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# Reducing children's behavior problems through social capital: A causal assessment



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## ABSTRACT

Behavior problems among young children have serious detrimental effects on short and long-term educational outcomes. An especially promising prevention strategy may be one that focuses on strengthening the relationships among families in schools, or social capital. However, empirical research on social capital has been constrained by conceptual and causal ambiguity. This study attempts to construct a more focused conceptualization of social capital and aims to determine the causal effects of social capital on children's behavior. Using data from a cluster randomized trial of 52 elementary schools, we apply several multilevel models to assess the causal relationship, including intent to treat and treatment on the treated analyses. Taken together, these analyses provide stronger evidence than previous studies that social capital improves children's behavioral outcomes and that these improvements are not simply a result of selection into social relations but result from the social relations themselves.

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## 1. Introduction

Researchers and policy makers alike increasingly recognize the importance of children's emotional and behavioral skills for their success in school (Cuellar, 2015). Behavior problems among children in early grades are especially consequential because they can impede cognitive skill development not only in elementary school but also in subsequent school years, with behavior problems at age six associated with math and reading achievement as late as age seventeen (Breslau et al., 2009; Duncan et al., 2007; Vitaro et al., 1999). Socio-emotional skills in kindergarten are associated with a variety of young adult outcomes, including education, employment, criminal activity, substance abuse, and mental health (Jones et al., 2015). The effects of behavior problems on academic achievement are so strong that they are comparable to the effects of prior grades, which are among the strongest predictors of achievement, and which are even larger than gaps typically found by socio-economic status and race/ethnicity (Casillas et al., 2012; Georges et al., 2012). Moreover, the association between behavior problems and academic outcomes does not appear to be merely a spurious relationship. Behavior problems at early ages exert strong effects on later academic achievement and attainment, independent of IQ, birth weight, family characteristics, and behavior problems during the intervening years (McLeod and Kaiser, 2004; Breslau et al., 2011).

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Reducing behavior problems improves academic outcomes through various mechanisms, including increased attention to task (Alexander et al., 1993; Duncan et al., 2007; Howse et al., 2003; Miech et al., 2001) and increased time engaged in academic activities (Duncan and Magnuson, 2011). In contrast, increased antisocial behavior, problems relating to peers, and general aggression promote conflict between students and teachers and reduce exposure to instruction and collaborative learning activities (Ladd et al., 1997; Battistich et al., 1993). Depression, anxiety, and withdrawn behavior also reduce children's engagement with classroom activities (Fantuzzo et al., 2003). As a result, scholars and policy makers have indicated that early intervention for children's emotional and behavior skills should be a critical priority (Portes, 1998; Raver and SRCD, 2002).

## 2. Social capital and Children's behavior

Although there are many interventions for addressing children's behavior problems, efforts to prevent problems from developing in the first place are particularly desirable, and an especially promising prevention strategy may be one that focuses on strengthening the relationships among families in schools, often referred to as building social capital (Gamoran et al., 2012). When families have stronger ties with other families, parents feel less isolated and stressed, and their children are less likely to manifest behavioral problems (Neece et al., 2012). Indeed, a recent National Research Council report identified the adverse health effects of social isolation as the strongest evidence of social capital effects in a review of research on social cohesion (Prewitt et al., 2014). Moreover, access to social capital can allow for better control over undesirable behaviors, and parents with more access to social capital can set behavioral norms for their children that aid in the development of human capital (Coleman, 1988; Portes, 1998).

One mechanism by which parents' social capital helps young children's behavior is through the social support these networks provide, which comes in various forms, including services and information. For example, African American parents of urban elementary school children who have formal contact with school staff are significantly more likely to be involved in at-home and at-school activities that support their children's educational and behavioral development, and this is attributed to the information they receive from school staff (McKay et al., 2003). More generally, parents who are less socially isolated are less likely to be irritable, distracted, neglectful, or abusive, and more likely to attend and respond to their children's needs (Belskey and Vondra, 1989; Creasey and Jarvis, 1994; Kozłowska and Hanney, 2002; Mash and Johnston, 1990; Webster-Stratton, 1990).

Another mechanism by which parents' social capital helps children is through the social control these networks provide, which helps guide children's behavior (Sampson et al., 1999). For example, in wealthy neighborhoods, preschool children have fewer behavior problems if their parents report knowing many neighbors (Caughy et al., 2003). This improved behavior is attributed to the parents' shared expectations regarding the collective socialization of children in the community. These studies indicate that, for young children, social capital functions through parents, and parents' social networks can provide social support and social control, which are beneficial for children's behavioral development. These mechanisms suggest that parents' social capital can reduce children's behavior problems both by preventing behavior problems and by helping parents respond more effectively when behavior problems arise.

Despite the intuitive appeal of these findings, evidence of social capital's causal role is open to question for two primary reasons. First, research on social capital suffers from conceptual and operational ambiguity (Prewitt et al., 2014). Even a brief review of the literature unearths a wide range of definitions and an even wider range of indicators used to measure social capital, which makes it quite difficult to compare across studies. Second, most empirical assessments of social capital have been limited to correlational analyses, which inhibit the causal interpretation of the effects of social capital. In particular, it is unclear whether social capital is a reflection of unobserved variables, a matter of selection (individuals who are alike tend to associate with one another), or a matter of influence (social capital and behavioral outcomes are causally related), and if the latter, it is unclear which way the causal pathway runs (Mouw, 2006). This paper responds to these limitations.

