negative effects of Vietnamese and Cambodian origin on assimilation, and in the more general context of immigration, the ambiguity of results related to the effects of assimilation and acculturation on adolescent health. The first question leads us to consider a complex array of historical, cultural and structural differences between S.E. Asians and other immigrant groups. The second question leads us to a further appreciation of the complex, nuanced and the conceptually elusive interconnections between acculturation, assimilation and health for all immigrant groups.

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Table 1. Comparison of self-reported health between the Add Health In-School sample and the Beyond High School Surveys

	Poor/Bad		Good		V Good		Excellent		Total	
	M*	F*	M	F	M	F	M	F	M	F
Add Health	8%	8%	22%	31%	32%	38%	38%	23%	100%	100%
Beyond High School	8%	13%	20%	30%	33%	35%	39%	22%	100%	100%

* M = male, F = female

Note on data sources: 1)Add Health Wave I In-School sample, 2) University of Washington Beyond High School (BHS) 2000, 2002 & 2003 senior surveys

Table 2: Means and standard deviations of item variables

Indicator	Mean	S.D.	N
Dependent Variable			
Self-Assessed Health	2.81	0.98	4641
Sex			
Male	0.45	0.50	4641
Female	0.55	0.50	4641
Race			
White	0.54	0.50	4641
American Indian/Pacific Island	0.04	0.21	4641
Filipino, other Asian	0.04	0.20	4641
Vietnamese	0.04	0.19	4641
Cambodian	0.03	0.17	4641
East Asian	0.07	0.26	4641
African American	0.15	0.36	4641
Hispanic	0.09	0.29	4641
Parental education			4641
High school or less	0.25	0.43	4641
Some college	0.38	0.49	4641
College degree or higher	0.37	0.48	4641
No father/mother figure	0.01	0.09	4641
Somatic variables			
Body mass index	0.50	0.50	4641

Table 3: Means and standard deviations of scale source variables

Indicator	Mean	S.D.	N
Self Esteem Scale [a]			
I feel that I do not have much to be proud of	3.27	0.79	4587
I feel I am a person of worth	3.29	0.67	4559
I feel useless at times	2.82	0.87	4568
On the whole I am satisfied with myself	3.16	0.73	4566
At times, I think I am no good at all	2.95	0.85	4558
I feel good about myself	3.25	0.67	4568
I am able to do things as well as most other people	3.25	0.64	4559
Locus of Control Scale [a]			
In my life, good luck is more important than hard wk for success	3.21	0.66	4599
When I make plans, I am almost certain I can make them work	3.17	0.57	4566
Every time I try to get ahead, something or somebody stops me	2.96	0.74	4594
My plans hardly ever work out, so planning only makes me unhappy	3.23	0.67	4584
I don't have enough control over direction of my life	3.07	0.76	4552
Chance and luck are important for what happens in my life	2.87	0.80	4556
Adolescent Competency Scale [b]			
Cumulative GPA	3.07	0.67	4641
Total hours spent per week on homework	6.36	2.47	4641
Whether participated in sports or extra-curricular activities, none, either, or both	0.88	0.75	4641
Hours worked per week in job	14.81	11.62	4641
Adolescent Popularity Factor [a][c]			
I am left out of things going on around me	2.95	0.73	4626
Kids at school see me as not fitting in	3.11	0.71	4582
It is difficult to make friends with members of my sex	3.13	0.78	4582
I am not popular with members of the opposite sex	3.06	0.76	4588
I see myself as not fitting in	3.12	0.72	4604
Social Capital Factor [d]			
Factor 1: Positive School Affiliation			
School provides a caring, encouraging environment	2.64	0.79	4630
Teaching is good	2.92	0.64	4577
Teachers are interested in students	2.87	0.67	4577
Students are graded fairly	2.70	0.69	4572
The discipline is fair	2.57	0.76	4571
Factor 2: Parent Network [c]			
Parents know friend's parents	2.48	0.89	4606
Parents know friends	2.98	0.81	4606
Factor 3: Safe Learning Environment [a]			
Do not feel safe in school	3.05	0.73	4579
Disruptions get in the way of learning	2.48	0.81	4574
Fights occur between different racial/ethnic groups	2.84	0.80	4574
Factor 4: Friendship Bonds			
Has knowledge of friend's plans [f]	5.19	1.47	4590
Number of people listing person as a best friend [g]	1.68	1.56	4641
Parental Support Factor			
Factor 1: Talks to parents for guidance			
How often have you discussed school activities with parents [h]	2.88	1.02	4583
How often have you discussed going to college [h]	3.39	0.85	4585
I receive high levels of love and support from my family [b]	3.22	0.78	4592
I have freq, in-depth conversations with my parents [a]	2.62	0.87	4562
I can go to my parents for advice and support [a]	3.12	0.79	4567
My parents are usually unhappy/disappoint with what I do [a]	3.06	0.77	4591
Factor 2: Parent helps with homework, etc. [h]			
Amount parents help with homework	2.44	1.09	4590
Amount another adult helps with homework	1.68	0.90	4588
Amount parents limit time w/ friends on school nights	2.51	1.12	4587

