

Feasibility of a randomized controlled trial for evaluating the effectiveness of the Big Brothers Big Sisters community match program at the national level

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Abstract

This study assessed the feasibility of a randomized controlled trial to evaluate the Big Brothers Big Sisters (BBBS) community match programs at the national level. Following a standardized protocol, 71 intake families (parents and children ages 7–14 years) and 30 adult mentors were recruited over 12 months from two BBBS agencies. Families were randomly assigned to the BBBS program ($n=39$) or a waiting list control ($n=32$). Information on children’s behavior and psychosocial outcomes was obtained from children and parents using face-to-face interviews and questionnaires administered after enrolling in the study (but prior to knowledge of assigned condition) and at 12 months follow-up. Tests of equivalence revealed non-significant group differences on most baseline outcomes. Twelve families dropped out prior to the post-test assessment. ANCOVA results revealed beneficial program effects for five outcomes (child self-reports): symptoms of emotional problems, symptoms of social anxiety (fear of negative peer evaluations and generalized social anxiety and distress), teacher social support, and social skills (self-control). The study demonstrated the feasibility of an RCT to evaluate the BBBS programs. However, the design may be

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✉ In fond memory of our dear friend and colleague Dan Offord who played a huge part in making this work possible.

challenged ethically given the evidence of positive benefits and the requirement that control group children remain unmatched for a minimum of 12 months.

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1. Introduction

Statistics indicate that one in every five Canadian children lives in single-parent households, the vast majority of whom (83%) live in households headed by single mothers (Canadian Institute of Child Health, 2000). In the decade of the 90s, the number of single-parent families with school age children in Canada increased by 35% (Canadian Council on Social Development, 2002). Children raised in single-parent households experience a number of disadvantages compared to those in two-parent households. For example, children in single-parent families (especially those headed by women) are more likely than other children to grow up in poverty (Canadian Institute of Child Health, 2000). They are also more likely to experience emotional and behavioral problems (Lipman, Boyle, Dooley, & Offord, 2002), poor physical health, difficulties getting along with parents and peers, poor academic performance (Ross, Roberts, & Scott, 1998), and disengagement from school (Health Canada, 1999).

Nonetheless, most young people growing up in single-parent households mature into well-adjusted adults. This “resiliency” in the face of adversity may be explained in part by the availability of extra-familial sources of support such as an adult mentor (Beam, Cheu, & Greenberger, 2002; Beier, Rosenfeld, Spitalny, Zansky, & Bontempo, 2000; DuBois & Silverthorn, 2005; Klaw, Rhodes, & Fitzgerald, 2003; Rae-Grant, Thomas, Offord, & Boyle, 1989; Resnick et al., 1997; Rhodes, Gingiss, & Smith, 1994). Evidence suggests that exposure to adult mentors reduces child behavioral problems by counteracting the effects of risk factors or protecting children against harmful environmental stressors (Zimmerman, Bingenheimer, & Notaro, 2002). Werner’s longitudinal study of low-income families found that children who had a supportive relationship with an adult figure other than a parent were more likely than children without such relationships to develop into competent young adults (Werner & Smith, 1992).

The positive effects of mentoring for children raised in high risk environments coupled with the rising number of low income single-parent families have led to a proliferation of mentoring programs designed to improve the lives of disadvantaged youth (Bauldry & Hartman, 2003; Herrera, Sipe, McClanahan, Arbretton, & Pepper, 2000; Jekielek, Moore, Hair, & Scarupa, 2002). Although program content varies, a common feature is a one-on-one relationship with a supportive adult. The programs are a promising alternative to traditional approaches to prevention programming for youth because they are not restricted to a single setting typical of many school-based initiatives, are not socially stigmatizing (a focus on building resilience) (Benard & Marshall, 2001), and are culturally sensitive to the needs of youth (Blechman, 1992; Hamilton & Hamilton, 1990). They also offer the potential of a high intensity one-on-one relationship sometimes lasting for years, the type of relationship believed necessary for producing permanent change in children’s health and well being. Adult mentoring programs are also relatively cost-effective because they capitalize on the unpaid time of adult volunteers. A cost effectiveness study of 61 established American intervention programs designed to prevent or reduce youth problem behavior found that the Big Brothers Big Sisters (BBBS) community match program was among a list of 36 that yielded a net monetary benefit (Aos, Lieb, Mayfield, Miller, & Pennucci, 2004).

Few rigorous outcome evaluations have been conducted aimed at demonstrating the effectiveness of adult mentoring as a mode of intervention for fostering improvements in children's health and well being (DuBois, Holloway, Valentine, & Cooper, 2002). Most evaluations have not been able to demonstrate program effectiveness for children due in part to a focus on mentoring benefits for parent caregivers (Campbell & O'Neill, 1985) and a heavy reliance on personal anecdotes, observational data, or the impressions of single informants (Frecknall & Luks, 1992). Problems with study design have also been common including the use of samples insufficient in size to detect meaningful program effects, the absence of random assignment of subjects to experimental and control conditions, and follow-up periods too short for assessing change in attitudes and behavior (see for example, Abbott, Meredith, Kelly, & Davis, 1997; Galvin, 1989; Keating, Tomishima, Foster, & Alessandri, 2002; McPartland & Nettles, 1991; Nelson & Vaillant, 1993; Royse, 1998; Saintonge, Achille, & Lachance, 1998; Seidl, 1982; Stocks, 1980; Thompson & Kelly-Vance, 2001; Turner & Scherman, 1996).

One exemplary study worthy of mention (Tierney, Grossman, & Resch, 1995) is the evaluation of the American Big Brothers/Big Sisters (BBBS) community match programs targeting children from low-income, single-parent families. Over 1000 children were randomly assigned to an experimental (match program) and control group (waiting list) and participated in interviews at pre-test and 18 months follow-up. Compared to the control group, experimental children showed modest improvements in relationships with family and peers, more favorable attitudes toward school, and better overall academic performance. They also skipped half as many days of school and were 46% less likely to initiate alcohol and other drug use during the follow-up period.

A national scientifically rigorous study of the benefits of BBBS adult mentoring for disadvantaged children has never been conducted in Canada, an unfortunate situation given the long history of BBBS in Canada (since 1912), promising findings around program effectiveness in other jurisdictions (e.g., United States), and the possibility of substantial regional differences in agency practices (e.g., referrals, mentor training, caseworker support) and characteristics (e.g., caseload, staffing, age, gender, ethnic composition of intakes) that might contribute to variation in the development of healthy match relationships and ultimately healthy child outcomes.

2. Objective

This study reports the results of a two year pilot study to assess the feasibility of implementing a randomized controlled trial for evaluating the effectiveness of the Big Brothers Big Sisters (BBBS) adult mentor community match programs at the national level. Specific objectives included: an assessment of the willingness of new BBBS intake families and mentors to participate in the study (and agree to random assignment to either the BBBS match program or a waiting list control), the development of standardized instrumentation (interviews and questionnaires) administered to parents, mentors, and children for measuring children's outcomes and match relationship features, an assessment of study attrition between the pre and post-test data collections and any bias attrition might cause, and the development of a training manual for BBBS caseworkers to ensure standardized implementation of the research protocol across agencies.

3. Program description

The goal of the BBBS community match program is to provide children from disadvantaged backgrounds a one-on-one mentoring relationship with a caring and responsible adult, a relationship expected to lead to positive changes in child psychosocial well being (Big Brothers

Big Sisters of Canada, 2005). The program involves several phases: family and mentor assessments, match determination, and match supervision/support. Eligibility requirements stipulate that applicants must be between the ages of 6 and 16, permanently reside in an agency's region, and agree to agency regulations. Mentors must be at least 18 years of age, have no prior criminal record, provide at least three personal references, and complete an assessment interview. They must agree to commit at least two to 4 h of time weekly with their Little Brother/Sister discussing or engaging in leisure and career-oriented activities. Involvement must be maintained for at least a year. Mentors must attend an initial training session delivered by agency staff on application and assessment procedures, roles and responsibilities of mentors and Little Brothers/Sisters, match termination, caseworker support and supervision, recognizing abuse, and optimizing the quality of the match relationship.