### 2.1. What do we mean by social capital?

Researchers disagree about the conceptualization and operationalization of social capital. In a review of 35 studies of social capital and educational outcomes between 1992 and 2001, Dika and Singh (2002) reported that social capital was conceptualized in a wide variety of ways, including as networks, network resources, trust, information channels, and norms and sanctions; and they reported that social capital was operationalized through an even wider range of measures, including family structure and size, parents' and friends' expectations and aspirations, residential mobility, youth activities, church activities, parent involvement, racial identity, reading and writing abilities, family cohesion, intergenerational closure, neighborhood attributes, social support networks, socioeconomic status, language proficiency and use, and whether parents have a say in school policy. This list, which is not exhaustive, illustrates a clear need for a more focused definition of social capital and a more precise specification of its indicators.

Three conceptual problems with social capital are particularly salient. First, some writers seem to confuse the conditions that generate social capital with the benefits that derive from social capital. The distinction between social capital as a property of relationships and social capital as the resources accessed through those relationships marks a necessary step in the development of social capital theory (Coleman, 1988; Lin, 2000; Portes, 1998; Putnam, 1995). This distinction is important because the resources themselves must remain conceptually distinct from the relationships that facilitate resource sharing.

Otherwise, defining social capital as the resources acquired through social relationships confounds social capital with other forms of capital, such as financial, human, or cultural capital. For example, if a person has a friend who is willing to provide a monetary loan, the relationship with that friend represents social capital. If that friend actually provides a loan, that loan represents financial capital. But if that loan is labeled as social capital, financial capital is indistinguishable from social capital, which reduces the utility of the concept.

The second conceptual problem is that researchers disagree on whether social capital is a property of groups or individuals. [Portes \(1998\)](#), perhaps the strongest proponent of the individualist perspective, argued that social capital should not be extended to be a property of groups because that would lead it to simultaneously be a cause and an effect. Portes was particularly concerned with the use of aggregate-level characteristics as both indicators of social capital and outcomes of social capital. We agree that using the same factors as both indicators and outcomes of social capital is problematic, but the problem stems from the use of the same factor, not the level of aggregation. In contrast, [Coleman \(1988\)](#) underscored that, “unlike other forms of capital, social capital inheres in the structure of relations between actors and among actors. It is not lodged either in the actors themselves or in physical implements of production” (p. S98). Because social capital resides in social relationships, it is most useful to define it as a property of groups rather than of individuals. An individual cannot possess social capital alone, as social capital cannot exist without a relationship between at least two people. However, individual group members may draw differentially from their social relationships, due to individual characteristics as well as the organizational context ([Small, 2009](#)). In the case of schools, some school contexts are more effective brokers of social relations than others. In addition, some individuals may benefit from the social relationships of others in their network even if their own relationships are limited (spillover effects). This is particularly relevant for young children who are unlikely to have many social relationships with adults but may benefit from their parents’ connections with other trustworthy adults (e.g., when parents know their children’s friends’ parents). For young children, social capital primarily functions through their parents ([Runyan et al., 1998](#)).

The third conceptual problem is that the literature is ambiguous on whether social capital should be conceptualized as the quantity of social relationships, the quality of those relationships, or some combination of the two. Connections alone do not establish social capital. Instead, social capital emerges from relationships characterized by trust, mutual expectations, and shared values ([Coleman, 1988, 1990](#)). To identify social capital, therefore, one must consider both the quantity as well as the quality of social relationships ([Torche and Valenzuela, 2011](#)). However, the social capital literature often focuses on one but not the other, resulting in an incomplete picture of social relationships. For example, [Carbonaro \(1998\)](#) was among the first to test empirically a particularly important type of social relationship, labeled by Coleman as intergenerational closure, which refers to whether parents know the parents of their children’s friends. Carbonaro’s study used a precise operational definition of social capital, measuring it as the number of parents of a child’s friends known by the parents of that child. Although this is a useful measure of the quantity of a particular type of social relationship (which we also use in the present study), it does not capture the quality of the social relationships. For example, do parents trust the other parents enough to ask them to babysit their children? Do they have mutual expectations about their relationship? Do they feel that the other parents share their values? When these questions are answered in the affirmative, social capital is more likely to be present.

Addressing these important disagreements and ambiguities will result in a more precise definition as well as more accurate measures of what is now a vague but widely used concept with limited utility ([Durlauf and Fafchamps, 2005](#)). For the reasons described above, we define social capital as relations of trust, mutual expectations, and shared values. We conceptualize social capital as a property of groups rather than individuals, recognizing that individual group members may draw differentially from their social relationships, and we assert that measures of social capital must capture both the quantity and quality of social relationships. In this study, we focus on relationships between parents and other parents in school communities, as these social relationships play an integral role in connecting individuals affiliated with a school. Using this definition of social capital, we focus on the effects of social capital on children’s behavior, testing the hypothesis that schools with more parent social capital produce better behavioral outcomes for children. To test this hypothesis rigorously, however, we must question the causal role of social capital.

## 2.2. *Research question and contribution*

This study attempts to construct a more focused conceptualization of social capital and aims to determine the causal effects of social capital on children’s behavior. A variety of studies have tested the relations between social capital and child outcomes, and although most have relied on longitudinal data, the causal direction in these studies is ambiguous. Does social capital foster school success, or do better social ties emerge in more successful schools? Even [Putnam \(2000\)](#) acknowledged that the causal direction of social capital can be difficult to discern, and [Mouw \(2006\)](#) warned that empirical estimates of social capital might be biased because people choose their friends, group memberships, neighborhoods, and schools, and they tend to associate with similar people, a practice known as social homophily. As a result, what is attributed to social capital may actually be due to a host of other factors that explain the selection of social relations, not the social relations themselves.

