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Parental Social Capital and Educational Attainment

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Abstract

This paper examines how resources that reside in social networks of parents affect adolescents' educational attainment. Previous findings are inconclusive. We argue that these inconsistent findings result from: (1) differential effects of different types of parental social capital, (2) selection into parental social capital, and (3) effect heterogeneity of social capital across social contexts. Using the National Longitudinal Study of Adolescent Health (Add Health), we combine propensity score matching and multi-level modeling to investigate three indicators of parental social capital: informal closure among parents, school-related closure through parents' activity in Parent-Teacher Associations, and parents' civic engagement. The results show that benefits of informal closure and school-related closure are specific to low-poverty schools. In high-poverty schools, school-related closure has no effect, and informal closure can even be detrimental to educational attainment. The paper concludes that social closure primarily functions as a multiplier of beneficial resources in parent's networks in socially advantaged communities and exacerbates a lack thereof in socially disadvantaged communities. The social closure generated in informal connections among parents thereby contributes to the encapsulation of disadvantage in areas of concentrated poverty.

Sociological research persuasively shows that inequality is transmitted from one generation to another and that education plays a key role in this process (see Breen and Jonsson 2005 for a review of the literature). Parents' economic and human capital, reflected in their education, occupation, income and wealth, shape their children's educational and professional success. Parents' social capital - resources that reside in parents' social networks - are an additional force in the intergenerational transmission of inequality (Coleman 1988; Bourdieu 1977). Just like other forms of capital, social capital provides individuals with resources, information, and access to various paths of socioeconomic advancement. Unequal access to parental social capital may thus contribute to the persistent inequality in educational attainment along the lines of race/ethnicity, social origin, and gender (Grodsky, Warren, and Felts, 2008; Jacobs 1996).

While Loury (1977) and Bourdieu (1977) first introduced the concept of social capital, James S. Coleman (1988) spearheaded research on social capital in the study of education. Building on Becker (1964), who conceptualized investment in individual skills, i.e. 'human capital' as a rational strategy, Coleman noted that purposeful and/or latent investment in social relations could bring similar returns. While human (or economic or cultural) capital is possessed by individuals and travels with them, "social capital inheres in the structure of relations between actors and among actors. It is not lodged…in the actors themselves" (Coleman 1988: 98). This capital is distinctly social because potential benefits are tied to social relations.

Parents' social connections may benefit educational attainment through several mechanisms. On one hand, parents' connections to resourceful persons can provide access to resources that parents' do not themselves hold, such as information, power, or money. On the other hand, potential benefits may arise from parents' network structure itself that exists irrespective of the resources held by individual persons in the network. An example for such a network structure is the degree of network closure, i.e. the extent to which everybody in the network knows one another.

In this paper, we argue that previous research on the impact of parental social capital on educational attainment is inconclusive because studies have not sufficiently accounted for three dynamics: (1) differential effects of different types of parental social capital, (2) social selection into parental social capital and (3) effect heterogeneity of parental social capital across social contexts. The same network structure among parents may be beneficial in advantaged communities but hamper educational attainment in disadvantaged communities. This paper contributes to the literature by investigating the impact of three indicators of parental social capital for educational attainment, by accounting for selection into parental social capital and for effect heterogeneity of parental social capital across social contexts.

PARENTAL SOCIAL CAPITAL IN THE STUDY OF EDUCATION

Beginning with James S. Coleman (1988), social capital studies in the sociology of education have focused on how adults' social networks improve the academic performance of children. A central piece of Coleman's (1990; 1988) argument is captured by the idea of *social closure*. Social closure refers to relational collectivities that are interconnected in dense and multiplex relationships - that is, where everybody knows everybody else and is connected in multiple ways, for instance as neighbors, friends and colleagues. *Intergenerational closure* exists when parents of children at the same school are connected as neighbors, engage in to the same social activities, and/or are active in the PTA at their children's school together. Such closure generates high levels of conformity by building reciprocal obligations, norms and expectations, trust, and access to information. Thus, social closure generates benefits for individuals and small groups, including safe streets, efficient informal business arrangements, and, in the formative example of the 'Catholic school effect', tenacious students (Coleman 1988; Coleman, Hoffer, and Kilgore 1982). Coleman argued that Catholic schools are characterized by tight-knit communities with norm-enforcing networks. In contrast, the disconnection among parents in public schools creates gaps in the authority structure that allow children to pursue the goals of the 'adolescent society', such as popularity and athletic success, at the expense of academic performance (Coleman 1961; Thorlindsson, Bjarnason, and Sigfusdottir 2007).[1]

Drawing on a social capital tradition rooted in the organizational literature and the study of information flows (Burt 1992; Granovetter 1973; Lin, Cook, and Burt 2001), Morgan and Sørensen (1999) contest Colman's argument on the benefits of intergenerational closure. They argue that intergenerational closure limits children's creativity and stunts otherwise high-achieving students. Instead, the beneficial network structures among parents are 'horizon-expanding'. When parents direct their social energies toward people outside their immediate social world, opportunities to acquire non-redundant information and social contacts arise from the "strength of weak ties" (Granovetter 1973).

Intergenerational closure has received much empirical attention in the education literature with rather fragmented and mixed findings. The bulk of this research uses the *National Education Longitudinal Study* of 1988 (NELS). Carbonaro (1998), for instance, initially supports intergenerational closure's benefits for math achievement and high

[1] For a review and analysis of the empirical validity of the Catholic school effect, see Morgan (2001).

school graduation using NELS data. He later retracts this claim (Carbonaro 1999) in light of a debate with Morgan and Sørensen (1999), who, using the same data, find that intergenerational closure depresses math scores. Also using NELS, Broh (2002) finds that intergenerational closure lowers math scores, but raises English scores. Thorlindsson, Bjarnason, and Sigfusdottir (2007: 161) report that among Icelandic adolescents: “school levels of intergenerational closure […] are predictive of higher math grades.” Using NELS, Kao and Rutherford (2007) report that intergenerational closure generally improves GPA and composite math and reading test scores, but point out differential returns to intergenerational closure for immigrant and minority groups. In particular, Asian students have higher educational returns from intergenerational closure than white students, while black students’ returns are lower than for their white peers.

Evidence based on NELS about the impact of intergenerational closure on college attendance and high school graduation is equally inconclusive. Sandefur, Meier, and Campbell (2006) find no effect for intergenerational closure on college attendance, while Kim and Schneider (2005) find that closure increases college attendance. Teachman, Paasch, and Carver (1997) note that closure initially increases the probability of high school graduation, but loses relevance as other social capital and control variables are considered. Other studies (Portes 2000; Thorlindsson, Bjarnason, and Sigfusdottir 2007) similarly find that a positive effect of closure on grades and test scores wanes once their models include parental monitoring and support, adolescent activities, parents’ socioeconomic status and immigration background. Overall, the literature suggests that social closure on the school level - the percentage of students surrounded by closure in schools - is more powerful in predicting educational attainment than intergenerational closure on the student level (Morgan and Sørensen 1999; Morgan and Todd 2009;

Thorlindson, Bjarnason, and Sigfusdottir. 2007). While Morgan and Sørensen (1999) find that school level intergenerational closure is detrimental to educational attainment, Thorlindson, Bjarnason, and Sigfusdottir (2007) find a moderate positive impact.

The logic of horizon-expanding networks has made only minimal inroads in the empirical study of educational attainment. One reason for this arguably is the difficulty of measuring such networks persuasively. Morgan and Sørensen (1999) claim horizon-broadening networks are beneficial without directly measuring such networks. They measure intergenerational closure and, in the absence of a positive closure effect, assume such horizon-expanding networks must exist. However, parents can be connected to their children's friends' parents, yet still have relations in the broader community that are horizon-expanding. Conversely, some parents may possess neither type of social capital. As put by Ronald Burt "[T]he parental network around their children defines only part of the social-capital effect on educational achievement. The complete story is about effective adult supervision (closure argument) combined with parental ability to wrestle resources out of society to support the child" (horizon expansion argument) (2001: 47).

A lack of persuasive measures of horizon-expanding contacts permeates research following Morgan and Sørensen's (1999) horizon expansion argument on educational attainment. Based on NELS, Kim and Schneider (2005) invoke Morgan and Sørensen (1999) and Burt (2001) in recognizing the role of parents' 'group-bridging' ties as sources of information that aid their children's college attendance. They operationalize 'bridging' ties among parents as bilingualism, under the assumption that different languages are used among distinct groups of people. They find that bilingualism benefits college attendance only for white students, possibly due to a higher concentration of advantageous resources in their bridging networks.

Analytical strategy and contribution

This paper argues that three dynamics lie at the core of the mixed findings on the role of social closure and horizon expansion in educational attainment: (1) differential effects of different types of social closure, (2) social selectivity into parental social capital, and (3) effect heterogeneity of parental social capital by social context.

Differential effects of different types of social closure

The inconsistent findings on the impact of intergenerational closure on educational attainment may be at least partly driven by ambiguity in the indicators used and the extent to which they succeed in capturing the essence of Coleman's closure argument. The most commonly used measure for intergenerational closure assesses how many parents of their child's friends a parent knows or has talked to in the last couple of weeks (e.g. Carbonaro 1998; 1999; Morgan and Sørensen 1999; Portes 2000; Teachman, Paasch, and Carver 1997). This type of informal closure among parents does not necessarily entail consensus about norms of academic achievement or effective monitoring of one another's children. Conversely, parents' involvement in the school, such as their activity in the PTA, captures school-related exchange among parents. While parents' PTA membership also does not necessarily imply monitoring of one another's children, parents' communication in the PTA centers around the definition of common norms of academic achievement and means to effectively enforce them. In the PTA, parents jointly direct their energies toward improving school environments to foster their children's educational success.

Several studies include a measure of parents' school involvement as control variables, such as parents PTA membership or a composite measure of parent-school connectivity, but do not treat them as measures of closure itself (Carbonaro 1998; Morgan and Sørensen 1999; Teachman, Paasch, and Carver 1997). For instance, Carbonaro (1998: 397) finds that parents' school participation is more beneficial for high school graduation than parents' informal closure, but does not further investigate parents' school participation in his subsequent related work (1999). Similarly, Teachman, Paasch, and Carver (1997) find that their composite measure of parent school connectivity enhances high school graduation.

In contrast to previous studies that treat intergenerational closure as one uniform construct, we argue that informal closure and school-related closure among parents pertain to different aspects of Coleman's original conceptualization of intergenerational closure and may differentially affect educational attainment. Breaking down the concept into these distinct aspects brings us closer to the mechanisms by which intergenerational closure affects educational attainment.

Social selection into parental social capital

Social selection may create an illusory parental social capital effect on educational attainment. Social closure in intergenerational networks might be correlated with other characteristics and resources of parents that affect educational attainment and confound the effect of social capital, such as parents' education or racial and ethnic background (Kao and Rutherford 2007; Huang, van den Brink, and Groot 2009; Ravanera and Rajulton 2010). For instance, parents who chose to be active in the PTA likely differ on other characteristics from parents who do not. They might invest more in their children’s education in other ways and have more time and resources available to do so. Further, based on the neighborhood in which they can afford to live, parents actively choose schools they think are best for their children, which leads similar parents to cluster in schools. A concentration of parents who value mutual supervision of their children may generate closure as a side effect of individual parents’ effort to maximize social opportunities for their children. Hence, networks can be seen as a by-product of processes that structure educational attainment. The question is whether parental social capital has in fact a causal effect on educational attainment. To account for this selection effects, we use propensity score matching (PSM) and capitalize on previous research about the substantive selection processes at work to guide the specification of the PSM models (Winship and Mare 1992; Harding 2003; Morgan and Winship 2007).

Effect heterogeneity of parental social capital by social context

Consider as an example, effective enforcement of norms that are beneficial to academic achievement as one mechanism through which closure can benefit educational attainment (Coleman 1988). Such a beneficial effect of closure will only come about if a) connected parents agree on common standards, b) these common standards foster academic performance, and c) parents have the capacity to effectively sanction deviations from them. If any of the above assumptions is not met, there is no reason to assume that closure will benefit adolescents’ educational attainment.

Indeed, closure may still be powerful as a multiplier of parenting effects but could exacerbate harmful influences on children’s academic achievement. In socially disadvantaged communities, closure may function to ‘lock-in’ disadvantage. Parents may not agree on common standards or be too overburdened by day-to-day problems to effectively sanction deviations from norms of academic achievement in communities where unemployment, economic deprivation, substance abuse, and criminal activity pervade daily life. In such areas of concentrated disadvantage, network closure among parents can undermine parents' efforts to shield their children from negative contextual influences. Conversely, social closure in middle- and upper-class communities potentially reinforces norms and practices that foster academic achievement.

The study of social closure has largely been preoccupied with its positive effects, while failing to consider that in some environments, closure might encapsulate disadvantage. Portes (1998) has spearheaded a body of literature about the 'downside of social capital,' noting that closure has negative effects including "exclusion of outsiders, excess claims on group members, restrictions on individual freedoms, and downward leveling norms" (Portes 1998: 15). The embedded nature of social capital (Granovetter 1985) and its downside are implicit or explicit in numerous studies including Rubio's (1997) discussion of 'perverse' capital in Columbia and Bourgois' (1995) treatment of getting ahead in *El Barrio*. Closure likely plays a role in the segregated urban core where poor academic performance is well documented and social isolation has progressively increased (Anderson 1999; Massey and Denton 1993; Orfield and Lee 2007; Wilson 1987; Duck 2009).

Studies that consider intergenerational closure in interaction with socioeconomic and contextual variables generally support that its benefits are specific to certain population groups and contexts. It is, however less clear which underlying contextual conditions drive the effect heterogeneity of social closure. Using standard interaction terms, Teachman, Paasch, and Carver (1997) note that intergenerational closure enhances the beneficial effect of parents' income on their children's high school graduation. Using a hierarchical model, Thorlindsson, Bjarnason, and Sigfusdottir (2007) note that high levels of intergenerational closure at the school level mitigate the importance of individual parents' education for children's math grades.[2] Kim and Schneider (2005) note that intergenerational closure moderately enhances college attendance for non-minority students but has no effect for minority students. Kao and Rutherford (2007) equally report differential returns to intergenerational closure for minority and immigrant children. Our study adds to this line of research by estimating how the impact of different types of parental social capital on educational attainment varies with social context on the school level. Schools based in residential neighborhoods are the focal point of social organization for most adolescents and the importance of accounting for school context in the study of educational attainment is well established (Morgan and Sørensen 1999; Morgan and Todd 2009).

