Prev Sci (2008) 9:99–113
DOI 10.1007/s11121-008-0083-z

The Study of Mentoring in the Learning Environment (SMILE): A Randomized Evaluation of the Effectiveness of School-based Mentoring

Michael J. Karcher

Published online: 23 February 2008

Abstract The effect of providing youth school-based mentoring (SBM), in addition to other school-based support services, was examined with a sample of 516 predominately Latino students across 19 schools. Participants in a multi-component, school-based intervention program run by a youth development agency were randomly assigned to one of two conditions: (1) supportive services alone or (2) supportive services plus SBM. Compared to community-based mentoring, the duration of the SBM was brief (averaging eight meetings), partly because the agency experienced barriers to retaining mentors. Intent-to-treat (ITT) main effects of SBM were tested using hierarchical linear modeling (HLM) and revealed small, positive main effects of mentoring on self-reported connectedness to peers, self-esteem (global and present-oriented), and social support from friends, but not on several other measures, including grades and social skills. Three-way cross-level interactions of sex and school level (elementary, middle, and high school) revealed that elementary school boys and high school girls benefited the most from mentoring. Among elementary school boys, those in the mentoring condition reported higher social skills (empathy and cooperation), hopefulness, and connectedness both to school and to culturally different peers. Among high school girls, those mentored reported greater connectedness to culturally different peers, self-esteem, and support from friends. Findings suggest no or iatrogenic effects of mentoring for older boys and younger girls. Therefore, practitioners coordinating multi-component programs that include SBM would be wise to provide mentors to the youth most likely to benefit from SBM and bolster program practices that help to support and retain mentors.

Keywords Mentoring · School · Connectedness · Social skills · Self-esteem · Multilevel modeling

School-based mentoring (SBM) is the fastest growing form of mentoring in the U.S. (AOL Time Warner Foundation 2002; DuBois and Karcher 2005). In SBM, typically mentors are adults from the community who meet for 1 h a week during school with the youth to whom they have been assigned. This differs from the better-known community-based mentoring (CBM) approach in which mentors meet with youth weekly in community settings for between 4 and 8 h.

While there is considerable evidence that CBM yields small positive effects (DuBois et al. 2002a, b, c; Grossman and Rhodes 2002), little is known about the potential impact of school-based youth mentoring. For example, nearly 50% of the matches coordinated by the Big Brothers Big Sisters (BBBS) programs now occur in schools (Hansen 2005), yet BBBS has only recently begun to study the impact of its SBM program. In fact, despite the rapid growth of SBM, there is little published evidence of its overall effectiveness from sufficiently powered, randomized trials.

Even less is known about the additive effects of including mentoring as one intervention component within a multi-component program. SBM programs can take many forms beyond the agency based model of which BBBS is a good exemplar. SBM programs can stand alone or be part of other services provided to youth at schools (Kuperminc et al. 2005; Portwood and Ayers 2005). BBBS has the largest single SBM program, but the vast majority of SBM programs are coordinated by school staff or multi-service agencies, wherein

M. J. Karcher (✉)
Department of Counseling and Educational Psychology,
University of Texas at San Antonio,
501 W. Durango Boulevard, Ste. 4.338,
San Antonio, TX 78207, USA
e-mail: michaelkarcher@mac.com

SBM occurs alongside other supportive services. It is important, therefore, to understand not only the effectiveness of SBM overall, but also its additive impact when provided along with other preventative and intervention services.

For whom SBM works best is the next important question in the mentoring literature. Although research on SBM is in its infancy, the severely limited number of available mentors makes it imperative to identify which youth—boys or girls, ethnic minority or majority, and in which school settings—will benefit most from participating in a mentoring program. Based on the literature review provided below it is clear that rigorous examinations of gender, age, and setting differences in the impact of mentoring program effectiveness is the next step for the mentoring literature in general. Latino youth are the fastest growing youth population and also the one most at-risk ethnic group for underachievement and drop-out, making the question of whether SBM can support Latino youths' engagement in school and facilitate their academic success a national imperative.

The present study is the first, large-scale, multi-school randomized exploration of the additive effects of providing school-based mentors to Latino youth who already receive other supportive services. It examines overall impact through intent-to-treat (ITT) analyses as well as differential effects across boys and girls in elementary, middle and high school contexts.

Effects of School-based Mentoring

Most previous studies of mentoring effectiveness have been on CBM programs and have consistently revealed small effects (DuBois et al. 2002b). Based on prior research on CBM and given the school context, one key outcome of SBM may be improved grades. However, it is equally plausible that academic performance is a relatively distal and less immediate outcome of SBM (Karcher et al. 2006). Self-esteem and connectedness to school have been identified as outcomes that are more likely to be directly influenced through the experience of meeting at school with a mentor (Portwood and Ayers 2005). There is some evidence from small-sample, randomized and quasi-experimental studies of SBM to support this claim (Karcher et al. 2002; King et al. 2002). Research on CBM also indicates that developing a positive mentoring relationship is associated with improvements in other relationships in adolescents' lives (DuBois et al. 2002c; Grossman and Rhodes 2002), which suggests that SBM mentoring relationships might facilitate improved connectedness to teachers, peers, and even to culturally different classmates when matches are cross-cultural (Sanchez and Colon 2005). One way these changes could occur is through the development of social skills that facilitate stronger relationships with others. For example, a study of the Big Brothers Big Sisters CBM found the effects of program participation on academic outcomes were mediated by proximal changes in parental relationship quality, self-esteem, and attitudes toward school that, in turn, led to improved grades and attendance (Rhodes et al. 2000). Increased hopefulness and mentees feeling more that they matter to others also could result from SBM and have an effect on grades.

One of several potential barriers to effective SBM is the abbreviated time frame in which it is typically conducted. Grossman and Rhodes (2002) found evidence that short-term CBM relationships (i.e., 6 months or shorter in programs that required a year or longer commitment) were negatively related to mentees' self-esteem, behavioral competence, and academic motivation. Although the actual duration of the match (i.e., "shorter than 6 months") may be less the issue than that these youth expected to meet for a year or longer, this study raises the question of how much can be gained through SBM, which is rarely longer than 6 months in length (Herrera et al. 2000), and whether there could be adverse consequences from these short matches. A second barrier is that programs and staff can be severely limited in how much structure and supervision they provide mentors to help establish and support SBM matches (Herrera et al. 2000; Sipe and Roder 1999). These barriers may help to explain why a meta-analysis reported evidence of smaller effect sizes for SBM programs relative to CBM programs (DuBois et al. 2002b).

Moderators of Effects of School-based Mentoring

Mentees' age may moderate the outcomes of SBM. It has been suggested that adolescents may be harder than children to engage in mentoring relationships, especially relationships that are not highly instrumental and goal oriented (Cavell and Smith 2005; Darling 2005). Yet the meta-analysis of DuBois et al. (2002b) did not find that mentees' age was a significant moderator of effect size after controlling for the number of best practices utilized by programs.

There also is theory and some research to suggest that the age and gender of mentees could interact as moderators of the effects of mentoring. While the meta-analysis of DuBois et al. (2002b) did not reveal an effect of sex on program impact, more recent studies have reported evidence of differential effects for boys and girls (Bogat and Liang 2005). Bogat and Liang (2005) suggest that because adolescents experience considerable pressure to assume traditional gender roles, boys may begin to seek greater autonomy and separation in relationships with adults, while adolescent girls, and especially Latinas, may become

increasingly concerned with relatedness and connection (Sanchez et al. 2005). Indeed, the help-seeking literature reveals that girls may be more open to relational assistance during adolescence (Bogat and Liang 2005; Weisz et al. 1995). However, in a sample of 8 to 15 year olds, DuBois et al. (2002c) found that boys were more likely than girls to nominate their mentors as significant adults in their lives. These two findings—that younger males may more readily welcome a mentor into their lives (DuBois et al. 2002c), but older adolescent girls may be more developmentally inclined to seek out relational connection and thus benefit from a mentor (Rhodes and Davis 1996; Sanchez and Reyes 1999)—are consistent with findings from child psychotherapy studies that larger effects for girls relative to boys are most pronounced among older youth (Weisz et al. 1995).

