This article examines the hypothesis that academic mentoring of college students improves perceived parental and teacher educational involvement. College students were randomly assigned to a 1-year academic mentoring program (protégés, n = 150) or a control group (n = 167) and completed questionnaires before, during, and after the intervention. Protégés perceived greater levels of parent and teacher educational involvement than did participants from the control group. However, the impact of the mentoring program on perceived parental involvement was found only among students who reported a secure relationship with their parents. Additional analyses suggest that some of these improvements were related to quality of the working alliance between mentors and protégés and to supportive behaviors exhibited by mentors during the intervention.

Formal mentoring (i.e., when a mentor is assigned to a young person through a structured mentoring program) is a preventive intervention that has become increasingly popular in contemporary school and community settings. Many studies suggest that this type of intervention improves the social, emotional, and vocational development of youth. For instance, it has been shown that adolescents and young adults who have participated in formal mentoring report higher levels of self-worth and social skills (Karcher, 2005), lower levels of aggressive behaviors and academic difficulties (Jackson, 2002), and greater development of professional skills and behaviors (Koch & Johnson, 2000; Schlosser, Knox, Moscovitz, & Hill, 2003) when compared to their nonmentored peers. While effect sizes are viewed as being relatively modest (Blinn-Pike, 2007; DuBois, Holloway, Valentine, & Cooper, 2002; Eby, Durley, Evans, & Ragins, 2008), formal mentoring is nevertheless considered by many practitioners as an intervention whose benefits for youth outweigh implementation and operating costs (Yates, 2005).

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One of the hypotheses on the benefits of mentoring presented in the literature pertains to the improvement of protégés’ relationships with their parents and other significant adults in their social networks (Keller, 2005; Rhodes, 2005). It has been suggested that mentoring can challenge negative views that protégés may hold of adults in general, increase their opportunities for positive contact with other members of the community, and reduce their parents’ stress and daily obligations (Jent & Niec, 2006; Rhodes, 2002). To date, very few studies have tested this hypothesis experimentally, and fewer still have addressed it in the context of academic mentoring among college students.

Mentoring programs aimed at college students are often instrumental in nature and geared toward vocational and academic goals, with relationships between parents and program practitioners (e.g., mentors and supervisors) rarely being the subject of investigation. This could have a limiting effect on the benefits of mentoring programs for the parent–adolescent relationship, while increasing those associated with the teacher–adolescent relationship. In addition, college students have reached a developmental phase characterized by a reduced need to seek out parental support, but at the same time they experience an improvement of their maternal relations (Levitt, Silver, & Santos, 2007). These factors could also affect the benefits of formal mentoring for these relationships.

Another gap identified in the mentoring literature is the lack of data on the intervention mechanisms believed to account for the effects of formal mentoring on the social relationships of adolescents. Some studies have identified protégés’ factors as the source of these effects (e.g., increase in social skills and emotional well-being), others have identified the parents’ factors (e.g., reduced level of parental stress), but to our knowledge, no empirical studies have examined the contribution of mentors’ behaviors. As Keller (2005) pointed out, through their actions with adolescents, mentors can, in various ways, influence the parent–adolescent and teacher–adolescent relationships. The mechanism through which this occurs requires investigation.

In this perspective, the first goal of our study is to test the hypothesis of a causal link between late adolescents’ participation in a structured peer mentoring program during their first year of college and their perceptions of parent and teacher educational involvement. The second goal is to explore the role of interpersonal mentor behaviors and quality of the mentor–protégé relationship on protégé perceptions of parent and teacher involvement. These goals were pursued in the context of the evaluation of the MIRES program (translated from French as “Mentoring to increase the integration and success of science students”), which aims at encouraging students to persevere in postsecondary mathematics, science, and technology (MST) programs of study.
How Do Mentoring Relationships Influence Youth Social Development?

Many theoretical models are based on the hypothesis of a link between mentoring and improved relationships with parents and teachers. The youth mentoring model (Rhodes, 2002), for example—which was developed for youth mentoring contexts—suggests that mentoring relationships built on reciprocity, trust, and empathy promote the development of protégés by increasing their social skills and emotional well-being, fostering their cognitive skills through active listening and feedback from the mentor, and exposing them to a positive role model with whom they can identify. This theoretical model also suggests that these developmental gains gradually change the relational dynamics between protégés and the important people in their lives (e.g., parents, teachers) and that these changes account for the effects of mentoring on the subsequent academic and social adjustment of protégés.

The systemic model of youth mentoring (Keller, 2005) also supports the aforementioned hypothesis. Inspired by the basic concepts of general systems theory, this model posits that mentor–protégé relationships must be understood within the larger context of all possible relationships, including those among mentors, protégés, parents, and supervisors. It stipulates that these relationships are interconnected and that the activities, discussions, and emotions experienced during the mentoring experience both influence and are influenced by the protégé’s other relationships. The model also suggests that the actions of mentors can indirectly influence parent–adolescent and teacher–adolescent relationships by having a direct impact on mentored teens themselves. When interacting with their protégés, mentors can validate and reinforce the rules, values, and viewpoints of parents and teachers and provide them with autonomy support, which, in turn, can help them better manage their relationship with authority figures or simply brighten their lives, generating positive feelings that can be transposed to other relationships. This model, therefore, supports the hypothesis of a link between sound mentoring practices and the quality of relationships with parents and teachers.