DATA AND METHODS

We use data from the *National Longitudinal Study of Adolescent Health* (Add Health), a nationally representative school-based sample (144 schools) of adolescents enrolled in 7th-12th grade in 1994/1995 when the first wave was administered (Harris et al. 2003). Adolescents were followed over time and interviewed up to four times after the baseline in-school survey in 1994 (1994/1995, 1996, 2001/2002, 2007/2008). We use data from the Wave I in-home survey in 1994/1995 when adolescents where in grades 7-12 to measure all independent variables. 20,745 adolescents participated in the Wave I in-home questionnaire. To measure parental social capital, we use the Wave I parental

[2] Morgan and Todd's (2009) findings from hierarchical models show that intergenerational closure is beneficial for educational attainment in Catholic schools, but not in public schools. Apparently, there are beneficial resources specific to the religiously anchored networks surrounding Catholic schools (Bryk, Lee, and Holland 1995) that are reinforced by intergenerational closure.

interview conducted with the primary caretaker of each adolescent, which was completed for 17,928 Wave I respondents. The educational attainment outcomes are measured in 2001/2002, in Wave III of Add Health when all respondents were 18 to 24 years old. Wave III contains data for 14,979 original Wave I respondents. There are 13,332 respondents for whom information from the Wave I in-school questionnaire, the Wave I parental questionnaire and Wave III is available.

Educational attainment is measured with two binary indicators: self-reported graduation from high school and college attendance. Since only part of the Add Health sample had reached college-completion age by Wave III, we focus on college attendance rather than college completion.

Parental social capital is measured with three indicators that pertain to different types of closure and horizon expansion. *Informal intergenerational closure* is measured with the following question, asked to a resident parent of each respondent child:

> Please think about all of [your child's] friends. How many parents of [your child's] friends have you talked to in the last four weeks?

Answers were recorded in seven categories from 0 to '6 or more'. We dichotomize informal closure into a binary variable that takes the value one when a parent talked to two or more parents of their child's friends and zero otherwise. This captures informal connections among parents that go beyond one dyadic tie between parents.

School-related intergenerational closure is measured with parents' membership in the PTA. Parents' PTA membership captures closure in which parents direct their energies toward school-related activities. It is coded as a binary variable that takes the value one when the respective parent is member of the PTA and zero otherwise.

Parents' civic participation provides potential opportunities to build both closure-generating and horizon-expanding networks. Robert Putnam (1995) has forcefully argued that social capital develops when people participate in voluntary associations. In such organizations, individuals may be exposed to people beyond their immediate cliques, which is the essence of Morgan and Sørensen's (1999) reasoning about horizon-expanding contacts. Civic and hobby organizations are sources of 'weak ties', which are critical to obtaining non-redundant information and provide exposure to diverse opinions (Burt 1992; Granovetter 1973). While there is a case to be made for civic participation as a measure of horizon expansion, the local availability of such organizations suggests that they may in fact generate another form of closure. Parents who are located in the same residential school districts may overlap in the civic and hobby organizations they participate in. In this case, parents' civic engagement reflects another type of informal intergenerational closure that is not school-related. We measure parents' civic engagement by 2 items that capture participation in non-school-related voluntary associations:

> Please tell me whether you are a member of any of the following:
>
> > Hobby or sports group, such as a bowling team or a ham radio club
> >
> > Civic or social organization, such as Junior League, Rotary, or Knights of Columbus

We generate a binary indictor of parents' civic participation that takes the value one if the primary caretaker is a member of one or more of these organizations and zero if he or she is not a member of any.[3] Table 1 shows descriptive statistics for the three parental social capital indicators for the full sample of parental interviews in Wave I and the analysis sample that contains only adolescents for whom information is available from the Wave I in-home, Wave I parental, and Wave III interviews.

[3] We also conducted the analysis including parents' membership in unions and veterans organizations. The substantive results remained the same and are available from the authors upon request.

- table 1 about here –

Individual level covariates

We include individual level covariates that capture adolescents' social demographic characteristics and academic performance. As indicators of adolescents' social demographic characteristics we include age, gender, race, parents' education, parents' occupation, family type, religiosity, health, whether their home language is English, whether they were born in a foreign country, and an indicator for poverty. Religiosity is a composite scale based on how important adolescents rate religion for their life, and how often they go to church, pray or engage in other church related activities. Adolescents are regarded as 'poor' if the family received welfare, food stamps, or other means-tested transfers in the year before Wave I, using information from the adolescent and parental surveys.

As indicators of adolescents' academic performance we include GPA, adolescents' college expectations, the Add Health picture vocabulary test, self-esteem, and whether respondents have been victimized or engaged in a serious delinquency in the past 12 months. Self-esteem is measured on a composite scale of how strongly adolescents agree or disagree with 12 items, including 'I have a lot of good qualities', 'I have a lot to be proud of', and 'I like myself just the way I am'. Victimization is recorded as a binary variable that takes the value one when an adolescent has been shot, stabbed, jumped or someone pulled a knife or gun at them at least once in the past 12 months. Delinquency is recorded as a count variable ranging from 0 to 16 that counts a variety of delinquent behavior over the past 12 months, including damage of property, stealing, running away from home and getting into serious physical fights. We include a scale for the quality of adolescents' relationship with their primary care-takers that captures whether adolescents perceive their primary care-taker as warm and loving, can talk to them about important and troublesome issues and are overall satisfied with their relationship. In addition, we include a subjective assessment of adolescents' general health ranging from 0 'poor' to 4 'excellent'.[4]

School level covariates

Social (dis-)advantage on the school level, the central contextual effect of interest, is operationalized using several indicators of school composition: percent poor students, percent students with a college-educated parent, average school level family socioeconomic status (SES), and percent black students as a proxy for residential segregation, for which research has well documented deleterious effects (Charles 2003). In addition, we include school percentages of the three parental social capital indicators; informal closure, school-related closure and parents' civic participation.

Method

This study combines propensity score matching (PSM) (Rubin 1974; Morgan and Winship 2007), to capture the selection of adolescents into parental social capital, and hierarchical non-linear models for binary data (Raudenbush and Bryk 2002). The hierarchical binary models estimate school context effects that reflect the social composition of schools.

[4] More detailed information on the measurement and construction of each covariate is available upon request.

Propensity score matching

We focus on an intuitive explanation of the counterfactual framework and PSM. Comprehensive formal introductions are provided in Rubin (1974), Winship and Morgan (1999), Morgan and Winship (2007), Schneider et al (2007), and Caliendo and Kopeinig (2008). To identify the 'causal' effect of parental social capital on educational attainment net of selection into parental networks, ideally, we could compare each adolescent's educational attainment if he or she had grown up surrounded by a specific type of parental social capital to their attainment without this parental social capital. Clearly, this is impossible since we can only observe each adolescent in one of the two states and not the counterfactual 'what-if' state. This is the fundamental problem of causal inference (Rubin 1974).

The estimation of propensity scores is one way to address this fundamental problem of causal inference with observational data. Analogous to the logic of randomized experiments, the parental social capital indicators are thought of as binary 'treatments' in this framework.[5] The propensity of each individual to experience the 'treatment' - in our case, the presence or absence of parental social capital - is estimated based on a set of covariates assumed to drive the selection into parental social capital. Following Harding (2003), our selection of covariates is based on previous research about the substantive selection process at hand. Then adolescents are matched on their *propensity* to be surrounded by a certain type of parental social capital. To estimate the

[5] One can question whether it makes sense to think about a concept like social capital as a 'treatment'. Social networks arise out of the lived experience of individuals and it is probably difficult, if not impossible, to administer social capital as one would administer a medical or educational intervention. Noting this, we nevertheless retain the term in keeping with the literature on causal inference. While in principle treatments can take multiple values, this exceedingly complicates estimation (Morgan and Winship 2007) and we focus on binary treatments in this paper. The results of the PSM models were insensitive to several other dichotomizations of the informal closure treatment (0 vs. all others, 0-2 vs. all others, 0-3 vs. all others alternative dichotomizations of parents' civic engagement (member of one or both types of organization, and each of them individually).

counterfactual outcome, we match adolescents who received the treatment with adolescents who did not receive the treatment but had an equal propensity to be 'treated'. Thus, we can estimate adolescents' educational attainment had they *not* been surrounded by specific types of parental social capital (Morgan and Winship 2007). The difference between the group who received the treatment and the matched group who did not, represents the causal effect of parental social capital net of selection into parental social capital.[6]

Among several available matching algorithms (see Harding 2007; Caliendo and Copeinig 2008), we chose Kernel Matching, a non-parametric matching estimator that uses weighted averages of nearly all individuals in the control group to estimate the counterfactual outcome for the treated adolescents (Heckman, Ichimura, and Todd 1998).[7] Weights depend on the distance between each treated and untreated individual. All control cases are matched to each treatment case and weighted so that the control cases closest to the treatment case are given the greatest weight (Harding 2007: 109). Kernel Matching achieves lower variances than most other matching methods because more information from the data is used and it has yielded good results in tests on experimental data (Smith and Todd 2005; Heckman, Ichimura and Todd, 1998).

We only include variables that are unambiguously temporally located before the treatment in the estimation of the propensity score, such as parental education, race, and gender. Including predictors that may themselves be affected by the treatment, instead of driving selection into the treatment, may lead to post-treatment bias (Rosenbaum 1984). In addition, we include school fixed effects to control for unobserved school-specific

[6] Specifically, it represents the average treatment effect on the treated (ATT), the expected educational attainment with and without parental social capital for those adolescents who actually were surrounded by the respective type of parental social capital. For adolescents who grew up in contexts that do not foster social capital, its effect might be different. (see Caliendo and Kopeinig 2008, Rubin 1974).
[7] Results were robust in nearest neighbor matching, caliper matching and local linear matching.

factors. This captures unobserved heterogeneity associated with parents' efforts to select the best school possible for their children, and thereby clustering of similar parents in schools, which in turn may be associated with parental networks.

Two core assumptions of PSM are unconfoundedness and overlap (Heckman and Smith 1999; Caliendo and Kopeinig 2008). The condition of unconfoundedness, or 'conditional independence', assumes that the treatment is exogenous after matching, i.e. that the existing selection is on observable covariates and that matching successfully eliminated all differences between matched control and treated on these observed covariates. 'Overlap' assures that both treated and control individuals span the full range of the propensity score. A lack of overlap could arise, for example, if there were no adolescents with high propensities to have parental social capital who were factually not surrounded by parental social capital. In this case, PSM models would amount to extrapolating between two very different groups and essentially comparing the incomparable. Appendix 1 shows an evaluation of balance and overlap, and sensitivity analyses of the results to possibly important unobserved variables (Harding 2003; Becker and Caliendo 2007). These analyses support overall high matching quality.

Hierarchical binary models

We specify hierarchical binary models (Raudenbush and Bryk 1986; 2002) to estimate the contingency of parental social capital for educational attainment on social context measured on the school level. The estimated propensity scores are included at the individual level to account for social selectivity into parental social capital. We estimate separate models for each parental social capital treatment. Full model equations are presented in appendix A2. The link function for Y is a logit function for the two binary dependent variables, high school graduation and college attendance. The school level equation models the intercept from the individual-level model as a function of school characteristics summarized in a set of school level covariates. Because the individual level covariates are centered around the grand mean, the intercept represents the school mean logit of high school graduation and college attendance for a student with a (grand) average on every individual level covariate, i.e. the adjusted school mean. To estimate the contingency of parental social capital on social context, we include cross-level interactions between the respective parental social capital treatment and school level indicators of social disadvantage. School level percentages are derived with empirical Bayes estimates in unconditional hierarchical models (Raudenbush and Bryk 1986; 2002).[8] The empirical Bayes estimates are an improved indicator for school percentages and means because they include information from all schools weighted by the reliability of the information for each school. Reliability of all estimated empirical Bayes estimates is high, ranging between .795 for parents' civic participation in schools and .965 for average family SES in schools. The school level percentages are rescaled such that zero represents the lowest value. Their effects can be interpreted as a change in the outcome with a one percent increase in the respective school composition variable.

[8] Technically, empirical Bayes estimates are calculated in a hierarchical model without covariates using, for instance, the poverty indicator as the outcome. The empirical Bayes coefficient for the intercept for each school is generated in HLM6 and can easily be transformed into school level percentages for binary variables and school means for continuous variables. Empirical Bayes estimates are also known as 'statistical shrinking', because outlier schools are 'shrunk' towards the population mean.

RESULTS

Table 2 summarizes descriptive statistics of the outcome variables high school graduation and college attendance, the parental social capital indicators, and all individual level and school level covariates for the PSM and hierarchical binary models. The individual level covariates that enter the PSM models are marked with an asterisk. In the PSM models, we additionally include school fixed effects to account for unobserved factors associated with selection into schools. This is important to capture self-selection of similar parents into schools.

- table 2 about here -

- table 3 about here -

Table 3 shows probit models that estimate the propensity to have the three types of parental social capital. Poverty lowers adolescents' probability to have either form of parental social capital and parents' education enhances access to all types of parental social capital. Similar dynamics drive selection into informal closure and school-related closure. They are usually associated with educational advantage: religious, white adolescents, in traditional family structures with two biological parents, who are employed in a professional occupation, are most likely to be surrounded by both informal and school-related closure. Selection into parents' civic participation differs on a number of factors: Hispanic and Asian - but not black adolescents - have a lower probability of their parents engaging in civic organizations than their white peers. Religiosity plays no role, while living in a rural area lowers the odds of having parents who are civically engaged. Non-traditional family structures increase the odds of parents' civic participation, which possibly captures outreach for external support networks by parents who raise their children in non-traditional families. Compared to parents who have no occupation, all parental occupations increase the probability of civic participation.

Table 4 shows estimated treatment effects of the three types of parental social capital on the probability to graduate from high school and to attend college. The difference in the mean probability of graduating from high school and attending college for the matched untreated and treated adolescents represents the estimated average treatment effect on the treated (ATT). For instance, adolescents who grew up surrounded by informal closure have a 93.5 percent probability to graduate from high school (table 4). Adolescents who are equal on all other characteristics, but were not surrounded by informal closure (matched untreated) have a 92.2 percent probability to graduate from high school. The ATT is the difference between the two, i.e. informal closure increases the probability to graduate from high school by 1.3 percent, net of selection into networks in which parents are informally connected to their child's friends' parents.