To determine a match, caseworkers conduct interviews with families and adult mentors to assess common interests, mentor ability to meet child needs, personal preferences, and mentor willingness to become involved with children from varied family backgrounds. Parents must provide written approval of the selected mentor. Once children reach age 18, formal agency ties terminate even though the match relationship may continue. Caseworkers must contact mentors and their match partners (including parents) at least once a month for a 12-month period after the match. After that, contact is reduced. Caseworkers may provide information on upcoming organizational events and offer advice on handling problems during the match. Mentors are expected to inform caseworkers of problems they experience in the match and provide notification of a change of address or their intention to terminate the relationship. They are obliged to report suspected incidents of physical or sexual abuse or other situations compromising child safety. Children meeting the eligibility criteria for the match program are assigned to a waiting list until a match can be found. Most agencies offer a waiting list program of recreational or educational activities.

4. Method

4.1. *Study design and sample*

A true experimental design was used to evaluate the effectiveness of the Big Brothers Big Sisters adult mentor community match program. A total of 71 consenting families were randomly assigned to one of two conditions: 1) an experimental group comprised of families with children matched to an adult mentor; and 2) a control group comprised of families participating in a waiting list program of recreational and educational activities. Questionnaires measuring program impact were administered to children and their parents at baseline (prior to knowledge of assigned condition) and at 12 months follow-up. A 12-month follow-up was chosen because the average waiting time for a child to receive a Big Brother or Big Sister is 10–12 months. Face-to-face interviews were conducted with children. Parents and adult mentors completed a self-report questionnaire. Obtaining teacher reports was deemed impractical because of required approvals from multiple schools and changes in classes or schools during the study.

At 4 months from the date of pre-test approximately half of the study families were randomly selected to participate in a four-month follow-up questionnaire designed to evaluate the temporal stability of the measures. At the end of each interview or questionnaire, children, parents, and adult mentors were asked to provide feedback on questionnaire length, language and reading comprehension, and content sensitivity.

To qualify as study participants, families must have met the agency's requirements for receiving an adult mentor, have a child applicant between the ages of 7 and 14 years, and qualify as a new

intake at the agency (i.e., not have a child currently enrolled in BBBS programs). Children 6 years of age were excluded because one objective of the evaluation was to examine mentoring effects on children's academic competencies and in-school behavior. Children ages 15 and 16 were excluded due to ethical considerations (i.e., children assigned to the waiting list control group were asked to wait a minimum of 12 months before they could be matched to a mentor). Among families with more than one eligible child, one was randomly selected as the official study participant. The parent/guardian in the study was required to have primary parenting responsibility for the child. Adult mentors were eligible for the study if they satisfied the agency's eligibility requirements for receiving a Little Brother/Sister and completed the necessary training requirements.

4.2. Procedures

Families were recruited over a 12-month period from two agencies located in Southern Ontario. Originally, three agencies were enrolled in the study. However, due to fiscal and time constraints, one agency withdrew before the study began. After the agency's assessment interview, staff read a script inviting eligible families and adult mentors to take part in the study. The script described the study purpose, random assignment process, content, timing, and administration of questionnaires, incentives to participate, and anonymity and confidentiality of disclosed information. Information sheets summarizing the scripts were distributed to family and mentor applicants. Families and mentors who declined participation were asked to provide general background information (e.g., gender, age, education). Interested families were asked to read and sign consent and assent forms indicating their willingness to participate. These forms were identical in content to the study scripts and information sheets. Parents were advised that their child may be randomly assigned to the waiting list control program and therefore not receive the match program for a period of 12 months. Children were given an assent form similar in content to the parent consent. Adult mentor forms were appended to the standard letter of agreement outlining mentor responsibilities at the conclusion of their interview with agency staff. Families and mentors who declined participation but agreed to provide general background information were also asked to complete a consent form.

To minimize possible bias in participant responses, agency staff informed families of their assigned condition following the completion of the baseline pre-test. Each agency was assigned a recruitment quota based on the average number of new matches made in a given year. Recruitment ended once the quota was reached. If a match dissolved during the study, agencies attempted to rematch the child to a new mentor. A one-time \$1000 stipend was provided to each agency to help support the processing of new cases and ensure that the total number of matches normally made by an agency did not decline as a result of the study. At the completion of the study, caseworkers placed a high priority on matching children who had been assigned to the waiting list program.

Agency staff conducted face-to-face interviews (60 min) with children in a private room. Most interviews occurred at the respective agencies. Questionnaires for parents and mentors (30–40 min) were self-administered. After the child interview, caseworkers met with parents to address literacy issues or difficulties completing the parent questionnaire. Similar procedures were followed for adult mentors. As a token of appreciation for completing the interviews, children received two movie passes or gift certificates (value \$20) at the end of the pre-test and 12-month follow-up. At the end of the study, all children received a certificate of completion. To preserve participant anonymity, a unique four-digit number was placed on the questionnaire and interview face sheets that linked individual responses across time and participant groups (child,

parent, mentor). The first two digits consisted of an agency code followed by a two digit respondent code. For each agency, a master list of names and unique codes was compiled for tracking participants and contained individual residential addresses, telephone numbers, and auxiliary contact information (i.e., name, telephone number of close friend, relative).

A day-long training was provided to participating agency staff addressing recruitment (delivery of study scripts and information sheets inviting families and mentors), the protection of human subjects (e.g., informed consent), procedures for conducting face-to-face interviews, data collection, and maintaining participant involvement. In addition, all caseworkers were provided with a training manual on the research protocol to ensure standardization of research procedures across sites.

5. Measurement

Study measures were chosen based on level of appropriateness for culturally diverse populations, high internal consistency and validity, and high sensitivity to change. The description of measures (see below) includes internal consistency coefficients (Cronbach alpha) estimated from the pre and post-test assessments and intra class correlations (ICC) for gauging the stability of the measures between the pre-test and an assessment four months later carried out on a random sub-set of the pre-test participants.

Child behavioral problems were measured using the child and parent versions of the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001; Goodman, Meltzer, & Bailey, 1998). The SDQ is 25-item scale designed to assess the extent of symptoms (now or in past month) of externalizing and internalizing behavior problems in children (3 response options: not true, somewhat true, certainly true). Constructs in this study include: emotional problems (5 items; e.g., worry a lot; child report *pre post-test* $\alpha = .57-.60$, *test-retest ICC* = .52; parent report *pre post-test* $\alpha = .65-.70$, *test-retest ICC* = .77), conduct problems (5 items; e.g., get very angry and lose temper; child report *pre post-test* $\alpha = .47-.62$, *test-retest ICC* = .80; parent report *pre post-test* $\alpha = .64$, *test-retest ICC* = .89), and hyperactivity and inattention (5 items; e.g., restless, cannot stay still for long; child report *pre post-test* $\alpha = .62-.69$, *test-retest r* = .76; parent report *pre post-test* $\alpha = .72-.82$, *test-retest ICC* = .88).

Children's behavior problems at school consisted of items adapted from previous research on child adjustment difficulties in the school setting (Jenkins, 1997). Children were asked to report in the last month at school how often they engaged in or experienced the following activities or events: truancy, disruptive behavior, delinquency, and disciplinary referrals. Five response options range from "never" to "four or more times" (10 items; e.g., talk back to teacher; *pre post-test* $\alpha = .70-.73$, *test-retest ICC* = .87). Parent reports of children's behavior problems in the last month at school consisted of one question: number of times child got into trouble for misbehaving (*test-retest ICC* = .57). Indirect aggression (child and parent report) consisted of items adapted from previous research (Bjorkqvist, Legerstet, & Kaukiainen, 1992). The items appear in the National Longitudinal Survey of Children and Youth (NLSCY, 1998) and are designed to measure how frequently children attempt to harm fellow peers by manipulating others. Three response options include never or hardly ever, sometimes, and often (5 items; e.g., when mad at someone tries to get others to dislike him/her; child report *pre post-test* $\alpha = .65-.72$, *test-retest ICC* = .40; parent report *pre post-test* $\alpha = .71-.80$, *test-retest ICC* = .82).

Depression was measured using the children's version (Weissman, Orvaschel, & Padian, 1980) of the Centre for Epidemiology Studies Depression Scale (CES-D) (Radloff, 1977). The CES-D assesses the frequency of children's depressive symptoms in the past week. Four response

options include not at all, some or a little of the time, most of the time, all of the time (20 items; e.g., I felt down and unhappy this week; *pre post-test* $\alpha = .82-.85$, *test-retest ICC* = .57). Social anxiety was measured using the Revised Social Anxiety Scale for Children (SASC-R) (La Greca & Stone, 1993). Using five response options (not at all, hardly ever, sometimes, most of the time, all of the time), items assess the frequency of anxiety symptoms in three areas: fear of negative peer evaluations (8 items; e.g., I worry about being teased; *pre post-test* $\alpha = .92$, *test-retest ICC* = .34), social avoidance and distress specific to new situations (6 items; e.g., I worry about doing something new in front of other kids; *pre post-test* $\alpha = .71-.75$, *test-retest ICC* = .19), and generalized social avoidance and distress (4 items; e.g., I am quiet when I am with a group of kids; *pre post-test* $\alpha = .61-.77$, *test-retest ICC* = .38).