Notes:

[a] Variable scored from 1 (strongly agree) to 4 (strongly disagree)

[b] Adolescent competency scale is made up of 4 variables and one factor

[c] Adolescent popularity factor analysis resulted in one component only

[d] All individual social capital variables are scored from 1 (low) to 4 (high)

[e] Variable scored from 1 (strongly disagree) to 4 (strongly agree)

[f] Scored from 0 (knows no plans) to 6 (knows six plans)

[g] Ranges from minimum = 0 to maximum = 9

[h] Variable scored from 1 (never) to 4 (often)

Table 4: Language assimilation indicators

Panel 1: Adolescents' self-reported health by bilingual proficiency

	Self-reported health				
Bilingual proficiency level *	Poor-bad	Good	Very good	Excellent	N
Limited bilingual	21	25	19	9	74
	28.3%	33.80%	25.70%	12.20%	100%
Foreign language dominated	18	46	50	35	149
	12.1%	30.90%	33.60%	23.50%	100%
English language dominated	105	244	362	273	984
	10.7%	24.80%	36.80%	27.70%	100%
Fluent bilingual	39	75	79	66	259
	15.10%	29%	30.50%	25.50%	100%
Total	183	390	510	383	1,466
	12.50%	26.60%	34.80%	26.10%	100%

Panel 2: Foreign language usage at home by generation and the length of stay in the US

	Student speaks a foreign language at home			
Generation/years in US	Yes	No	Total	N
1st generation, <=4 yrs in US	94.4%	5.5%	100%	126
1st generation, 5-9 yrs in US	91.3%	8.7%	100%	218
1st generation, >=10 yrs in US	71.9%	28.1%	100%	327
2nd generation, born in US	42.8%	57.2%	100%	795
Total	60.9%	39.1%	100%	1,466

Panel 3: How often does student speaks foreign language with parents?

	Freqency with which student speaks foreign language with parents				
Generation/years in US	Never/ Sometimes	About half the time	Most of the time	Total	N
1st generation, <=4 yrs in US	30.2%	8.7%	61.1%	100%	126
1st generation, 5-9 yrs in US	22.5%	9.6%	67.9%	100%	218
1st generation, >=10 yrs in US	50.2%	11.6%	38.2%	100%	327
2nd generation, born in US	78.0%	8.6%	13.5%	100%	795
Total	59.4%	9.4%	31.2%	100%	1,466

Panel 3: How often does student speaks foreign language with friends?