- table 4 about here -

Treatment effects of informal closure and school-related closure on educational attainment are similar: a 1 to 2 percent increase in the probability to graduate from high school, and about a 7 percent increase in the probability to attend college. Parents' civic participation has no effect on adolescents' probability to graduate from high school and increases adolescent's odds of college attendance by 3.5 percent (table 4).

These estimates do not control for potentially confounding variables that could not be included in the PSM models without risking post-treatment bias, such as college expectations and academic performance in 7th - 12th grade. Of course, these resources are in part also affected by the presence or absence of parental social capital, but surely social capital is not the only pathway by which academic achievement affects educational attainment. In this sense, the effects reported in table 4 represent a non-conservative estimation of the causal effect. Models reported below therefore control for academic achievement and other characteristics associated with educational attainment and represent successively more conservative estimates of the effect of parental social capital. Furthermore, the analyses reported so far tell us nothing about the hypothesized effect heterogeneity of parental social capital across social context. The propensity scores estimated with the PSM models are subsequently included in the hierarchical models on level 1 to jointly account for selection into parental social capital and for contextual effects.

We estimate six hierarchical models, one for each type of parental social capital and educational outcome. The hierarchical models proceed in three steps: step (1) includes only the estimated propensity score, the parental social capital treatments, and interactions with social context; step (2) additionally includes potentially post-treatment controls such as student achievement, victimization, delinquency, and self esteem; and step (3) additionally includes the pre-treatment controls that were used to calculate the propensity score.[9] We calculate these three model scenarios as a conservative estimate of the effects to explore their robustness across all scenarios.

Tables 5, 6 and 7 summarize the estimates from the three model steps for the parental social capital treatments and cross-level interaction effects. Tables A5-A10 in the appendix report full hierarchical models. They are weighted with the Add Health Wave I population weights. Deviance statistics (tables A5-A10) indicate that step 3, which includes the full set of pre- and potentially post-treatment controls, provides the best fit to the data for both outcomes. School level family SES and school percent of

[9] The impact of pre-treatment controls on educational attainment is principally included in the hierarchical binary models in the propensity score.

black adolescents were omitted from the final model specifications, because they were insignificant in all models. The percent of poor students and of students with college-educated parents remain in the models as significant indicators of social (dis-)advantage. The propensity scores for parental social capital are included as dummy variables for quantiles of the propensity score taking the lowest quantile as the reference category (see Morgan 2001).[10] Cross-level interactions between the individual level social capital treatments and the concentration of poverty and of college-educated parents in schools test for effect heterogeneity across social context. The effects are presented as odds-ratios. We limit our interpretation to effects that were significant across all three model steps, highlighted in bold in tables 5, 6, and 7.

- table 5, 6, 7 about here -

Informal closure increases the probability of high school graduation, but has no effect on college attendance, once we account for selection and potentially post-treatment covariates (table 5). The benefits of informal closure for high school graduation are specific to low-poverty schools, expressed in the positive odds ratio for informal closure and negative cross-level interaction between school level poverty and informal closure in table 5. This relationship is robust across all three steps, albeit the effect sizes decrease as additional controls enter the model in steps 2 and 3. In fact, as illustrated in figure 1 for all three model steps, informal closure among parents benefits high school graduation only in very low-poverty schools and is increasingly detrimental with a higher concentration of poverty in schools. The negative effect of informal closure in high-poverty schools by far outweighs its moderate benefits for high school graduation in low-poverty schools. We only examine the 10^{th} to 90^{th} percentile range of school poverty to

[10] Estimates are substantially similar if we use the propensity score as a continuous variable, or when including both the quantile dummies as well as the continuous propensity score.

ensure that the effect sizes we interpret are sufficiently supported by data and not purely driven by outliers. In the lowest poverty schools, informal closure enhances the probability of high school graduation between 0.5 and 2 percent. In the highest poverty schools, informal closure decreases the probability of high school graduation between 5 and 10 percent (figure 1). We conclude that informal closure functions as a multiplier of contextual effects on high school graduation and is one mechanism by which educational disadvantage is encapsulated in socially disadvantaged communities.

- figure 1 about here -

School-related closure, measured as parents' membership in the PTA, equally only affects high school graduation consistently and this effect is contingent on social context (table 6). Similar to informal closure, the benefits of parents' school-related closure for high school graduation are specific to low-poverty schools, expressed in the significant negative cross-level interaction between school level poverty and parents in the PTA. Figure 2 shows two important differences between informal closure and school-related closure: in low-poverty schools, the benefits of school-related closure are far more sizeable between 2 and 4 percent than for informal closure. In contrast to informal closure, parents' school-related closure is not detrimental for high school graduation in high-poverty schools.

In sum, the results for informal and school-related closure among parents suggest that intergenerational closure is beneficial to high school graduation in socially advantaged schools but not in socially disadvantaged schools. Our findings also point to important differential affects of informal and school-related closure. Informal closure among parents is harmful for adolescents' educational attainment in areas of concentrated poverty. School-related closure has a more sizeable positive effect in low-poverty schools and does not bear such negative potential; it is simply ineffective in areas of concentrated poverty.

- figure 2 about here -

We find no support that the horizon-expanding potential of parents' civic participation benefits adolescents' educational attainment. Parents civic participation on the individual level does not affect educational attainment (table 7). This is in line with no treatment effect of parents' civic participation on high school graduation in the PSM models (table 4). Compared to a 3.5 percent increase in college attendance in the PSM models (table 4), the hierarchical models represent lower bounds of the civic participation effect including school level and potentially post-treatment controls.

This finding suggests that parents' civic participation on the individual level does not per se hold the benefits for educational attainment assumed to reside in parents' horizon-expanding contacts. On the school level, parents' civic participation is even consistently detrimental to both high school graduation and college attendance (table 7). However, these results do not permit any basic conclusions about the impact of horizon-expanding contacts for educational attainment. Instead, they primarily point to conceptual ambiguity about the social capital-generating content of civic participation. It is uncertain to what extent parents' civic participation captures horizon-expanding contacts or possibly another type of locally organized closure among parents. A relatively high positive correlation (.64) between parents' civic participation and informal closure on the school level suggests that civic organizations indeed primarily carry closure-generating potential (see correlations in table A11). Simply by force of numbers, the more parents at a school engage in the locally available civic, hobby, and sports groups, the more likely they will cross paths in these organizations. At a sufficiently high percentage of civically engaged parents in schools, parents' civic participation seems to primarily generate non-school-related closure among parents that carries detrimental potential for educational attainment, similar to the detrimental potential of informal closure. Interpreted as another type of closure, the negative school level effect of parents civic participation is in accordance with previous research (Morgan and Sørensen 1999; Carbonaro 1999) and our own finding of a negative, albeit inconsistent effect of informal closure on the school level (table 5 and 6).

DISCUSSION

This paper examined how resources that reside in parents' social networks affect adolescents' educational attainment and thereby contribute to the intergenerational transmission of social inequality. We argued that mixed findings on the role of parental social capital on educational attainment result from a neglect of three factors: differential effects for different types of parental social capital, social selection into parental social capital, and effect heterogeneity of parental social capital across social context. We used three indicators of parental social capital that pertain to different aspects of social closure and combined propensity score matching with hierarchical binary modeling.

Overall, parental social capital during adolescence only modestly affects later educational attainment once selection is accounted for. In the propensity score models, effect sizes range between a 1 percent increase in high school graduation and a 7 percent increase in college attendance in response to informal and school-related closure. In the more conservative estimation in the hierarchical models including context effects and controls for academic achievement, the three types of parental social capital no longer affect college attendance beyond their effect on high school graduation. Only informal and school-related closure consistently affect high school graduation and their impact is contingent on social context. The detrimental potential of informal closure in areas of concentrated poverty outweighs its moderate benefits in low-poverty schools and it has no effect in average schools. Conversely, school-related closure captured in parents' PTA membership holds more sizeable benefits in low-poverty schools and does not have the destructive potential of informal closure in areas of concentrated poverty.

How do these findings relate to previous research? Studies that use hierarchical modeling have pointed out negative effects of intergenerational closure (Morgan and Sørensen 1999; Carbonaro 1999) and the specificity of its positive effects to certain social contexts, such as Catholic schools (Morgan and Todd 2009), and specific populations, for instance non-minority students (Kim and Schneider 2005). Given the possibility of unaccounted selection, problems of representativeness and very low student numbers in some schools in NELS (Carbonaro 1999), Morgan and Sørensen (1999) likely picked up the negative component of intergenerational closure in their finding of a detrimental effect of closure. Our findings resonate with evidence on an elevated high school dropout risk for adolescents from high-poverty neighborhoods (e.g. Harding 2003), and suggest that informal closure among parents multiplies such negative contextual effects in disadvantaged neighborhoods.

Ethnographic studies may shed further light on the mechanisms through which different types of social closure multiply contextual effects. David Harding's (2010) work suggests that adolescents who live in neighborhoods plagued by concentrated poverty are exposed to heterogeneous normative influences that result in "code switching". Although almost everyone in their social worlds believes education is important, there is little effective reinforcement of behavior required for educational success. Behavior that is associated with academic failure, however, is socially acceptable among adolescents' peers and role models such as older boys. Harding also notes that contacts to someone who has actually completed college are crucially important to help parents and students develop realistic expectations and plans for the college enrollment process.

With regard to parents' civic participation, our analysis underlines the ambiguity about the social capital-generating content of this indicator, as it offers opportunities to build both closure-generating and horizon-expanding contacts. We cannot adjudicate between these two interpretations using the data at hand; and data that would allow us to more fully describe the structure of parents' networks are not available. Either way, on the individual level parents' civic participation per se does not affect educational attainment. Civic participation on the school level seems to organize another form of non-school-related closure that is detrimental to educational attainment.

As pointed out by Kim and Schneider (2005), the impact of horizon-expanding contacts is likely contingent on the contacts' characteristics, just as the impact of closure is dependent on the social context in which one is located. To adjudicate the impact of horizon-expanding contacts on educational attainment, future research should directly measure characteristics of the persons who populate parents' social networks. A fuller, more detailed view of parents' participation in civic associations and more information on the people participating in these civic organizations is necessary to test whether weak ties are strong for educational attainment.

In terms of policy conclusions, our study has a simple message: while social capital is in principle available to everyone,[11] intergenerational closure is not one uniform construct and the impact of different types of closure is status-dependent. Our findings

[11] This is visible in the very small number of cases "off support" in the propensity models (see appendix A1).

suggest that promoting informal closure will not benefit adolescents in average schools and is potentially even detrimental to educational attainment of adolescents in schools with concentrated poverty. Promoting school-related closure through PTA's is more promising to enhance educational attainment, albeit our analyses give no reason to be optimistic about its effectiveness in areas of concentrated poverty. In fact, both informal and school-related closure reinforce the intergenerational transmission of social inequality in educational attainment by benefiting adolescents in socially advantaged communities more than adolescent in socially disadvantaged communities. This is one example how social networks contribute to the accumulation of advantage/disadvantage (DiPrete and Eirich, 2006).

Quite how difficult it would be to design ethically sensible and effective social policies targeted at parents' social networks becomes apparent when we relate the findings of our study to other known dynamics in social networks. Research on network homophily, the tendency of persons to associate with similar others, shows that homogeneous networks are more stable than heterogeneous networks (McPherson, Smith-Lovin, and Cook 2001). Over time, such homogenous networks tend to increasingly cluster people with similar characteristics in a cumulative-advantage-like process (Kossinets and Watts 2009). Moreover, people in homogenous groups tend to become more extreme in their attitudes and convictions, a phenomenon known as group polarization in social psychology (Stoner 1968; Isenberg 1986).

Applied to intergenerational closure and educational attainment, this implies that social closure will be particularly stable in networks in which either social advantage or disadvantage is highly concentrated. On the one hand, stable, closed networks of resourceful parents will spur increasing commitment to norms that are beneficial to academic achievement. On the other hand, parents who lack the resources to effectively enforce norms of academic achievement will be ‘locked-in’ in equally stable and closed social networks where other parents are also unable to promote their children’s academic performance. Such a dynamic can induce downward spirals of educational disadvantage in areas of concentrated poverty. Homophily, group polarization, and the multiplying effect of social closure likely are powerful and relatively inert network dynamics that are not easily swayed by social policies, apart from profound ethical concerns about social policies interfering with peoples’ personal networks. We therefore conclude that social policy should primarily target the reduction of contextual disadvantage, and when possible foster social closure as a multiplier of positive effects. Nevertheless, an awareness of the inequality reinforcing dynamics of social networks is an important precondition to design effective social policies to reduce inequality in educational attainment.

References

Anderson, Elijah. 1999. *Code of the Streets: Decency, Violence, and the Moral Life of the Inner City*. New York: W. W. Norton.

Becker, Gary. 1964. *Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education*. University of Chicago Press by arrangement with the National Bureau of Economic Research. 3rd Edition.

Becker, Sascha O. and Marco Caliendo. 2007. "Sensitivity Analysis for Average Treatment Effects." *The Stata Journal* 7:71-83.

Breen, Richard and Jan O. Jonsson. 2005. Inequality of Educational Opportunity in Comparative Perspective: Recent Research on Educational Attainment and Social Mobility. *Annual Review of Sociology* 31:223-43.

Bryk, Anthony, Valerie Lee, and Peter Holland. 1995. *Catholic schools and the common good*. Harvard University Press.

Bourdieu, Pierre 1977. *Reproduction in Education, Society, and Culture*. Thousand Oaks, CA: Sage Publications.

Bourgois, Philippe. 1995. *In Search of Respect: Selling Crack in El Barrio*. New York: Cambridge University Press.

Broh, Beckett. 2002. "Linking Extracurricular Programming to Academic Achievement: Who Benefits and Why?" *Sociology of Education* 75:69-95.

Burt, Ronald. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge, MA: Harvard University Press.

—. 2001. "Structural Holes versus Network Closure as Social Capital." Pp. 31-56 in *Social Capital: Theory and Research*, Nan Lin, Karen Cook, and Ronald Burt (eds.). Piscataway, NJ: Aldine Transaction Publishers.

Caliendo, Marco, and Sabine Kopeinig. 2008. "Some Practical Guidance for the Implementation of Propensity Score Matching." *Journal of Economic Surveys* 22:31-72.

Carbonaro, William. 1998. "A Little Help from My Friends' Parents: Intergenerational Closure and Educational Outcomes." *Sociology of Education* 71:295-313.

—. 1999. "Opening the Debate on Closure and Schooling Outcomes." *American Sociological Review* 64:682-686.

Charles, Camille Zubrinsky. 2003. "The Dynamics of Racial Residential Segregation". *Annual Review of Sociology* 29:167-207.