Children's academic performance at school was assessed based on child and parent reports. One question asked what letter grades children mostly received in the last month at school (mostly A's B's etc) (child report: *test-retest ICC* = .63; parent report: *test-retest ICC* = .89). Children and parents were also asked to report how well children performed in three subject areas: English, Science, and Mathematics. Five response options include: a lot better than other students, a little better, about the same, a little worse, and a lot worse than other students (child report; *pre post-test* $\alpha = .43-.44$; parent report; *pre post-test* $\alpha = .81-.90$, *test-retest ICC* = .47). Children's involvement in community activities was assessed using child and parent reports of how frequently children participate in community activities for youth (e.g., organized sports, lessons in art, dance, music). Five response options range from never to four or more times (child report; 7 items; *pre post-test* $\alpha = .32-.44$, *test-retest ICC* = .30; parent report; 7 items; *pre post-test* $\alpha = .38-.54$, *test-retest ICC* = .64).

Peer self-esteem was measured using the peer dimension of the HARE self-esteem scale (Shoemaker, 1980). Five response options include strongly agree, agree, neither agree or disagree, disagree, and strongly disagree (7 items; e.g., I am not as popular as other kids my age; *pre post-test* $\alpha = .69$, *test-retest ICC* = .86). Self-image was measured using items designed to gauge children's perceptions of their physical attractiveness (Canadian Centre for Studies of Children at Risk, 1995). Four response options include not at all true, not very true, kind of true, and very true (5 items; e.g., I don't like the way I look; *pre post-test* $\alpha = .85-.89$, *test-retest ICC* = .93). Academic self-efficacy was measured using items tapping children's perceived ability to perform well academically (Midgley et al., 1995). Five response options include not at all true of me, not true of me, somewhat true of me, true of me, and very true of me (5 items; e.g., I can do even the hardest school work if I try; *pre post-test* $\alpha = .83-.87$, *test-retest ICC* = .46).

Children's social support was measured using The Survey of Children's Social Support (SCSS) (Dubow & Ullman, 1989). The SCSS assesses children's perceptions of how often they receive social support from significant others. Five response options include never, hardly ever, sometimes, most of the time, and always. Dimensions in this study include: peer social support (10 items; e.g., my friends like to hear my ideas; *pre post-test* $\alpha = .83-.85$, *test-retest ICC* = .82) and teacher social support (6 items; e.g., my teachers care about me; *pre post-test* $\alpha = .82-.86$, *test-retest ICC* = .83). Parent social support from mother/female guardians was assessed using a scale designed to capture children's receipt of emotional and instrumental support from parent caregivers (Wills, Vaccaro, & McNamara, 1992). Four response options include not at all, a little, fairly much, and very much (15 items; child report only; e.g., I can share my feelings with her; *pre post-test* $\alpha = .82-.86$, *test-retest ICC* = .92).

Quality of children's relationships with mother or female guardians was measured using items tapping the relational aspects of trust, warmth, respect, and closeness. Response options include strongly agree, agree, neither agree or disagree, disagree, and strongly disagree (5 items; parent report only; e.g., a warm and affectionate relationship; *pre post-test* $\alpha = .86-.92$, *test-retest*

$ICC=.87$). Quality of children's relationships with friends (Boyle et al., 1987) was measured using a single question: how well child got along with friends in the past month (child report, *test-retest ICC* = .19; parent report, *test-retest ICC* = .62). Quality of relationships with teachers (Boyle et al., 1987) was measured using a single question: how well child got along with teachers in the past month (child report, *test-retest ICC* = .56; parent report, *test-retest ICC* = .73). Both questions contain five response categories that include excellent—got along very well, good, fair, poor, and very poor—did not get along at all.

Children's attachment to school was measured using a scale designed to assess attitudes toward school. Response options include strongly agree, agree, neither agree or disagree, disagree, and strongly disagree (7 items; e.g., school is a boring place to be; *pre post-test α* = .84, *test-retest ICC* = .68). Parent reports of children's attachment to school were measured using a single item asking parents how much their child liked school. Five response options include likes school very much, likes it a little, neither likes it or dislikes it, dislikes it, and dislikes school very much (*test-retest ICC* = .75). School bullying and safety were measured using a scale tapping children's feelings of safety at school and to and from school (NLSCY, 1998). Five response options include never, rarely, some of the time, most of the time, and all of the time (5 items; e.g., I feel safe at school; *pre post-test α* = .69–.75, *test-retest ICC* = .69).

Children's social skills were measured using the Elementary Level Student and Parent Forms of the Social Skills Rating System (SSRS) (Flanagan, Alfonso, Primavera, Povall, & Higgins, 1996; Gresham & Elliott, 1990). Children and parents are asked to indicate how frequently children engage in various pro-social behaviours using three response options: "never", "sometimes", and "often". SSRS dimensions include: cooperation (10 items; child report; e.g., I use my free time in a good way; *pre post-test α* = .75–.78, *test-retest ICC* = .66; parent report; e.g., uses free time at home in acceptable way; *pre post-test α* = .83–.85, *test-retest ICC* = .78), empathy (10 items; child report only; e.g., I try to understand how my friends feel; *pre post-test α* = .72–.82, *test-retest ICC* = .65), self-control (10 items; child report; e.g., I ignore classmates who are clowning around in class; *pre post-test α* = .73–.80, *test-retest ICC* = .84; parent report; e.g., avoids situations that are likely to result in trouble; *pre post-test α* = .80–.82, *test-retest ICC* = .81), assertion (10 items; child report; e.g., I start conversations with classmates; *pre post-test α* = .53–.60, *test-retest ICC* = .85; parent report; e.g., starts conversations rather than waiting for others to talk first; *pre post-test α* = .79–.80, *test-retest ICC* = .88), and responsibility (10 items; parent report only; e.g., asks permission before leaving the house; *pre post-test α* = .52–.67, *test-retest ICC* = .80).

Children's coping skills were measured using the Coping Scale for Children and Youth (CSCY) (Brodzinsky et al., 1992). Children are asked to report how frequently they behave or think in certain ways to deal with problems that upset or worry them. Four response options include never, sometimes, often, and very often. Sub-dimensions of the CSCY include: cognitive behavioural problem solving (8 items; e.g., I go over in my head some of the things I can do about the problem; *pre post-test α* = .82, *test-retest ICC* = .64), cognitive avoidance (11 items; e.g., I try not to think about the problem; *pre post-test α* = .83–.85, *test-retest ICC* = .67), behavioural avoidance (6 items; e.g., I stayed away from things that reminded me of the problem; *pre post-test α* = .55–.69, *test-retest ICC* = .63), and assistance seeking (4 items; e.g., I ask someone in my family for help with the problem; *pre post-test α* = .32–.65, *test-retest ICC* = .73).

6. Statistical analysis

Repeated measures analysis of covariance (ANCOVA) was performed on the data with the program variable (experimental BBBS match program vs. waiting list control program) as the

independent variable, the post-test score as the dependent variable, and the pre-test score as the covariate. The repeated measures ANCOVA procedure enhances statistical power by adjusting post-test mean differences between the experimental and control groups for sample pre-test/post-test correlations and possible pre-existing group differences at baseline (Lipsey, 1990). Prior research suggests that even in the presence of random assignment, non-equivalence of study outcomes at baseline will occur just by chance alone (Costner, 1989). The analyses include all participants assigned to the experimental condition regardless of the level of exposure to the intervention (i.e., intent to treat analysis, see Jo, 2002) because excluding experimental group non-completers can lead to biased intervention effects due to differences between subjects who receive the intervention (in full or in part) and those who do not receive the intervention by the time of follow-up. Two-tailed tests were used to judge statistical significance given evidence that negative and positive changes can occur in community interventions for youth (Ellikson & Bell, 1990). Due to our small sample and the exploratory nature of the study, statistical significance for intervention effects was set at a criterion of $p < .10$.