Given the widespread support and increasing number of SBM programs, research on for whom SBM works best and under what conditions is critical. For example, in 2003, the Department of Education allocated $150 million over 3 years to support "student mentoring programs" (MENTOR 2004). This is a considerable investment in an intervention with limited evidence of effectiveness, which should concern policy makers and the public alike, because what is known is that (a) mentoring programs that are poorly run tend to have small effects (DuBois et al. 2002b) and (b) programs in which mentors quit prematurely or which provide only short-term mentors (i.e., 6 months or shorter) have been associated with negative outcomes (Grossman and Rhodes 2002; Karcher 2005; Rhodes et al. 2000). Indeed, while SBM is intuitively appealing to many, "there is relatively little evaluation research demonstrating positive outcomes as a result of SBM" (Portwood and Ayers 2005, p. 336).

This literature review indicates that key outcomes targeted by SBMs include grades, school connectedness, and other behavioral and emotional indices of positive youth development. Karcher et al. (2006) propose that psychosocial and academic outcomes are likely interrelated. Positive changes in one likely facilitate improvements in the other, such that promoting either connectedness or grades through SBM could prevent underachievement, dropout, and problem behavior (Thomas and Smith 2004). In addition, connectedness to school, teachers, and peers tend to differ between boys and girls (Karcher 2003) and may help reveal gender-specific effects of SBM. Connectedness also may be an especially culturally compatible outcome to study among Latinos (Sanchez et al. 2005), who are the student population most at-risk for dropout. Other outcomes associated with risk-taking behaviors that may be influenced by SBM include self-esteem, social skills, social support, hopefulness and mattering, which is one's sense that he or she is important to others (Bramlett et al. 1999; DuBois et al. 2002a; Marshall 2001; Snyder et al. 2003).

Present Study

The goal of the present study was to examine the effects of 1 h of weekly SBM across one academic year among students in 19 elementary, middle and high schools. The outcomes assessed were those revealed in the literature as most likely to be affected by SBM: math and reading grades, connectedness, self-esteem, social skills, social support, hope, and mattering. Main effects of SBM and the role of both school setting (elementary, middle, and high school) and gender as moderators of effects were investigated using hierarchical linear modeling.

Method

Design

The study included 525 youth who were referred by their parents or teachers or who nominated themselves to participate in a program of social and academic enrichment services provided by the Communities in Schools of San Antonio (CIS-SA) agency. CIS-SA places a case manager in each school who is responsible for providing a range of support services to the youth who enroll in CIS programs. Mentors and tutors are sometimes provided to youth through the CIS programs. The youth in this study were told they would either receive a school-based mentor *in addition to* the other supportive services or receive the supportive services alone. Therefore, this was not a waitlist comparison group but rather an alternate treatment comparison group.

Stratified random sampling by gender and grade was done within each school by researchers after all 525 students had returned parent surveys and consent forms and after youth had completed the baseline survey in September. Omitted, prior to randomization, were nine youth whom the CIS case managers identified as having psychological disorders or abuse histories, because research suggests mentoring may be contraindicated for such youth (DuBois et al. 2002b). All 516 of the remaining youth received educational enhancement activities, supportive guidance, enrichment activities, and/or tutoring (i.e., Standard Services). The Standard Services condition was provided to 264 youth, and the remaining youth were assigned to receive a mentor in addition. This group was called (Standard Services) Plus Mentoring (n= 252). Three hundred and twenty-eight youth were recruited in Fall 2003, and 197 youth were recruited in Fall 2004. Post-test surveys were completed in late April. This study reports findings from the participants' first year in the study.

Participants

Pre-test data were collected from 525 youth between the ages of 10 and 18 who attended 19 public schools in a large, Southwestern metropolitan area. At post-test there were 468 youth, 313 girls and 155 boys, with more girls due to their demonstrating more interest in participating in the agency's programs. Seven sites were elementary schools, five were middle schools, and seven were high schools. Elementary school-aged youth were all in fifth grade, and the middle school youth were in grades 6 through 8. The majority of the students were from families earning less than $20,000 a year. Perhaps because parents were the primary referral source and there were just as many self-referrals as teacher-referrals, the demographics and achievement levels of the participating youth appeared to be similar to the larger school body in each of the 19 schools.

Not all youth received their assigned services as intended. There were 28 youth assigned to the mentoring condition who were never mentored, either because insufficient mentors were recruited for their schools (n=8) or because their mentors quit before ever going to the school (n=20). The mentees whose mentors quit were then reassigned to other mentors when available. Because the agency had a policy that each student had to receive at least 8 h of enrichment services, all youth were provided the standard support services. Four youth assigned to the Standard Services only condition inadvertently received a mentor as well. Nevertheless, in order to maintain the randomization, all of these youth are included in the "intent to treat" (ITT) analyses which included all 468 youth (235 mentees and 233 non-mentees) after accounting for attrition.

Mentors (n=292) were 54% Latino, 35% Caucasian, 5% African American, and 6% "Other." Seventy percent were college students, 13% were military personnel, 15% full-time employed adults, and 2% "Other." Forty-three percent spoke Spanish; 73% were female (50 were male). Mentors were recruited by agency staff at military bases, local businesses, colleges and within local organizations (e.g., Chamber of Commerce). A doctoral student on the project also recruited at local universities through class presentations and volunteer fair booths. There were no incentives for mentor participation, although some businesses encouraged employees' participation. In all, 292 mentors were recruited. Of these, 64 went to the schools but met only one or two times with a mentee before quitting.

Mentoring Program

Interest lists were collected from mentors and mentees for the purpose of matching mentees and mentors with similar interests, but 83% of matches were made as a function of schedule compatibility. Ninety-two percent of matches were made by agency staff; 8% of mentors/mentees met in a group format and selected their partner on the basis of mutual interest. As is typically practiced in the field of mentoring (for safety reasons) girls are rarely given male mentors. In this study, only two girls received male mentors. The remaining 48 male mentors mentored 24 high school aged boys and 24 elementary or middle school aged male students.

Mentors attended a 1-h orientation before being assigned to a youth. Although additional evening training/support meetings were offered, only 29 mentors participated in one of these and none attended more than two. It was expected that mentees would meet with mentors 1-h/week at school during the school day or after school from October through May. Case managers were available for onsite support, although because the case managers also provide services to youth it was common for mentors to not see the case manager when at the school. Meetings outside of school were prohibited. The mentoring was unstructured and took place wherever space was available (e.g., library, cafeteria, CIS agency office). After each meeting, the mentors completed an activity log which was entered into a computer to track meeting dates.

Data Collection Procedures

Written consent was obtained from parents and verbal assent was obtained from youth. Surveys were collected in a group format with no more than 20 youth at a time. Pre-test surveys were collected in September. Eight months later, in April and May, 468 youth were surveyed again. Youth were given a movie pass and were told the surveys were used to evaluate the effectiveness of the CIS-SA program of which mentoring was one component.

Measures

Hemingway: measure of adolescent connectedness (5.5 version) The Hemingway instrument consists of several six-item (and one three-item) scales that assess adolescents' caring for and involvement in specific relationships and activities (Karcher 2003). Items are rated using a 1–5 Likert-type scale, whereas all the other measure in the study used a 1–4 range. In each scale, there is one negatively worded item included to lessen response bias. The *Connectedness to School* scale focuses on the importance youth place on school and how actively they try to be successful in school. *Connectedness to Teachers* assesses effort made to get along with teachers and concerns about earning teachers' respect and trust. *Connectedness to Peers* assesses feelings about peers and about working with peers on projects and school-related tasks. *Connectedness to Culturally Different Peers* asks about youths' desire to interact with and get to know peers from other cultural groups.

Two scales assessed present and future-oriented self-esteem. *Self-in-the-Present* assesses feelings about current relationships, continuity in behavior across contexts, and an awareness of skills and interests that make them liked by others. *Self-in-the-Future* asks about the behaviors and qualities of youth that will help them have a positive future. These scales have demonstrated good 3-month test–retest reliability, a distinct factor structure, and evidence of convergent and discriminant validity (Karcher 2003). Post-test internal consistency: School (a=.80), Teachers (a=.80), Peers (a=.83), Culturally Different Peers (a=.84), Self-in-the-Future (a=.79) and Self-in-the-Present (a=.70).

Self-esteem questionnaire (SEQ) Self-esteem was assessed using the SEQ which consists of 42 self-evaluation statements pertaining to each of five separate domains (peer relations [8 items], school [8 items], family [8 items], physical appearance [4 items], and sports/athletics [6 items]), as well as global self-esteem (8 items) (DuBois et al. 1996). Each statement is rated on a 4-point scale ranging from *strongly disagree* to *strongly agree*. In prior research, the scale has demonstrated good reliability and evidence of construct validity (DuBois et al. 1996) with estimates of school self-esteem typically being the highest and sports/athletics the lowest. For this reason, and because of no obvious connection to mentoring, the sports scale was not used. This study included the *Global* self-esteem scale, which assesses overall perceptions of self-worth (e.g., "I am happy with myself as a person") (a=.80), as well as self-esteem in the family (a=.84), physical appearance (a=.82), peer relations (a=.78), and school (a=.75) domains.