Coleman, James. 1961. *The Adolescent Society: The Social Life of the Teenager and its Impact on Education*. New York: The Free Press.

—. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology* 94S:s95-s120.

—. 1990. *Equality and Achievement in Education*. Boulder, CO: Westview Press.

Coleman, James and Thomas Hoffer. 1987. *Public and Private Schools: The Impact of Communities*. New York: Basic Books.

Coleman, James, Thomas Hoffer, and Sally Kilgore. 1982. *High School Achievement: Public, Catholic, and Private Schools Compared*. New York: Basic Books.

DiPrete, Thomas A. and Gregory M. Eirich 2006 "Cumulative Advantage as a Mechanism for Inequality: A Review of Theoretical and Empirical Developments" *Annual Review of Sociology 32*:271–97.

Duck, Waverly. 2009. "'Senseless' Violence. Making Sense of Murder" *Ethnography* 10:417-434.

Durkheim, Emile. 1982 [1895]. "The Rules of Sociological Method." Translated by W.D. Halls. New York: The Free Press.

Granovetter, Mark. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78:1360-1380.

—. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *American Journal of Sociology* 91:481-510.

Grodsky, Eric, John Robert Warren, and Erika Felts. 2008. "Testing and Social Stratification in American Education". *Annual Review of Sociology* 34:385-404.

Harding, David J. 2003. "Counterfactual Models of Neighborhood Effects: The Effect of Neighborhood Poverty on Dropping out and Teenage Pregnancy." *American Journal of Sociology* 109: 676-719.

—. 2007. "Matching Estimators of Causal Effects." Pp. 87-122 in *Counterfactuals and Causal Inference. Methods and Principles for Social Research*. Stephen L. Morgan and Christopher Winship (eds.). New York: Cambridge University Press.

—. 2010. *Living the Drama: Community, Conflict, and Culture Among Inner-City Boys*. University of Chicago Press.

Harris, Kathleen Mullan, Francesca Florey, Joyce Tabor, Peter S. Bearman, Jo Jones, and J. Richard Udry. 2003. The National Longitudinal Study of Adolescent Health: Research Design. http://www.cpc.unc.edu/projects/addhealth/design.

Heckman, James, Hidehiko Ichimura, and Petra Todd. 1998. "Matching as an Econometric Evaluation Estimator." *Review of Economic Studies* 65:261-294.

Heckman, James and Jeffrey Smith. 1999. "The Pre-program Earnings Dip and the Determinants of Participation in a Social Program: Implications for Simple Program Evaluation Strategies." *Economic Journal* 109:313-348.

Huang, Jian, Henriette Maassen van den Brink, and Wim Groot. 2009. "A Meta-Analysis of the Effect of Education on Social Capital." *Economics of Education Review* 28:454-464.

Isenberg, Daniel J. 1986. "Group Polarization: A Critical Review and Meta-Analysis." *Journal of Personality and Social Psychology* 50: 1141-1151.

Kao, Grace and Lindsay Rutherford. 2007. "Does Social Capital Still Matter? Immigrant Minority Disadvantage in School-Specific Social Capital and Its Effects on Academic Achievement." *Sociological Perspectives* 50:27–52.

Kim, Doo Hwan, and Barbara Schneider. 2005. "Social Capital in Action: Alignment of Parental Support in Adolescents' Transition to Postsecondary Education." *Social Forces* 84:1181-1206.

Kossinets, Gueorgi and Duncan J. Watts. 2009. "Origins of Homophily in an Evolving Social Network." *American Journal of Sociology* 115:405-50.

Lin, Nan, Karen Cook, and Ronald Burt. 2001. *Social Capital: Theory and Research*. Piscataway, NJ: Aldine Transaction Publishers.

Loury, Glenn. 1977. "A Dynamic Theory of Racial Income Differences." Pp. 153-86 in *Women, Minorities, and Employment Discrimination*, Wallace, Phyllis A. and Annette M. Lamond (eds.).Lexington, MA: Lexington Books.

Massey, Douglas and Nancy Denton. 1993. *American Apartheid: Segregation and the Making of the Underclass*. Cambridge, MA: Harvard University Press.

McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27:415-44.

Morgan, Stephen L. 2001. "Counterfactuals, Causal Effect Heterogeneity, and the Catholic School Effect on Learning." *Sociology of Education* 74:341-374.

Morgan, Stephen L. and Aage B. Sørensen. 1999. “Parental Networks, Social Closure, and Mathematics Learning: A Test of Coleman's Social Capital Explanation of School Effects.” *American Sociological Review* 64: 661-681.
Morgan, Stephen L., and Christopher Winship. 2007. *Counterfactuals and Causal Inference: Methods and Principles for Social Research.* Cambridge, MA: Cambridge University Press.
Morgan, Stephen and Jennifer Todd. 2009. “Intergenerational Closure and Academic Achievement in High School: A New Evaluation of Coleman’s Conjecture.” *Sociology of Education* 82: 267–286.
Orfield, Gary, and Chungmei Lee. 2007. *Historical Reversals, Accelerating Resegregation, and the Need for New Integration Strategies*. Civil Rights Project at University of California Los Angeles.
Portes, Alejandro. 1998. “Social Capital: Its Origins and Applications in Modern Sociology.” *Annual Review of Sociology* 22:1-24.
—. 2000. “The Two Meanings of Social Capital.” *Sociological Forum* 15:1-12.
Putnam, Robert. 1995. “Bowling Alone: America’s Declining Social Capital.” *Journal of Democracy* 6:65-78.
Raudenbush, Stephen W. and Anthony S. Bryk. 1986. “A Hierarchical Model for Studying School Effects.” *Sociology of Education* 59:1-17.
—. 2002. *Hierarchical Linear Models: Applications and Data Analysis Methods*. Thousand Oaks, CA: Sage Publications.
Ravanera, Zenaida R. and Fernando Rajulton. 2010. “Measuring Social Capital and Its Differentials by Family Structures.” *Social Indicators Research* 95:63-89.
Rosenbaum, Paul R. 1984. “The Consequences of Adjustment for a Concomitant Variable That Has Been Affected by the Treatment.” *Journal of the Royal Statistical Society A* 147:656-666.
Rubin, Donald B. 1974. “Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies.” *Journal of Educational Psychology* 66: 688-701.
Rubin, Donald B. and Neal Thomas. 1996. “Matching Using Estimated Propensity Scores: Relating Theory to Practice.” *Biometrics* 52: 249-264.
Rubio, Mauricio. 1997. “Perverse Social Capital: Some Evidence from Columbia.” *Journal of Economic Issues* 31:805-816.
Sandefur, Gary, Ann Meier, and Mary Campbell. 2006. “Family Resources, Social Capital, and College Attendance.” *Social Science Research* 35:525–553.
Schneider, Barbara; Martin Carnoy; Jeremy Kilpatrick; William Schmidt; and Richard Shavelson. 2007. *Estimating Causal Effects Using Experimental and Observational Designs.* (Report from the Governing Board of the American Educational Research Association Grants Program). Washington, DC: American Educational Research Association.
Smith, Jeffrey A. and Petra Todd. 2005. “Does Matching Overcome Lalonde’s Critique of Nonexperimental Estimators?” *Journal of Econometrics* 125: 305-353.
Stanton-Salazar, Ricardo D. 1997. “A Social Capital Framework for Understanding the Socialization of Racial Minority Children and Youths.” *Harvard Educational Review* 67:1-40.
—. 2001. *Manufacturing Hope and Despair: The School and Kin Support Networks of U.S.-Mexican Youth*. New York: Teachers College Press.
Stoner, James A. F. 1968. “Risky and Cautious Shifts in Group Decisions: The Influence of Widely Held Values.” *Journal of Experimental Social Psychology* 4:442-459.
Teachman, Jay, Kathleen Paasch, and Karen Carver. 1997. “Social Capital and the Generation of Human Capital.” *Social Forces* 75:1343-1359.

Thorlindsson, Thorolfur, Thoroddur Bjarnason, and Inga Dora Sigfusdottir. 2007. "Individual and Community Processes of Social Closure: A Study of Adolescent Academic Achievement and Alcohol Use." *Acta Sociologica* 50:161–178.

Wilson, William J. 1987. *The Truly Disadvantaged: The Inner City, the Underclass, and Public Policy*. University of Chicago Press.

Winship, Christopher, and Stephen L. Morgan. 1999. "The Estimation of Causal Effects from Observational Data." *Annual Review of Sociology* 25:659-706.

Winship, Christopher, and Robert D. Mare. 1992. "Models for Sample Selection Bias." *Annual Review of Sociology* 18:327-50.

Tables and Figures

Table 1: Distribution of three parental social capital indicators

	Full parental Wave I sample		Analysis sample	
	N	Percent	N	Percent
Parents talk to friends of parents (number): informal closure				
0	4,624	25.79	3,219	24.14
1	3,664	20.44	2,695	20.21
2	3,480	19.41	2,637	19.78
3	2,101	11.72	1,589	11.92
4	1,388	7.74	1,095	8.21
5	598	3.34	471	3.53
6 or more	1,701	9.49	1,361	10.21
Missing	372	2.07	265	1.99
Total	17,928	100.00	13,332	100.00
Parents member of PTA: school-related closure				
0	11,868	66.20	8,634	64.76
1	5,629	31.40	4,374	32.81
Missing	431	2.40	324	2.43
Total	17,928	100.00	13,332	100.00
Parents civic participation				
0	13,092	73.03	9,622	72.17
1	4,290	23.93	3,304	24.78
Missing	546	3.05	406	3.05
Total	17,928	100.00	13,332	100.0

Note: Analysis sample refers to adolescents participated in the Wave I in-home, Wave I parental and Wave III interviews

Table 2 Descriptive Statistics

Variable	**Mean**	**StD**	**Range**		**N**	**Missing**
Outcome variables						
High school graduation	.91	.29	0	1	13,332	0
College attendance	.48	.50	0	1	13,332	0
Parental social capital variables						
Informal closure	.55	.50	0	1	13,067	265
School-related closure	.34	.47	0	1	12,926	406
Parents' Civic Participation	.26	.44	0	1	13,008	324
Individual level: social demographic characteristics						
*Age	21.84	1.75	18	28	13,332	0
**Family type:* 2 step parents (ref. 2 bio. parents)	.18	.38	0	1	13,332	0
Single parent	.23	.42	0	1	13,332	0
Other family	.04	.21	0	1	13,332	0
*Female	.53	.50	0	1	13,332	0
*Foreign born	.07	.25	0	1	13,328	4
*Fundamentalist/born again	.24	.43	0	1	13,332	0
*Home language English	.11	.32	0	1	13,327	5
On parent with a college degree	.37	.48	0	1	12,852	480
**Parental education:* High school (ref. drop out)	.29	.46	0	1	12,852	480
Some college	.21	.41	0	1	12,852	480
College graduate	.24	.43	0	1	12,852	480
Graduate school	.13	.34	0	1	12,852	480
**Parental occupation:* Professional (ref. none)	.34	.47	0	1	13,332	0
Skilled	.21	.41	0	1	13,332	0
Unskilled	.28	.45	0	1	13,332	0
Other	.09	.29	0	1	13,332	0
*Poor/benefit recipient	.17	.37	0	1	13,326	6
**Race:* Black (ref. Caucasian)	.21	.41	0	1	12,547	785
Hispanic	.15	.36	0	1	12,547	785
Asian	.06	.23	0	1	12,547	785
Other Race	.02	.14	0	1	12,547	785
**Region:* Urban area (ref. suburban)	.28	.45	0	1	12,555	777
Rural	.18	.39	0	1	12,555	777
*Religiosity	.61	.27	0	1	13,275	57
Individual level: academic performance						
AH picture vocabulary test	100.91	14.55	14	146	12,018	1314
College expectations	4.30	.99	1	5	13,261	71
GPA (z-standardized)	.03	.99	-3.18	2.53	12,095	1237
Health	2.89	.91	0	4	13,325	7
Relationship to primary care taker	3.23	.79	0	4	13,167	165
Self esteem	3.09	.56	.11	4	13,305	27
Serious delinquency	1.18	2.01	0	16	12,494	838
Victimization	.19	.39	0	1	13,286	46
School level covariates						
School civic participation	26.40	8.30	2.06	57.59	130	14
School informal closure	57.76	11.68	31.64	80.19	132	12
School parents college degree	35.73	17.04	8.9	88.32	132	12
School poverty	17.03	12.09	2.06	57.59	132	12
School school-related closure	35.53	14.37	12.92	78.10	132	12

Note: unweighted because PSM models are unweighted. Weighted means available upon request. Variables marked with an asterisk are included in the propensity score models

Table 3: Estimation of the propensity scores, probit regression

	Informal closure		**School-related**		**Civic**	
	Coef.	z-value	Coef.	z-value	Coef.	z-value
Female	.022	(.92)	.001	(.01)	-.0445	(-1.67)
Age at wave 3	-.059***	(-6.12)	-.059***	(-5.65)	-.0176	(-1.68)
Race						
Black (ref. Caucasian)	-.256***	(-5.93)	-.129**	(-2.81)	-.062	(-1.31)
Hispanic	-.261***	(-5.49)	-.285***	(-5.48)	-.255***	(-4.68)
Asian	-.431***	(-6.36)	-.338***	(-4.70)	-.267***	(-3.53)
Other	-.336***	(-3.54)	-.148	(-1.43)	-.027	(-.26)
Region						
Urban (ref. suburban)	.113	(.23)	.500	(1.20)	-.334	(-.53)
Rural	.219	(.60)	.523	(1.31)	-.926*	(-2.11)
Religiosity	.382***	(7.18)	.290***	(5.08)	.014	(.24)
Fundamentalist/born again	.018	(.54)	.028	(.80)	-.019	(-.52)
Family type:						
Two (step) parents (ref. tow	-.124***	(-3.74)	-.144***	(-4.03)	.036	(1.00)
Single parent	-.106***	(-3.21)	-.140***	(-3.87)	.023	(.64)
Other	-.196**	(-2.62)	-.275**	(-3.22)	.225**	(2.72)
Poor/benefit recipient	-.138***	(-3.63)	-.145**	(-3.34)	-.093*	(-2.05)
Parental education:						
High school (ref. drop out)	.167***	(3.83)	.342***	(6.32)	.267***	(4.67)
Some college	.241***	(5.14)	.567***	(10.08)	.461***	(7.76)
College graduate	.352***	(7.18)	.794***	(13.78)	.578***	(9.51)
Graduate school	.433***	(7.45)	1.054***	(16.14)	.799***	(11.80)
Parental occupation:						
Professional (ref.	.170**	(2.77)	.336***	(4.72)	.356***	(4.61)
Skilled	.061	(.99)	.048	(.67)	.261**	(3.35)
Unskilled	-.018	(-.31)	-.019	(-.28)	.169*	(2.25)
Other	-.003	(-.05)	.027	(.36)	.213**	(2.56)
Foreign born	-.236***	(-4.18)	-.079		-.212**	(-3.01)
N	11,899		11,790		11,647	
Pseudo R2	.092		.167		.090	

notes: school fixed effects, *** p<.001 ** p<.01 *p<.05

Table 4: Average treatment effects of parental social capital on high school graduation and college attendance