7. Results

7.1. Sample descriptive results

During the 12-month recruitment period, agency staff approached 72 families with invitations to participate in the study (roughly equal numbers at each agency). One family declined to participate, citing bad timing for their decision. A total of 71 families provided formal written assent/consent to participate and were randomly assigned by researchers to the experimental match program ($n=39$) or the control waiting list program ($n=32$). Thirty adult mentors were matched to experimental children during the recruitment period and provided formal written consent to participate. Twelve families were lost to attrition between pre and post-test assessments (7 experimental and 5 control). Some losses resulted from problems occurring in the match relationship and family relocation. In most cases, however, the agency withdrew the family from the study because of legal issues (e.g., child custody, child abuse or neglect). Overall, 59 families completed both the pre-test assessment and the 12-month follow-up assessment (33 experimental and 26 controls). Twenty-six out of the 33 assigned experimental group children were matched to an adult mentor during the 12-month period.

Table 1 presents selected demographic and socioeconomic background characteristics of child, parent, and adult mentor participants. At pre-test ($n=71$), 45% of the children in the study were aged 7–9, 51% were boys, and 77% came from a single-parent family (72% were headed by a female parent/guardian). Twenty-four percent had a parent caregiver with less than a high school education. A large percentage of children came from families affected by poverty and high geographic mobility. For example, 51% came from families with a gross household income of less than \$20,000, 36% received government social assistance, 37% lived in a subsidized dwelling, 25% lived in a home in need of major repairs, 33% lived in a rented dwelling, and 17% experienced three or more family moves in the past five years. Thirty-five percent of the children belonged to a visible minority group (i.e., African Canadian, Aboriginal, Asian, Hispanic, Arab, Jewish). Thirty-eight percent were reported by parents to have a chronic physical or mental health condition.

Almost all (94%) parent caregivers enrolled in the study were female. The mean age of parents was 43 years. A majority (60%) were currently divorced, separated or widowed and 45% reported a long-term physical or mental health problem. Results for adult mentors ($n=26$) revealed that slightly more than half were male (54%). The mean age of mentors was 27 years. The majority (77%)

Table 1
Background characteristics ($n=71$)

Study variable	Percent	\bar{x}	SD
Parent ($n=71$)			
Age	–	43.17	7.46
Gender (male)	5.6	–	–
Current marital status			
Married/common-law	12.9	–	–
Separated/divorced/widowed	60.0	–	–
Never married/single	27.1	–	–
Child ethnicity/race			
African–Canadian and Aboriginal	19.3	–	–
White European	45.6	–	–
Other (African–Canadian, Aboriginal, Hispanic, Asian, Arab, Jewish)	35.1	–	–
Education			
<High school	23.9	–	–
Completed high school	25.4	–	–
Some university/university	19.4	–	–
Completed university/university	31.3	–	–
Gross household income			
<20,000	50.7	–	–
20,000–39,999	25.4	–	–
40,000–59,999	17.5	–	–
60,000+	6.3	–	–
Main activities			
Unemployed/laid off	7.0	–	–
Unable to work	16.9	–	–
Full-time paid employment	39.4	–	–
Part-time paid employment	14.1	–	–
Homemaker	15.5	–	–
Other	7.1	–	–
Family economic deprivation			
Subsidized dwelling			
Yes	36.8	–	–
No	63.2	–	–
Own or rent dwelling			
Own	33.3	–	–
Rent	66.7	–	–
Home needs major repairs			
Yes	24.6	–	–
No	75.4	–	–
Social assistance			
Yes	36.4	–	–
No	63.6	–	–
Length of time in current residence		3.77	2.02
<12 months to 1 year	33.8	–	–
2–3 years	18.3	–	–
4-and more years	47.9	–	–
Number of family moves		1.58	1.97
Zero	34.8	–	–
One	18.8	–	–
Two	29.0	–	–
Three or more	17.4	–	–
Rural/urban place of residence			
City (100,000 people or more)	81.8	–	–

Table 1 (continued)

Study variable	Percent	\bar{x}	SD
City (between 99,999 and 49,999)	12.2	–	–
Town (between 3,00 and 14,999)	6.0	–	–
Number of children living with parent		1.89	1.00
1–2	78.6	–	–
3 or more	21.3	–	–
Parent long term illness			
Yes	44.9	–	–
No	55.1	–	–
<i>Child (n=71)</i>			
Age	–	9.96	2.00
7–9	45.1		
10–14	54.9		
Gender (male)	50.7	–	–
Siblings living with child		1.00	1.06
0	34.8	–	–
1–2	56.5	–	–
3 or more	8.7	–	–
Living arrangements	–		
Both biological parents	5.1	–	–
Biological mother only	71.8	–	–
Biological father only	5.1	–	–
Biological mother and stepfather	7.7	–	–
Biological father and stepmother	2.6	–	–
Other relative (e.g., brother, sister, grandparents)	5.1	–	–
Other	2.6	–	–
Child chronic health conditions		1.62	0.49
Yes	38.2	–	–
No	61.8	–	–
<i>Adult mentor (n=26)</i>			
Age	–	27.12	6.53
Gender (male)	53.8	–	–
Current marital status			
Married/common-law	34.6	–	–
Never married	65.4	–	–
Ethnicity/race			
African–Canadian and Aboriginal	3.8	–	–
White European	76.9	–	–
Other (e.g., Hispanic, Asian, Arab, Jewish)	19.2	–	–
Education			
Completed high school	11.5	–	–
Some university/university	42.3	–	–
Completed university/university	46.1	–	–
Gross household income			
<20,000	26.1	–	–
20,000–39,999	8.7	–	–
40,000–59,999	13.0	–	–
60,000+	52.1	–	–
Main activities (multiple responses)			
Going to school	50.0	–	–
Full-time paid employment	69.2	–	–

(continued on next page)

Table 1 (continued)

Study variable	Percent	\bar{x}	SD
Part-time paid employment	19.2	–	–
Volunteer work	34.6	–	–
Other	15.5	–	–
Own or rent dwelling			
Own	30.4	–	–
Rent	69.6	–	–
Length of time in current residence			
<12 months to 1 year	23.1	–	–
2–3 years	26.9	–	–
4- and more years	49.9	–	–
Rural/urban place of residence			
City (100,000 people or more)	84.6	–	–
City (between 99,999 and 15,000)	11.5	–	–
Town (between 14,999 and 3,000)	3.8	–	–

were white European in ethnic background, highly educated (88% with at least some university or completed university education), financially well off (65% with household incomes of \$40,000 or more), and never married (65%). Most (69%) were involved in full-time paid employment.

7.2. Participant feedback on questionnaires

Most parents and mentors (80 and 95% respectively) reported little or no difficulty understanding the questions. However, children experienced more difficulty. This was particularly true of younger children (ages 7–9). Between 50 and 60% in this age group did not understand some of the questions asked by interviewers compared to just 20–28% of children ages 10–14. Most respondents (children, parents, and mentors) indicated a high comfort level responding to the questions (80–100%). More varied responses occurred for questionnaire length. Seventy percent of the parents felt that the questionnaire was about the right length. The percentage for adult mentors was slightly higher at 87%. In contrast, only 40% of the children responded this way (55% felt it was too long).

7.3. Baseline equivalence and study attrition

Prior to evaluating the effectiveness of the BBBS community match program, we attempted to assess possible threats to validity arising from non-equivalence of participants at baseline and attrition between the pre and post-test assessments. To assess these threats, a 2×2 analysis of variance was performed on each baseline outcome measure with the program variable (experimental match condition versus the waiting list control) and attrition (did not complete both pre and post-test assessments versus completed both) entered as independent variables. A statistically significant main effect of condition was judged to infer initial non-equivalence between groups at baseline (adjusting for attrition). A main effect of attrition was judged to infer that children who completed the study differed in some respect from those who did not (adjusting for assigned condition). Finally, a significant condition by attrition interaction was judged to infer that experimental group children who left the study differed from control group children who left.

Among the measured child outcomes at baseline, we found evidence of a statistically significant ($p \leq .10$) main effect of condition for only five models involving child indirect aggression (parent report), academic self-efficacy, teacher social support, physical attractiveness (child report), and

quality of parent/child relationship (parent report). These results suggest that the random assignment procedure used in this study to achieve baseline equivalence across conditions (match program versus waiting list controls) was for the most part effective.