	Freqency with which student speaks foreign language with friends				
Generation/years in US	Never/ Sometimes	About half the time	Most of the time	Total	N
1st generation, <=4 yrs in US	46.0%	30.2%	23.8%	100%	126
1st generation, 5-9 yrs in US	63.7%	22.9%	13.4%	100%	218
1st generation, >=10 yrs in US	86.9%	7.9%	5.2%	100%	327
2nd generation, born in US	94.7%	2.2%	3.1%	100%	795
Total	84.2%	8.9%	6.9%	100%	1466

* Bilingual proficiency level is determined by proficiency level in both English and the foreign language spoken at home that students report in the survey. The students report how well they speak, write, understand, and read both English and the foreign language.

Table 5: Ordered dichotomous contrasts of self-reported health using binary logistic regression

	Threshold Comparisons			Contrast of Extremes
	Poor / Good-Exc	**Good / Very Good-Exc**	**Very Good/ Exc**	**Poor / Exc**
	Exp (B)	Exp (B)	Exp (B)	Exp (B)
Gender				
Female	0.505 ***	0.515 ***	0.514 ***	0.286 ***
Male	comparison group	comparison group	comparison group	comparison group
Race/Ethnicity				
American Indian, Pacific Islander,	0.838	1.111	0.825	0.752
African American	0.816	1.091	0.873	0.837
Hispanic	0.758 *	1.107	1.171	0.863
Vietnamese	0.538 ***	1.009	0.930	0.533 **
Cambodian	0.528 ***	1.376	0.708	0.560 *
Filipino, other Asians	0.865	0.861	1.105	0.800
East Indian	0.908	1.175	0.933	0.878
Non-Hispanic White	comparison group	comparison group	comparison group	comparison group
Maximum level of education of either parent				
High school or less	comparison group	comparison group	comparison group	comparison group
Some college	1.171	1.126	1.056	1.219
College degree or higher	1.698 ***	1.403 ***	1.167	2.114 ***
No father/mother figure	0.829	1.767	1.618	1.063
Adolescent competency				
Adolescent competency scale	1.120 ***	1.099 ***	1.021	1.157 ***
Body mass index (BMI)	0.890	0.845 **	0.888	0.799 *
Psychological indicators				
Self esteem scale	4.819 ***	9.690 ***	8.010 ***	18.904 ***
Locus of control scale	3.875 ***	2.380 ***	1.445	4.940 ***
Social capital				
Positive school affiliation	1.139 ***	1.126 ***	1.072 *	1.248 ***
Parent network	1.082	1.032	1.078 *	1.111 *
Safe learning environment	1.195 ***	1.035	1.006	1.183 ***
Friendship bonds	1.082	1.034	1.041	1.031
Parental support				
Talks to parents for guidance	1.151 **	1.052	0.875 ***	1.094
Parent/tutor helps with homework etc.	1.085	0.962	0.937 *	1.010
N	4,641	4,140	2,921	1,852
Cox and Snell r-square	0.078	0.10	0.06	0.25

Test of statistical significance: * p<.10, ** p<.05, *** p<.01

Table 6: Ordered dichotomous contrasts of self-reported health in a sub-sample of 1st and 2nd generation immigrants