	Sample	Mean outcome (probability of dependent		Difference	S.E	T-stat
		Treated	Untreated			
Informal closure						
High school	Unmatched	.935	.889	.046	.005	9.05
	Matched	.935	.922	**.013**	.006	2.08
College attendance	Unmatched	.560	.413	.148	.009	16.23
	Matched	.560	.489	**.072**	.011	6.68
PTA membership						
High school	Unmatched	.964	.890	.073	.005	13.68
	Matched	.963	.941	**.023**	.007	3.35
College attendance	Unmatched	.644	.416	.228	.009	24.03
	Matched	.642	.570	**.073**	.012	5.95
Civic participation						
High school	Unmatched	.948	.897	.050	.005	9.32
	Matched	.948	.940	**.008**	.006	1.40
College attendance	Unmatched	.579	.448	.131	.009	13.66
	Matched	.579	.544	**.035**	.010	3.36

Note: ATT=average treatment effect on the treated, highlighted in bold

Table 5: Hierarchical binary model with informal closure treatment

	High school graduation			College attendance		
	(1)	(2)	(3)	(1)	(2)	(3)
Level 1						
Informal closure	**3.872****	**2.907***	**3.375***	1.429	1.535	1.479
	(2.877)	(1.915)	(2.181)	(1.453)	(1.539)	(1.415)
Poor	**.627*****	**.612*****	**.678****	**.678*****	**.735****	**.733****
	(-3.661)	(-3.714)	(-2.757)	(-4.838)	(-3.288)	(-3.128)
One parent college degree	**2.237*****	**2.060*****	**1.720****	**1.590*****	**1.374*****	**1.390*****
	(4.906)	(3.698)	(2.767)	(6.384)	(4.152)	(3.782)
Level 2						
School poverty (percent)	.985*	.995	1.001	.986*	.993	.987
	(-3.923)	(-.484)	(.144)	(-2.071)	(-.961)	(-1.579)
School college-educated	**1.021****	**1.017***	**1.017***	**1.029*****	**1.026*****	**1.024*****
parents (percent)	(2.860)	(2.248)	(2.171)	(7.027)	(5.468)	(5.297)
School informal closure	.958***	.983	.983	**.958*****	**.982***	**.984***
(percent)	(-3.923)	(-1.512)	(-1.581)	(-6.657)	(-2.537)	(-2.133)
Cross level interactions						
School poverty*closure	**.961*****	**.964****	**.962****	.992	.990	.991
	(-4.192)	(-3.236)	(-3.479)	(-1.259)	(-1.431)	(-1.274)
School college-educated	.984	.982	.980	.993	.995	.996
parents*closure	(-1.787)	(-1.683)	(-1.739)	(-1.695)	(-.950)	(-.935)
School informal closure*	.991	.995	.993	1.429	1.003	1.003
informal closure	(-.868)	(-.424)	(-.682)	(1.545)	(.395)	(.439)

Note: *** p<.001 ** p<.01 *p<.05, Odds ratios, t-ratios in parentheses, consistently significant effects across all model steps highlighted in bold, full models in tables A5 & A6

Table 6: Hierarchical binary model with parents in PTA treatment

	High school graduation			College attendance		
	(1)	(2)	(3)	(1)	(2)	(3)
Level 1						
Parents in PTA	**3.747*** **	**3.235** **	**3.226** **	1.458	1.392	1.411
	(3.672)	(3.032)	(2.955)	(1.715)	(1.502)	(1.550)
Poor	**.617*** **	**.626** **	**.628** **	**.679*** **	**.749** **	**.736** **
	(-3.766)	(-3.379)	(-3.167)	(-4.807)	(-2.960)	(-3.038)
One parent college degree	**1.932** **	**2.222** **	**2.030** **	1.226*	1.193	1.254*
	(3.312)	(3.547)	(3.179)	(2.124)	(1.748)	(2.071)
Level 2						
School poverty (percent)	.976**	.988	.985	.982**	.988	.984*
	(-3.495)	(-1.374)	(-1.829)	(-3.088)	(-1.812)	(-2.226)
School college-educated	1.018*	1.012	1.010	**1.026*** **	**1.023*** **	**1.021*** **
parents (percent)	(2.269)	(1.481)	(1.257)	(5.494)	(4.757)	(4.463)
School parents in PTA	.967***	.989	.985	.971***	.989*	.991
(percent)	(-3.995)	(-1.017)	(-1.548)	(-6.306)	(-2.215)	(-1.678)
Cross level interactions						
School poverty* parents	**.966*** **	**.970** **	**.968** **	1.004	1.001	1.001
in PTA	(-3.450)	(-3.138)	(-3.288)	(.539)	(.199)	(.128)
School college-educated	.994	.995	.992	1.011*	1.010	1.010
parents*parents in PTA	(-.559)	(-.463)	(-.821)	(2.037)	(1.834)	(1.829)
School parents in PTA	1.001	.995	.999	**.988***	**.985***	**.985***
*parents in PTA	(.063)	(-.403)	(-.048)	(-1.975)	(-2.245)	(-2.296)

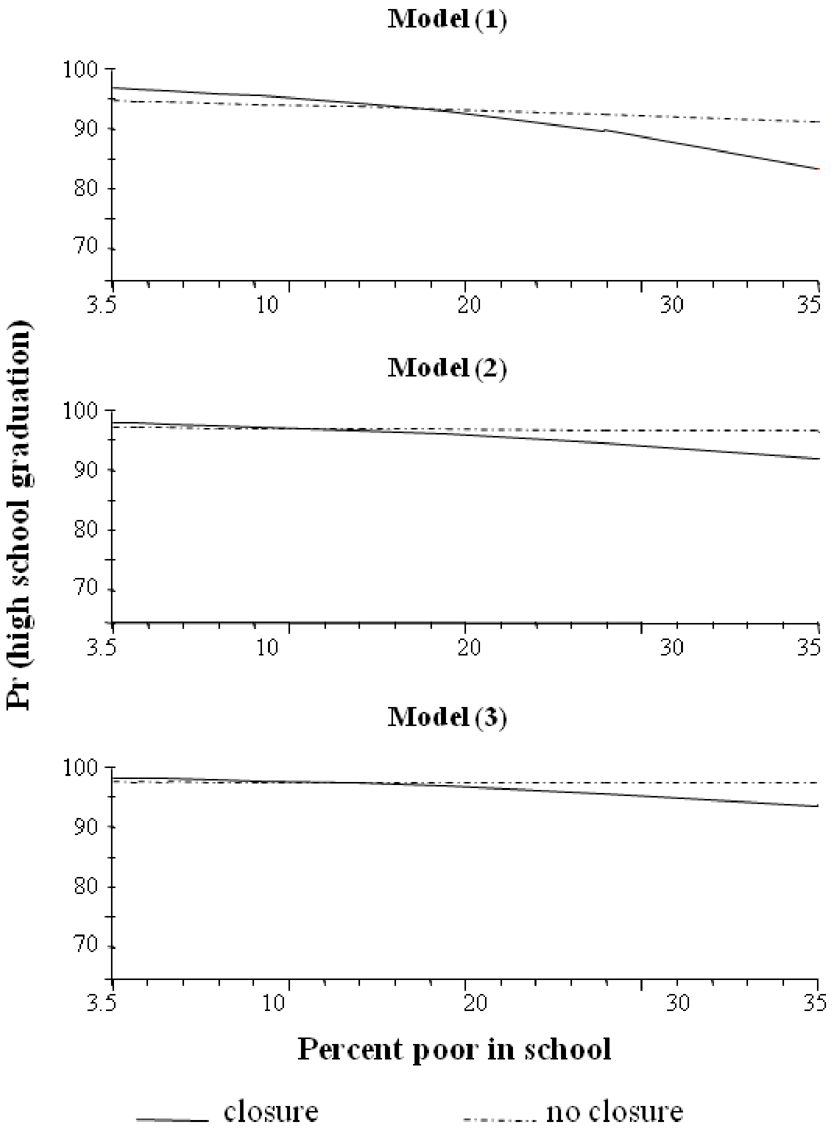
Note: *** p<.001 ** p<.01 *p<.05, Odds ratios, t-ratios in parentheses, consistently significant effects across all model steps highlighted in bold, full models in tables A7 & A8

Table 7: Hierarchical binary model with parent civic participation treatment

	High school graduation			College attendance		
	(1)	(2)	(3)	(1)	(2)	(3)
Level 1						
Parent civic participation	.758	.999	1.119	.891	.825	.858
	(-.353)	(-.002)	(.162)	(-.438)	(-.569)	(-.462)
Poor	**.590*****	**.657****	**.666****	**.587*****	**.706****	**.756****
	(-4.187)	(-3.102)	(-2.866)	(-6.610)	(-3.485)	(-2.701)
One parent college degree	1.915**	1.638*	1.494	1.615***	1.347	1.120
	(3.546)	(2.379)	(1.916)	(5.814)	(3.372)	(1.907)
Level 2						
School poverty (percent)	**.970*****	**.978***	**.977***	**.981****	**.985***	**.981***
	(-3.772)	(-2.410)	(-2.481)	(-2.926)	(-2.071)	(-2.377)
School college-educated	1.014*	1.012	1.008	**1.026*****	**1.025*****	**1.025*****
parents (percent)	(2.037)	(1.478)	(1.132)	(6.115)	(5.111)	(5.223)
School parent civic	**.935*****	**.952****	**.950****	**.956*****	**.973****	**.964****
participation (percent)	(-3.968)	(-2.624)	(-2.839)	(-4.844)	(-2.851)	(-3.686)
Cross level interactions						
School poverty* civic	1.005	1.009	.995	1.005	1.005	1.004
participation	(.215)	(.531)	(-.199)	(.616)	(.619)	(.528)
School college-educated	1.008	1.005	1.005	1.002	1.001	1.001
parents*civic participation	(.662)	(.364)	(.286)	(.312)	(.134)	(.200)
School parent civic	1.006	.998	1.006	1.004	1.008	1.006
participation*civic	(.213)	(-.073)	(.416)	(.344)	(.580)	(.452)
participation						

Note: *** p<.001 ** p<.01 *p<.05, Odds ratios, t-ratios in parentheses, consistently significant effects across all model steps highlighted in bold, full models in tables A9 & A10

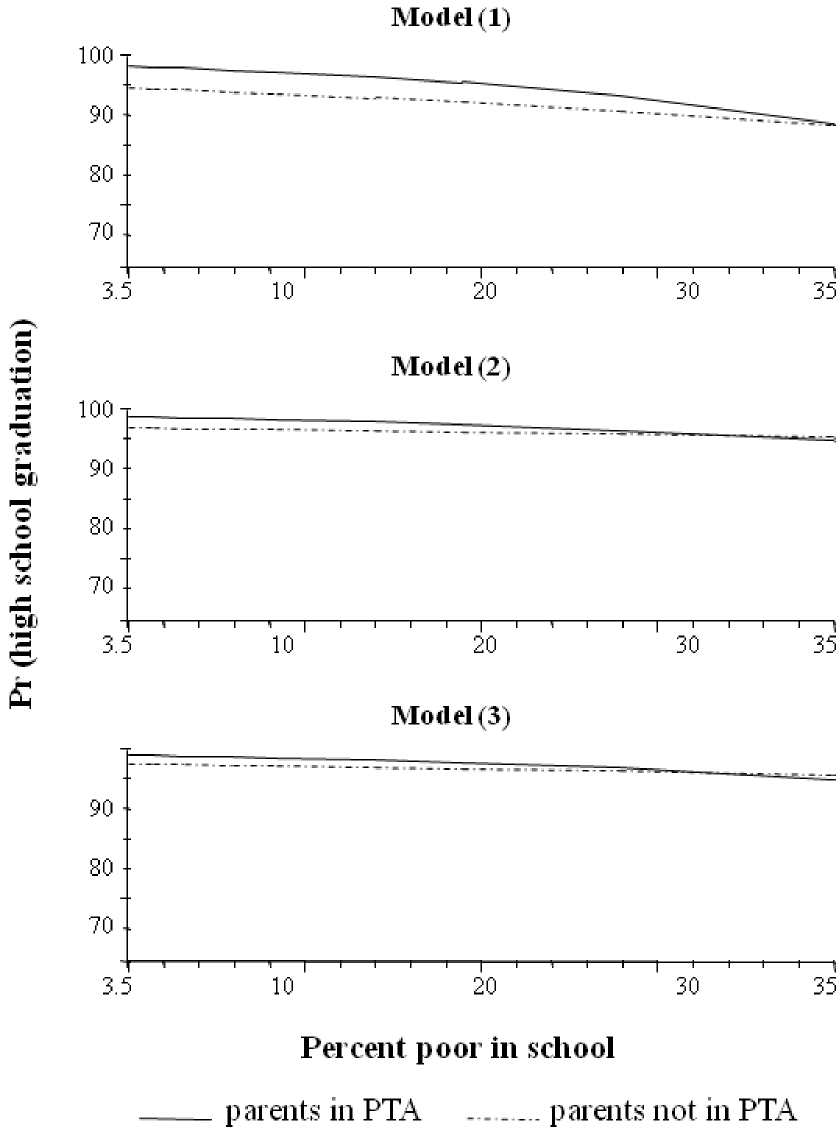
Figure 1: Cross level interaction, informal closure and school level poverty



Notes:
10th-90th percentile of school poverty range. School level poverty rescaled by subtracting the lowest school poverty given in the data (2 percent). Zero poverty in the graphs above represents 2 percent school level poverty.

Model (1): Baseline model with propensity score, no additional controls
Model (2): Model with propensity score and post-treatment controls
Model (3): Model with propensity score, post-treatment controls and additional pre-treatment controls

Figure 2: Cross level interaction, school-related closure and school level poverty



Notes:
10th-90th percentile of school poverty range. School level poverty rescaled by subtracting the lowest school poverty given in the data (2 percent). Zero poverty in the graphs above represents 2 percent school level poverty.