Main effects of attrition between the pre and post-test assessments were found for three outcomes: child behavioral problems at school (child report), social skills-assertion (child report), and attachment to school (parent report). An examination of the outcome mean values for each group (children who completed the study versus those who did not) found that children who left the study were significantly more likely than completers to score high on misbehavior at school and low on assertiveness and attachment to school. For all other outcomes, non-significant differences emerged.

7.4. Match program results

To test the ANCOVA assumption of equality of regression slopes across the experimental and control groups, preliminary analyses were conducted for each outcome measure at baseline. Non-significant interactions were found, allowing us to proceed with the ANCOVA analysis on match program effectiveness. The ANCOVA results are presented in Table 2. The adjusted marginal means for both the experimental match program and waiting list control groups refer to the predicted post-test scores holding constant differences in the pre-test covariates. Because a significant number of the families assigned to the match program condition had not received an adult mentor prior to the 12-month assessment (a component of our intent to treat analysis), a correction factor for testing of multiple hypotheses was not applied to the results. Statistically significant ($p \leq .10$) main effects of program condition in favor of beneficial BBBS match program effects were found for five child outcomes. They included child self-reports of emotional problems $F(1,38)=3.27$, social anxiety pertaining to fear of negative peer evaluations $F(1,39)=2.77$, generalized social anxiety and distress $F(1,38)=2.80$, teacher social support $F(1,48)=3.56$, and social skills involving self-control $F(1,49)=3.16$. Interestingly, none of the outcomes based on parent reports emerged as significant.

8. Discussion

For nearly a century, BBBS adult mentoring programs in Canada have been an important component of community-based efforts to address the health and social needs of children without a parent caregiver. However, despite the widespread acceptance and implementation of these programs, systematic efforts have not been undertaken to evaluate the impact of BBBS adult mentoring on the lives of Canadian children. To address this shortfall, we undertook a two-year pilot study to investigate the feasibility of conducting a randomized controlled trial as a means of evaluating the effectiveness of BBBS community match programs at the national level.

In general, results supported the use of an RCT as a means of evaluating the BBBS programs. All except one of the families invited by researchers to participate accepted the invitations despite a 50% probability that their child would be randomly assigned to a waiting list control group without an adult mentor for a minimum of 12 months. Tests of equivalence revealed only minor differences on the baseline outcomes between match program and waiting list control children, evidence that random assignment was mostly successful in equating the two groups prior to implementation of the program. Achieving equivalence enhances the internal validity of study findings, or in other words, the ability to make sound causal inferences around program effects. Most participants (parents and children) completed both the pre and post-test assessments and the characteristics of those who dropped out were similar to those who stayed, suggesting that results

Table 2
Analyses of covariance results

Child outcome	Adjusted marginal means	F-value	Sig. $p < .10$
Emotional problems (PR)			
Experimental	2.89	$F(1,56) = .10$	ns
Control	2.76		
Emotional problems (CR)			
Experimental	1.85	$F(1,38) = 3.27$.08
Control	2.75		
Hyperactivity and in attention problems (PR)			
Experimental	4.48	$F(1,55) = .70$	ns
Control	4.06		
Hyperactivity and in attention problems (CR)			
Experimental	3.35	$F(1,39) = .13$	ns
Control	3.56		
Conduct problems (PR)			
Experimental	2.27	$F(1,55) = .01$	ns
Control	2.29		
Conduct problems (CR)			
Experimental	1.66	$F(1,39) = .06$	ns
Control	1.78		
Indirect aggression (PR)			
Experimental	6.46	$F(1,53) = .89$	ns
Control	6.05		
Indirect aggression (CR)			
Experimental	0.90	$F(1,36) = .28$	ns
Control	1.18		
In-school behavioural problems (PR)			
Experimental	0.48	$F(1,48) = .061$	ns
Control	0.42		
In-school behavioural problems (CR)			
Experimental	5.75	$F(1,51) = .26$	ns
Control	6.36		
Depression (CR)			
Experimental	11.05	$F(1,39) = 1.37$	ns
Control	14.10		
Social anxiety (fear of negative peer evaluation) CR)			
Experimental	5.25	$F(1,39) = 2.77$.10
Control	8.70		
Social anxiety (distress in new situations) (CR)			
Experimental	5.09	$F(1,40) = .04$	ns
Control	5.39		
Social anxiety (generalized anxiety and distress) (CR)			
Experimental	2.24	$F(1,38) = 2.80$.10
Control	3.75		
Academic achievement (PR) (subject areas)			
Experimental	9.27	$F(1,46) = .21$	ns
Control	9.56		
Academic achievement (CR) (subject areas)			
Experimental	8.98	$F(1,43) = .17$	ns
Control	8.64		
Academic achievement (PR) (grade)			
Experimental	2.38	$F(1,52) = .16$	ns
Control	2.31		

Table 2 (continued)

Child outcome	Adjusted marginal means	F-value	Sig. $p < .10$
Academic achievement (CR) (grade)			
Experimental	2.07	$F(1,48) = .45$	ns
Control	2.18		
Involvement in youth activities in community (PR)			
Experimental	6.10	$F(1,54) = .17$	ns
Control	5.57		
Involvement in youth activities in community (CR)			
Experimental	4.98	$F(1,55) = 2.05$	ns
Control	6.59		
Peer self-esteem (CR)			
Experimental	16.79	$F(1,51) = .87$	ns
Control	17.80		
Physical attractiveness (CR)			
Experimental	11.31	$F(1,52) = .34$	ns
Control	11.89		
Academic self-efficacy (CR)			
Experimental	14.47	$F(1,49) = .01$	ns
Control	14.45		
Peer social support (CR)			
Experimental	32.60	$F(1,54) = .10$	ns
Control	32.19		
Quality of relationship with friend (CR)			
Experimental	1.56	$F(1,54) = .03$	ns
Control	1.52		
Quality of relationship with friend (PR)			
Experimental	1.84	$F(1,51) = .04$	ns
Control	1.87		
Teacher social support (CR)			
Experimental	19.09	$F(1,48) = 3.56$.07
Control	16.35		
Quality of relationship with teachers (PR)			
Experimental	1.74	$F(1,52) = .78$	ns
Control	1.97		
Quality of relationship with teachers (CR)			
Experimental	1.72	$F(1,51) = 2.02$	ns
Control	2.02		
Parent social support (mother/female guardian (CR)			
Experimental	38.29	$F(1,37) = 1.13$	ns
Control	35.81		
Attachment to school (CR)			
Experimental	14.02	$F(1,51) = .24$	ns
Control	13.52		
Bullying and safety (CR)			
Experimental	8.27	$F(1,37) = .23$	ns
Control	7.80		
Quality of relationship with mother/female guardian (PR)			
Experimental	23.39	$F(1,53) = .74$	ns
Control	22.91		
Coping skills assistance seeking (CR)			
Experimental	7.16	$F(1,44) = .47$	ns
Control	6.64		

(continued on next page)

Table 2 (continued)

Child outcome	Adjusted marginal means	F-value	Sig. $p < .10$
Coping skills cognitive behavioural problem solving (CR)			
Experimental	13.12	$F(1,43)=1.14$	ns
Control	11.66		
Coping skills cognitive avoidance (CR)			
Experimental	11.27	$F(1,44)=.04$	ns
Control	10.94		
Coping skills behavioural avoidance (CR)			
Experimental	5.47	$F(1,43)=.25$	ns
Control	5.01		
Social skills self-control (PR)			
Experimental	11.66	$F(1,52)=1.37$	ns
Control	12.43		
Social skills self-control (CR)			
Experimental	12.45	$F(1,49)=3.16$.08
Control	10.87		
Social skills cooperation (PR)			
Experimental	10.41	$F(1,54)=.02$	ns
Control	10.31		
Social skills cooperation (CR)			
Experimental	15.10	$F(1,49)=.77$	ns
Control	14.26		
Social skills responsibility (PR)			
Experimental	13.35	$F(1,54)=.17$	ns
Control	13.10		
Social skills assertion (PR)			
Experimental	14.27	$F(1,54)=1.16$	ns
Control	14.97		
Social skills assertion (CR)			
Experimental	13.92	$F(1,49)=.58$	ns
Control	13.24		
Social skills empathy (CR)			
Experimental	15.57	$F(1,51)=.04$	ns
Control	15.74		

$n = 59$ (experimental = 33; control = 26).

relating to program effectiveness could be extrapolated to all families presenting to BBBS agencies for an adult mentor. The majority of children, parents, and adult mentors indicated a high degree of comfort answering the pre and post-test assessment questions. Most of the parents and mentors comprehended the meaning of the questions and felt that the questionnaires were about the right length. However, a significant percentage of children, particularly those aged 7–9, felt that the interview was too long and indicated difficulty answering some of the questions.