Experimental manipulation offers the best method for testing the causal effects of social capital. By randomly assigning a set of schools to an intervention that produces social capital, we can introduce an exogenous stimulus to social capital formation, which provides leverage to assess the causal effects of improved social capital compared to an untreated set of

schools. This experimental design reduces problems of ambiguous causality and omitted variables that have created uncertainties in prior studies. It renders the causal direction clear, and it eliminates the selection processes that lead some groups to have more, and qualitatively different, social capital than others. Testing the causal effects of social capital has important implications for interventions that aim to improve children's behavior.

### 3. Data and methods

In this study, we implemented a randomized intervention to generate social capital among families in a school, and assessed the impact of the intervention on children's behavior outcomes. The experimental design and focused conception of social capital allows a more rigorous test for causal effects than prior research has allowed.

#### 3.1. The intervention

The intervention we test, which stimulates social capital, is Families and Schools Together (FAST), a program designed to develop relations of trust and shared expectations among parents, school staff, and children (McDonald, 2002; McDonald and Frey, 1999). FAST has been identified as an exemplary evidence-based model by the U.S. Department of Education and the Office of Juvenile Justice and Delinquency Prevention, and it is listed in the National Registry of Effective Prevention Programs of the U.S. Substance Abuse and Mental Health Services Administration (Office of Juvenile Justice and Delinquency Prevention, 2006; US Department of Education Office of Educational Research and Improvement, 1998). FAST is a multi-family after school program that is typically implemented in three stages: (1) active outreach to recruit parents, (2) an eight-week session of weekly group meetings, and (3) two years of follow-up monthly parent-led meetings (FASTWORKS). Before this study, FAST was usually implemented as a single group (hub) of five to ten families of at-risk children, but in this study, FAST was implemented as multiple groups (multi-hub) of universally recruited (as opposed to targeted at-risk) children.

A trained team of parents and professionals led the FAST sessions, which begin with activities designed primarily to strengthen relationships within the family by reinforcing the boundaries and the hierarchy of the family unit (Minuchin, 1974).<sup>1</sup> Next, the families share a meal together. Every week, one family wins a gift card to a grocery store; the following week, that family buys or prepares dinner for the entire hub of families participating in FAST. Parents direct their children to serve the food and clean up after eating. Next, the families play games at their own tables, with parents leading the children in their native language in games and activities that encourage turn-taking, listening, sharing feelings, and delaying gratification. The children observe that their parents know what to do at the school, regardless of parents' language proficiency or literacy.

These first activities of the evening, designed to improve social relations between parents and their children, also contribute to trust, shared expectations, and shared values across families and between families and school staff. Singing together, playing games, and sharing a meal comprise a positive, shared experience for families and school staff, providing a basis for the development of relationships and reducing anxiety about the school context. Because families take turns providing meals for the entire FAST hub, they develop reciprocity in their relationships with each other, which engenders trust across the social network.

After the family-focused time, the FAST sessions turn to developing relations across families, fostering intergenerational closure in the network. The children and adults are separated, with the children going to a supervised area to play and complete homework, while the parents begin "Buddy Time," a fifteen-minute period in which two parents partner together to take turns, each speaking for seven uninterrupted minutes about his or her day. The parents are directed to listen without judging or giving advice, an interaction meant to develop trust and shared values in the new friendships. This activity develops friendships across families. Next, the parents come together for "Parent Group Time," in which the parents sit in a circle to talk together. A FAST team member, who is instructed to participate as little as possible, explains that the group conversation is confidential and that their goal is "to help each other help their child succeed in school." School staff are not permitted to join this meeting. The Parent Group Time is intended to build a peer support system and facilitate the growth of a social network among the parents. Families generally choose to discuss challenges at home and school, often finding commonalities in these issues and then working together to develop solutions.

Parent Group Time is followed by 15 min of one-to-one parent-child time called "Special Play," during which the child takes the lead in playing. The goal is for each parent to pay full attention to the child without criticism or interruption, following four guidelines: "(1) Don't boss. (2) Don't teach. (3) Don't judge. (4) Follow the child's lead." Parents are assigned "homework" in which they are to repeat special play at home.

Finally, the hub reunites to further develop relationships across families and between families and school staff. Each week, one family wins a door prize, including the gift card for purchasing and preparing the meal for the next FAST session. Every family wins one time during the 8-week program, ensuring that all families are included. After the prizes are distributed, members can make announcements about school events, community events, and birthdays, and the entire group comes

<sup>1</sup> Descriptions of FAST sessions are laid out in materials such as McDonald and Frey (1999) and McDonald (2002); they were verified by on-site observations during this study.

**Table 1**  
Socio-demographic characteristics of FAST and control schools.

	FAST schools	Control school	t-test p-values
Enrollment	722.3	762.2	0.509
% Black	10.8	10.8	0.994
% Hispanic	71.5	75.0	0.501
% Free-reduced lunch	76.9	76.7	0.958
% LEP	23.6	19.8	0.340
% Special Ed	11.6	11.4	0.755
% Eng proficient	73.6	70.7	0.630
% Math proficient	71.9	69.4	0.614

together in a circle to create a “rain storm” through snapping, clapping, and foot-stomping. These closing activities are designed to reinforce togetherness through routine and a positive group experience.<sup>2</sup>

### 3.2. Sample and design

To implement FAST, we turned to elementary schools in San Antonio, Texas, and Phoenix, Arizona. We selected these communities for three reasons. First, they have effective social service agencies with successful experience implementing FAST in the past. Second, many schools in these communities had high concentrations of low-income, Latino families, a prime target for increasing social capital (Gamoran et al., 2012). Third, we found school districts in these communities that were willing to participate in the study, including randomization of participating schools to FAST and control groups. One large district in San Antonio participated in the study, as did three medium-sized districts in Phoenix, for a total of 52 schools. Randomization of schools occurred within districts, and we included district as a fixed effect in our analyses. To ensure representation of the most disadvantaged schools in our San Antonio district, we created two blocks of schools based on percentage of students on free or reduced-priced lunch and randomized students within blocks. This blocking is also indicated by a fixed effect in our analyses.