The mentoring sociomotivational model, proposed by Larose and Tarabulsy (2005) and inspired by self-determination theory (Deci & Ryan, 1985), is another conceptual framework that supports the hypothesis of a link between mentor behaviors and youth social development. Unlike the two previous models, however, it places additional importance on mentor behaviors and their description. According to this model, four sets of mentor behaviors are critical for improving youth’s social development: structure, involvement, autonomy support, and competence support. A mentor who establishes clear guidelines in terms of mentoring objectives, activities, and
functioning (structure); who openly and respectfully discusses personal, academic, and career issues with the protégé (involvement); who accepts and validates the protégé’s personal choices without exercising any control or pressure (autonomy support); and who is able to increase the protégé’s feelings of competence following negative experiences (competence support) should develop a more productive working alliance with the protégé. This resulting positive working alliance is believed to foster the protégé’s feelings of competence, relatedness, autonomy, and support. The model posits that in this specific mentoring context, protégés have a greater chance of developing positive relationships with people in their lives and improving their level of adaptation to new environments (Larose & Tarabulsy, 2005). As such, the model provides a framework for identifying the dimensions of mentoring (i.e., mentor behaviors and working alliance) likely to influence the development of positive relations between protégés and other adults.

Despite their heuristic value, the ideas put forward in these models have never been systematically tested in the literature. The few studies that have specifically addressed the impact of formal mentoring on protégé relationships with their parents and teachers have been conducted in different settings (e.g., community, school), with children of different ages (e.g., childhood, early adolescence, late adolescence), among groups presenting highly varied risk levels and in contexts involving different kinds of mentors (e.g., adults, college students, paraprofessionals). Caution should be used, therefore, when considering the contribution of this research to the objectives being tested presently.

While empirically testing the youth mentoring model, Rhodes, Grossman, and Resch (2000) found that the quality of relationships with parents mediated the impact of formal mentoring on protégé’s global self-worth, school value, and grades. This study included 959 young adolescents who applied to the Big Brothers/Big Sisters community-match programs and used a randomized control trial design. Rhodes and colleagues suggested that this mediating effect may have been the result of a gradual change in protégé’s representation models of relationships with parents, or a decrease in the tension experienced between adolescents and their parents.

In a subsequent study using the same sample and design (Rhodes, Reddy, & Grossman, 2005), the authors showed that protégé participation in long-term (i.e., more than 12 months) relationships positively influenced the affective bond with parents, which, in turn, improved protégé peer relationships. However, these effects were not found to be significant among youth who were engaged in short-term mentoring relationships (i.e., less than 12 months). The authors suggested that short-term mentoring does not provide sufficient opportunity for the development of secure and productive relationships and the transfer of these benefits to other relationships. Additional, less
recent studies conducted among young adolescents participating in the “Across the Ages” program also showed similar results (for a review, see Blinn-Pike, 2007).

A study by Jent and Niec (2006) conducted among 60 children between the ages of 8 and 12 years experiencing mental health problems demonstrated that participation in a structured mentoring program linked to a community mental health center and featuring, for the most part, college students as mentors was associated with improved family functioning. The mothers of protégés perceived less family stress and greater social support than did the mothers of youth on a waiting list, while protégés reported more secure attachment to their parents than did youth on the same waiting list. Additionally, this study indicated a decrease of youth externalized behavioral problems after mentoring that was mediated by lower levels of parental stress. The presence of a mentor was believed to reduce parental burden and improve the quality of parent–child interaction, thus reducing parental stress (Jent & Niec, 2006).

A third study conducted among young Latinos considered at risk by professionals, indicated that parental involvement in their children’s mentoring process had positive effects on the support provided by parents to their children and on the quality of parent–child communication (Barron-McKeagney, Woody, & D’Souza, 2002). This study involved the participation of 49 children and their families who took part in the Family Mentoring Program. It was conducted using a pretest–posttest design without a comparison group. The difference between this study and the two previously described studies, however, is that the former involved a clear parental intervention component, the suggestion being that changes in parental involvement were attributable to this aspect of the intervention.

Finally, few other studies have not found any significant links between youth participation in formal mentoring and the quality of the parent–child relationship (Herrera, Grossman, Kauh, Feldman, & McMaken, 2007; Schmidt, McVaugh, & Jacobi, 2007). However, these studies addressed mentoring programs taking place within an educational setting, rather than in the community, which could explain the lack of impact of the intervention on protégé–parent relationships.

Recent reviews on the outcomes of formal mentoring for youth and college students do not include any experimental studies pertaining to the objective of assessing the impact of mentoring on student–teacher relationships (Blinn-Pike, 2007; Johnson, 2007). The closest any of these studies have come to addressing these relationships are those that have addressed the issue of school bonding. The concept of school bonding, however, does not directly and solely apply to adolescent–teacher dynamics. Yet, research on academic mentoring and college adjustment suggests that the development of
a positive relationship with teachers constitutes one of the significant determinants of student adaptation (Campbell, 2007; Johnson, 2007).

The mentoring experience may lead protégés to better understand their teachers’ expectations, initiate more requests for support from them, and spend more time with them outside classroom hours on academic issues. Moreover, teachers who know that a student is accompanied by a mentor may, like parents, show more interest in that student and build a more personalized relationship with him or her. Such mechanisms may explain how the mentoring experience may subsequently affect protégés’ perceptions of their teachers’ academic involvement.

In summary, while many theoretical proposals support the hypothesis of a causal link between the formal mentoring experience and the quality of relationships between youth and their parents and teachers, empirical data remain fragmented and inconsistent. Furthermore, since the studies on this issue have been conducted mainly among young children participating in community-based mentoring programs, it is difficult to generalize these assumptions to late adolescents involved in academic mentoring programs. Finally, the intervention mechanisms explaining this causal link—particularly those related to mentor behaviors—remain widely misunderstood.