Perceived social support scale The items in this scale were drawn from a widely used measure of friend and family support for college students (DuBois et al. 1994; Procidano and Heller 1983). DuBois et al. (1994) adapted the measure for children and adolescents by simplifying item content in some cases, reducing the number of items per subscale from 20 to 10, and modifying the response scale to eliminate a "Don't know" option. Each statement is rated on a 4-point scale ranging from *strongly disagree* to *strongly agree*. DuBois et al. (1994) provide evidence of reliability and validity for the adapted measure. Coefficient alpha for the scales at post test were adequate for support from family (a=.90) and friends (a=.82).

Social skills rating system This survey assesses social skills that affect teacher–student relationships, peer acceptance, and academic performance (Gresham and Elliott 1990). It is designed to identify children who have problems with behavior and interpersonal skills, detect problem behaviors for treatment, and assist intervention planning. Each statement (e.g., "I follow the teacher's directions.") was rated on a 4-point scale (*Not at all* to *Very true*). Separate 8-item scales assessed *Cooperation* (a=.78), *Empathy* (a=.76), *Assertion* (a=.57), and *Self-Control* (a=.82).

Children's hope scale This 6-item scale measures goal-directed thought (Snyder et al. 1997). Three of the six items reflect agency thinking (e.g., "I think the things I have done in the past will help me in the future"), which is an active orientation about goals and the future. The other three items reflect pathways thinking (e.g., "When I have a problem, I can come up with lots of ways to solve it"), which pertains to ways to reach one's goals. Posttest a=.84.

Perceived mattering survey Mattering is the psychological tendency to view the self as significant to others (Marshall 2001). The survey items measure how much youth feel they matter to their parents, friends, and other important individuals. Examples include, "My teachers notice when I need help." The eight-item survey demonstrated good post-test reliability (a=.81).

Grades Agency staff in the schools collected first 6-weeks grades and last 6-weeks grades in Math and Reading from students' report cards. Grade scale ranged from 0 to 100 points.

Additional data Pre and post data on social skills, connectedness, and problem behaviors were collected from parents and teachers but are not reported here because of large sample non-response rates. Teachers frequently declined requests to rate youth whom they did not yet know well at the start of the year, and parental return rates were less than 80% at the end of the year. However, complete baseline parent-rated child behavior ratings were available and were used as covariates.

Conners' child rating scale: global index (CGI) This survey, completed by parents prior to each youth being randomly assigned to conditions, reflects 10 items which capture a range of problems behaviors, both internalizing and externalizing (Conners et al. 1998). Items include: The child is "Restless or overactive; Excitable, impulsive; Cries often and easily; and Mood changes quickly and drastically." The scale demonstrated good post-test reliability (a=.82).

Plan of Analysis

Preliminary analyses compared Standard Services (SS) and the Plus Mentoring (SBM) groups at baseline using Multivariate Analysis of Variance (MANOVA). Chi-square analyses tested for proportional differences in the numbers of youth across sex and school levels between the two

groups. Finally patterns of differential attrition and missing data were examined.

Tests of program impact were conducted using hierarchical linear modeling. Results of these analyses are presented according to terminology used by Raudenbush and Bryk (2002). Because students were randomized within the 19 schools, these observations are clustered and not independent. In order to estimate the variance in outcomes due to school settings and thereby to account for data nestedness, hierarchical linear models analyses were conducted which apportion individual and school-level variance separately. In these models, there were two levels of analysis.

At the first level, the individual's post-test score was regressed on the individual-level (level 1) predictors. These were the overall grand mean (β_0); the main effect terms (ITT, β_1; SEX, β_2); referral source (REF, β_3); total hours of support services (excluding mentoring; TOTAL, β_4); the pre-test score (β_5; e.g., SCHOOLCONN1), and the same three pre-intervention covariates (initial status on the Hope [β_6, HOPE1], Self-in-the-Present [β_7, SELF1], and Connors' Global Index [β_8, CONNORS1]; see Eq. 1). Each of the pre-test covariates included in the model were grand mean centered (i.e., each individual score was subtracted from the variable's overall mean).

Equation 1: Level-1 Model for Post-intervention Connectedness to School (SCHOOLCONN2), Y

$$\begin{aligned} Y = {} & \beta_0 + \beta_1(\mathrm{ITT}_{ij}) + \beta_2(\mathrm{SEX}_{ij}) + \beta_3(\mathrm{REF}_{ij} - \mathrm{REF}..) \\ & + \beta_4(\mathrm{TOTAL}_{ij} - \mathrm{TOTAL}..) \\ & + \beta_5(\mathrm{SCHOOLCONN1}_{ij} - \mathrm{SCHOOLCONN1}..) \\ & + \beta_6(\mathrm{SELF1}_{ij} - \mathrm{SELF1}..) + \beta_7(\mathrm{HOPE1}_{ij} - \mathrm{HOPE1}..) \\ & + \beta_8(\mathrm{CONNORS1}_{ij} - \mathrm{CONNORS1}..) + r_{ij} \end{aligned} \tag{1}$$

In the level-2 equation for the coefficient representing impact of mentoring (ITT), $\beta_1 = \gamma_{10} + U_1$, a random error coefficient is included in order both to account for random variation across schools in estimated impact and to ensure that the standard error utilized in evaluating the coefficient representing average impact (γ_{10}) is not downwardly biased (Raudenbush and Bryk 2002).

To test for interactions between mentoring and youths' sex and school setting, the same models as above were run with additional cross-level interaction terms. As in main effect tests above, at level one in the cross-level interaction models, the post-test score (Y) was regressed on its associated pre-test score (β_5), main effect terms (ITT, SEX), and the three additional pre-test covariates.[1] Also included was the two-way interaction term for Mentoring by sex (β_3, ITT×SEX).

School level is a setting characteristic. Therefore it was used as a level-2 predictor of level-1 coefficients. In the level-2 equation, the level-1 intercept, two main effects, and one interaction term were regressed on two school level dummy codes (see Eq. 2). For outcomes on which there were significant interactions, these models were rerun varying the SEX and two of three school dummy code terms for school level in order to compare treatment effects across specific subgroups. To indicate either sex as the reference group, SEX and ITT×SEX were dummy coded two ways, once with males and once with females as 0. In those models, the school level and sex that are *not* included in the model serve as the reference group (e.g., high school in Eq. 2), and the γ_{10} coefficient reflects the test of differences on the adjusted mean score for that variable between the Plus Mentoring and Standard Services groups of the same sex and within the same school level.

The intercept for the fixed effect (γ_{00}) is the adjusted mean score for the Standard Services group. The ITT slope coefficient (γ_{10}) reflects the effect of being assigned to the Plus Mentoring condition. Therefore, γ_{10} is the increase or decrease in the outcome associated with assignment to the mentoring condition for youth of the same sex (SEX=0) and in the same school level. For example, in Eq. 2 and 3, the model includes SEX=0 for females, so that β_0 reflects the mean for high school girls in the Standard Services condition. The β_1 is the difference between this mean and the mean of the high school girls who were mentored.

Equation 2: Level-2 Model Cross-level Interaction and Random Effects for High Schools

$$\begin{aligned} \beta_0 &= \gamma_{00} + \gamma_{01}\mathrm{Elementary}_j + \gamma_{02}\mathrm{MiddleSchool}_j + U_0 \\ \beta_1 &= \gamma_{10} + \gamma_{11}\mathrm{Elementary}_j + \gamma_{12}\mathrm{MiddleSchool}_j + U_1 \\ \beta_2 &= \gamma_{20} + \gamma_{21}\mathrm{Elementary}_j + \gamma_{22}\mathrm{MiddleSchool}_j \\ \beta_3 &= \gamma_{30} + \gamma_{31}\mathrm{Elementary}_j + \gamma_{32}\mathrm{MiddleSchool}_j \\ \beta_4 &= \gamma_{40} \\ \beta_5 &= \gamma_{50} \\ \beta_6 &= \gamma_{60} \\ \beta_7 &= \gamma_{70} \\ \beta_8 &= \gamma_{80} \end{aligned} \tag{2}$$

[1] At level 1, this is like Eq. 1 except that for β_3 the referral source [REF] term has been replaced by the two-way level-1 interaction term. Because referral source was non-significant in the main effect HLM analyses, it was omitted from the cross-level interaction models.