Following a cluster-randomized design, we randomly assigned 26 schools (half in San Antonio and half in Phoenix) to participate in FAST and the other 26 schools to continue business as usual without FAST. Because FAST implementation is labor intensive, we staggered implementation across two years, and we randomly assigned schools to two cohorts: Cohort 1 consisted of 12 FAST schools and 12 control schools during the 2008–09 academic year, and Cohort 2 consisted of 14 FAST schools and 14 control schools during the 2009–10 academic year. A dummy indicator for cohort is included as a fixed effect in our analysis. A total of 3084 first-grade students participated in the study. The treatment and control schools were compared to determine whether the randomization produced comparable groups, and t-tests demonstrated that there were no statistically significant differences in terms of the characteristics commonly used to compare schools, including size, racial/ethnic composition, and the proportions of students who are eligible for the national school lunch program, who are Limited English Proficient, who receive special education services, and who are proficient in reading and math state assessments (Table 1).

We aimed to recruit universally all first graders in participating schools, which on average had 104 first graders per school. The research team and staff from the local social service agencies recruited families to the study at both FAST and comparison schools through family dinner events, parent-teacher conferences, and home visits. Potential participants learned about the study, chose whether to consent to the study, and received a \$10 gift card as compensation for filling out a short 3-page pre-test questionnaire. Parents in the FAST schools also learned about FAST and chose whether to consent and participate in FAST.<sup>3</sup> Teachers also learned about the study, chose whether to participate, and were compensated \$150 for filling out questionnaires for all of their participating students about two weeks after the FAST intervention concluded.

### 3.3. Response rates, sample attrition, and missing data

Overall, 3084 families participated in our study, just under 60% of the targeted population, with nearly identical rates of participation in FAST and control schools. The lack of full participation means our finding may not generalize to the total population of students, but equal rates of participation in FAST and control schools means that treatment estimates are unbiased. Compared to publicly available racial/ethnic distribution of the first grade cohorts in study schools during FAST

<sup>2</sup> A distinctive feature of FAST is that the eight-week intervention is followed by two years of parent-led monthly meetings, where parents can further develop and reinforce the relationships established through FAST. The follow-up meetings, known as FASTWORKS, provide a supportive structure for increased parent involvement, which should become self-sustaining as it maintains the newly formed relationships. This phase of FAST occurred outside the time frame of the present analysis and will be the focus of future research.

<sup>3</sup> In FAST schools, families were invited to participate in the study even if they declined to attend FAST, and they were welcome at FAST even if they declined to participate in FAST. In practice, however, virtually everyone in the FAST schools who consented to FAST also consented to the study, and vice versa. Not all who consented to FAST actually attended, however.

implementation, our sample included a smaller proportion of African American students (8% versus 10%,  $p$ -value  $<0.001$ ) and a slightly larger proportion of Hispanic students (75% versus 74%,  $p < 0.05$ ).

Our analysis draws data from three surveys: pre- and post-treatment surveys of parents, and post-treatment surveys of teachers. We obtained survey response rates of 95% from first grade teachers and 99% from parents on the pre-treatment survey, with no differences in response rates between treatment and control groups. About 65% of parents returned surveys during the follow-up, and response rates were higher among parents from control schools (69.5%) than FAST schools (61.7%). We use weights to adjust the follow-up parent sample for non-response so that it represents the full population of consented children. Parents who responded to the follow-up tended to be more socially connected than non-respondents prior to FAST, and we account for this by including pre-treatment measures of social capital in all models. For all analyses, we excluded 98 cases with missing pre-treatment family social capital indicators, and for the child outcome analyses we also excluded 154 cases with missing data on child behavior. The final (unweighted) analytic samples included 2832 families in models of child behavior (92% of the consented sample) and 1929 families in models of post-treatment social capital (64% of the consented sample, weighted to account for survey non-response).

### 3.4. Measures

We argue, and demonstrate empirically, that FAST is a stimulus to social capital in schools. Thus, hosting FAST can be taken as a proxy for social capital in school communities. Moreover, FAST is a closer proxy for social capital than many others that have been used in past studies, such as family structure, educational expectations, discussions with children about academic issues, PTA involvement, and residential mobility (e.g., Kao and Rutherford, 2007; Kim and Schneider, 2006; Ream and Palardy, 2008; Teachman et al., 1997).

#### 3.4.1. Parent social capital

We expect heterogeneity in the extent to which individuals access social capital within their communities. In our analysis, “parent social capital” refers to the extent to which parents draw on social capital in schools. In this study, we measured parent social capital both prior to the treatment period and afterward in ways that capture both the quantity and quality of social relations. First, we asked parents, “How many parents of your child’s friends at the school do you know?” (mean = 3.34,  $sd = 2.14$ ). This survey item parallels the widely used measure representing intergenerational closure (e.g., Carbonaro, 1999; Morgan and Sørensen, 1999). We measured the quality of relationships within parents’ networks in two ways: shared expectations and trust among parents. These qualities are key features of group-bonding social capital, as opposed to bridging social capital, where the quality of the relationships can be very different (Leonard, 2004). We asked parents to report how much they thought other parents at the school shared their expectations for their child. Parents could respond, “not at all,” “a little,” “some,” or “a lot” (mean = 2.39,  $sd = 1.13$ ). Then, we asked parents a series of questions about the social support they give and receive from other parents, such as babysitting, shopping, discussing problems, and socializing at meals or parties, with response categories the same as those for the shared expectations measure. These items describe reciprocal exchanges between families. The measure is an additive scale ranging from 1 to 24, where higher values indicate more trust (mean = 10.90,  $sd = 4.92$ ). To aid in interpretation of regression results and comparability across measures, we standardize each of the three social capital measures to have a mean of 0 and a standard deviation of 1.