Results of the ANCOVA revealed beneficial BBBS match program effects at post-test for five child outcomes, namely emotional problems, social anxiety (fear of negative peer evaluations and generalized social anxiety and distress), teacher social support, and social skills (self-control). Similar findings on BBBS match program effectiveness have been made elsewhere in terms of improvements in children's self-esteem and reduced symptoms of depression (Frecknall & Luks, 1992; Nelson & Vaillant, 1993; Stocks, 1980; Turner & Scherman, 1996). However, the validity of these studies was weak because they did not randomly assign families to conditions and most restricted their sample to boys. Perhaps the closest parallel to our findings comes from the rigorous evaluation of an American adult mentoring program (Across Ages) designed to reduce substance use among middle school youth

(Aseltine, Dupre, & Lamlein, 2000). At post-test, children in the mentoring condition achieved more effective strategies for managing anxiety and anger than untreated controls. In addition, 6-month follow-up results (LoSciuto, Rajala, & Taylor, 1996) revealed significantly higher levels of self-control (social skills) among children assigned to the adult mentoring program compared to children assigned to either a curriculum skills-based program or untreated control group.

An interesting observation arising from our work is the fact that children assigned to the BBBS match program did not exhibit significant improvements for a variety of overt behavioral outcomes such as substance use, conduct problems, attention difficulties, aggression, and misbehavior at school. One explanation for this finding is that children's internal psychological states are more responsive in the short term to the companionship and support of an adult mentor and that deeply entrenched behaviors change only gradually with exposure to stable and long-term relationships. Some mentoring experts (McPartland & Nettles, 1991) have speculated that structured mentoring programs are unlikely to impact strongly on child behaviors (e.g., attendance at school) that require careful monitoring and strict supervision by parents and teachers because the latter represents activities that fall outside the roles and responsibilities and perhaps capabilities of most adult mentors. Future research employing a larger sample and an extended time frame is required to shed light on this important question.

This study possessed a number of methodological advantages over previous work on the effectiveness of adult mentoring programs. First, our study is one of only two ever conducted to employ a true experimental design to evaluate the effectiveness of BBBS community match programs for children. Random assignment of families to the match program and waiting list control conditions increased our confidence that the positive child outcomes observed at post-test were a result of the impact of the BBBS program and not some other factor.

Our study also benefited from having a rich and highly reliable set of outcome measures encompassing multiple domains of influence in children's lives including family, peer, and school environments. Furthermore, the use of widely adopted measures of mental health problems for children provided important new information on the potential of adult mentoring to improve the psychological well-being of young people. This was particularly true for social anxiety. Although mentoring programs have been recommended as a means of fostering positive change in children's mental health (Greenberg, Domitrovich, & Bumbarger, 2001), to date the benefits of structured mentoring in this area have been poorly understood.

Third, our evaluation of the BBBS match program utilized both parent and child reports of children's outcomes. This use of multiple informants is significant since virtually all of the knowledge on the benefits of adult mentoring programs has been based on youth self-reports (Cavell & Smith, 2005), a problematic situation as many youth may not be willing to disclose personal issues with mentors and tend to underreport serious behavioral problems. Indeed, prior studies have identified significant cross-informant (child and parent) discrepancies in the reported prevalence of child behavioral problems and poor mental health (Stanger & Lewis, 1993). Interestingly, none of the significant findings in our study was based on parent reports of children's behaviors. This is an unexpected finding in light of research showing that parents are somewhat biased toward perceptions of post-intervention improvements in child outcomes (Dishion, Patterson, & Kavanaugh, 1992). However, it is important to note that all of the child outcomes for which significant results were found consisted of internal subjective feelings or states (e.g., emotional problems, feelings of anxiety and depression) that may be more difficult to detect by outside observers than hard behavioral outcomes.

Despite the methodological strengths of this pilot work, children enrolled in the BBBS match program did not appear to fare much better on most outcomes than their waiting list control

counterparts. Although this situation may be attributed in part to a lack of statistical power to detect actual program effects (due to the small sample), other opposing factors may have been operating as well. One factor may have been the active nature of the control group during the study period. In the majority of BBBS community match programs, children who pass the eligibility criteria for receiving an adult mentor are automatically placed on a waiting list until a suitable match can be found. While waiting for a match these children may become involved in a variety of social and recreational activities offered by the agency that bear many similarities to what they might otherwise receive in the context of a match relationship.

The modest program effects could also have been due to the time-limited nature of our study and the fact that many participants received a relatively small dose of the intervention. Given the 12-month interval between the pre and post-test assessments, the maximum amount of time that children assigned to the match program condition could have been immersed in a match relationship with an adult mentor was 12 months. In our sample, the median match duration for mentored children was 9 months. Moreover, 10 children assigned to the match program condition had still not been matched to a mentor by the 12-month post-test. Nevertheless, these children were retained as experimental group participants in the ANCOVA models as part of an “intent to treat” analysis to maintain the equivalence across conditions that had been achieved through the random assignment process. Previous research suggests that BBBS match relationships may require a considerably longer period of time (perhaps 2–3 years) before the benefits to children become apparent (Frecknall & Luks, 1992; Furrano, Roaf, Styles, & Branch, 1993).

Finally, the success of structured mentoring programs in promoting positive change in child outcomes depends to a large extent on the quality and functioning of the match relationship. When children and mentors meet with each other only occasionally, spend time together for very short periods, or are unsatisfied with some aspect of the relationship, logic dictates that children will not exhibit marked improvements in attitudes and behavior. Fortunately, in our study this was not the case. Seventy-two percent of the adult mentors met with their child protégés at least once a week. Eighty percent spent a minimum average of 3–4 h a week, well above the guidelines established by BBBS agencies. More importantly, the majority of children and mentors reported feeling satisfied or happy with their match relationship.

Future studies are needed that explore the questions of how and for whom structured adult mentoring programs like BBBS achieve positive outcomes in children. With respect to mediation, a picture is just beginning to emerge on the possible pathways through which the effects of mentoring are transmitted. For example, a re-analysis of data from the American BBBS study of match program effectiveness described in the introduction found that adult mentoring contributed to strong academic performance and reduced incidents of truancy in children in part by improving the quality of parent/child relations and enhancing children’s self-esteem and scholastic competence (Rhodes, Grossman, & Resch, 2000). A later study using the same data found that exposure to mentoring reduced children’s substance use directly and indirectly through improvements in the quality of parent and peer relationships and positive feelings of self-esteem but only for matches lasting 12 months or longer (Rhodes, Reddy, & Grossman, 2005). Unfortunately, the authors’ attempts at demonstrating mediation were weakened by having only two data points on children’s psychosocial outcomes and the collection of retrospective information (at the study’s conclusion) on the quality and functioning of the match relationships. Moreover, the authors did not identify specific match relationship components that work through the various mechanisms to contribute to positive child development. These limitations underscore the need for greater complexity in models of adult mentoring and for longitudinal designs containing multiple waves of data that will enable researchers to examine the extent to which trajectories of growth in mentoring relationships (and the underlying

components) transmit positive or negative change to children's long-term health and behavioral outcomes by altering the growth trajectories of intervening processes.

Even less is known about factors that possibly moderate the impact of BBBS adult mentoring on children's health. Mentoring programs may fall short of achieving their desired impact if the environmental conditions in which they operate do not support the maintenance of child/adult mentor relationships. For example, children from dysfunctional family settings may find it difficult to form lasting and strong attachments to adult figures outside the home if they have suffered at the hands of a controlling or an emotionally and physically abusive parent (Grossman & Rhodes, 2002; Soucy & LaRose, 2000). Child/mentor relationships may also become strained if the parent is hostile or unreceptive toward the adult mentor. Similarly, sustaining a mentoring relationship may be challenging when a child resides in a neighborhood or community or attends a school that lacks socially cohesive support networks, sufficient opportunities for youth to engage in social and recreational activities, or that is generally unsafe as a result of theft, drug use, and violence.