As in Eq. 1, the level-1 intercept (β_0) and treatment slope (β_1) were allowed to vary randomly to account for the intraclass correlation among outcomes due to school-specific variability.

Equation 3: Combined (Mixed) Model Equation for the Three-way Cross-Level Interaction

$$\begin{aligned}\mathrm{SCHOOL2}_{i_j} = {} & \gamma_{00} + \gamma_{01}\mathrm{Elementary}_j + \gamma_{02}\mathrm{MiddleSchool}_j \\ & + \gamma_{10}\mathrm{ITT}_{i_j} + \gamma_{11}\mathrm{Elementary_j} \\ & + \gamma_{12}\mathrm{MiddleSchool_j} + \gamma_{20}\mathrm{SEX_{ij}} \\ & + \gamma_{21}\left(\mathrm{Elementary}_j \times \mathrm{SEX}_{i_j}\right) \\ & + \gamma_{22}\left(\mathrm{MiddleSchool}_j \times \mathrm{SEX}_{i_j}\right) \\ & + \gamma_{30}\left(\mathrm{ITT} \times \mathrm{SEX}_{i_j}\right) \\ & + \gamma_{31}\left(\mathrm{Elementary}_j \times \mathrm{ITT} \times \mathrm{SEX}_{i_j}\right) \\ & + \gamma_{32}\left(\mathrm{MiddleSchool}_j \times \mathrm{ITT} \times \mathrm{SEX}_{i_j}\right) \\ & + \gamma_{40}\left(\mathrm{TOTAL}_{i_j} - \mathrm{TOTAL..}\right) \\ & + \gamma_{50}\left(\mathrm{SCHOOL1}_{i_j} - \mathrm{SCHOOL1...}\right) \\ & + \gamma_{60}\left(\mathrm{SELF1_{ij}} - \mathrm{SELF1..}\right) \\ & + \gamma_{70}\left(\mathrm{HOPE_{ij}} - \mathrm{HOPE1..}\right) \\ & + \gamma_{80}\left(\mathrm{CONNORS1}_{i_j} - \mathrm{CONNORS1..}\right) \\ & + u_{0_j} + u_{1_j}\mathrm{ITT}_{i_j} + r_{i_j} \end{aligned} \tag{3}$$

Results

Preliminary Analyses

Tests for mentoring vs. standard services differences at baseline For both the 516 youth initially included in the sample at baseline and the 468 available at post-test, there were proportionally similar numbers of Standard Services condition and Plus Mentoring condition youth across elementary, middle, and high school. Additional demographic information for the sample is presented in Table 1 indicating no differences between the two intervention groups on ethnicity, age, number in the home, or annual income, but the proportion of those from Spanish vs. English speaking homes was smaller among the Plus Mentoring group than the Standard Services group. Although the ratio of boys to girls was 2:1, there was not a significant difference in the gender distribution across Mentoring and Standard Services conditions, χ^2=2.36 (1, n=465), p=.14.

Four MANOVAs testing for pre-test between-group differences on connectedness, social skills, self-esteem and hope/mattering variables were conducted. The omnibus test for the Hope and Mattering scales was significant, F (2, 465)=3.34, p=.04, as was the omnibus test for self-esteem F (3, 464)=2.52, p=.05, revealing that the Standard Services group scored higher on hope and present-oriented self-esteem at the pre-intervention assessment. The omnibus tests for social skills and domain-specific self-esteem were not significant, suggesting no between group pre-test differences. The omnibus test for the connectedness scales approached significance (p=.09), with Standard Services youth higher on connectedness to school, teachers, and culturally different peers, but these differences were eliminated (p=.50) when the Self-in-the-present self-esteem scale was used as a covariate. Boys were higher on parent-reported problem behaviors (CGI: e.g., impulsiveness) than girls, and CGI declined between elementary and high school. Therefore, hope, self-in-the-present, and CGI were included as covariates in all models.

Tests for differential attrition Nine percent (n=48) of the sample left school during the study and were unavailable to complete post-tests. More youth in the mentoring condition (n=31) dropped from the study than in the Standard Services condition (n=17), χ^2=5.25(1, n=516), p=.02, but the proportions of boys (n=16) and girls (n=32) who dropped was similar to the overall proportions of boys and girls who did not, χ^2=.01 (1, n=468), p=.98. The students who discontinued participation either moved or withdrew from the school (n=24 Mentoring; n=16 Standard Services), graduated early (n=2 Mentoring; n=1 Standard Services), or were transferred to an "alternative school" for disciplinary purposes (n=2 Mentoring; n=0 Standard Services). Included in the 48 were 3 youth in the Mentoring condition who quit the mentoring program.

There also was an age difference in attrition. Those who dropped were on average approximately 1 year older than those who stayed, F (1, 514)=7.75, p<.05. Of the 48 youth (9%) who were not included in the final sample, 30 were from the high school group (n=20 mentees, n=10 non-mentees) and 18 were from the elementary and middle school groups (n=11 mentees, n=7 non-mentees). The proportion of older and younger participants who dropped was the same for the Mentoring and Standard Services groups, χ^2=.15 (1, 516), p=.67.

Missing data procedures Because participants were randomized into treatment only after completing the pre-test, pre-test data were available on all youth (n=468) with less than 5% item non-response. Missingness at post-test was due to item

Table 1 Tests of between-group differences before and after random assignment (n=516)

	Standard services N or M (SD)	Standard services plus mentoring N or M (SD)	χ^2 (df) or t (df)
Before random assignment differences			
Sample surveyed at pre-test ("[initial]")	249	267	
Gender: female/male	180/69	165/102	6.04** (1,513)
School level: elementary–middle/high school	138/111	140/127	0.46 (1,516)
At post-test			
Sample surveyed at post-test	232	236	
Gender: female/male	168/64	145/91	6.63** (1,465)
School level: elementary–middle/high school	131/101	129/107	0.15 (1,468)
Ethnicity			5.75 (4,464)
Mexican American	136	122	
Anglo/Caucasian	3	3	
African American	16	26	
Asian American	2	0	
Hispanic/Anglo biracial	73	83	
Age	13.1 (2.28)	13.2 (2.27)	0.56
Home language (Spanish/English)	37/191	23/211	4.18*
Number of individuals in the home	4.96 (1.64)	4.77 (1.78)	1.36
Annual family income	$21,100 (16,421)	$19,200 (16,487)	0.81
Total CIS service hours (n=465) t (df= 1, 463)			
Mentoring	0.17 (1.35)	7.69 (5.43)	20.47***
CIS services (including mentoring)	29.03 (28.95)	37.78 (27.72)	2.71**
Enrichment activities	8.71 (13.40)	9.76 (11.83)	1.11
Educational enhancement activities	7.50 (11.93)	8.64 (9.75)	1.04
Tutoring	3.40 (9.11)	3.08 (7.03)	0.38

***$p\leq.005$; **$p\leq.01$; *$p\leq.05$

nonresponse (none more than 9%, most scales under 4%) as well as from sample attrition. Multiple attempts were made to survey youth in order to minimize data loss due to student absence on testing days. There were no consistent differences across groups (treatment, sex, grade level) between those youth who were missing all of their post-survey data with those who were not. Because the data were not missing completely at random, based on Little's MCAR χ^2=4539 (144, n=468), p<.001, but assumed to be missing at random (MAR), missing values were imputed (i.e., rather than deleted) (Schafer and Graham 2002). All of the demographic variables in Table 1 and several others, the scale pre-test and post-test variables, and an indicator for each school were used to impute values using the Expectation Maximization (EM) algorithm-based maximum likelihood estimation procedure in the SPSS 13 Missing Values module. Although this approach is not as statistically elegant as multiple imputation, given the small amount of missing data, the EM estimation was deemed satisfactory.

Tests of differences in program services Mentoring and Standard Services groups both received approximately 29 h of program services that included 34% supportive guidance (including mentoring), 31% enrichment activities, 28% educationally oriented support, and 10% tutoring (see Table 1). Mentees met with mentors for an average of eight meetings (M=7.7 h, SD=5.3 h). The two significant differences between mentoring and services only groups at the end of the year in Table 1 reflect the 8 h of mentoring received by the Plus Mentoring condition.