#### 3.4.2. Children’s socio-emotional behavior

The outcome of interest for this paper is children’s socio-emotional behavior. Children’s first grade teachers reported on student behaviors through a series of questions from the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). This widely used instrument for assessing social adjustment and behavior problems taps five dimensions of psychological functioning: emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems, and prosocial behavior. In research (as opposed to clinical) applications, the items covering behavioral problems are commonly combined into scales representing internalizing and externalizing behavior. We follow that approach in this paper for parsimony and in light of findings reported by Goodman et al. (2010) that the broader scales exhibit greater validity in community samples such as ours, as contrasted with samples at high risk for mental health problems for which the more fine-grained subscales are preferred.

The internalizing behavior scale, which incorporates emotional symptoms and peer problems, includes items such as those asking teachers whether the child “has many fears, is easily scared,” “is often nervous or clingy in new situations,” “has at least one good friend” (reverse-coded), and “is picked on or bullied by other children.” The externalizing behavior scale, which incorporates conduct problems and hyperactivity, includes items such as those indicating the child is “constantly fidgeting or squirming,” “often fights with other children,” and is “generally obedient” (reverse-coded). These types of behavior are expected to respond to parents’ social capital, where parents who are less isolated and more involved in school may engender less anxiety and stress in their children leading to fewer behavior problems and, when problems do arise, have better access to support, services, and information so they can respond more effectively. Teachers are asked to indicate whether each characteristic is “not true,” “sometimes true,” or “always true,” for each child. Responses are coded 0, 1, and 2, respectively, and the totals are summed to form the scales. Both the internalizing and externalizing scales range from 0 to 20, with means and standard deviations of 3.02 and 3.07 (internalizing) and 4.12 and 4.81 (externalizing), respectively.

### 3.5. Analysis plan

We employ two analytic strategies to uncover the causal effects of social capital on children's behavior. The two strategies pose different questions and embody different assumptions. In both approaches, we first validate FAST as an indicator of social capital and then assess the impact of FAST on children's behavior. Taken together, these analytic approaches permit a judgment of whether the effects of social capital warrant a causal interpretation.

#### 3.5.1. Intent-to-treat analyses

The first approach consists of intent-to-treat (ITT) analyses in which we rely on the randomized design to uncover the causal effects of attending a school that was assigned to FAST on social capital and children's behavior. ITT effects refer to the impact of attending a school that was assigned to FAST, regardless of whether one actually attended any FAST sessions. This analysis addresses a policy-relevant question: What is the school-wide impact of implementing FAST in schools like the ones we studied? Social capital measures constitute the first set of outcomes in the ITT models, and this analysis is intended to validate FAST as an indicator of social capital. With that validation established, a second set of models assesses the impact of social capital on child behavior using FAST as an indicator of social capital.

Because we randomized treatment at the school level and students are clustered within schools, multilevel models are the appropriate technique for estimating treatment effects in our study (Raudenbush, 1997). We estimated the following random slope model of students nested within schools, with FAST included as a predictor at the school level:

$$y_{ij} = \beta_{0j} + \beta_{1j}X_{1ij} + r_{ij} \quad (1)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01}W_{1j} + \gamma_{02}W_{2j} + u_{0j} \quad (2)$$

where  $y_{ij}$  is the outcome of respondent  $i$  in school  $j$  of the outcome, and  $\beta_{0j}$  is the mean outcome across all schools. The ITT effect of FAST is represented by  $\gamma_{01}$ . These models also include pre-treatment indicators of parent and school-level social capital ( $\beta_{1j}$ ,  $\gamma_{02}$ ). The effect of FAST can be interpreted as causal if the parent and school-level residuals ( $r_{ij}$ ,  $u_{0j}$ ) are conditionally independent from  $\gamma_{01}$ . The random assignment of schools to the program satisfies this condition.

By examining outcomes for all students enrolled in FAST schools compared to all those enrolled in control schools, this approach uses the randomized design to ensure an unbiased estimate of FAST effects. However, a key limitation of this approach for our purposes – which is to use FAST to test the effects of social capital – is that not all students in the FAST schools were exposed to FAST. Since the stimulus to social capital was most likely to occur among those who actually attended FAST, and not all students attended FAST, the ITT is a conservative estimate of social capital effects. Our second approach addresses this limitation.

#### 3.5.2. Treatment-on-treated analyses

Our second strategy is to estimate treatment-on-treated (TOT) models. The TOT analyses address a different question than the ITT models. Rather than asking how FAST affects those who attended schools assigned to FAST, the TOT models assess the impact of FAST for those who actually completed the program. From the standpoint of testing social capital effects, the TOT models pose the question that we need answered, because those who participate in FAST would presumably have the best access to the resources generated by social capital. Yet the TOT models give up something in return for this more powerful interpretation. Unlike the experimental ITT estimates, the TOT estimates are quasi-experimental, relying on a model to simulate which study participants in the control group would have attended FAST had they been enrolled in schools assigned to the FAST group. Note that there were no “crossovers” in our sample, that is, no subjects from the control group who attended FAST. However, there were non-compliers in the FAST group: about three-quarters of sample families enrolled in FAST schools actually attended FAST, and about one-third of those who attended FAST carried through to graduation, which we consider full compliance. Thus, the validity of this approach to assessing causal effects rests on the strength of the compliance model, that is, the model of who completed FAST in the treatment group and who would have completed FAST in the control group had they been given the opportunity to do so.