Although BBBS match programs serve children from a wide age range (ages 5 to 16 years), to the best of our knowledge a comprehensive study comparing the benefits of BBBS mentoring for younger versus older children has not been conducted. Rhodes (2005) speculates that adolescents might be more inclined to welcome abstract conversations with mentors because of a pre-occupation with identity issues whereas younger children (at a less advanced stage of cognitive development) might be more receptive to structured activities. Alternatively, adolescents may be more resistant to embracing a mentor as they strive toward achieving independence from adult authority figures (e.g., parents) (Rhodes, Reddy, Roffman, & Grossman, 2005). Others suggest that younger children may benefit more from mentors because they have yet to experience events (e.g., traumatic life events, negative peer influences) that crystallize internal subjective states and entrench behavioral patterns, factors that may interfere with mentor efforts at cultivating meaningful social ties (Cavell & Smith, 2005; Galbo, 1986).

Some evidence indicates that girls and boys derive different benefits from adult mentoring (e.g., improved scholastic competence for girls and better relations with parents and peers for boys) (Tierney et al., 1995). However, gender differences in the mechanisms through which components of mentoring lead to positive changes in child behavior have yet to be identified. Gender differences are likely because girls (more so than boys) tend to make greater emotional investments in relationships (Claes, 1992), demand higher levels of intimacy and self-disclosure (Clark & Ayers, 1993), and when confronted with problems are more inclined to use adaptive coping strategies involving turning to significant others for comfort and support (Boldero & Fallon, 1995; Greenberger & McLaughlin, 1998; Shulman, 1993). These findings suggest that boys might be more receptive to instrumental mentoring that focuses on skill development while girls may respond more favorably to psychosocial mentoring with an emphasis on intimacy and emotional support (Bogat & Liang, 2005).

9. Conclusions

Results of this pilot study support the use of a randomized controlled trial to evaluate the effectiveness of the Big Brothers Big Sisters community match programs. However, implementing this design may be difficult in practice due to ethical concerns around withholding the match program for a significant period of time for children in the control condition. Our outcome evaluation revealed that BBBS community match programs hold promise for improving the mental health and psychological well being of children from disadvantaged backgrounds. In the future, scientifically rigorous investigations with large samples and longer follow-up periods

are required to arrive at definitive conclusions on match program effectiveness for children's psychological outcomes and for overt behaviors that are typically more resistant to change. These studies will also permit an in depth analysis of how adult mentoring leads to positive change in children's lives and for whom and under what conditions change is most likely to occur.

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References

- Abbott, D. A., Meredith, W. H., Kelly, R., & Davis, M. E. (1997). The influence of a Big Brothers program on the adjustment of boys in single-parent families. *The Journal of Psychology, 131*(2), 143–156.
- Aos, S., Lieb, R., Mayfield, J., Miller, M., & Pennucci, A. (2004). *Benefits and costs of prevention and early intervention programs for youth*. Olympia: Washington State Institute for Public Policy.
- Aseltine, R. H., Dupre, M., & Lamlein, P. (2000). Mentoring as a drug prevention strategy: An evaluation of across ages. *Adolescent and Family Health, 1*(1), 11–20.
- Bauldry, S., & Hartman, T. A. (2003). The promise and challenge of mentoring high risk youth: Findings from the National Faith-Based Initiative. *Public/Private Ventures*.
- Beam, M. R., Cheu, C., & Greenberger, E. (2002). The nature of adolescents' relationships with their very important non parental adults. *American Journal of Community Psychology, 39*(2), 305–325.
- Beier, S. R., Rosenfeld, W. D., Spitalny, K. C., Zansky, S. M., & Bontempo, A. N. (2000). The potential role of an adult mentor in influencing high-risk behaviours in adolescents. *Archives of Pediatrics and Adolescent Medicine, 154*, 327–331.
- Benard, B., & Marshall, K. (2001). *Big Brothers Big Sisters Mentoring: The power of developmental relationships*. Minneapolis: National Resilience Resource Centre.
- Big Brothers and Big Sisters of Canada (2005). *Every child who needs a mentor has a mentor: A blueprint to serving 100,000 children by 2013*. Ontario: Burlington.
- Bjorkqvist, K., Legerspetz, K. M. J., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggressive Behavior, 18*, 117–127.
- Blechman, E. A. (1992). Mentors for high-risk minority youth: From effective communication to bicultural competence. *Journal of Clinical Child Psychology, 21*(2), 160–169.
- Bogat, G. A., & Liang, B. (2005). Gender in mentoring relationships. In D. L. DuBois & M.J. Karcher (Eds.), *Handbook of youth mentoring* (pp. 205–217). Thousand Oaks: Sage Publications.
- Boldero, J., & Fallon, B. (1995). Adolescent help seeking: What do they get help for and from whom? *Journal of Adolescence, 18*, 193–209.
- Boyle, M. H., Offord, D. R., Hofmann, H. F., Catlin, G. P., Byles, J. A., Cadman, D. T., et al. (1987). Ontario Child Health Study: I. Methodology. *Archives of General Psychiatry, 44*, 826–831.
- Brodzinsky, D. M., Elias, M. J., Steiger, C., Simon, J., Gill, M., & Hitt, J. C. (1992). Coping scale for children and youth: Scale development and validation. *Journal of Applied Developmental Psychology, 13*, 195–214.
- Campbell, R. E., & O'Neill, P. (1985). Social support for single mothers: A study of Big Brothers/Big Sisters. *Canadian Journal of Community Mental Health, 4*, 81–87.
- Canadian Centre for Studies of Children at Risk (1995). *Transition 3 questionnaire for youth*. Hamilton: McMaster University.
- Canadian Council on Social Development (2002). *The progress of Canada's children 2001. Highlights*. Ottawa: Canadian Council on Social Development.
- Canadian Institute of Child Health (2000). *The health of Canada's children*, (3rd ed.). Ottawa: Canadian Institute of Child Health.
- Cavell, T. A., & Smith, A. -M. (2005). Mentoring children. In D. L. DuBois & M. Karcher (Eds.), *Handbook of youth mentoring* (pp. 160–176). Thousand Oaks California: Sage Publications.
- Claes, M. E. (1992). Friendship and personal adjustment during adolescence. *Journal of Adolescence, 15*, 39–55.
- Clark, M. L., & Ayers, M. (1993). Friendship expectations and evaluations: Reciprocity and gender effects. *Youth and Society, 24*, 299–313.
- Costner, H. L. (1989). The validity of conclusions in evaluation research: A further development of Chen and Rossi's theory driven approach. *Evaluation and Program Planning, 12*, 345–353.