The Present Study

There are three aspects that distinguish the current study from previous research. First, given that research suggests a positive link between parent and teacher involvement and the academic persistence and adjustment of college students (Lamport, 1993; Ratelle, Larose, Guay, & Senécal, 2005; Strage & Brandt, 1999), perceived educational involvement was selected as the dependent variable. Moreover, while the role played by parental involvement in supporting the academic adjustment and success of late adolescents is recognized by practitioners at the college level, fostering this involvement remains a major challenge. Encouraging it through mentoring may, therefore, constitute a viable intervention option.

Second, by way of a randomized control trial, we tested the hypothesis of a causal link between formal mentoring and perceived educational involvement in a post-secondary academic mentoring context involving young adult peers as mentors. Similar links have been shown in community-mentoring contexts with adult mentors and younger children as protégés, but not with late adolescents involved in mentoring programs where mentors are young adults. The transition to college has often been recognized as a difficult period for a significant number of late adolescents, where a number of academic, social, emotional, and vocational issues must be addressed.
(Larose & Boivin, 1998; Margaretha, 1997). Within this specific context, mentoring by young adults may prove to be helpful for late adolescents who are engaged in this transition, thereby helping parents in their support of their children. Late adolescent participation in a mentoring program during the first year of college can also make parents aware of the importance of academic follow-up during postsecondary education. Various studies have shown that the support and involvement of parents remain important determinants of student adjustment, career decision, success, and perseverance during college studies (Brooks, 2004; Ratelle et al., 2005; Soucy & Larose, 2000). Knowing that their child has the support of a mentor may motivate parents to ask more questions about their children’s college experiences and engage more fully in a supportive relationship with them. In the current study, the hypothesis that mentoring increases parental academic involvement will be investigated.

Finally, we will attempt to identify features of the mentoring relationship that may lead to a more positive perception of parental and teacher involvement. Based mainly on the mentoring sociomotivational model (Larose & Tarabulsy, 2005), but also on other relevant models (Keller, 2005; Rhodes, 2002), we will examine the respective contributions of four mentor interpersonal skills (i.e., being sensitive to the distress and problems of their protégés, providing useful feedback and information, bolstering their social and academic competence, and supporting their autonomy) and three dimensions of the quality of the working alliance (i.e., quality of the bond, agreement on the goals, and agreement on the tasks). As underlined by Keller, we believe that by examining these factors in an experimental context, we will gain greater insight into the mechanisms that link youth exposure to mentoring and the improvement of relationships with parents and other important people in their lives.

Method

Participants and Procedure

The target sample for this study included all students newly admitted into science and technology programs in Fall 2006 at two colleges in the Québec City area. These students were all given the opportunity to register in the MIRES program. The objective of this mentoring program, which is offered during the first year of college, is to help protégés fulfill academic requirements, consolidate their academic and career choices, and persevere in the field of science and technology (the program description will follow).

The majority of students admitted into science and technology programs in Fall 2006 ($n = 659$) received a telephone call from our research assistants.
The assistants congratulated them for being admitted into an MST program and informed them of the existence of the MIRES program and their eligibility to receive formal mentoring. After a brief presentation of the program and evaluation process, the students were asked if they would be interested in eventually participating in the mentoring program. They were also told that the program would only accommodate 150 students for the current year and that if the number of volunteers exceeded 150, program participants would be selected at random. There were 307 students who expressed an interest in the mentoring program. Of that number, 150 were randomly assigned to the program (experimental group), while 157 were assigned to a control group (i.e., the regular academic path followed by first-year college students).

Of the 307 participants (163 females, 144 males), 80% were enrolled in natural science programs; 12% were enrolled in a science, art, and literature program; and 8% were enrolled in a computer science program. Participants’ mean age was 16.7 years. Mean high school grade—based on percentage scores obtained in six different school subjects in Grades 11 and 12—was 85% ($SD = 5.6$). A little over half of the students were working part-time while studying (56%). Participants’ mothers had a mean annual income between $20,000 and $39,000, while their fathers earned between $45,000 and $55,000. The majority of fathers (82%) and mothers (78%) of participants had a postsecondary education. Almost all participants were born in Québec (93%) and spoke French at home (98%). The vast majority of the participants (98%) had never been exposed to mentoring before.

All participants (experimental and control) completed a questionnaire on parental attachment (see Measures section) and sociodemographic questions prior to the beginning of the school year (August 2006). These participants also completed a parent and teacher academic involvement measure at the end of the second college semester (April 2007), which coincided with the end of the formal mentoring intervention. In addition, youth in the experimental group completed two questionnaires on perceived mentor behavior and the quality of the mentoring relationship. These questionnaires were completed four times during the intervention (October and December 2006; February and April 2007).

The MIRES Program

Mentors for the MIRES program were recruited from the science and engineering programs of Laval University, the major university in the Québec City area. After a selection interview, mentors were assigned 5 students whom they were to meet during the full academic year. In 2006, the program recruited 30 mentors: 53% were women, 57% were undergraduate students,
43% were graduate students (master’s and Ph.D.), and 30% were students who had previously studied teaching. Mentors came from various university disciplines, such as computer science, physics, biology, microbiology, and engineering. Their mean age was 24 years.