We employ a complier causal average effect (CACE) model to estimate the TOT effects. The CACE model simultaneously predicts which families are likely to participate in FAST based on a compliance model (described below) and estimates the difference in outcomes between predicted compliers in the treatment schools and predicted would-be compliers in the control schools (Angrist et al., 1996; Bloom, 1984; Borman and Dowling, 2006; Jo et al., 2008; Muthen and Muthen, 1998–2010). Compliance is defined as those who graduated from the FAST program, which requires participation in at least 6 of the 8 FAST sessions.

We take advantage of the randomization in that we know who attended FAST from among those enrolled in FAST schools, and we know that control group members are equivalent on the whole to the FAST group members. The challenge is to estimate a reliable model that distinguishes between control group members who would have attended had their schools been assigned to FAST, and those who would not have complied even if they had the chance.

Equation (3) describes the compliance model used to identify families that were likely to graduate from FAST in treatment schools and in comparison schools. The compliance model predicts compliance in the treatment group as a function of pre-

**Table 2**

Average latent class probabilities for most likely latent class membership (Row) by latent class (column) for each outcome.

	Compliers	Non-compliers
Internalizing behavior problems		
Predicted compliers	0.94	0.06
Predicted non-compliers	0.03	0.97
Externalizing behavior problems		
Predicted compliers	1.00	0.00
Predicted non-compliers	0.15	0.85

treatment measures of social capital, uses that information to simulate who would have attended FAST in both the treatment group and control group, and is embedded into equations (1) and (2):

$$C_{ij} = \beta_{0j} + \beta_{1j}X_{1ij} + v_{ij} \quad (3)$$

In this context, the predicted compliance is a latent variable in both the treatment and comparison groups. However, we can judge the strength of the compliance model in the treatment group because we observe graduation in FAST schools. The final predicted latent class assignments are based on estimated posterior probabilities. Each person has a probability of being in each class. Higher probabilities suggest that the compliance model strongly predicts participation in FAST within the treatment group. Table 2 shows that our compliance model is highly successful for both child outcome variables. For the internalizing behaviors analysis, predicted compliers have an average probability of being in the complier class of 0.93, and predicted non-compliers have an average probability of being in the non-complier class of 0.97. For the externalizing behavior analysis, the analogous figures are 1.0 and 0.85.

We estimate the effect of social capital from two predicted latent classes – compliers compared to would-be compliers – with Equations (1) and (2).<sup>4</sup> All the cases are used for this analysis, as control group members are weighted according to their probability of compliance while in the treatment group, compliers are weighted 1 and non-compliers are weighted 0.

#### 4. Results

We present results in two sections: first the effects of FAST on social capital, and then the effects of FAST on children's socio-emotional outcomes. With the first, we validate FAST as a stimulus for social capital, and in the second, we use FAST to test the effects of social capital on child outcomes. In both cases, we provide multilevel intent-to-treat analyses followed by multilevel treatment-on-treated analyses. Taken together, these models offer a judgment on the causal role of social capital in affecting child outcomes.

##### 4.1. Effects of FAST on social capital

The left panel of Table 3 displays intent-to-treat (ITT) estimates of FAST effects on four measures of parent social capital: intergenerational closure, reciprocity, shared expectations, and a composite measure of social capital that includes all three measures. The results indicate that FAST generates structural and qualitative aspects of parent social capital. Parents in FAST schools were more likely to know other parents of their children's friends in the school than parents in control schools (0.21 standard deviations,  $p < 0.001$ ), indicating effects on intergenerational closure. Parents in FAST schools were also more likely to exhibit reciprocity with one another (0.11 standard deviations,  $p = 0.001$ ) and to share expectations with other parents (0.14 standard deviations,  $p = 0.005$ ). When we measure social capital as a composite variable, FAST effects come to 0.18 standard deviations ( $p < 0.001$ ). This means that families in FAST schools score, on average, approximately 18% of a standard deviation higher on the composite social capital measure than families in comparison schools.

These ITT results validate the claim that FAST serves as a stimulus to social capital. However, the estimates are likely diluted by non-compliance, in that only about one quarter of families in FAST schools actually completed the FAST program. Hence, the right panel of Table 3 provides treatment-on-treated (TOT) estimates of FAST effects for students whose families attended FAST through graduation. The TOT analysis reveals that FAST increases intergenerational closure by 0.54 standard deviations ( $p < 0.001$ ), and FAST increases reciprocity by 0.36 standard deviations ( $p < 0.001$ ). Similarly, FAST affects parents' perceptions