	Threshold Comparisons			Contrast of Extremes
	Poor / Good-Exc	**Good / Very Good-Exc**	**Very Good/ Exc**	**Poor / Exc**
	Exp (B)	Exp (B)	Exp (B)	Exp (B)
Gender				
Female	0.584 ***	0.557 ***	0.680 ***	0.387 ***
Male	comparison group	comparison group	comparison group	comparison group
Race/Ethnicity				
American Indian, Pacific Islander	0.796	0.809	0.450	0.191 **
African American	0.512 *	1.243	0.567 **	0.541
Hispanic	0.985	1.059	1.120	1.255
Vietnamese	0.472 **	0.861	0.698	0.394 **
Cambodian	0.489 **	1.351	0.475 **	0.418 *
Filipino, other Asians	0.561 *	0.852	0.876	0.523
East Indian	0.704	0.898	0.737	0.559
Non-Hispanic White	comparison group	comparison group	comparison group	comparison group
Maximum level of education of either parent				
High school or less	comparison group	comparison group	comparison group	comparison group
Some college	1.659 **	1.219	0.951	1.695 *
College degree or higher	1.903 ***	1.270	0.987	1.710 *
No father/mother figure	0.767	1.604	4.485 **	1.627
Adolescent competency				
Adolescent competency scale	1.084 **	1.120 ***	1.019	1.160 ***
Body mass index (BMI)	0.864	0.759 **	0.951	0.857
Psychological indicators				
Self esteem scale	1.835	13.086 ***	8.217 ***	6.759 ***
Locus of control scale	10.860 ***	1.172	1.476	6.817 **
Social capital				
Positive school affiliation	1.088	1.044	1.093	1.212 *
Parent network	1.169 *	1.046	1.192 **	1.280 **
Safe learning environment	1.187 *	1.042	1.113	1.143
Friendship bonds	0.942	1.092	1.005	0.945
Parental support				
Talks to parents for guidance	1.176	0.984	0.788 ***	1.147
Parent/tutor helps with homework etc.	1.019	0.943	0.829 ***	0.870
Assimilation				
Speaks a foreign language at home	1.571 *	1.213	1.509 **	1.988 **
Bilinguall proficiency level				
Limited bilingual	0.472 **	0.553 *	0.628	0.343 **
Foreign language dominant	0.842	1.010	0.746	0.637
English dominant	comparison group	comparison group	comparison group	comparison group
Fluently bilingual	0.685	0.792	0.878	0.502 **
Speaks foreign language with parents				
Never-sometimes	comparison group	comparison group	comparison group	comparison group
Half the time	1.428	1.421	1.320	2.107
Most of the time	0.821	0.905	0.850	0.910
Speaks foreign language with friends				
Never-sometimes	comparison group	comparison group	comparison group	comparison group
Half the time	1.160	1.006	0.654	0.626
Most of the time	0.620	0.710	1.432	0.582
Length of stay in the US				
1st generation, 4 years or less	2.004	1.124	1.938 *	2.979 *
1st generation, 5-9 years	1.360	1.216	1.320	1.572
1st generation, 10 years or more	0.960	0.874	1.311	1.062
Second generation	comparison group	comparison group	comparison group	comparison group
N	1466	1,283	893	566
Cox and Snell r-square	0.098	0.107	0.088	0.278