Mentors received a 2-day training seminar (see Drouin et al., 2008). Training focused on the problems generally encountered by young people making the transition from high school to college, about university science programs, and about best individual practices in mentoring. Furthermore, specifically designed video segments, discussions of cases, and group discussions were aimed at training mentors to address the four sociomotivational skills highlighted by the mentoring sociomotivational model (Larose & Tarabulsy, 2005). Mentor training continued throughout the intervention through monthly individual and group meetings with supervisors. These meetings allowed mentors to discuss personal issues and to share tips and expertise.

The MIRES program is comprised of 16 hr of formal meetings between mentor and protégé—one every 2 weeks—throughout the academic year. During these meetings, mentors work with their protégés to help them explore science and technology programs, ask for help with their schoolwork and exams from teachers when needed, clarify their academic interests and aspirations, and broaden their scientific literacy through visits to research centers and occupational settings in the Québec City area (mentors and their protégés participate in three 2-hr educational visits to occupational settings, research centers, or both).

**Measures**

Youth perceptions of parental and teacher involvement were measured at the end of the intervention using parent and teacher versions of the Measure of Involvement in Youth Scientific Education (MIYSE; Harvey & Larose, 2008). Each version of the MIYSE contains 19 items that are rated on a 5-point Likert-type scale ranging from 1 (never) to 5 (always). In addition, each version features four subscales: Support of Competency (3 items; e.g., “This person believed that I was competent in science”), Autonomy Support (3 items; e.g., “This person considered my thoughts and feelings with an open mind, even if they were different from his/her own”), Involvement (7 items; e.g., “This person was there when I needed help with my homework and school assignments”), and Negative Pressure (6 items; e.g., “This person put pressure on me to choose and stay in science”).

The MIYSE’s theoretical foundation is based on the sociomotivational model of self-determination (Connell & Wellborn, 1991), and the measures
have sound psychometric characteristics. An exploratory factor analysis conducted in a different sample and on the parental scales 19 items extracted four factors, with the correlations among these factors varying from -0.12 to 0.53 (Harvey & Larose, 2008). MIYSE total score was associated with accepted and validated indicators of academic motivation, feelings of science competence, and institutional attachment to college, thus supporting the construct validity of the measure (Harvey & Larose, 2008). In the interest of parsimony and given the very similar correlation profiles between each of the MIYSE subscales and the predictive variables of the current study, only the total scores for parents (Cronbach’s $\alpha = .81$) and teachers ($\alpha = .85$) were used.

To ensure that the involvement perceived by youth at the end of the intervention was unrelated to the overall affective quality of interaction with parents, we administered the parental version of the Inventory of Parent and Peer Attachment (IPPA; Armsden & Greenberg, 1987) to all participants prior to the mentoring intervention. This 25-item questionnaire evaluates the degree of mutual trust (10 items), quality of communication (9 items), and prevalence of anger and alienation toward mothers and fathers (6 items). Reliability and construct validity of the IPPA are well established (Armsden & Greenberg, 1987). High test–retest reliability has been reported ($r = .93$) for a 3-week period (Armsden & Greenberg, 1987, as cited in De Jong, 1992).

Items were rated on a 5-point scale ranging from 1 (*never true or almost never true*) to 5 (*always true or almost always true*). A global score of parental attachment was obtained by adding the raw scores on the Trust and Communication scales and then subtracting the raw scores on the Alienation scale, as recommended by Armsden and Greenberg (1987). In the present study, the internal consistency values of the mother–adolescent and father–adolescent scores were .92 and .93, respectively. For the purpose of the study and given the strong correlations noted between the mother and father scores ($r = .71$), we averaged these two scores in subsequent analyses.

During the intervention, mentor behaviors were measured using four subscales from the Academic Mentoring Behavior Scale (AMBS; Soucy & Larose, 2004). These subscales were completed on four occasions by protégés (October, December, February, and April) and were rated on a 5-point scale. They were used to measure mentor sensitivity to distress and problems expressed by protégés (3 items; e.g., “My mentor listens carefully when I talk about my needs, concerns, and successes”), structure provided during the meetings (3 items; e.g., “My mentor gives me useful advice when I tell him or her about my needs, concerns, and difficulties”), support of competence (3 items; e.g., “My mentor values me, especially after I experience difficult experiences and failure”), and autonomy support (3 items; e.g., “My mentor encourages me to make my own decisions”).
The theoretical foundations of the AMBS (Soucy & Larose, 2004) are based on the mentoring sociomotivational model (Larose & Tarabulsy, 2005). A factor analysis conducted on the data of the current study indicates a clear factor structure that corresponds to the four subscales. Moderate correlations were found between the four subscales. These metric qualities were confirmed during each of the four measurement times. In addition, the sensitivity, structure, support of competence, and autonomy support evaluated in October 2006 predicted the perceived usefulness of mentoring and the relationship quality at the end of the intervention. Given the relatively high correlation among the four measurement times (mean Pearson $r = .54$), we used the average repeated scores for each of the behavior scales in subsequent analyses.

The quality of the mentoring relationship was measured on four occasions during the intervention using the Short Version of the Working Alliance Inventory (S-WAI; Horvath & Greenberg, 1986; Tracey & Kokotovic, 1989). The S-WAI is a 12-item questionnaire answered by protégés to evaluate three dimensions of the relationship: (a) agreement on the goals pursued in the relationship (Goal); (b) agreement on tasks to be accomplished to achieve these goals (Task); and (c) the development of a personal bond between mentors and protégés (Bond). The construct validity of this version has been established by confirmatory factor analysis (Tracey & Kokotovic, 1989). A bi-level factor structure—with a primary General Alliance factor and three secondary specific factors (i.e., Goal, Task, and Bond)—was found as the model that best fit the data for both clients and therapists.