- Dishion, T. J., Patterson, G. R., & Kavanaugh, K. A. (1992). An experimental test of the coercion model: Linking theory, measurement, and intervention. In J. McCord & R.E. Tremblay (Eds.), *Preventing anti-social behavior: Interventions from birth through adolescence* (pp. 253–282). New York: Guilford Press.
- DuBois, D. L., Holloway, B. E., Valentine, J. C., & Cooper, H. (2002). Effectiveness of mentoring programs for youth: A meta-analytic review. *American Journal of Community Psychology*, 30(2), 157–197.
- Dubois, D. L., & Silverthorn, N. (2005). Characteristics of natural mentoring relationships and adolescent adjustment: Evidence from a national study. *The Journal of Primary Prevention*, 26(2), 69–92.
- Dubow, E. F., & Ullman, D. G. (1989). Assessing social support in elementary school children: The Survey of Children's Social Support. *Journal of Clinical Child Psychology*, 18(1), 52–64.
- Ellikson, P. L., & Bell, R. M. (1990). Drug prevention in junior high: A multi-site longitudinal test. *Science*, 247, 1299–1305.
- Flanagan, D. P., Alfonso, V. C., Primavera, L. H., Povall, L., & Higgins, D. (1996). Convergent validity of the BASC and SSRS: Implications for social skills assessment. *Psychology in the Schools*, 33, 13–23.
- Frecknall, P., & Luks, A. (1992). An evaluation of parental assessment of the Big Brothers/Big Sisters program in New York City. *Adolescence*, 27(107), 715–718.
- Furrano, K., Roaf, P. A., Styles, M. B., & Branch, A. Y. (1993). *Big Brothers Big Sisters: A study of program practices*. Philadelphia: Public/Private Ventures.
- Galbo, J. J. (1986). Adolescents' perceptions of significant adults: Implications for the family, the school, and youth serving agencies. *Children and Youth Services Review*, 8, 37–51.
- Galvin, P. F. (1989). Concept mapping for planning and evaluation of a Big Brother Big Sister Program. *Evaluation and Program Planning*, 12, 53–57.
- Goodman, R. (2001). Psychometric properties of the Strengths and Difficulties Questionnaire. *Journal of the American Academy of Child and Adolescent Psychiatry*, 40(11), 1137–1145.
- Goodman, R., Meltzer, H., & Bailey, V. (1998). The Strengths and Difficulties Questionnaire: A pilot study on the validity of the self-report version. *European Child and Adolescent Psychiatry*, 7(3), 125–130.
- Greenberg, M. T., Domitrovich, C., & Bumbarger, B. (2001). *The prevention of mental disorders in school-age children: Current state of the field. Prevention and Treatment, Vol. 4, Article 1*: American Psychological Association.
- Greenberger, E., & McLaughlin, C. S. (1998). Attachment, coping, and explanatory style in late adolescence. *Journal of Youth and Adolescence*, 27, 121–140.
- Gresham, F. M., & Elliott, S. V. (1990). *Social Skills Rating System*. Circle Pines, Minnesota: American Guidance Service.
- Grossman, J. B., & Rhodes, J. E. (2002). The test of time: Predictors and effects of duration in youth mentoring relationships. *American Journal of Community Psychology*, 30(2), 199–219.
- Hamilton, S. F., & Hamilton, M. A. (1990). *Linking up: Final report on a mentoring program for youth*. Ithaca, NY: Department of Human Development and Family Studies, Cornell University.
- Health Canada (1999). *Health development of children and youth: The role of determinants of health*. Ottawa: Health Canada. Cat. No. H39-501/1999E.
- Herrera, C., Sipe, C., McClanahan, W., Arbreton, A., & Pepper, S. (2000). *Mentoring school-age children: Relationship development in community-based and school-based programs. National Mentoring Partnership's Public Policy Council*. U.S. Department of Education, Office of Educational Research and Improvement.
- Jekielek, S. M., Moore, K. A., Hair, E. C., & Scarupa, H. J. (2002). *Mentoring: A promising strategy for youth development*. Washington, D.C.: Child Trends Research Brief.
- Jenkins, P. H. (1997). School delinquency and the school social bond. *Journal of Research in Crime and Delinquency*, 34(3), 337–367.
- Jo, B. (2002). Statistical power in randomized intervention studies with noncompliance. *Psychological Methods*, 7(2), 178–193.
- Keating, L. M., Tomishima, M. A., Foster, S., & Alessandri, M. (2002). The effects of a mentoring program on at-risk youth. *Adolescence*, 37(148), 717–734.
- Klaw, E. L., Rhodes, J. E., & Fitzgerald, L. F. (2003). Natural mentors in the lives of African-American adolescent mothers: Tracking relationships over time. *Journal of Youth and Adolescence*, 32(3), 223–232.
- La Greca, A. M., & Stone, W. L. (1993). Social Anxiety Scale for Children—revised: Factor structure and concurrent validity. *Journal of Clinical Child Psychology*, 22(1), 17–27.
- Lipman, E. L., Boyle, M. H., Dooley, M. D., & Offord, D. R. (2002). Child well-being in single-mother families. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41(1), 75–82.
- Lipsey, M. W. (1990). *Design sensitivity: Statistical power for experimental research*. Newbury Park: Sage Publications.
- LoSciuto, L., Rajala, A. K., & Taylor, A. S. (1996). An outcome evaluation of Across Ages: An intergenerational mentoring approach to drug prevention. *Journal of Adolescent Research*, 11(1), 116–129.

- McPartland, J. M., & Nettles, S. M. (1991). Using community adults as advocates or mentors for at-risk middle school students: A two-year evaluation of project RAISE. *American Journal of Education*, 99, 568–586.
- Midgley, C., Maehr, M. L., Hicks, L., Urdan, T. U., Roeser, R. W., Anderman, E., et al. (1995). *Patterns of Adaptive Learning Survey (PALS) Manual*. Ann Arbor: University of Michigan.
- Nelson, C., & Vaillant, P. M. (1993). Personality dynamics of adolescent boys where the father is absent. *Perceptual and Motor Skills*, 76, 435–443.
- NLSCY (1998). *National Longitudinal Survey of Children and Youth. User's Handbook. Cycle One*. Human Resources Development Canada : Statistics Canada.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385–401.
- Rae-Grant, N., Thomas, H., Offord, D. R., & Boyle, M. H. (1989). Risk and protective factors and the prevalence of behavioural and emotional disorders in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 28, 262–268.
- Resnick, M. D., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., et al. (1997). Protecting adolescents from harm: Findings from the National Longitudinal Study on Adolescent Health. *Journal of the American Medical Association*, 278(10), 823–832.
- Rhodes, J. E. (2005). A model of youth mentoring. In D. L. DuBois & M. Karcher (Eds.), *Handbook of youth mentoring* (pp. 30–43). Thousand Oaks California: Sage Publications.
- Rhodes, J. E., Gingiss, P. L., & Smith, P. B. (1994). Risk and protective factors for alcohol use among pregnant African–American, Hispanic, and White adolescents: The influence of peers, sexual partners, family members, and mentors. *Addictive Behaviors*, 19(5), 555–564.
- 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(6), 1662–1671.
- Rhodes, J. E., Reddy, R., & Grossman, J. B. (2005). The protective influence of mentoring on adolescents' substance use: Direct and indirect pathways. *Applied Developmental Science*, 9(1), 31–47.
- Rhodes, J. E., Reddy, R., Roffman, J., & Grossman, J. B. (2005). Promoting successful youth mentoring relationships: A preliminary screening questionnaire. *Journal of Primary Prevention*, 26(2), 147–167.
- Ross, D. P., Roberts, P. A., & Scott, K. (1998). Variations in child development outcomes among children living in lone-parent families. *Applied Research Branch Strategic Policy Human Resources Development Canada. Ottawa*. W-98-7E.
- Royse, D. (1998). Mentoring high risk minority youth: Evaluation of the Brothers Project. *Adolescence*, 33(129), 145–158.
- Saintonge, S., Achille, P. A., & Lachance, L. (1998). The influence of Big Brothers on the separation–individuation of adolescents from single-parent families. *Adolescence*, 33(130), 343–353.
- Seidl, F. W. (1982). Big Sisters: An experimental evaluation. *Adolescence*, 27(65), 117–129.
- Shoemaker, A. L. (1980). Construct validity of area-specific self-esteem: The HARE self-esteem scale. *Educational and Psychological Measurement*, 40, 495–501.
- Shulman, S. (1993). Close relationships and coping behavior in adolescence. *Journal of Adolescence*, 16, 267–283.
- Soucy, N., & LaRose, S. (2000). Attachment and control in family and mentoring contexts as determinants of adolescent adjustment at university. *Journal of Family Psychology*, 14, 125–143.
- Stanger, C., & Lewis, M. (1993). Agreement among parents, teachers, and children on internalizing and externalizing behavior problems. *Journal of Clinical Child Psychology*, 22(1), 107–115.
- Stocks, B.C. (1980). Father-absence in boys with Big Brothers: Problem versus remedy. Unpublished Masters Thesis. University of Windsor.
- Thompson, L. A., & Kelly-Vance, L. (2001). The impact of mentoring on academic achievement of at-risk youth. *Children and Youth Services Review*, 23(3), 227–242.
- Tierney, J. P., Grossman, J. B., & Resch, N. L. (1995). *Making a difference: An impact study of Big Brothers/Big Sisters*. Philadelphia, PA: Public/Private Ventures.
- Turner, S., & Scherman, A. (1996). Big Brothers: Impact on Little Brothers' self-concepts and behaviours. *Adolescence*, 31(124), 875–882.
- Weissman, M. M., Orvaschel, H., & Padian, N. (1980). Children's symptom and social functioning self-report scales: Comparison of mother's and children's reports. *The Journal of Nervous and Mental Disease*, 168(12), 736–740.
- Werner, E. E., & Smith, R. (1992). *Overcoming the odds: High risk children from birth to adulthood*. Ithaca, New York: Cornell University Press.
- Wills, T. A., Vaccaro, E., & McNamara, G. (1992). The role of life events, family support, and competence in adolescent substance use: A test of vulnerability and protective factors. *American Journal of Community Psychology*, 20(3), 349–374.
- Zimmerman, M. A., Bingenheimer, J. B., & Notaro, P. C. (2002). Natural mentors and adolescent resiliency: A study with urban youth. *American Journal of Community Psychology*, 30(2), 221–243.