Referral source Referral source (school vs. non-school) was used as a covariate in main effect analyses. There were three primary referral sources. The majority of referrals came from parents (n=253). Self-referrals included 79 youth who self-referred to the program and 27 youth who met with Case Managers who made the referral. Remaining referrals (n=97) were by individuals at school: Principal/ Vice Principal (n=7), School Counselor (n=23), Teacher (n=60), or a peer (n=7). These were divided into school-based (n=97) versus non-school based referrals (n=358) because these two types differed significantly on School self-esteem, Family self-esteem, Family support, Grades, and Mattering at baseline. The percentage of school vs. non-school referrals differed across grade levels. Fewer school referrals were made in elementary (n=10) and middle school (n=24) than in high school (n=56); more non-school referrals were made in elementary and middle school (n=174) than in high school (n=139; χ^2=19.76, (1, n=468), p=.001; η^2=.208.

Analyses of Effects of Mentoring

The HLM results presented in Table 2 reveal four significant main effects of mentoring on connectedness to peers, global self-esteem, self-in-the-present, and perceived support from friends. On all of these outcomes, youth assigned to the Plus Mentoring condition had higher end-of-year scores than those in the Support Services only condition. Main effects for mentoring were not significant for the remaining 17 outcomes (see Table 2). Effect sizes were computed using a formula described in Kalaian (2003), and were small for connectedness to peers (d=.25), global self-esteem (d=.16), self-in-the-present (d=.25), and perceived support from friends (d=.18). The effect sizes averaged across all 21 outcomes was considerably smaller (d=.10).

Results from the cross-level gender-by-school level on treatment condition interactions revealed significant three-way interactions on several outcomes among elementary school boys and high school-aged girls. Among elementary school boys, those in the Plus Mentoring condition reported higher connectedness to school (d=.86; see Fig. 1), to culturally different peers (d=.58), social skills (empathy [d=.77] and cooperation [d=.71]), and hopefulness (d=.73) than those in the Standard Services condition (see Table 3).

The effects for the high school girls resembled the main effect findings above. Compared to high school girls receiving Standard Services, the mentored high school girls reported greater connectedness to culturally different peers (d=.34), self-esteem (global [d=.27] and self-in-the-present [d=.34]), and support from friends ([d=.39] see Table 4). There were no interaction effects among the girls on grades or any of the future-oriented, conventional outcome measures (e.g., hopefulness or connectedness to school).

There also were a few iatrogenic (adverse) effects of mentoring evident for older boys and younger girls. More than half of the treatment (γ_{10}) coefficients for high school boys in the Mentoring condition were negative (e.g., connectedness to school, −.23; self-in-the-future, −.20; cooperation, −.19), though the mentored high school boys were significantly lower than high school boys receiving standard services alone only in connectedness to teachers. Middle school girls in the Plus Mentoring condition also demonstrated only one iatrogenic effect, which was lower self-control compared to middle school girls in the Standard Services condition (see Tables 3 and 4).

Estimates of School-level or Program Staff-Specific Variance in Outcomes from Mentoring

Also of concern was whether adding mentoring to other support services would be more effective in some schools than others, implying that differential effectiveness might be due to school characteristics or to the agency staff members assigned to each school. Given the small number of schools, p<.10 was considered significant, but test statistics were examined only for those outcomes above on which there were significant main and interaction effects of mentoring. Chi-square significance tests for level-2 variance in the treatment slopes are shown next to the Chi-square statistics in Table 2 (in the far right column for the slope tau) and under "Variance Components" in Tables 3 and 4. The treatment effects of mentoring varied significantly across schools on empathy, self-esteem (self-in-the-future and family), and hopefulness.

Discussion

The present study of the effects of SBM during one academic year revealed small but positive main effects on two measures of self-reported self-esteem, on connectedness to peers, and on perceived social support from friends. In addition, effects differed by sex and school type with elementary boys and high school girls benefiting most from receiving mentoring in addition to receiving standard support services. Mentored elementary school boys reported higher connectedness to school and to culturally different peers, social skills (empathy and cooperation), and hopefulness. Mentored high school girls reported greater connectedness to culturally different peers, self-esteem, and support from friends. The effect sizes for the main effects were small, and the average effect size (d=.10) was remarkably similar to those reported in the meta-analytic review by DuBois et al. (2002b) for SBM (d=.11 fixed effects; d= .07 random effects).

The evidence of main effects of SBM on self-esteem and peer relationships, however, should be viewed cautiously. While an effect of SBM on self-esteem may be viewed by much of the public as an indication of the positive impact of SBM, it is reasonable to argue that the effect may be negative depending how these changes ultimately influence behavior. Recent research suggests peer-referenced self-esteem can be predictive of increased problem behaviors (DuBois et al. 2002a). Similarly, research conducted with the Connectedness to Peers and Self-in-the-Present scales, on which the mentees improved the most, has found they cluster with factors that predict risk-taking and disengagement from school (Karcher 2003, 2004; Karcher and Finn 2005). In fact, the absence of a main effect on the more conventional Connectedness to School, Self-in-the-Future, and Mattering scales or on grades suggests that the changes in self-esteem associated with having a mentor were not related to academic engagement or future-oriented thinking. While these present- and peer-oriented effects of mentoring were found in main effects for the mentored youth as a

Table 2 Fixed and random effects for main effect of school-based mentoring in hierarchical models

Construct	Fixed effect			Random effect variance components		χ^2
Dependent variable	Coefficient	SE	*t* Ratio	σ^2	τ	
Connectedness						
Connectedness to school						
Intercept: comparison *M*, γ_{00}	3.97	0.060		0.326	0.012	23.89
Slope: main effect (ITT), γ_{10}	0.063	0.060	1.05		0.008	18.36
Connectedness to teachers						
Intercept: comparison *M*, γ_{00}	4.02	0.066		0.387	0.013	25.21†
Slope: main effect (ITT), γ_{10}	−0.020	0.063	−0.32		0.003	20.72
Connectedness to peers						
Intercept: comparison *M*, γ_{00}	3.86	0.061		0.343	0.012	23.49
Slope: main effect (ITT), γ_{10}	0.168	0.061	2.73**		0.007	14.62
Connectedness to culturally different peers						
Intercept: comparison *M*, γ_{00}	4.23	0.075		0.422	0.029	30.49*
Slope: main effect (ITT), γ_{10}	0.100	0.069	1.45		0.010	13.77
Self-esteem						
Global self esteem						
Intercept: comparison *M*, γ_{00}	3.233	0.044		0.175	0.007	24.52
Slope: main effect (ITT), γ_{10}	0.087	0.042	2.09*		0.000	13.93
Self-in-the-present						
Intercept: comparison *M*, γ_{00}	4.022	0.059		0.282	0.015	27.77*
Slope: main effect (ITT), γ_{10}	0.162	0.056	2.87**		0.007	17.95
Self-in-the-future						
Intercept: comparison *M*, γ_{00}	4.25	0.042		0.209	0.000	12.33
Slope: main effect (ITT), γ_{10}	−0.044	0.057	−0.76		0.021	25.28†
Peer						
Intercept: comparison *M*, γ_{00}	3.36	0.048		0.164	0.014	32.66**
Slope: main effect (ITT), γ_{10}	0.061	0.048	1.26		0.012	19.00
School						
Intercept: comparison *M*, γ_{00}	3.24	0.052		0.253	0.008	21.46
Slope: main effect (ITT), γ_{10}	0.031	0.058	0.53		0.016	23.41
Family						
Intercept: comparison *M*, γ_{00}	3.47	0.042		0.209	0.000	13.05
Slope: main effect (ITT), γ_{10}	−0.022	0.058	−0.37		0.022	29.58*
Physical						
Intercept: comparison *M*, γ_{00}	3.01	0.056		0.334	0.005	22.00
Slope: main effect (ITT), γ_{10}	0.096	0.057	1.68		0.001	15.56
Social skills						
Empathy						
Intercept: comparison *M*, γ_{00}	3.48	0.038		0.149	0.003	21.32
Slope: main effect (ITT), γ_{10}	0.063	0.048	1.32		0.014	26.57†
Assertiveness						
Intercept: comparison *M*, γ_{00}	3.10	0.039		0.174	0.001	17.89
Slope: main effect (ITT), γ_{10}	0.035	0.045	0.78		0.005	17.25
Cooperation						
Intercept: comparison *M*, γ_{00}	3.28	0.037		0.144	0.003	17.99
Slope: main effect (ITT), γ_{10}	−0.007	0.045	−0.15		0.010	23.45
Self-control						
Intercept: comparison *M*, γ_{00}	2.98	0.045		0.224	0.002	13.80
Slope: main effect (ITT), γ_{10}	−0.01	0.048	−0.21		0.002	14.66
Social support						
Support from friends						
Intercept: comparison *M*, γ_{00}	3.49	0.036		0.163	0.000	11.37
Slope: main effect (ITT), γ_{10}	0.083	0.040	2.10*		0.000	11.14
Support from family						
Intercept: comparison *M*, γ_{00}	3.46	0.047		0.240	0.003	16.81