In Tracey and Kokotovic’s (1989) study, Cronbach’s alphas for the Goal, Task, and Bond subscales were .90, .92, and .90, respectively, for clients; and .83, .91, and .88, respectively, for therapists. In the present study, adequate reliability coefficients were found at each measurement time (October: $\alpha$s for Goal, Task, and Bond were .67, .87, and .88, respectively; December: $\alpha$s = .70, .82, and .82; February: $\alpha$s = .60, .78, and .89; April: $\alpha$s = .67, .88, and .88). Given the relatively high correlation among the four measurement times (mean Pearson $r = .57$), we used the average repeated scores for each of the mentoring alliance scales in subsequent analyses.

Results

Preliminary Analyses

First, given that mentors in the MIRES program were assigned 5 students each, which may potentially affect the assumption of independence among cases, we computed intraclass correlations (ICCs) on the two dependent
variables, as well as on the working alliance and AMBS scores. As proposed by Kashy and Kenny (2000), we conducted a one-way random effect ANOVA on each variable using mentors as the classification variable, and then calculated the ICC. The ICCs were .001 and .087, respectively, for the perceived parental and teacher involvement scores, and varied from .001 to .192 for the working alliance and AMBS scores ($M = .081, SD = .071$). Only two ICCs estimated out of nine possibilities were found to be greater than .10 (i.e., Agreement on Goals, Mentor Sensitivity). This suggests small between-mentor variations on protégés’ data. Moreover, the two variables for which an ICC was greater than .10 are variables that were not found to play a determinant role in predicting parental and teacher involvement (see regression findings in the section titled “Links Among Mentor Behavior, Quality of the Mentoring Relationship, and Perceived Academic Involvement”).

Second, we verified whether participant characteristics varied based on whether they belonged to the MIRES group or control group. Student $t$ tests and chi-square tests indicate that the two groups did not vary in terms of sociodemographic and academic profiles (e.g., program, gender, high school average, parent income, parent postsecondary education). The $t$ values varied from $-0.25$ to $-1.39$ ($p > .05$), while the chi-square values varied from $0.17$ to $3.57$ ($p > .05$).

Finally, we examined whether groups varied in their reference to other support measures offered by colleges (i.e., other than the MIRES program). We asked five questions at the end of the first and second semesters. These questions allowed us to pinpoint the proportion of participants who received or did not receive special one-on-one support from five possible sources: a learning center, a teacher, an individual academic advisor, a vocational counselor, or a psychologist. Analyses using the chi-square test indicate that the proportion of students registered in the MIRES program who received support in college outside the scope of the program was similar to the proportion of students from the control group. This was the case both in the first semester ($\chi^2$ values varied from 0.001 to 1.81, $p > .05$) and the second semester ($\chi^2$ values varied from 0.02 to 1.71, $p > .05$) when this possible confound was addressed.

**Impact of Mentoring on Parent and Teacher Academic Involvement**

In order to evaluate the impact of mentoring on student perceptions of parent and teacher academic involvement, we conducted multiple linear regressions. Each regression included perceived involvement as the dependent variable and group variable (control vs. MIRES program) as the main independent variable. The regression model featured three steps. The
parental attachment score was entered first to ensure that the differences between experimental group and control group participants in perceived involvement after the intervention were not skewed by the initial difference in the quality of attachment relationships with parents. Then, we entered the group variable (1 = control group, 2 = MIRES group), which allowed us to establish whether exposure to mentoring led to a more positive perception of parent and teacher involvement. Finally, the Attachment × Group interaction scores were added to explore whether exposure to mentoring had a different influence on perceived involvement, based on the quality of the parent–child attachment. For each regression analysis, we presented descriptive data drawn from each of the steps, rather than from the final model.

Table 1 summarizes the results of the regression analysis conducted on perceived parental involvement. The total model before interaction terms were included was significant and accounted for 15% of the variance in perceived parental involvement, $F(2, 265) = 21.81, p < .001$. First, perceived security in the attachment relationship with parents predicted parental academic involvement as reported by youth ($β = .35, p < .01$). More positive perceptions of attachment predicted greater parental involvement. Second, above and beyond perceived attachment, having been exposed to the mentoring program was associated with a more positive perception of parental involvement ($β = .16, p < .01$). However, this link was moderated by perceived attachment, as indicated by the significant interaction effect.

In order to better understand this interaction effect, we first dichotomized the parental attachment score (from the median) and conducted two regression analyses, the first with participants who perceived higher attachment security (above the median), and the second with participants who perceived

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**Table 1**

*Hierarchical Regression Predicting Protégés’ Perceptions of Parental School Involvement*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$B$</th>
<th>$SE\ B$</th>
<th>$β$</th>
<th>$R^2$</th>
<th>$ΔR^2$</th>
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<td>0.35***</td>
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<td></td>
<td></td>
<td>.15</td>
<td>.03***</td>
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<td>0.23</td>
<td>0.16***</td>
<td>.17</td>
<td>.02**</td>
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<tr>
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<td>1.25</td>
<td>0.68</td>
<td>1.08*</td>
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</tbody>
</table>

*$p < .05$. **$p < .01$. ***$p < .001$.*
For each regression, we examined the link between exposure to mentoring (Group) and perceived parental involvement. Exposure to mentoring was associated with perceived parental involvement among participants who initially reported higher attachment security to their parents ($\beta = .26, p < .005$), but this association was not found among participants who reported lower attachment security ($\beta = .13, p = .12$). This interaction effect is illustrated in Figure 1. It suggests that low security in parent–adolescent relationships limits the potential of mentoring to promote parental involvement in their children’s science education.