Test of statistical significance: * p<.10, ** p<.05, *** p<.01

Appendix 1: Bivariate Pearson's correlations of study variables, N = 4,641

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1: Self-Assessed Health	1.00 ***																							
2: Male	0.17 ***																							
3: White	0.06 ***	-0.01	1.00																					
4: Hawaii	-0.01	0.01	-0.23 ***	1.00																				
5: Filipino	0.00	0.02	-0.22 ***	-0.04 **	1.00																			
6: Vietnamese	-0.06 ***	0.03 **	-0.21 ***	-0.04 **	-0.04 **	1.00																		
7: Cambodian	-0.07 ***	0.02	-0.19 ***	-0.04 **	-0.04 ***	-0.03 **	1.00																	
8: East Asian	0.00	0.01	-0.30 ***	-0.06 ***	-0.06 ***	-0.05 ***	-0.05 ***	1.00																
9: African American	0.00	-0.02	-0.45 ***	-0.09 ***	-0.09 ***	-0.08 ***	-0.07 ***	-0.12 ***	1.00															
10: Hispanic	-0.02	-0.02	-0.34 ***	-0.07 ***	-0.07 ***	-0.06 ***	-0.06 ***	-0.09 ***	-0.13 ***	1.00														
11: High School Graduate	-0.11 ***	-0.01	-0.15 ***	0.02	-0.02	0.12 ***	0.20 ***	0.03 **	-0.03 **	0.09 ***	1.00													
12: Some College	-0.03 **	-0.04 **	0.00	0.05 **	-0.01	-0.03 *	-0.07 ***	-0.06 ***	0.09 ***	-0.02	-0.45 ***	1.00												
13. College Educated	0.14 ***	0.04 **	0.15 ***	-0.06 ***	0.04 **	-0.09 ***	-0.12 ***	0.03 **	-0.06 ***	-0.06 ***	-0.44 ***	-0.60 ***	1.00											
14: No parents	-0.02	0.03 **	-0.06 ***	-0.02	-0.02	0.05 ***	0.09 ***	0.00	0.02 *	0.01	-0.05 ***	-0.07 ***	-0.07 ***	1.00										
15: Locus of Control	0.25 ***	-0.12 ***	0.11 ***	-0.02	-0.03 ***	-0.11 ***	-0.10 ***	-0.04 **	0.02 *	-0.02	-0.12 ***	0.01	0.10 ***	-0.02	1.00									
16: Self-Esteem	0.33 ***	0.01	0.06 ***	0.00	-0.01	-0.11 ***	-0.09 ***	-0.06 ***	0.07 ***	-0.02	-0.10 ***	0.02	0.07 ***	-0.04 ***	0.56 ***	1.00								
17: Positive school affiliation	0.11 ***	0.01	0.01	0.02	0.05 ***	0.05 ***	0.02 *	0.00	-0.08 ***	0.00	0.02	-0.04 ***	0.03 *	0.00	0.10 ***	0.13 ***	1.00							
18: Parental network with friends	0.11 ***	-0.08 ***	0.05 ***	-0.01	0.00	-0.05 ***	-0.05 ***	-0.04 **	0.04 ***	-0.03 **	-0.08 ***	0.00	0.07 ***	-0.04 **	0.16 ***	0.25 ***	0.00	1.00						
19: Safe learning environment	0.12 ***	0.01	0.03 *	-0.02	-0.02	-0.01	-0.07 ***	-0.01	0.02 *	0.01	-0.08 ***	-0.04 ***	0.12 ***	-0.02	0.22 ***	0.19 ***	0.00	0.00	1.00					
20: Friendship Bonds	0.07 ***	-0.12 ***	0.09 ***	-0.04 **	0.00	-0.02	-0.01	0.02	-0.06 ***	-0.06 ***	-0.10 ***	-0.03 **	0.13 ***	-0.05 ***	0.14 ***	0.08 ***	0.00	0.00	0.00	1.00				
21: Adolescent Competency Scale	0.25 ***	-0.14 ***	0.07 ***	-0.05 **	0.00	0.02	-0.05 ***	0.01	-0.03 **	-0.04 ***	-0.13 ***	-0.02	0.15 ***	-0.06 ***	0.44 ***	0.42 ***	0.13 ***	0.16 ***	0.17 ***	0.29 ***	1.00			
22: Talks to parents	0.22 ***	-0.11 ***	0.14 ***	-0.02	-0.05 ***	-0.11 ***	-0.12 ***	-0.04 ***	0.00	-0.03 *	-0.16 ***	0.02 *	0.13 ***	-0.08 ***	0.43 ***	0.51 ***	0.20 ***	0.40 ***	0.16 ***	0.09 ***	0.34 ***	1.00		
23: Parent/tutor helps	0.01	-0.01 ***	-0.06 ***	0.00	0.03 *	0.06 ***	0.00	0.02	0.02	0.01	-0.10 ***	0.00	0.09 ***	-0.03 **	-0.04 ***	-0.03 **	0.08 ***	0.17 ***	0.00	-0.01	0.06 ***	0.00	1.00	
24: Body mass index	-0.06 ***	-0.06 ***	-0.02 *	0.02	0.00	0.08 ***	-0.02	0.00	0.00	-0.01	0.00	0.01	-0.01	0.01	-0.02	-0.02	0.01	-0.02	0.00	-0.03 **	-0.03 **	-0.01	0.00	1.00