Table 2 (continued)

Construct / Dependent variable	Fixed effect			Random effect variance components		χ^2
	Coefficient	SE	*t* Ratio	σ^2	τ	
Slope: main effect (ITT), γ_{10}	0.012	0.056	0.21		0.013	23.33
Grades						
Math						
Intercept: comparison *M*, γ_{00}	79.68	0.771		54.77	1.95	19.74
Slope: main effect (ITT), γ_{10}	−0.253	0.991	−0.25		7.32	24.92†
Reading						
Intercept: comparison *M*, γ_{00}	79.88	0.662		43.44	0.827	18.67
Slope: main effect (ITT), γ_{10}	−0.760	0.679	−1.12		0.659	15.56
Hope and mattering						
Hope						
Intercept: comparison *M*, γ_{00}	4.07	0.053		0.259	0.009	20.36
Slope: main effect (ITT), γ_{10}	0.067	0.062	1.09		0.021	24.95†
Mattering						
Intercept: comparison *M*, γ_{00}	3.65	0.047		0.219	0.004	16.43
Slope: main effect (ITT), γ_{10}	0.030	0.046	0.65		0.000	14.11

Comparison refers to youth assigned to the Standard Services treatment.
σ^2: sigma squared, variance estimate for means at level one (individual), τ: tau, variance estimate for level two (setting/school), for intercept (γ_{00}) and slope (γ_{10})
**$p \leq .01$; *$p \leq .05$; $^{\dagger}p \leq .10$

whole, it was the high school female mentees who demonstrated the greatest changes in self-esteem, peer connectedness, and support from friends relative to the Standard Services group. Male high school mentees reported significant decreases in connectedness to teachers, and moderate-sized but non-significant declines in connectedness to school, self-in-the-future, and cooperation.

These dubious main effects are qualified by more clearly positive effects on social skills, hopefulness, and connectedness for elementary school male mentees. Prior research has shown connectedness to culturally different peers and to school to correlate positively with academic engagement and other prosocial activities that are condoned by adults (Battistich et al. 2004; Henrich et al. 2005; Karcher 2003; Karcher and Finn 2005; Thomas and Smith 2004). The two social skills on which elementary male mentees improved—empathy and cooperation—and the Hope scale also have been shown to predict academic engagement and improved interpersonal relationships (Elliott et al. 1988; Shorey et al. 2003; Stuart et al. 1991). These findings, because of their relevance to success in school (both academically and interpersonally), seem to provide the most unequivocal support for the positive effects of SBM but only apply to elementary school boys.

It is concerning that for boys in high school we found no positive effects of SBM and a decline in connectedness to teachers. These sex and age differences warrant further study and underscore the importance of better understanding who benefits most from having a mentor in school. Big Brothers was created because Coulter and Westheimer wanted to provide older male role models to teenage boys who had few adult males in their lives (Baker and Maguire 2005). But in this study, elementary school boys benefited more than middle and high school age boys. In fact, the older male mentees more often quit the program. In addition, there was no effect of mentor gender on outcomes, which suggests that providing elementary school boys a mentor of either gender can be helpful.

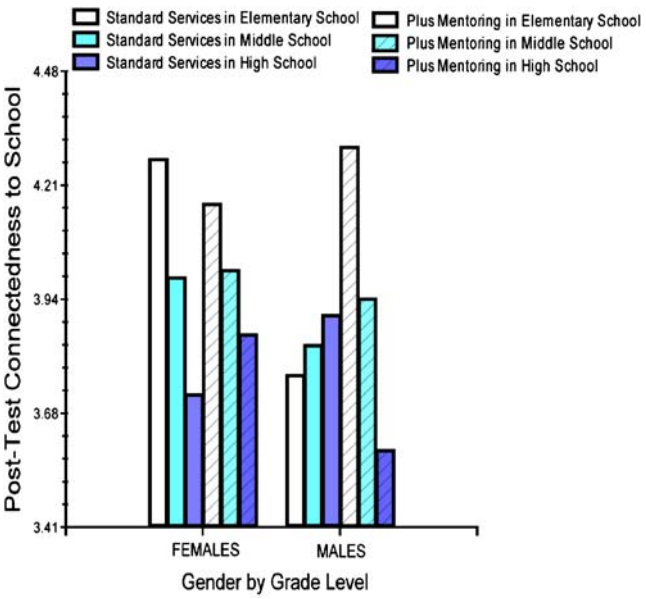

Fig. 1 Adjusted mean levels of post-intervention connectedness to school for the Standard Services and the Plus Mentoring groups by gender and grade level

Table 3 Fixed and random effects in hierarchical models: ITT by school level for boys

Construct	Variance components	Fixed effect, coefficient (SE)		
Dependent variable	(σ^2) τ	Elementary school	Middle school	High school
Connectedness				
Connectedness to school				
Intercept: comparison *M*, γ_{00}	(0.31) 0.029*	3.64 (0.16)	3.79 (0.15)	3.96 (0.13)
Slope: three-way interaction, γ_{10}	0.023	0.63 (0.19)***	−0.03 (0.17)	−0.23 (0.17)
Connectedness to teachers				
Intercept: comparison *M*, γ_{00}	(0.379) 0.023*	3.93 (0.17)	3.87 (0.15)	4.03 (0.15)
Slope: three-way interaction, γ_{10}	0.005	0.26 (0.20)	−0.10 (0.17)	−0.41 (0.18)*
Connectedness to culturally different peers				
Intercept: comparison *M*, γ_{00}	(0.416) 0.024†	3.88 (0.18)	4.25 (0.16)	4.38 (0.15)
Slope: three-way interaction, γ_{10}	0.005	0.55 (0.21)*	0.14 (0.18)	−0.04 (0.19)
Social skills				
Empathy				
Intercept: comparison *M*, γ_{00}	(0.147) 0.004	3.09 (0.10)	3.35 (0.09)	3.43 (0.09)
Slope: three-way interaction, γ_{10}	0.018*	0.44 (0.14)***	0.01 (0.13)	−0.10 (0.12)
Cooperation				
Intercept: comparison *M*, γ_{00}	(0.140) 0.006	3.08 (0.10)	3.18 (0.09)	3.26 (0.08)
Slope: three-way interaction, γ_{10}	0.009	0.36 (0.13)**	0.06 (0.11)	−0.19 (0.11)
Hope				
Intercept: comparison *M*, γ_{00}	(0.257) 0.004	3.90 (0.13)	4.10 (0.11)	3.92 (0.11)
Slope: three-way interaction, γ_{10}	0.005	0.44 (0.16)*	−0.15 (0.14)	12 (0.15)

Comparison refers to youth assigned to the Standard Services treatment.
σ^2: sigma squared, variance estimate for means at level 1 (individual), τ: tau, variance estimate for level 2 (setting/school) for intercept (γ_{00}) and slope (γ_{10})
***$p \leq .005$; **$p \leq .01$; *$p \leq .05$; †$p \leq .10$

Table 4 Fixed and random effects in hierarchical models: Effect of ITT by school level for girls

Construct	Variance components	Fixed effect, coefficient (SE)		
Dependent variable	(σ^2) τ	Elementary school	Middle school	High school
Connectedness				
Connectedness to culturally different peers				
Intercept: comparison *M*, γ_{00}	(0.416) 0.024†	4.27 (0.13)	4.53 (0.13)	4.20 (0.09)
Slope: three-way interaction, γ_{10}	0.005	−0.15 (0.17)	−0.13 (0.15)	0.23 (0.11)*
Self-esteem				
Global self-esteem				
Intercept: comparison *M*, γ_{00}	(0.172) 0.010†	3.37 (0.08)	2.23 (0.08)	3.08 (0.06)
Slope: three-way interaction, γ_{10}	0.000	−.03 (.11)	0.08 (0.09)	0.16 (0.07)*
Self-in-the-present				
Intercept: comparison *M*, γ_{00}	(0.279) 0.018*	4.19 (0.10)	4.08 (0.11)	3.87 (0.08)
Slope: three-way interaction, γ_{10}	0.016	0.22 (0.14)	0.05 (0.13)	0.22 (0.10)*
Social skills				
Self-control				
Intercept: comparison *M*, γ_{00}	(0.218) 0.002	2.97 (0.08)	3.03 (0.07)	2.99 (0.06)
Slope: three-way interaction, γ_{10}	0.000	0.02 (0.12)	−0.24 (0.10)*	0.05 (0.08)
Social support				
Support from friends				
Intercept: comparison *M*, γ_{00}	(0.163) 0.000	3.57 (0.06)	3.47 (0.06)	3.42 (0.05)
Slope: three-way interaction, γ_{10}	0.001	−0.05 (0.09)	0.11 (0.88)	0.16 (0.07)*