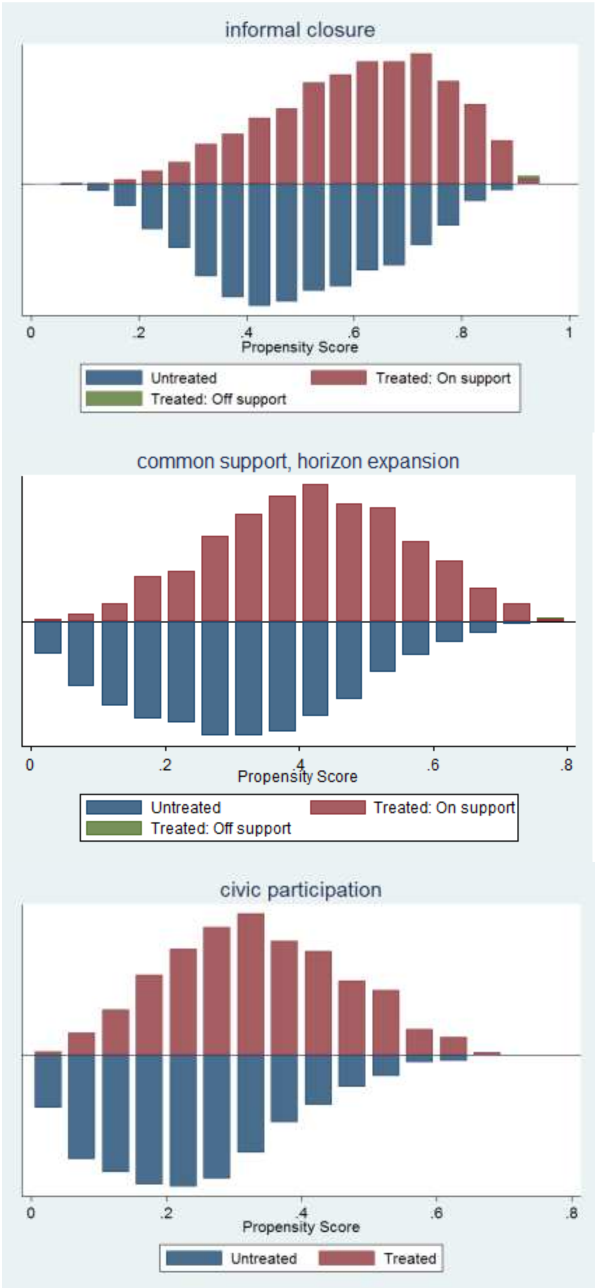
Model (1): Baseline model with propensity score, no additional controls
Model (2): Model with propensity score and post-treatment controls
Model (3): Model with propensity score, post-treatment controls and additional pre-treatment controls

APPENDIX

Appendix A1: propensity score matching quality

Figure A1 shows the common support of treated and matched controls on the propensity scores. In all three PSM models there are very few treated cases off support (<20 cases), which suggests a good overlap of treated and untreated matched cases. We exclude the treated cases off support in all subsequent analyses. The right-skewed distribution of treated cases and left-skewed distribution of untreated cases on the propensity shows that our PSM models successfully discriminate the propensity to be surrounded by each type of parental social capital.

Figure A1: Common support on propensity score



The balancing property of propensity scores is satisfied if the resulting matched control and treated observations have the same distribution of multivariate *X* and thus the selection bias due to *X* has been controlled. Tables A1, A2, and A3 show the standardized bias (Rosenbaum and Rubin 1985) and t-tests for significant differences between the treated and matched controls on each covariate. The standardized bias (SB) is defined for each covariate as the difference in sample means between the treated and matched control subsamples as a percentage of the square root of the average of sample variance in both groups (Caliendo and Kopeinig 2008: 48). Low standardized bias for the matched treated and control cases and insignificant t-tests indicate good balance.

We calculate Mantel Haenzsel bounds (MH) to test for the sensitivity of our results to hidden bias due to omitted variables (Becker and Caliendo 2007). MH bounds give no information on whether bias actually exists or not, but they can quantify how influential an omitted variable would have to be to invalidate the findings and whether we are at risk of over or underestimating treatment effects due to hidden bias. Table A4 shows the MH test statistic for various levels of hypothetical bias (gamma). A significant gamma indicates possible invalidation of results, if an omitted variable were included that explains a certain proportion of the selection we already account for with the variables in the model. All treatment effects are insensitive to underestimation. The effects for informal closure and civic participation are moderately sensitive to overestimation. The unobserved selection would have to be 80 percent (gamma= 1.8) of the selection we can account for in the PSM models to invalidate the treatment effects of informal closure on high school graduation and college attendance. For civic participation, the unobserved selection would have to be twice the selection we account for to invalidate the treatment effect on high school graduation and 80 percent the selection we account for to invalidate the treatment effect on college attendance. Overall, the MH bounds show that - if anything - we are overestimating the effect of parental social capital on adolescent educational attainment in the PSM models.

Table A1: percent bias reduction and t-tests for balance, informal closure

		Mean			% red.	t-value	t-test
Variable	Sample	Treated	Control	%bias	|bias|		p>|t|
Female	Unmatched	.532	.520	2.4		1.33	.185
	Matched	.532	.528	.9	64.5	.5	.618
Age at wave 3	Unmatched	21.667	22.091	-24.7		-13.41	.000
	Matched	21.672	21.703	-1.8	92.8	-1.02	.309
Race							
Black (ref. causcasian)	Unmatched	.175	.239	-15.7		-8.55	.000
	Matched	.176	.179	-.8	95.0	-.48	.632
Hispanic	Unmatched	.112	.201	-24.5		-13.44	.000
	Matched	.112	.113	-.3	98.8	-.19	.848
Asian	Unmatched	.043	.072	-12.7		-6.99	.000
	Matched	.043	.045	-.9	92.5	-.62	.537
Other	Unmatched	.015	.023	-5.5		-2.99	.003
	Matched	.015	.014	.6	89.6	.37	.713
Region							
Urban area (ref. suburban)	Unmatched	.264	.296	-7.1		-3.83	.000
	Matched	.265	.262	.6	92.1	.33	.744
Rural area	Unmatched	.196	.174	5.8		3.13	.002
	Matched	.197	.202	-1.3	78.3	-.7	.484
Religiosity	Unmatched	.633	.585	17.6		9.56	.000
	Matched	.632	.633	-.3	98.5	-.16	.877
Fundamentalist/born again	Unmatched	.268	.220	11.3		6.08	.000
	Matched	.269	.263	1.2	89.2	.68	.498
Family type							
Two step parents (ref. 2 bio par)	Unmatched	.171	.190	-4.9		-2.64	.008
	Matched	.171	.178	-1.9	61.7	-1.08	.280
Single parent	Unmatched	.199	.271	-17.1		-9.31	.000
	Matched	.199	.203	-1	94.4	-.58	.564
Other family	Unmatched	.021	.039	-10.7		-5.89	.000
	Matched	.021	.020	.3	96.8	.24	.813
Poor/benefit recipient	Unmatched	.112	.204	-25.6		-14.05	.000
	Matched	.112	.115	-1	96.1	-.65	.515
Parental education:							
High school (ref. drop out)	Unmatched	.270	.322	-11.2		-6.11	.000
	Matched	.271	.275	-.8	93	-.46	.646
Some college	Unmatched	.214	.210	.9		.49	.627
	Matched	.214	.212	.6	36.5	.33	.744
College graduate	Unmatched	.273	.202	16.7		9	.000
	Matched	.272	.270	.4	97.6	.22	.823
Graduate school	Unmatched	.165	.093	21.7		11.61	.000
	Matched	.165	.162	.9	96	.45	.651
Parental occupation:							
professional (missing/none)	Unmatched	.415	.276	29.5		15.91	.000

	Matched	.414	.408	1.3	95.5	.72	.469
Skilled	Unmatched	.213	.221	-2		-1.11	.268
	Matched	.213	.217	-1.1	48.4	-.61	.544
Unskilled	Unmatched	.248	.318	-15.7		-8.54	.000
	Matched	.248	.244	.9	94.2	.54	.587
Other	Unmatched	.083	.105	-7.8		-4.23	.000
	Matched	.083	.086	-1	86.9	-.61	.540
Foreign born	Unmatched	.042	.096	-21.3		-11.81	.000
	Matched	.042	.046	-1.4	93.7	-.95	.340

Table A2: percent bias reduction and t-tests for balance, school-related closure

		Mean			% red.	t-value	t-test
Variable	Sample	Treated	Control	%bias	|bias|		p>|t|
Female	Unmatched	.526	.525	.3		.13	.894
	Matched	.526	.527	-.2	22.4	-.09	.928
Age at wave 3	Unmatched	21.613	21.992	-22.1		-11.38	.000
	Matched	21.623	21.641	-1.1	95.2	-.48	.633
Race							
Black (ref. causcasian)	Unmatched	.220	.195	6.4		3.3	.001
	Matched	.222	.227	-1.2	80.6	-.54	.59
Hispanic	Unmatched	.093	.185	-26.9		-13.27	.000
	Matched	.094	.095	-.3	98.8	-.17	.863
Asian	Unmatched	.060	.053	2.8		1.47	.141
	Matched	.060	.065	-2.3	18.4	-.99	.324
Other	Unmatched	.017	.020	-2.3		-1.16	.245
	Matched	.017	.016	.6	75.4	.27	.791
Region							
Urban area (ref. suburban)	Unmatched	.307	.266	9.1		4.73	.000
	Matched	.306	.309	-.7	92	-.32	.749
Rural area	Unmatched	.148	.205	-15		-7.56	.000
	Matched	.149	.148	.3	97.8	.16	.874
Religiosity	Unmatched	.652	.590	22.8		11.78	.000
	Matched	.651	.650	.1	99.5	.05	.961
Fundamentalist/born again	Unmatched	.285	.227	13.4		7.01	.000
	Matched	.284	.278	1.2	91.3	.51	.611
Family type							
Two step parents (ref. 2 bio par)	Unmatched	.158	.190	-8.4		-4.27	.000
	Matched	.159	.167	-2.1	74.6	-.98	.327
Single parent	Unmatched	.187	.256	-16.5		-8.35	.000
	Matched	.189	.190	-.3	98.2	-.14	.889
Other family	Unmatched	.018	.035	-10.9		-5.36	.000
	Matched	.018	.019	-.6	94.6	-.31	.754
Poor/benefit recipient	Unmatched	.088	.189	-29.6		-14.54	.000
	Matched	.089	.092	-.8	97.2	-.45	.654
Parental education:							
High school (ref. drop out)	Unmatched	.195	.343	-34		-17.03	.000
	Matched	.196	.197	-.2	99.3	-.11	.913
Some college	Unmatched	.200	.220	-4.8		-2.48	.013
	Matched	.201	.199	.3	93.7	.14	.889
College graduate	Unmatched	.326	.199	29.6		15.68	.000
	Matched	.328	.325	.6	97.8	.27	.79
Graduate school	Unmatched	.240	.076	46.2		25.67	.000
	Matched	.236	.235	.3	99.4	.11	.915
Parental occupation:							
professional (missing/none)	Unmatched	.524	.264	55.3		29.06	.000

	Matched	.522	.522	-.1	99.8	-.05	.963
Skilled	Unmatched	.183	.234	-12.6		-6.42	.000
	Matched	.184	.180	.8	93.4	.39	.694
Unskilled	Unmatched	.196	.322	-28.9		-14.53	.000
	Matched	.197	.199	-.5	98.4	-.23	.82
Other	Unmatched	.068	.107	-13.9		-6.92	.000
	Matched	.068	.069	-.2	98.6	-.1	.924
Foreign born	Unmatched	.050	.077	-10.9		-5.44	.000
	Matched	.050	.056	-2.3	78.5	-1.14	.256

Table A3: percent bias reduction and t-tests for balance, civic participation

Variable	Sample	Mean Treated	Mean Control	%bias	% red |bias|	t-T	Test p>|t|
Female	Unmatched	.509	.530	-4.2		-2.01	.044
	Matched	.509	.514	-.9	78.1	-.36	.717
Age at wave 3	Unmatched	21.758	21.911	-8.9		-4.2	.000
	Matched	21.758	21.769	-.7	92.5	-.26	.792
Race:							
Black (ref. causcasian)	Unmatched	.186	.210	-5.9		-2.79	.005
	Matched	.186	.184	.5	90.7	.22	.826
Hispanic	Unmatched	.078	.177	-30.1		-13.24	.000
	Matched	.078	.076	.5	98.4	.23	.819
Asian	Unmatched	.048	.059	-4.8		-2.23	.026
	Matched	.048	.052	-1.8	62.7	-.72	.470
Other	Unmatched	.018	.019	-1		-.46	.645
	Matched	.018	.018	-.3	72.0	-.11	.913
Region:							
Urban area (ref. suburban)	Unmatched	.252	.285	-7.5		-3.53	.000
	Matched	.252	.248	.8	89.7	.31	.757
Rural area	Unmatched	.181	.189	-1.9		-.9	.367
	Matched	.181	.189	-.9	52.1	-.36	.720
Religiosity	Unmatched	.613	.611	.6		.31	.758
	Matched	.613	.613	-.3	60.0	-.1	.920
Fundamentalist/born again	Unmatched	.245	.248	-.7		-.34	.737
	Matched	.245	.251	-1.5	-114.5	-.59	.553
Family type:							
Two step parents (ref 2 bio	Unmatched	.183	.178	1.3		.6	.550
	Matched	.183	.186	-.9	30.0	-.34	.734
Single parent	Unmatched	.192	.246	-13.1		-6.08	.000
	Matched	.192	.194	-.4	97.1	-.16	.875
Other family	Unmatched	.026	.030	-2.7		-1.25	.212
	Matched	.026	.028	-1.5	45.8	-.58	.564
Poor/benefit recipient	Unmatched	.088	.178	-26.6		-11.85	.000
	Matched	.088	.088	0	100.0	.000	.996
Parental education:							
High school (ref. drop out)	Unmatched	.218	.319	-22.9		-10.56	.000
	Matched	.218	.222	-.8	96.7	-.31	.754
Some college	Unmatched	.216	.211	1.1		.55	.585
	Matched	.216	.220	-1.1	4.0	-.43	.669
College graduate	Unmatched	.302	.220	18.7		9.11	.000
	Matched	.302	.305	-.6	96.6	-.24	.812
Graduate school	Unmatched	.222	.100	33.6		17.27	.000
	Matched	.222	.212	2.7	91.9	.94	.349
Parents occupation:							
professional	Unmatched	.485	.307	37		17.91	.000