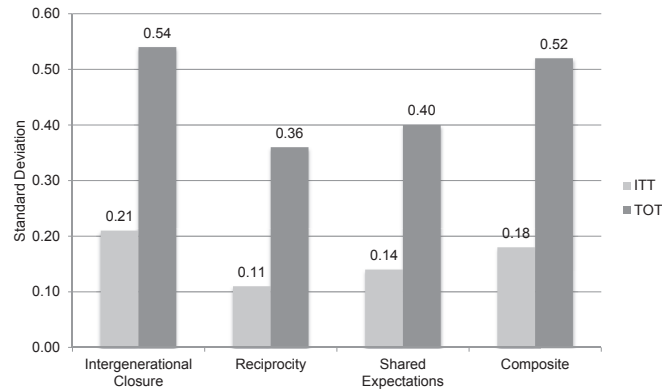
<sup>4</sup> In addition to the results reported here, we employed two additional strategies to identify causal effects: an instrumental variables (IV) analysis (Holland, 1988) in which assignment to treatment served as an instrument for social capital; and a causal mediation analysis (Imai et al., 2010) intended to test whether social capital mediates the effects of FAST on child outcomes. Both analyses yielded results consistent with a causal interpretation. The IV analysis showed that a one standard deviation increase in social capital resulted in a 0.34 standard deviation decrease in internalizing behavior problems. However, as is often the case with IV models (Morgan and Winship, 2007), the standard error was large and the effect was not statistically significant. The causal mediation results indicated that social capital mediated 16% of the effects of FAST on internalizing behavior problems and 8% of the effects on externalizing behavior problems. The mediation effect of externalizing behaviors had a p-value of 0.03 and the mediation effect of internalizing behaviors had a p-value of 0.07. These results are available by request.



**Table 3**  
ITT and TOT effects of FAST on parent social capital.

Social capital outcomes	Unweighted N	ITT			TOT		
		Effect size	Std. error	P-value	Effect size	Std. error	P-value
Number of parents known	1929	0.21	0.04	<0.001	0.54	0.09	<0.001
Reciprocity	1929	0.11	0.03	0.001	0.36	0.09	<0.001
Shared expectations	1929	0.14	0.05	0.005	0.40	0.12	0.001
Composite	1929	0.18	0.04	<0.001	0.52	0.09	<0.001

Note: Models adjusted for pre-treatment measures of social capital and design effects and weighted to account for parent post-test non-response.



**Fig. 1.** Intent-to-treat and treatment-on-treated effects of FAST on parent social capital.

of shared expectations with other parents by 0.40 standard deviations ( $p = 0.001$ ). The FAST effect on the composite measure indicates that social capital increases by 0.52 standard deviations ( $p < 0.001$ ) in response to FAST. As displayed in Fig. 1, these coefficients are substantially greater than those of the ITT models, indicating that the effects of FAST are much larger for those who complete FAST than for the school as a whole. Overall, both sets of analyses support our plan to use FAST to test the effects of social capital on child outcomes.

#### 4.2. FAST as a proxy for social capital: effects on Children's socio-emotional outcomes

Once again, we begin with ITT estimates. The left panel of Table 4 examines ITT effects on two socio-emotional scales: internalizing and externalizing behavior problems. The results exhibit small reductions in behavior problems for internalizing ( $-0.09$ ) and externalizing ( $-0.02$ ) behavior, neither of which is statistically significant. As explained earlier, this is a conservative test of social capital because the treatment group includes all consenting students, whether or not they attended FAST. A more powerful test of social capital theory comes from the TOT model, which compares students in the treatment group who completed FAST, to those in the control group who (based on our simulation) *would* have completed FAST had it been offered to them. The TOT results indicate that FAST decreases internalizing behavior problems by 1.84 standard deviations ( $p < 0.001$ ), a much larger impact than appeared in the ITT results.<sup>5</sup> By contrast the FAST effect on children's externalizing behavior problems was only slightly larger than the ITT coefficient ( $-0.04$ ) and not statistically significant.<sup>6</sup> Fig. 2 displays the two sets of results.

Comments from a parent who was interviewed about the FAST experience help illustrate how building social capital may reduce children's internalizing behavior as manifested in fears, anxiety, and tendency to play alone instead of with others:

<sup>5</sup> Although the TOT effect is very large compared to the ITT effect, it does not necessarily follow that FAST had a large effect in the opposite direction on non-compliers. Inspection of internalizing behavior means among predicted compliers and non-compliers shows a small positive (i.e. deleterious) difference for non-compliers and a large negative (i.e., beneficial) difference for compliers; the benefits for compliers are obscured in the ITT model because the effects are assumed to be the same for all of those assigned to the treatment and because there were three times as many non-compliers as there were compliers.

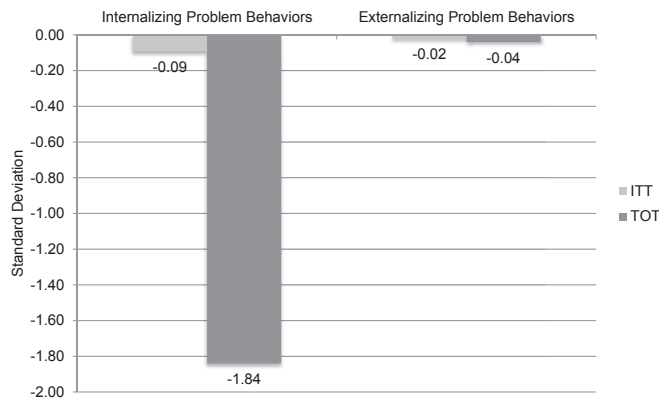
<sup>6</sup> In supplementary analyses, we also estimated ITT and TOT effects of FAST on behavioral problems as dichotomous outcomes to indicate students at the 75th and 90th percentiles on the scales. At the 75th percentile, the supplementary results conformed closely to the linear results: no effects on externalizing behavior problems, a modest ITT effect on internalizing behavior problems (odds ratio = 0.82, i.e. a FAST student was only 82% as likely to have serious internalizing behavior problems as a control student), and large TOT effects (odds ratio = 0.62), contrasted with no effects on externalizing behavior (odds ratios of 0.98 and 1.01 for ITT and TOT effects respectively). However, presumably due to the scarcity of cases at the top of the scale, even the large TOT effects on internalizing behavior problems were not statistically significant. Effects at the 90th percentile were volatile and yielded large standard errors, indicating they could not be estimated precisely.