* correlation significant p <0.10

**correlation significant p< 0.05

Appendix 2. Bivariate Pearson's correlation coefficients in immigrant sub-sample, N =1,466

		1	2	3	4	5
1	Self-reported health (low to high)					
2	Speaks a foreign language at home (dummy, yes=1)	-0.038 *				
3	Bilingual proficiency (limited to fluent bilingual)	0.071 ***	-0.030 0.251			
4	Length of stay in the US (1 year to all their lives)	0.030	-0.415 ***	0.157 ***		
5	How often speaks foreign language with parents (never to most of the time)	-0.087 ***	0.602 ***	-0.038	-0.452 ***	
6	How often speaks foreign language with friends (never to most of the time)	-0.064 ***	0.288 ***	-0.108 ***	-0.382 ***	0.432 ***

* correlation significant p <0.10

**correlation significant p< 0.05

*** correlation significant p<0.01

Appendix 3 (a): Adolescent Popularity Factor Loading*

	1 - Adolescent Popularity
I am left out of things going on around me	0.68
Kids at school see me as not fitting in	0.80
It is difficult to make frnds with members of my sex	0.53
I am not popular with members of the opposite sex	0.66
I see myself as not fitting in	0.84

Notes:
1. Extraction Method: Principal Component Analysis.
2. Rotation Method: Varimax with Kaiser Normalization.
3. Eigenvalue cut-off = 1.0
4. Alpha reliability = .74
5. N=4399

Appendix 3 (b): Social Capital Factor Loadings

	1 - Positive School Affiliation	2 - Parent Network	3 - Safe Learning Environment	4 - Friendship Bonds
School provides a caring, encouraging environment	**0.64**	0.19	0.27	-0.02
Teaching is good	**0.77**	0.06	0.10	0.01
Teachers are interested in students	**0.79**	0.06	0.12	0.06
Students are graded fairly	**0.74**	-0.03	0.06	0.01
The discipline is fair	**0.70**	-0.04	0.09	-0.01
Parents know friend's parents	0.07	**0.88**	0.03	0.01
Parents know friends	0.04	**0.84**	0.09	0.18
Do not feel safe in school	0.27	0.05	**0.69**	0.02
Disruptions get in the way of learning	0.03	0.09	**0.74**	0.01
Fights occur between different racial/ethnic groups	0.15	-0.02	**0.74**	0.06
Has knowledge of friend's plans	0.01	0.01	0.00	**0.80**
Number of people listing person as a best friend	0.02	0.14	0.07	**0.71**

Notes:
1. Extraction Method: Principal Component Analysis.
2. Rotation Method: Varimax with Kaiser Normalization.
3. Eigenvalue cut-off = 1.0
4. Alpha reliability = .65
5. N=4299

Appendix 3 (c): Parental Support Factor Loadings

	1 - Talks to Parents for Guidance	2 - Parent/mentor helps with homework
Amount parents help with homework	0.29	**0.74**
Amount another adult helps with homework	0.04	**0.67**
Amount parents limit time w/ friends on school nights	-0.05	**0.67**
How often have you discussed school activities with parents	**0.60**	0.43
How often have you discussed going to college	**0.55**	0.38
I receive high levels of love and support from my family	**0.77**	0.12
I have freq, in-depth conversations with my parents	**0.72**	0.14
I can go to my parents for advice and support	**0.81**	0.07
My parents are usually unhappy/disappoint with what I do	**0.71**	-0.18

Notes:
1. Extraction Method: Principal Component Analysis.
2. Rotation Method: Varimax with Kaiser Normalization.
3. Eigenvalue cut-off = 1.0
4. Alpha reliability = .77
5. N=4422

*After factor loadings and reliability estimates were estimated, missing values for individuals items were estimated through regressing each item on the other factor components. These adjusted factor scores were then employed in the main analysis. This procedure was. applied to all factors