Table 2 summarizes the outcome of the regression analysis conducted on perceived teacher involvement. The total model before interaction terms were included accounted for 4% of the variance in perceived teacher involvement, $F(2, 265) = 5.93, p < .005$. Perceived security in the attachment relationship with parents predicted teacher academic involvement as reported by students ($\beta = .15, p < .01$). More positive perceptions of attachment predicted greater teacher involvement. Beyond perceived attachment security, exposure to the mentoring program was associated with more positive perceptions of teacher involvement ($\beta = .15, p < .01$). Unlike the finding noted for parental involvement, this link was not moderated by attachment security.

Links Among Mentor Behavior, Quality of the Mentoring Relationship, and Perceived Academic Involvement

The second goal of the current study deals with the links among mentor behavior, quality of the mentor–protégé relationship, and the involvement
perceived by protégés. Table 3 presents the correlations among these variables for the experimental group. The majority of correlations were found to be significant. Sensitivity, autonomy support, support of competence, and quality of the mentor–protégé bond were associated with a positive
perception of parental and teacher involvement. Structure and agreement on the tasks and goals of mentoring were also associated with perceived teacher involvement.

In order to better identify these links, we applied the same multiple regression analytic strategy as in the previous section. We first entered the attachment score to determine whether the mentoring variables were linked to involvement beyond perceived parental attachment. A second step involved entering the four mentor behavior scores, and a third step included inputting the three mentoring working alliance scores. This sequential logic follows the predictions of the mentoring sociomotivational model (Larose & Tarabulsy, 2005). In fact, this model suggests that the adoption of certain behaviors by mentors precedes the development of a productive mentor–protégé working alliance. A final step involved examining the interaction effects between all behaviors and relationship indicators and perceived parental attachment.

Table 4 summarizes the results of the regression analysis performed on perceived parental involvement. The total model before interaction terms were included accounted for 28% of the variance in perceived involvement, $F(8, 121) = 5.43, p < .001$. The contribution of both mentor behaviors and working alliance indicators to predicting parental involvement was 8%. Mentor behaviors were found to partially explain this variance beyond what was previously accounted for by parental attachment. An examination of the beta scores indicates that mentor autonomy support was the only variable to predict parental involvement ($b = .19, p < .05$). The greater the autonomy support perceived by protégés, the more they reported parental involvement in their science education. Beyond mentor behaviors and initial attachment, working alliance indicators did not have any significant impact. Finally, no interaction effect was noted, suggesting that the autonomy support effect on perceived involvement did not vary based on the level of attachment security to parents. It should be noted that the effects of the interaction terms were also assessed through seven different regressions (by way of countering the potential influence of multicollinearity), and the findings remained identical.

Table 5 presents the findings of the regression analysis performed on perceived teacher involvement. The total model before interaction terms were included accounted for 20% of the variance in perceived involvement, $F(8, 121) = 3.50, p < .001$. Beyond perceived attachment, mentor behaviors and the quality of the working alliance made unique contributions to predicting perceived teacher involvement. An examination of the beta scores indicates that autonomy support ($b = .19, p < .05$) and agreement on the tasks of mentoring ($b = .48, p < .01$) predicted teacher involvement. Autonomy support and clear agreement on the tasks and projects to be carried out led
protégés to perceive greater teacher involvement. No significant interaction effect was found (also confirmed through separate regression analyses), suggesting that these links were not moderated by protégés’ perceived attachment. It should also be noted that the combined contribution of mentor behaviors and working alliance indicators to predicting teacher involvement was 2 times greater (19%) than the contribution found in parental involvement. In other words, the mentoring indicators measured in the present study appear to have a greater influence on teacher involvement than on parental involvement.

Table 4

*Hierarchical Regression Analysis Predicting Parental School Involvement From Mentoring Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>ΔR²</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.44***</td>
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<td>.07*</td>
</tr>
<tr>
<td>Feedback and structure</td>
<td>0.49</td>
<td>0.77</td>
<td>0.09</td>
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<td></td>
</tr>
<tr>
<td>Autonomy support</td>
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</tr>
<tr>
<td>Competence support</td>
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<td></td>
</tr>
<tr>
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<td>-0.17</td>
<td>.28</td>
<td>.01</td>
</tr>
<tr>
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<td>0.49</td>
<td>0.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bond</td>
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<td>0.42</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attachment × Sensitivity</td>
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<td>2.65</td>
<td>-1.20</td>
<td>.31</td>
<td>.03</td>
</tr>
<tr>
<td>Attachment × Feedback</td>
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<tr>
<td>Attachment × Competence</td>
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<td>1.80</td>
<td>1.80</td>
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<tr>
<td>Attachment × Goal</td>
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<td>1.37</td>
<td>2.60</td>
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<tr>
<td>Attachment × Task</td>
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<td>-0.35</td>
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<td></td>
</tr>
<tr>
<td>Attachment × Bond</td>
<td>-1.97</td>
<td>1.69</td>
<td>-3.19</td>
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</tr>
</tbody>
</table>

*p < .05. ***p < .001.
The findings of the present study indicate that academic mentoring—featuring university students as mentors and newly enrolled college students as protégés—generated positive outcomes for parental and teacher academic involvement. These findings corroborate previous data observed in the community-mentoring context where mentors are adults and protégés are children (Barron-McKeagney et al., 2002; Jent & Niec, 2006; Rhodes et al., 2005). They also support the premise of certain theoretical models suggesting that improvement in relationships with adults other than the mentor is one