**Table 4**

ITT and TOT effects of FAST on child behavior.

Child behavior outcomes	N	ITT			TOT		
		Effect size	Std. error	P-value	Effect size	Std. error	P-value
Internalizing behavior problems	2832	-0.09	0.06	0.168	-1.84	0.33	<0.001
Externalizing behavior problems	2832	-0.02	0.05	0.742	-0.04	0.09	0.662

Note: Models adjusted for pre-treatment measures of social capital and design effects.



**Fig. 2.** Intent-to-treat and treatment-on-treated effects of FAST on children's behavioral problems.

It has helped my first grader come out of his shell. He is not as reserved as he used to be. I've noticed that about him, like family functions or if we're out somewhere, any kind of activity or social setting. I notice he is more outgoing, and I think FAST did that for him. I don't know, I think it just gave him some kind of confidence knowing that it was geared toward his age group and that it was specifically for his classroom, it just, I don't know, it helped him come out of his shell. He just felt really important.

More broadly, parents spoke about FAST providing a "bridge" to other families and school staff and the value of getting to know them better, and about increased opportunities to learn about what was going on in school and how they could use that knowledge to support their children (Shoji et al., 2014). These comments reinforce the empirical results that children whose families participated in the social-capital-boosting FAST program exhibited fewer internalizing behavior problems at the conclusion of the program.

## 5. Discussion

In this paper, we constructed a more focused conception of social capital, with more precise measures, that facilitated a causal analysis of the effects of social capital on children's behavior. Taken together, the two analytical approaches in this study – multilevel intent to treat models and multilevel complier average causal effects – provide stronger evidence than previous studies that social capital improves children's behavior and that these improvements are not simply a result of other factors that explain the selection of social relations but result from the social relations themselves.

The results of this study point to interventions that embed families in a network of social relations around the school community as a promising strategy for reducing children's problems relating to their peers. Notably, however, the intent-to-treat effects were modest, reducing peer problems by just under a tenth of a standard deviation. By contrast, effects among children whose families attended FAST through to graduation were large and meaningful, more than 1.8 standard deviations. The key, therefore, is not just to offer social-capital-building programs, but to secure consistent participation.

### 5.1. Limitations

A fundamental limitation of this study is that social capital cannot be randomized; hence any effort to achieve our goal of identifying causal effects must rely on some sort of approximation. Judgments about our findings, therefore, must rest not on whether we have captured the "true" causal effect, but whether our approximation is better and more convincing than those that have preceded it.

The approach we have taken is to use an intervention – which can be randomized – to stimulate social capital among families attending the same school. At one level, our approach was very successful: social capital was demonstrably higher in schools exposed to the intervention than in schools not exposed. At another level, however, our approach was weakened by

incomplete participation in the intervention, which evidently limited its impact on social capital and child outcomes on a school-wide basis. In response, we moved from an experimental intent-to-treat analysis to a quasi-experimental treatment-on-treated analysis, arguing that the latter provides a better estimate of the effects of social capital because families that participated in FAST had better access to the resources generated by social capital. In moving to a quasi-experiment, one might argue, we are back where we started, criticizing existing work for failing to sort out selection from influence in estimating social capital effects. Yet our quasi-experiment is more powerful than prior non-experimental studies of social capital, for two reasons. First, the randomized design provides a better basis than most for comparing FAST participants to non-participants, as long as the compliance model is sound. Second, the inclusion of pre-treatment measures of social capital in the compliance model provides a strong basis for identifying which members of the control group would have participated in FAST had it been offered, as evidenced by accuracy of prediction within the treatment group. We acknowledge that unobserved selection processes cannot fully be ruled out, but maintain that our findings offer a stronger basis for concluding that social capital has causal effects on child behavior than has previously appeared.

Yet another limitation of our study is that the findings are specific to a particular sample of children in a particular set of schools. How they may generalize to other schools and communities cannot be ascertained from our data. Nonetheless, the findings speak to an important – and growing – subset of U.S. schoolchildren, and one for whom the creation of social capital to support their success, socially, academically, and ultimately in the economic realm, is extremely important. As we noted at the outset, Latino families are particularly vulnerable to isolation due to economic, linguistic, and cultural barriers, and devising strategies to overcome those barriers remains a high priority for educators and community leaders alike.

## 5.2. Implications

This study has implications both for the conception of social capital and for policy decisions. Conceptually, this study offers a more precise definition of social capital, defining it not as resources but rather as relationships for which the quantity and quality must be taken into account, and a property not of individuals but rather of groups which may consist of young children for whom social capital primarily functions through their parents. This definition distinguishes social capital from other forms of capital, such as human or material capital, and significantly improves the empirical utility of the concept. Moreover, this study suggests that social capital does not merely emerge in more successful schools, but rather that social capital exerts positive effects on children's outcomes.

From a policy perspective, the causal evidence presented in this study suggests that investing in improving the quantity and quality of social relationships among parents at schools is important for improving children's behavior. When parents know the parents of their children's friends, interact in trusting ways with other parents, and share expectations for their children, their children get along better with peers. Behavioral improvements, in turn, are linked to performance improvements that have lasting effects on a child's life trajectory. Based on these findings, schools would do well to invest in programs, such as FAST, that improve social relationships among parents and between parents and school personnel. Moreover, parents may be advised to participate in these programs, and when there are significant obstacles to their participation, schools should invest in assisting and pursuing the participation of the most disadvantaged families. Our findings suggest that social capital is a potent tool for improving children's outcomes.

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