	Matched	.485	.478	1.4	96.2	.53	.594
Skilled	Unmatched	.198	.222	-6		-2.81	.005
	Matched	.198	.203	-1.3	78.7	-.51	.613
Unskilled	Unmatched	.218	.299	-18.7		-8.68	.000
	Matched	.218	.218	-.1	99.4	-.05	.961
Other	Unmatched	.074	.100	-9.3		-4.29	.000
	Matched	.074	.075	-.4	95.5	-.18	.860
Foreign born	Unmatched	.033	.078	-19.6		-8.56	.000
	Matched	.033	.033	.2	98.8	.12	.906

Table A4: Mantel Haenzel bounds on sensitivity to hidden bias

	High school graduation				College attendance			
Gamma	Qmh+	Qmh-	pmh+	pmh-	Qmh+	Qmh-	pmh+	pmh-
Informal closure								
1	8.95	8.95	.000	.000	15.95	15.95	.000	.000
1.2	6.14	11.81	.000	.000	11.03	20.91	.000	.000
1.4	3.80	14.29	.000	.000	6.89	25.13	.000	.000
1.6	1.78	16.50	.037	.000	3.32	28.82	.000	.000
1.8	.01	18.49	**.495**	.000	.16	32.11	**.435**	.000
2	1.51	20.32	.066	.000	2.62	35.07	.004	.000
School related closure								
1	13.47	13.47	.000	.000	23.24	23.24	.000	.000
1.2	11.22	15.80	.000	.000	18.57	27.97	.000	.000
1.4	9.381	17.85	.000	.000	14.66	32.01	.000	.000
1.6	7.83	19.70	.000	.000	11.30	35.60	.000	.000
1.8	6.48	21.38	.000	.000	8.35	38.80	.000	.000
2	5.29	22.93	.000	.000	5.72	41.69	.000	.000
Civic participation								
1	8.99	8.99	.000	.000	12.85	12.8529	.000	.000
1.2	6.95	11.10	.002	.000	8.54	17.212	.000	.000
1.4	5.26	12.94	.007	.000	4.92	20.9437	.004	.000
1.6	3.82	14.58	.000	.000	1.79	24.219	.037	.000
1.8	2.56	16.07	.005	.000	.93	27.147	**.177**	.000
2	1.45	17.43	**.074**	.000	3.39	29.8015	.000	.000

Notes:
Gamma : odds of differential assignment due to unobserved factors
Qmh+ : Mantel-Haenszel statistic, assumption: overestimation of treatment effect
Qmh- : Mantel-Haenszel statistic, assumption: underestimation of treatment effect
pmh+ : significance level, assumption: overestimation of treatment effect
pmh- : significance level, assumption: underestimation of treatment effect

Appendix A2: Hierarchical binary models

We show the model equations for the three model steps for the treatment school-related closure measured by parents' membership in the PTA. The models for the other two parental social capital treatments are analogous. Y denotes the dependent variables high school graduation and college attendance. Covariates highlighted in bold italic are grand-mean centered, thus representing the adjusted average school effect. All individual level covariates except the respective parental social capital treatment are grand-mean centered. The school level variables are not centered, but rescaled such that the lowest value is zero to give zero a natural interpretation.

Model step 1

<u>Level 1 model</u>

$\log\left[\frac{P}{(1-P)}\right] =$

$\beta_0 + \beta_1 \boldsymbol{poor} + \beta_2 \boldsymbol{informal\ closure} + \beta_3 \boldsymbol{civic\ participation} + \beta_4 \text{school related closure} +$
$\beta_5 \boldsymbol{pscore\ 2nd\ quant.} + \beta_6 \boldsymbol{pscore\ 3rd\ quant.} + \beta_7 \boldsymbol{pscore\ 4th\ quant.} +$
$\beta_8 \boldsymbol{pscore\ 5th\ quant.} + \beta_9 \boldsymbol{parent\ college\ degree})$

with $Prob(Y = 1|\beta) = P$.

<u>Level 2 model</u>

β_0
$= \gamma_{00} + \gamma_{01}\text{ school poverty} + \gamma_{02}\text{school parent college degree} + \gamma_{03}\text{school school related closure} + u_0$
$\beta_1 = \gamma_{10}$
$\beta_2 = \gamma_{20}$
$\beta_3 = \gamma_{30}$
$\beta_4 = \gamma_{40} + \gamma_{41}\text{ school poverty} + \gamma_{42}\text{school parent college degree} + \gamma_{43}\text{school related closure}$
$\beta_5 = \gamma_{50}$
$\beta_6 = \gamma_{60}$
$\beta_7 = \gamma_{70}$
$\beta_8 = \gamma_{80}$
$\beta_9 = \gamma_{90}$

Where γ_{41} represents the cross-level interaction between school related closure on the individual level and school level poverty, and γ_{42} represents the cross-level interaction between school level closure and the school percentage of college educated parents and

γ_{43} represents the cross-level interaction between individual level school-related closure and school level school-related closure.

Model step 2

Level 1 model

$\log\left[\frac{P}{(1-P)}\right] = \beta_0 + \beta_1 \boldsymbol{college\ expectation} + \beta_2 \boldsymbol{GPA} + \beta_3 \boldsymbol{AH\ picture\ vocabulary\ test} +$
$\beta_4 \boldsymbol{victimized} + \beta_5 \boldsymbol{serious\ delinquency} + \beta_6 \boldsymbol{home\ language\ english} +$
$\beta_7 \boldsymbol{general\ health} + \beta_8\ \boldsymbol{poor} + \beta_9 \boldsymbol{relationship\ primary\ care\ taker} + \beta_{10} \boldsymbol{self\ esteem} +$
$\beta_{11}\ \boldsymbol{religiosity} + \beta_{12} \boldsymbol{informal\ closure} + \beta_{13} \boldsymbol{parent\ civic\ participation} +$
$\beta_{14}\text{school related closure} + \beta_{15} \boldsymbol{pscore\ 2nd\ quant}. +$
$\beta_{16} \boldsymbol{pscore\ 3rd\ quant.} + \beta_{17} \boldsymbol{pscore\ 4th\ quant.} + \beta_{18} \boldsymbol{pscore\ 5th\ quant.} + \beta_{19} \boldsymbol{parent\ college\ degree})$
with $Prob(Y = 1|\beta) = P$.

Level 2 model

β_0
$= \gamma_{00} + \gamma_{01}\text{ school poverty} + \gamma_{02}\text{school parent college degree} + \gamma_{03}\text{school school related closure} + u_0$
$\beta_1 = \gamma_{10}$
...
$\beta_{14} = \gamma_{140} + \gamma_{141}\text{ school poverty} + \gamma_{142}\text{school parent college degree} + \gamma_{143}\text{school related closure}$
…
$\beta_{19} = \gamma_{190}$

Model step 3

Level 1 model

$\log\left[\frac{P}{(1-P)}\right] = \beta_0 + \beta_1 \boldsymbol{college\ expectation} + \beta_2 \boldsymbol{GPA} + \beta_3 \boldsymbol{AH\ picture\ vocabulary\ test} +$
$\beta_4 \boldsymbol{victimized} + \beta_5 \boldsymbol{black} + \beta_6 \boldsymbol{hispanic} + \beta_7 \boldsymbol{asian} + \beta_8 \boldsymbol{other\ race} +$
$\beta_9 \boldsymbol{serious\ delinquency} + \beta_{10} \boldsymbol{age} + \beta_{11} \boldsymbol{female} + \beta_{12} \boldsymbol{home\ language\ english} +$
$\beta_{13} \boldsymbol{general\ health} + \beta_{14}\ \boldsymbol{poor} + \beta_{15} \boldsymbol{relationship\ primary\ care\ taker} + \beta_{16} \boldsymbol{self\ esteem} +$
$\beta_{17}\ \boldsymbol{religiosity} + \beta_{18} \boldsymbol{two\ step\ parents} + \beta_{19} \boldsymbol{other\ family\ type} + \beta_{20} \boldsymbol{single\ parent} +$
$\beta_{21} \boldsymbol{informal\ closure} + \beta_{22} \boldsymbol{parent\ civic\ participation} + \beta_{23}\text{school related closure} +$
$\beta_{24} \boldsymbol{pscore\ 2nd\ quant}. +$
$\beta_{25} \boldsymbol{pscore\ 3rd\ quant.} + \beta_{26} \boldsymbol{pscore\ 4th\ quant.} + \beta_{27} \boldsymbol{pscore\ 5th\ quant.} + \beta_{28} \boldsymbol{parent\ college\ degree})$
with $Prob(Y = 1|\beta) = P$.

Level 2 model

β_0
$= \gamma_{00} + \gamma_{01}\text{ school poverty} + \gamma_{02}\text{school parent college degree} + \gamma_{03}\text{school school related closure} + u_0$
$\beta_1 = \gamma_{10}$
...
$\beta_{23} = \gamma_{230} + \gamma_{231}\text{ school poverty} + \gamma_{232}\text{school parent college degree} + \gamma_{233}\text{school related closure}$
…
$\beta_{28} = \gamma_{280}$

Table A5: Hierarchical model (Odds-Ratios) for informal closure on high school graduation

	OR	**t-ratio**	**OR**	**t-ratio**	**OR**	**t-ratio**
Level 1						
Post-treatment risk						
College expectation			1.297***	(5.479)	1.303***	(5.283)
GPA			1.851***	(10.498)	1.825***	(10.239)
AH picture vocabulary test			1.044***	(9.215)	1.050***	(10.258)
Victimization			.905	(-.722)	.863	(-1.086)
Serious delinquency			.885***	(-4.519)	.883***	(-4.574)
Home language English			1.387	(1.323)	1.577	(1.643)
Health			1.130*	(2.079)	1.132*	(1.991)
Relationship primary caretaker			1.051	(.595)	1.091	(1.014)
Self esteem			.814	(-1.643)	.768*	(-1.968)
Religiosity			1.884*	(2.274)	1.222	(.765)
Parent Civic participation	1.128	(.785)	1.232	(1.356)	1.229	(1.319)
School related closure	1.755***	(4.691)	1.437**	(3.019)	1.440**	(3.067)
Pre-treatment						
Age at wave 3					1.253***	(6.269)
Female					1.025	(.200)
Black (ref. Caucasian)					2.817***	(5.781)
Hispanic					1.530*	(2.050)
Asian					3.480***	(4.166)
Other race					1.950*	(2.421)
Step parents (ref two bio parents)					.948	(-.349)
Other family type					.712	(-1.358)
Single parent					.885	(-.827)
Poor	.627***	(-3.661)	.612***	(-3.714)	.678**	(-2.757)
One parent college degree	2.237***	(4.906)	2.060***	(3.698)	1.720**	(2.767)
Prop score 2. Quint.	1.607**	(2.674)	1.320	(1.472)	2.039**	(3.304)
Prop score 3. Quint.	2.458***	(4.630)	1.242	(1.082)	2.415***	(4.059)
Prop score 4. Quint.	4.054***	(6.592)	1.471	(1.556)	3.530***	(4.515)
Prop score 5. Quint.	8.388***	(6.654)	1.902	(1.721)	5.992***	(4.367)
Treatment: informal closure	3.872**	(2.877)	2.907*	(1.915)	3.375*	(2.181)
Level 2						
Intercept	28.852***	(9.645)	23.916***	(7.379)	29.926***	(8.334)
School poverty	.985*	(-1.955)	.995	(-.484)	1.001	(.144)
School parents college degree	1.021**	(2.860)	1.017*	(2.248)	1.017*	(2.171)
School informal closure	.958***	(-3.923)	.983	(-1.512)	.983	(-1.581)
Cross level interactions						
School poverty * informal closure	.961***	(-4.192)	.964**	(-3.236)	.962**	(-3.479)
School parents college * inf. closure	.984	(-1.787)	.982	(-1.683)	.980	(-1.739)
School inf. closure* inf. closure	.991	(-.868)	.995	(-.424)	.993	(-.682)
Number of adolescents	11,453		10,589		10,589	
Number of schools	130		130		130	
Deviance	**26759.32**		**23802.57**		**23702.17**	
Chi-square model comparison =	**2956.75*** **		**100.40*** **			

*** p<.001 ** p<.01 *p<.05, population average model with robust standard errors, EM Laplace iterations, full maximum likelihood, weighted data

Table A6: Hierarchical model (Odds-Ratios) for informal closure on college attendance

	OR	t-ratio	OR	t-ratio	OR	t-ratio
Level 1						
Post-treatment risk						
College expectation			1.610***	(11.264)	1.582***	(10.458)
GPA			2.017***	(17.932)	1.988***	(16.937)
AH picture vocabulary test			1.018***	(6.694)	1.020***	(7.563)
Victimization			.866	(-1.517)	.913	(-.973)
Serious delinquency			.940**	(-3.348)	.938**	(-3.298)
Home language English			1.515**	(2.815)	1.206	(1.221)
Health			1.060	(1.669)	1.076*	(2.137)
Relationship primary caretaker			.973	(-.633)	.959	(-.958)
Self esteem			.926	(-1.211)	.947	(-.868)
Religiosity			1.322*	(1.977)	1.174	(1.092)
Parent Civic participation	1.067	(.951)	1.041	(.509)	1.060	(.733)
School related closure	1.605***	(6.871)	1.346***	(4.070)	1.329***	(3.918)
Pre-treatment						
Age at wave 3					.943*	(-2.428)
Female					1.205*	(2.535)
Black (ref. Caucasian)					1.463**	(3.074)
Hispanic					1.391*	(2.291)
Asian					2.294**	(3.386)
Other race					1.499	(1.757)
Step parents (ref two bio parents)					.634***	(-4.908)
Other family type					.355***	(-4.644)
Single parent					.784**	(-2.855)
Poor	.678***	(-4.838)	.735**	(-3.288)	.733**	(-3.128)
One parent college degree	1.590***	(6.384)	1.374***	(4.152)	1.390***	(3.782)
Prop score 2. Quint.	1.378**	(3.109)	1.173	(1.444)	1.186	(1.429)
Prop score 3. Quint.	2.024***	(6.022)	1.337*	(2.163)	1.292	(1.569)
Prop score 4. Quint.	2.738***	(7.544)	1.433*	(2.245)	1.345	(1.415)
Prop score 5. Quint.	5.118***	(9.344)	1.998**	(3.410)	1.779*	(2.255)
Treatment: informal closure	1.429	(1.453)	1.535	(1.539)	1.479	(1.415)
Level 2						
Intercept	1.267	(.909)	.628	(-1.664)	.671	(-1.339)
School poverty	.986*	(-2.071)	.993	(-.961)	.987	(-1.579)
School parents college degree	1.029***	(7.027)	1.026***	(5.468)	1.024***	(5.297)
School informal closure	.958***	(-6.657)	.982*	(-2.537)	.984*	(-2.133)
Cross level interactions						
School poverty * informal closure	.992	(-1.259)	.990	(-1.431)	.991	(-1.274)
School parents college * inf. closure	.993	(-1.695)	.995	(-.950)	.996	(-.935)
School inf. closure* inf. closure	1.429	(1.545)	1.003	(.395)	1.003	(.439)
Number of adolescents	11,453		10,589		10,589	
Number of schools	130		130		130	
Deviance	**34716.76**		**30463.11**		**30309.68**	
Chi-square model comparison =	**4253.65*** **		**153.42*** **			