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
<th>R²</th>
<th>ΔR²</th>
</tr>
</thead>
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<tr>
<td>Feedback and structure</td>
<td>0.24</td>
<td>1.09</td>
<td>0.03</td>
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<td>.11**</td>
</tr>
<tr>
<td>Autonomy support</td>
<td>0.74</td>
<td>0.37</td>
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</tr>
<tr>
<td>Competence support</td>
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<td>0.13</td>
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<td>1.75</td>
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<td>0.48**</td>
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<tr>
<td>Bond</td>
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<td>0.58</td>
<td>0.04</td>
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<td>.08**</td>
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<tr>
<td>Attachment × Sensitivity</td>
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<td>3.67</td>
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<tr>
<td>Attachment × Feedback</td>
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<td>Attachment × Autonomy</td>
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<td>Attachment × Competence</td>
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<tr>
<td>Attachment × Bond</td>
<td>−2.38</td>
<td>2.34</td>
<td>−2.96</td>
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</table>

*p < .05. **p < .01.

Discussion

The findings of the present study indicate that academic mentoring—featuring university students as mentors and newly enrolled college students as protégés—generated positive outcomes for parental and teacher academic involvement. These findings corroborate previous data observed in the community-mentoring context where mentors are adults and protégés are children (Barron-McKeagney et al., 2002; Jent & Niec, 2006; Rhodes et al., 2005). They also support the premise of certain theoretical models suggesting that improvement in relationships with adults other than the mentor is one
of the significant benefits of mentoring, contributing to youth psychosocial adjustment (Keller, 2005; Larose & Tarabulsy, 2005; Rhodes, 2002).

To capture the underlying mechanisms at work in this context, it is important to keep in mind that the present study measured parental and teacher involvement based on young people’s perceptions. It is possible, therefore, that the mentoring program modified youth perceptions without necessarily involving greater involvement on the part of parents and teachers. Some may say that it is such perceptions that must change, since they are at the core of young people’s adjustment (Silvers, 2007). However, if youth perceptions are a reflection of actual involvement by parents and teachers, it becomes pertinent to speculate about the processes by which mentoring might lead to these changes.

First, as suggested in the mentoring sociomotivational model (Larose & Tarabulsy, 2005), it is possible that the MIRES program helped protégés to increase their academic motivation and feelings of competence and belonging over the course of the mentoring intervention. Such changes may have been perceived in a positive light by parents and teachers, who subsequently showed greater interest and involvement in their relationships with protégés. In other words, parents and teachers may have displayed better attitudes and more supportive behaviors after noting the positive changes in protégés. A more direct mechanism may also have played a role in this respect. With their higher level of academic involvement and confidence in their choice of an MST field, protégés may have been more likely to initiate interactions with parents and teachers regarding academic and vocational issues.

Second, in keeping with the premises of the systemic model of youth mentoring (Keller, 2005), participation in mentoring may have been a topic of discussion and exchange with parents and science teachers. This may have had a direct, positive impact on the supportive relationship. Parents who progressively learn about their children’s mentoring experience may have became more aware of the importance of following up on their children’s academic progress during postsecondary education. In the same way, talking about the MIRES experience to teachers may have personalized the student–teacher relationship, increased teachers’ interest to the mentored students, and facilitated the student help-seeking process in times of need.

An interesting finding of the present study is that exposure to formal mentoring positively influenced parental involvement, but only when the attachment relationship was perceived as more secure. This result corroborates findings from a correlational study (Soucy & Larose, 2000), which showed that perceived security in mentoring helped to predict protégés’ adjustment to college, but only among those who initially perceived a secure parent–child attachment. This suggests that the benefits of academic mentoring on parental involvement are not the same from one young
person to the next. Young people from secure family environments, therefore, seem to experience greater involvement by parents in their academic pursuits following their exposure to formal mentoring. This finding raises concerns regarding the impact of mentoring among young people from more insecure family environments and who may be at greater risk for academic problems. These young people may require more intensive types of intervention than the currently studied mentoring program. An alternative explanation for this interaction effect may be, however, that protégés with secure relationships with their parents have a foundation for transposing these benefits to the academic domain. Based on this second interpretation, secure attachment is a factor that could influence young people’s interest in mentoring and their ability to establish positive relationships with their mentors.

The second objective of the present study was to explore the links among certain mentor behaviors, the quality of the mentor–protégé relationship, and perceived parental and teacher involvement. The correlational analyses conducted among the experimental group suggest two observations. On the one hand, parental and teacher involvement appeared to be of higher quality when mentors displayed certain supportive behaviors (especially autonomy support) and succeeded in building a productive alliance with protégés (especially in terms of an agreement on the tasks to be accomplished during the meetings). These findings help us to better define the process connecting mentoring to parental and teacher involvement. They suggest that supporting autonomy and providing a structured mentoring relationship (by establishing a clear agreement on functioning and objectives) are two mentor behaviors that promote the transfer of mentoring advantages to other relational contexts. In fact, as suggested by the sociomotivational mentoring model (Larose & Tarabulsy, 2005), these behaviors may have had an impact on protégés’ motivation and feelings of competence, indirectly improving the relationships binding protégés to their parents and teachers. It is also possible that autonomy support on the part of the mentor may have led protégés to use their parents and teachers as complementary sources of support more frequently. However, given the correlational nature of the data and the exclusive reference to protégé viewpoints, it is difficult to determine if it is, in fact, mentor behaviors that promoted a better parent and teacher involvement, or if the opposite is true. Otherwise, these links were found to be significant in the context of a prospective analysis that carefully controlled for the initial quality of the affective relationship with parents (attachment security) in predicting subsequent perceived involvement. This methodological precaution limited inference errors.