Comparison refers to youth assigned to the Standard Services treatment.
σ^2: sigma squared, variance estimate for means at level 1 (individual), τ: tau, variance estimate for level 2 (setting/school) for intercept (γ_{00}) and slope (γ_{10})
*$p \leq .05$; †$p \leq .10$

It also may be instructive for future research to consider why older girls might benefit more than younger girls, or why older girls would benefit while older boys might not. Regarding the mentees' age, one possibility is that older girls might be better able to utilize their adult mentors to help them plan for the future. As was the case in this study, mentors often have more resources and post-secondary educational experience than do their mentees' parents (AOL Time Warner Foundation 2002). Perhaps older female mentees used their mentors to help them think about their futures (e.g., talking about jobs or post-secondary education) while younger mentees may have been less interested in discussing their future. However, two findings suggest this is not a strong explanation of the results. First, there was virtually no effect of mentoring on future-oriented outcomes. Second, from this perspective older boys should have been able to use their mentors *better than* younger boys to leverage positive outcomes, which was not the case. Rather, Bogat and Liang's (2005) hypothesis about heightened needs for relatedness among older girls may best explain the positive effects for high school girls.

Given the number of barriers experienced by mentors to establishing and maintaining school-based matches during this study, the fact that even small effects on self-esteem, connectedness, and social skills appeared to result from SBM is impressive and bodes well for the potential impact that SBM *could* have. However, there is no evidence of program impact on grades, which was the primary objective of the Department of Education's student mentoring initiative (MENTOR 2004). The effects are small compared to those of psychotherapy for youth (Weisz et al. 1995), but they are similar in that older girls appear to benefit more than older boys. Consistent with some other interventions (viz., Huston et al. 2001), effects for elementary boys were larger than for elementary girls. However, the effects reported here, while similar in size to those found in community-based mentoring, occurred on fewer outcomes and the effects are not found consistently across gender and school level (DuBois et al. 2002b). In addition, the potential long-term preventative effect and the clinical significance of changes on this small set of outcomes is unclear.

Both the agency which coordinated the program and the schools likely could have better supported the mentors in ways that might have facilitated stronger program impacts. The agency in this study did not provide many of the "best practices" that DuBois et al. (2002b) found were used by those mentoring programs that achieved the best results. Little structure was provided to guide or facilitate meetings. Ongoing training occurred among very few mentors (but perhaps partly because of mentors' limited interest or time). Therefore, this study's estimates of the effects of SBM may well be substantially less than if more of these practices had been in place. Given this evidence, agencies should emphasize quality of programs (as opposed to the number of mentors) as a way of increasing the likelihood that the match will last long enough to have an impact.

The school structure also introduced formidable barriers to mentors and mentees meeting consistently. Although the school year may afford as many as 9 months of meetings, this program experienced a slow startup, which is common in school-based mentoring (Hansen 2005; Herrera et al. 2000). The process of getting matches together took 2 to 3 months from the beginning of school. The average match length was eight meetings or approximately 3 months' worth of meetings. Then there were holidays, such as winter and spring break, after which many mentors never returned. A large majority of mentors in this study were college students who had their own schedules for testing and vacation that sometimes conflicted with those of their mentees.

The significant school-specific variance in the treatment effects suggests other school-related phenomena (e.g., staff support, matching procedures, or school climate) may have affected outcomes and should be examined in future research. For example, although federally mandated achievement testing (and practice testing) was a phenomenon shared by all schools that often precluded mentors and mentees from meeting, schools differed in their willingness to allow mentors to meet with youth during these periods. Some schools also were more restrictive in the times they allowed students to meet with mentors in general (e.g., only during elective class periods).

There were several other limitations to the present study that should be addressed and remedied in future research on SBM. The findings from this study suggest that SBM, as it was conducted in this study, is of modest immediate value beyond other services provided to youth in schools and that it may have no direct, appreciable effect on academic achievement. Yet one reason for this finding may reflect the absence of data on pre-intervention or pre-randomization grades. Therefore the use of first semester grades as the covariates for the tests of SBM effects on post-test grades may be biased if first semester grades (covariates) were affected by treatment status (although most matches started after the first 6-weeks period). It is also possible that a positive effect of SBM on grades will occur but only in response to the changes in self-esteem, connectedness and social skills that occurred (Karcher et al. 2006). Future longitudinal studies could help estimate the duration of effects and whether proximal effects do indeed contribute to later outcomes such as grades.

To maintain the purest test of the counterfactual state (Grossman 2005), we did not include as predictors any variables that were measured or occurred after randomization because they could have been influenced by treatment. For example, although past research suggests that dosage and program support factors are influential (DuBois et al. 2002b; e.g., measures of the amount or quality of

mentoring or number of meetings), these reflect post-assignment, non-random variations in treatment. Such factors can be addressed in future reports of the quasi-experimental findings from the current project. Also instructive would be qualitative, phenomenological investigations into how boys and girls may differently experience mentors across school settings.

In conclusion, these findings suggest school-based mentoring as typically implemented within a multi-component program may be of limited value for students in general and most helpful to elementary school boys and high school girls. SBM's effectiveness is likely to be hampered by poor program fidelity that results from difficulties in recruiting sufficient mentors, scheduling regular mentoring meetings and supervision times, and maintaining matches for longer than a few months. Greater attention to providing programmatic structure and ongoing mentor support seems essential to improving program outcomes. As DeVone Boggan (2005) once said, "It may take a village to raise a child, but who's raising the village?" By extension, it may be better for SBM program staff to focus time and resources on "how much" support they can provide to mentors than to emphasize "how many" mentors they can recruit.

Acknowledgements This research was funded by the William T. Grant Foundation and received ongoing support from Drs. Robert Granger and Ed Seidman. The study was conducted through the Communities in Schools of San Antonio (CISSA) agency with the help of ChiChi Allen, Kristine Benne, Debby Gil-Hernandez, Molly Gomez, Michelle Holcomb, and Laura Roy-Carlson. David DuBois consulted on the design and data analyses. The project would not have succeeded without the support of Dr. Patrick McDaniel, Nancy Reed. Jessica Weaver, the Case Managers and Cluster Leaders at CISSA. Ed Connor assisted with data management. Bob Frasier and Ross Trevino assisted with mentor recruitment. Drs. Rich Diem, Art Hernandez, and Jesse Zapata provided a home for the 3-year project. The author thanks David DuBois, Renee Spencer, and Timothy Cavell for their feedback on earlier drafts, and both Tina Kauh and Mathilda du Toit for assistance with the HLM models.

References

AOL Time Warner Foundation (2002). *Mentoring in America*. New York: AOL Time Warner Foundation.

Baker, D., & Maguire, C. (2005). Mentoring in historical perspective. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 14–29). Thousand Oaks, CA: Sage.

Battistich, V., Schaps, E., & Wilson, N. (2004). Effects of an elementary school intervention on students' "connectedness" to school and social adjustment during middle school. *Journal of Primary Prevention*, *24*, 243–262.

Boggan, D. (2005, June 15). Lunch Keynote. *Youthfriends' Second National School-based Mentoring Conference*, Kansas City, Missouri.

Bogat, G. A., & Liang, L. (2005). Gender and mentoring relationships. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 205–218). Thousand Oaks, CA: Sage.

Bramlett, R. K., Dielmann, K. B., & Smithson, M. (1999). Screening for behavior problems in preschool: A comparison of the social skills rating system (SSRS) and a structured teacher interview. *Research in the Schools*, *6*, 47–52.

Cavell, T., & Smith, A. M. (2005). Mentoring children. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 160–176). Thousand Oaks, CA: Sage.

Conners, C. K., Sitarenios, G., Parker, J. D. A., & Epstein, J. N. (1998). The revised Conners' Parent Rating Scale (CPRS-R): Factor structure, reliability, and criterion validity. *Journal of Abnormal Child Psychology*, *26*, 257–268.