*** p<.001 ** p<.01 *p<.05, population average model with robust standard errors, EM Laplace iterations, full maximum likelihood, weighted data

Table A7: Hierarchical model (Odds-ratios), school-related closure on high school graduation

	OR	t-ratio	OR	t-ratio	OR	t-ratio
Level 1						
Post-treatment risk						
College expectation			1.312***	(5.665)	1.324***	(5.580)
GPA			1.866***	(10.536)	1.844***	(10.262)
AH picture vocabulary test			1.043***	(9.129)	1.049***	(9.855)
Victimization			.901	(-.753)	.867	(-1.033)
Serious delinquency			.886***	(-4.598)	.885***	(-4.545)
Home language English			1.404	(1.429)	1.498	(1.486)
Health			1.140*	(2.303)	1.135*	(2.102)
Relationship primary caretaker			1.045	(.541)	1.089	(1.017)
Self esteem			.797	(-1.854)	.755*	(-2.090)
Religiosity			2.011*	(2.580)	1.685*	(2.054)
Parent Civic participation	1.123	(.765)	1.229	(1.331)	1.241	(1.391)
Informal closure	1.081	(.670)	.894	(-.949)	.940	(-.526)
Pre-treatment						
Age at wave 3					1.201***	(4.926)
Female					1.057	(.441)
Black (ref. Caucasian)					2.212***	(5.040)
Hispanic					1.174	(.776)
Asian					2.160**	(2.748)
Other race					1.381	(1.398)
Step parents (ref two bio parents)					.866	(-.996)
Other family type					.623	(-1.827)
Single parent					.843	(-1.140)
Poor	.617***	(-3.766)	.626**	(-3.379)	.628**	(-3.167)
One parent college degree	1.932**	(3.312)	2.222**	(3.547)	2.030**	(3.179)
Prop score 2. Quint.	1.885***	(4.294)	1.351	(1.718)	1.506*	(2.257)
Prop score 3. Quint.	3.213***	(7.483)	1.895**	(3.349)	2.243***	(4.142)
Prop score 4. Quint.	3.505***	(5.869)	1.293	(.958)	1.582	(1.604)
Prop score 5. Quint.	5.631***	(4.234)	1.173	(.336)	1.661	(1.045)
Treatment: school related closure	3.747***	(3.672)	3.235**	(3.032)	3.226**	(2.955)
Level 2						
Intercept	21.900***	(11.050)	20.580***	(8.771)	32.157***	(11.141)
School poverty	.976**	(-3.495)	.988	(-1.374)	.985	(-1.829)
School parents college degree	1.018*	(2.269)	1.012	(1.481)	1.010	(1.257)
School school related closure	.967***	(-3.995)	.989	(-1.017)	.985	(-1.548)
Cross level interactions						
School poverty * school closure	.966***	(-3.450)	.970**	(-3.138)	.968**	(-3.288)
School parents college * school closure	.994	(-.559)	.995	(-.463)	.992	(-.821)
School parents PTA * school closure	1.001	(.063)	.995	(-.403)	.999	(-.048)
Number of adolescents	11,453		10,589		10,589	
Number of schools	130		130		130	
Deviance	**26739.27**		**23799.15**		**23708.19**	
Chi-square model comparison =	**2940.12*** **		**90.96*** **			

*** p<.001 ** p<.01 *p<.05, population average model with robust standard errors, EM Laplace iterations, full maximum likelihood, weighted data

Table A8: Hierarchical model (Odds-Ratios) for school-related closure on college attendance

	OR	**t-ratio**	**OR**	**t-ratio**	**OR**	**t-ratio**
Level 1						
Post-treatment risk						
College expectation			1.606***	(11.043)	1.580***	(10.330)
GPA			2.015***	(17.957)	1.983***	(17.062)
AH picture vocabulary test			1.017***	(6.592)	1.020***	(7.413)
Victimization			.856	(-1.627)	.904	(-1.077)
Serious delinquency			.940**	(-3.293)	.939**	(-3.188)
Home language English			1.568**	(3.204)	1.217	(1.326)
Health			1.060	(1.680)	1.077*	(2.144)
Relationship primary caretaker			.972	(-.679)	.957	(-1.013)
Self esteem			.919	(-1.323)	.946	(-.894)
Religiosity			1.390*	(2.395)	1.241	(1.601)
Parent Civic participation	1.063	(.904)	1.045	(.562)	1.063	(.769)
Informal closure	1.362***	(5.156)	1.266**	(3.525)	1.253**	(3.282)
Pre-treatment						
Age at wave 3					.941*	(-2.516)
Female					1.218**	(2.678)
Black (ref. Caucasian)					1.399**	(2.916)
Hispanic					1.415*	(2.541)
Asian					2.179**	(3.176)
Other race					1.403	(1.561)
Step parents (ref two bio parents)					.634***	(-4.749)
Other family type					.364***	(-4.747)
Single parent					.800**	(-2.656)
Poor	.679***	(-4.807)	.749**	(-2.960)	.736**	(-3.038)
One parent college degree	1.226*	(2.124)	1.193	(1.748)	1.254*	(2.071)
Prop score 2. Quint.	1.646***	(5.348)	1.272*	(2.137)	1.164	(1.349)
Prop score 3. Quint.	2.339***	(8.011)	1.508**	(3.290)	1.326*	(2.225)
Prop score 4. Quint.	3.270***	(8.515)	1.724**	(3.483)	1.460*	(2.328)
Prop score 5. Quint.	6.773***	(9.970)	2.506***	(4.302)	2.024**	(2.977)
Treatment: parents in PTA	1.458	(1.715)	1.392	(1.502)	1.411	(1.550)
Level 2						
Intercept	.977	(-.130)	.618*	(-2.456)	.638*	(-2.142)
School poverty	.982**	(-3.088)	.988	(-1.812)	.984*	(-2.226)
School parents college degree	1.026***	(5.494)	1.023***	(4.757)	1.021***	(4.463)
School school related closure	.971***	(-6.306)	.989*	(-2.215)	.991	(-1.678)
Cross level interactions						
School poverty * school rel. closure	1.004	(.539)	1.001	(.199)	1.001	(.128)
School parents college * school rel. clos	1.011*	(2.037)	1.010	(1.834)	1.010	(1.829)
School school clos * school rel. clos.	.988*	(-1.975)	.985*	(-2.245)	.985*	(-2.296)
Number of adolescents	11,453		10,589		10,589	
Number of schools	130		130		130	
Deviance	**34684.15**		**30443.73**		**30299.05**	
Chi-square model comparison =	**4240.42*** **		**44.68*** **			

*** p<.001 ** p<.01 *p<.05, population average model with robust standard errors, EM Laplace iterations, full maximum likelihood, weighted data

Table A9: Hierarchical model (Odds-Ratios), for parent' civic participation on high school graduation

	OR	t-ratio	OR	t-ratio	OR	t-ratio
Level 1						
Post-treatment risk						
College expectation			1.304***	(5.529)	1.310***	(5.293)
GPA			1.874***	(10.617)	1.843***	(10.340)
AH picture vocabulary test			1.043***	(8.892)	1.048***	(9.795)
Victimization			.894	(-.815)	.870	(-1.022)
Serious delinquency			.885***	(-4.613)	.884***	(-4.574)
Home language English			1.508	(1.732)	1.469	(1.416)
Health			1.138*	(2.190)	1.137*	(2.064)
Relationship primary caretaker			1.038	(.458)	1.083	(.949)
Self esteem			.803	(-1.768)	.769	(-1.942)
Religiosity			2.090**	(2.914)	1.827*	(2.501)
School-related closure	1.784***	(4.615)	1.398**	(2.699)	1.394**	(2.767)
Informal closure	1.097	(.825)	.884	(-1.048)	.930	(-.622)
Pre-treatment						
Age at wave 3					1.189***	(4.703)
Female					1.110	(.836)
Black (ref. Caucasian)					2.236***	(5.241)
Hispanic					1.345	(1.417)
Asian					2.564**	(2.988)
Other race					1.441	(1.457)
Step parents (ref two bio parents)					.809	(-1.474)
Other family type					.484**	(-2.920)
Single parent					.806	(-1.454)
Poor	.590***	(-4.187)	.657**	(-3.102)	.666**	(-2.866)
One parent college degree	1.915**	(3.546)	1.638*	(2.379)	1.494	(1.916)
Prop score 2. Quint.	1.636**	(3.350)	1.490**	(2.875)	1.627**	(3.467)
Prop score 3. Quint.	2.512***	(4.685)	1.829**	(2.850)	2.201***	(3.794)
Prop score 4. Quint.	3.109***	(4.481)	1.901*	(2.510)	2.460**	(3.504)
Prop score 5. Quint.	9.443***	(6.655)	4.072***	(3.727)	5.822***	(4.485)
Treatment: parents civic participation	.758	(-.353)	.999	(-.002)	1.119	(.162)
Level 2						
Intercept	53.074***	(11.170)	53.669***	(9.532)	78.355***	(10.596)
School poverty	.970***	(-3.772)	.978*	(-2.410)	.977*	(-2.481)
School parents college degree	1.014*	(2.037)	1.012	(1.478)	1.008	(1.132)
School parent civic participation	.935***	(-3.968)	.952**	(-2.624)	.950**	(-2.839)
Cross level interactions						
School poverty * parents civic part.	1.005	(.215)	1.009	(.531)	.995	(-.199)
School parents college * parents civic	1.008	(.662)	1.005	(.364)	1.005	(.286)
School parents civic * parents civic	1.006	(.213)	.998	(-.073)	1.006	(.416)
Number of adolescents	11,453		10,589		10,589	
Number of schools	130		130		130	
Deviance	**26791.17**		**23801.43**		**23707.95**	
Chi-square model comparison =	**2989.74*** **		**93.49*** **			

*** p<.001 ** p<.01 *p<.05, population average model with robust standard errors, EM Laplace iterations, full maximum likelihood, weighted data

Table A10: Hierarchical model (Odds-Ratios), for parents' civic participation on college attendance

	OR	t-ratio	OR	t-ratio	OR	t-ratio
Level 1						
Post-treatment risk						
College expectation			1.609***	(11.308)	1.572***	(10.301)
GPA			2.029***	(18.203)	1.988***	(17.098)
AH picture vocabulary test			1.0179***	(6.714)	1.020***	(7.230)
Victimization			.862	(-1.562)	.913	(-.961)
Serious delinquency			.939**	(-3.371)	.938**	(-3.236)
Home language English			1.473*	(2.578)	1.205	(1.224)
Health			1.062	(1.736)	1.076*	(2.148)
Relationship primary caretaker			.976	(-.575)	.957	(-1.007)
Self esteem			.921	(-1.280)	.951	(-.789)
Religiosity			1.588**	(3.565)	1.337*	(2.266)
School related closure	1.671***	(7.566)	1.355***	(4.255)	1.313***	(3.833)
Informal closure	1.415***	(5.831)	1.277***	(3.667)	1.249**	(3.225)
Pre-treatment						
Age at wave 3					.936**	(-2.844)
Female					1.258**	(3.028)
Black (ref. caucasian)					1.411**	(2.977)
Hispanic					1.488**	(2.828)
Asian					2.358**	(3.570)
Other race					1.374	(1.483)
Step parents (ref two bio parents)					.596***	(-5.335)
Other family type					.304***	(-5.505)
Single parent					.760**	(-3.354)
Poor	.587***	(-6.610)	.706**	(-3.485)	.756**	(-2.701)
One parent college degree	1.615***	(5.814)	1.347	(3.372)	1.120	(1.907)
Prop score 2. Quint.	1.171	(1.542)	1.110	(.928)	1.264*	(1.970)
Prop score 3. Quint.	1.492**	(3.118)	1.197	(1.247)	1.476*	(2.474)
Prop score 4. Quint.	1.734***	(3.872)	1.209	(1.201)	1.608**	(2.661)
Prop score 5. Quint.	2.921***	(5.933)	1.702**	(2.745)	2.504***	(4.177)
Treatment: parents civic participation	.891	(-.438)	.825	(-.569)	.858	(-.462)
Level 2						
Intercept	1.329	(1.247)	.855	(-.625)	1.032	(.123)
School poverty	.981**	(-2.926)	.985*	(-2.071)	.981*	(-2.377)
School parents college degree	1.026***	(6.115)	1.025***	(5.111)	1.025***	(5.223)
School parent civic participation	.956***	(-4.844)	.973**	(-2.851)	.964**	(-3.686)
Cross level interactions						
School poverty * parents civic part.	1.005	(.616)	1.005	(.619)	1.004	(.528)
School parents college * parents civic	1.002	(.312)	1.001	(.134)	1.001	(.200)
School parents civic * parents civic	1.004	(.344)	1.008	(.580)	1.006	(.452)
Number of adolescents	11,453		10,589		10,589	
Number of schools	130		130		130	
Deviance	**34843.41**		**30473.56**		**30295.92**	
Chi-square model comparison =	**4369.85*** **		**177.64*** **			

*** p<.001 ** p<.01 *p<.05, population average model with robust standard errors, EM Laplace iterations, full maximum likelihood, weighted data

Table A11: Correlation of individual and school level parental social capital indicators

		Individual level			School level	
		Informal closure	Civic participation	School related closure	Informal Closure	Civic participation
Individual level	Civic participation	.16				
	School related closure	.21	.22			
School level	Informal closure	.27	.15	.14		
	Civic participation	.17	.24	.16	**.64**	
	School related closure	.11	.12	.33	**.42**	**.50**