On the other hand, the current study shows that mentor behaviors and the quality of the mentor–protégé relationship were more effective in predicting
teacher involvement than was parental involvement. These characteristics explained 19% of the variance in teacher involvement versus 8% for parental involvement (beyond the variance accounted for by attachment security). This finding suggests that the impact of academic mentoring is greater for the student–teacher relationship than for the parent–child relationship. This certainly did not come as a surprise. One of the objectives of the MIRES program is to encourage the social development of young people in college; and this development involves, among other things, building positive relationships with teachers. This observation, therefore, leads us to nuance the role mentoring may play on youth social development based on the intervention context (Rhodes, 2002). Academic mentoring might be more important to improve student–teacher relationships, whereas community mentoring should play a stronger role on parent–child relationships.

The present research is one of the rare studies to document a causal link between formal mentoring in late adolescence and the academic involvement of parents and teachers. Too few studies in the mentoring field rely on experimental designs, limiting the leverage of knowledge in this area. This research project is also unique in that it compared the impact of mentoring in two relational contexts: the parent–child relationship and the teacher–student relationship. While exposure to the mentoring program generated relatively similar effects from one context to the other, the autonomy support provided by mentors and agreements on mentoring tasks were found to have greater explanatory power for the teacher–student relationship than for the parent–child relationship.

Despite these strengths, the present study also features some limitations. First, the fact that the quality of relationships with teachers before the intervention was not evaluated—which represents a complex challenge, given that the young people have not yet entered college—limits our understanding of the specific nature of the effects of the mentoring program. Even if the posttest protocol with equivalent comparison groups allows us to draw sound causal inferences (since randomization presupposes that control group and mentored participants both shared similar attitudes and experiences before the intervention), it cannot indicate the trajectory of change. The mentoring process could have acted as a protective factor by limiting the development of negative perceptions, for example. Another possibility is that the trajectory of control participants may have followed a downward trend and mentored participants an upward trend. A pretest could have been administered to clarify this situation.

Second, the study deals with a single mentoring program intended for 17-year-olds who showed a relatively low level of psychosocial risk. While the community, academic, and vocational mentoring contexts share many similar characteristics (Allen & Eby, 2007), they also present unique features
that can limit the external validity of the findings, especially with respect to much research in the mentoring domain conducted in the context of different high-risk populations.

Third, the present study is limited to examination of the program’s short-term effects. The involvement observed may be time-limited; it may last while the adolescent participates in the mentoring program, but fade once the program is completed. Thus, it is important to include follow-up measures after the completion of the formal mentoring intervention. Such longitudinal follow-up is currently projected as part of our research program.

Fourth, certain correlations between mentor behaviors and perceptions of parental and teacher involvement should be interpreted with caution, given the strong conceptual similarity between the involvement measure (MIYSE) and mentor behavior evaluation measure (AMBS). It is possible, in fact, that the predictive links observed between the Autonomy Support subscale and perceptions of parental and teacher educational involvement are, in part, explained by shared method variance.

Finally, the absence of objective assessments of the content of mentor–protégé meetings limits our understanding of the links between the specific actions of mentors and perceived involvement. By what processes was autonomy support actually facilitated? Did mentors encourage their protégés to use their parents and teachers when facing certain problems? Did they suggest contacting their parents regularly to keep them up to date about their lives? Did they themselves talk with the teachers or parents? These questions remain unanswered. Subsequent research should, therefore, pay more attention to the specific involvement behaviors of mentors and protégés as they relate with one another.

The present findings have significant implications for academic mentoring programs. First, they call on program practitioners to reflect on ways of getting parents and teachers involved in young people’s academic development. In the mass education context at the college level, mentoring can be a way to personalize the academic experience and draw parents closer to schools and teachers. By communicating the nature and goals of the program and presenting positive feedback of protégés and mentors participating in the mentoring experience, program practitioners can help parents and teachers better understand how mentoring and parental interventions complement one another.

Second, the findings suggest that it may be useful to assist and train mentors on how to best support protégé–parent and protégé–teacher relationships. As Keller (2005) suggested, mentors can interact directly with parents and teachers, or indirectly through their actions with their protégés. Mentors can directly raise parents’ awareness of the importance of staying involved with their youth and inform them on the types of interventions
involved and their complementary nature with their own actions. During mentoring meetings, mentors can express the values shared by parents and teachers, reinforce certain codes of conduct, and directly encourage protégés to seek support from their parents and teachers when they face challenges.

Third, the findings also suggest paying special attention to the presence and development of two mentoring skills that seem to impact youth social development: the mentors’ capacity for autonomy support, and their ability to structure the mentoring relationship. During their training, mentors could be asked to encourage their protégés to make their own decisions, support them in reaching their own objectives, and provide them with a wide range of social and academic activities that reflect the needs they express. These behaviors and attitudes may support protégé autonomy. Mentors could also benefit from training on how to establish clear guidelines for the relationship, set short-term goals, define an operating framework, and give useful, constructive feedback. This type of training may help mold their ability to structure the mentoring relationship.

The present study suggested that participation in a formal mentoring program led to a positive perception of parental and teacher involvement in young people’s academic and science pursuits. It also found that autonomy support by mentors and their ability to structure the mentoring relationship are two skills that help to motivate involvement. Future studies should address the mechanisms underlying these links. Improving academic motivation, feelings of competence, and sense of belonging is a process that may explain these links and, therefore, warrants further investigation.

References