Darling, N. (2005). Mentoring adolescents. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 177–190). Thousand Oaks, CA: Sage.

DuBois, D. L., & Karcher, M. J. (2005). Youth mentoring: Theory, research, and practice. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 2–11). Thousand Oaks, CA: Sage Publications.

DuBois, D. L., Burk-Braxton, C., Swenson, L. P., Tevendale, H. D., Lockerd, E. M., & Moran, B. J. (2002a). Getting by with a little help from self and others: Self-esteem and social support as resources during early adolescence. *Developmental Psychology*, *38*, 822–839.

DuBois, D. L., Felner, R. D., Brand, S., Phillips, R. S. C., & Lease, M. A. (1996). Early adolescent self-esteem: A developmental-ecological framework and assessment strategy. *Journal of Research on Adolescence*, *6*, 543–579.

DuBois, D. L., Felner, R. D., Sherman, M. D., & Bull, C. A. (1994). Socio-environmental experiences, self-esteem, and emotional/behavioral problems in early adolescence. *American Journal of Community Psychology*, *22*, 371–397.

DuBois, D. L., Holloway, B. E., Valentine, J. C., & Cooper, H. (2002b). Effectiveness of mentoring programs for youth: A meta-analytic review. *American Journal of Community Psychology*, *30*, 157–197.

DuBois, D. L., Neville, H. A., Parra, G. R., & Pugh-Lilly, A. O. (2002c). Testing a new model of mentoring. In J. E. Rhodes (Ed.) *A critical view of youth mentoring*, (Vol. 93, pp. 21–57). San Francisco: Jossey-Bass.

Elliott, S. N., Gresham, F. M., Freeman, T., & McCloskey, G. (1988). Teacher and observer ratings of children's social skills: Validation of the social skills rating scales. *Journal of Psychoeducational Assessment*, *6*, 152–161.

Gresham, F. M., & Elliott, S. N. (1990). *Social skills rating system manual*. Circle Pines, MN: American Guidance Services.

Grossman, J. B. (2005). Evaluating mentoring programs. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 251–265). Thousand Oaks, CA: Sage.

Grossman, J. B., & Rhodes, J. E. (2002). The test of time: Predictors and effects of duration in youth mentoring programs. *American Journal of Community Psychology*, *30*, 199–219.

Hansen, K. (2005). *School-based mentoring study phase 1 report 2003–2004 school year: Effective practices*. Philadelphia: Big Brothers Big Sisters.

Henrich, C. C., Brookmeyer, K. A., & Shahar, G. (2005). Weapon violence in adolescence: Parent and school connectedness as protective factors. *Journal of Adolescent Health*, *37*, 306–312.

Herrera, C. L., Sipe, W. S., & McClanahan, Z. (2000). *Mentoring school-age children: Relationship development in community-based and school-based programs*. Philadelphia: Public/Private Ventures.

Huston, A. C., Duncan, G. J., Granger, R., Bos, J., McLoyd, V., Mistry, R., et al. (2001). Work-based antipoverty programs for parents can enhance the school performance and social behavior of children. *Child Development*, *72*, 318–336.

Kalaian, S. A. (2003). Meta-analysis methods for synthesizing treatment effects in multisite studies: Hierarchical linear modeling (HLM) perspective. *Practical Assessment, Research & Evalua-*

tion, 8(15). Retrieved June 28, 2007 from http://PAREonline.net/getvn.asp?v=8&n=15.

Karcher, M. J. (2003). *The Hemingway: Measure of adolescent connectedness: Validation studies*. ERIC no. ED477969; ERIC/CASS no. CG032433. Retrieved February 28, 2005 from http://www.adolescentconnectedness.com

Karcher, M. J. (2004). Connectedness and school violence: A framework for developmental interventions. In E. R. Gerler Jr. (Ed.) *Handbook of school violence* (pp. 7–39). New York: Haworth.

Karcher, M. J. (2005). The effects of school-based developmental mentoring and mentors' attendance on mentees' self-esteem, behavior, and connectedness. *Psychology in the Schools*, *42*, 65–77.

Karcher, M. J., Davis, C., & Powell, B. (2002). Developmental mentoring in the schools: Testing connectedness as a mediating variable in the promotion of academic achievement. *The School Community Journal*, *12*, 36–52.

Karcher, M. J., & Finn, L. (2005). How connectedness contributes to experimental smoking among rural youth: Developmental and ecological analyses. *Journal of Primary Prevention*, *26*, 25–36.

Karcher, M. J., Kuperminc, G., Portwood, S., Sipe, C., & Taylor, A. (2006). Mentoring programs: A framework to inform program development, research, and evaluation. *Journal of Community Psychology*, *34*, 709–725.

King, K., Vidourek, R., Davis, B., & McClellan, W. (2002). Increasing self-esteem and school connectedness through a multidimensional mentoring program. *Journal of School Health*, *72*, 294–299.

Kuperminc, G., Emshoff, J. G., Reiner, M. N., Secrest, L. A., Niolon, P., & Foster, J. D. (2005). Integration of mentoring with other programs and services. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 314–334). Thousand Oaks, CA: Sage.

Marshall, S. (2001). Do I matter? Construct validation of adolescents' perceived mattering to parents and friends. *Journal of Adolescence*, *24*, 473–490.

MENTOR/National Mentoring Partnership. (2004). *$450 million dollars for mentoring: Issue brief*. Retrieved July 18, 2004, from http://www.mentoring.org/take_action/hot_issues/president/index.adp.

Portwood, S. G., & Ayers, P. M. (2005). Schools. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 336–347). Thousand Oaks, CA: Sage.

Procidano, M., & Heller, K. (1983). Measures of perceived social support from friends and from family: Three validation studies. *American Journal of Community Psychology*, *11*, 1–24.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Newbury Park, CA: Sage.

Rhodes, J. E., & Davis, A. B. (1996). Supportive ties between nonparent adults and urban adolescent girls. In B. J. Leadbeater & N. Way (Eds.) *Urban girls: Resisting stereotypes, creating identities* (pp. 213–225). New York: New York University Press.

Rhodes, J. E., Grossman, J. B., & Resch, N. L. (2000). Agents of change: Pathways through which mentoring relationships influence adolescents' academic adjustment. *Child Development*, *71*, 1662–1671.

Sanchez, B., & Colon, Y. (2005). Race, ethnicity, and culture in mentoring relationships. In D. L. DuBois & M. J. Karcher (Eds.) *Handbook of youth mentoring* (pp. 251–265). Thousand Oaks, CA: Sage.

Sanchez, B., Colon, Y., & Esparza, P. (2005). The role of a sense of school belonging and gender in the academic achievement of Latino adolescents. *Journal of Youth and Adolescence*, *34*, 619–628.

Sanchez, B., & Reyes, O. (1999). Descriptive profile of the mentorship relationships of Latino adolescents. *Journal of Community Psychology*, *27*, 299–302.

Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147–177.

Shorey, H. S., Snyder, C. R., Yang, X., & Lewin, M. R. (2003). The role of hope as a mediator in recollected parenting, adult attachment, and mental health. *Journal of Social & Clinical Psychology*, *22*, 685–715.

Sipe, C. L., & Roder, A. E. (1999). *Mentoring school-age children: A classification of programs*. Philadelphia: Public/Private Ventures.

Snyder, C. R., Hoza, B., Pelham, W. E., Rapoff, M., Ware, L., Danovsky, M., et al. (1997). The development and validation of the Children's Hope Scale. *Journal of Pediatric Psychology*, *22*, 399–421.

Snyder, C. R., Lopez, S. J., Shorey, H. S., Rand, K. L., & Feldman, D. B. (2003). Hope theory, measurements, and applications to school psychology. *School Psychology Quarterly*, *18*, 122–139.

Stuart, D. L., Gresham, F. M., & Elliott, S. N. (1991). Teacher ratings of social skills in popular and rejected males and females. *School Psychology Quarterly*, *6*, 16–26.

Thomas, S. P., & Smith, H. (2004). School connectedness, anger behaviors, and relationships of violent and nonviolent American youth. *Perspectives in Psychiatric Care*, *40*, 135–148.

Weisz, J. R., Weiss, B., Han, S. S., Granger, D. A., & Morton, T. (1995). Effects of psychotherapy with children and adolescents revisited: A meta-analysis of treatment outcome studies. *Psychological Bulletin*, *117*, 450–468.