Teachers’ self-efficacy beliefs as determinants of job satisfaction and students’ academic achievement: A study at the school level

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Abstract

Teachers’ self-efficacy beliefs were examined as determinants of their job satisfaction and students’ academic achievement. Over 2000 teachers in 75 Italian junior high schools were administered self-report questionnaires to assess self-efficacy beliefs and their job satisfaction. Students’ average final grades at the end of junior high school were collected in two subsequent scholastic years. Structural equation modeling analyses corroborated a conceptual model in which teachers’ personal efficacy beliefs affected their job satisfaction and students’ academic achievement, controlling for previous levels of achievement.

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Children’s success at school is particularly crucial in any advanced society that places education at the core of its socio-economic development. Although academic achievement is not the only school-related outcome, it represents an important indicator of their
functioning. A vast literature attests to the influence of academic attainments on children’s course of life. In particular, academic achievement affects children’s scholastic choices and professional aspirations as well as their psychosocial development and adjustment (Aluja & Blanch, 2002; Batin-Pearson et al., 2000; Jimerson, Ferguson, Whipple, Anderson, & Dalton, 2002; Marsh, 1990; Muijs, 1997; Tai-sang, 1997).

Whereas the study of school achievement has traditionally placed great emphasis on qualities of the student (e.g., ability, motivation), family (e.g., family relations, attitudes toward school), and socioeconomic context of the family and school, the task of creating learning environments conducive to cognitive capacities, relational skills, and personal growth has become a principal mission of modern schools. This mission rests heavily on the capacity of various school constituents – the principal, teachers, staff, and families – to operate in concert. As teachers play a special role in setting the standards and creating the conditions for children’s school attainments, it is critical to understand the key mechanisms through which teachers contribute to their students’ academic success.

**Teachers’ self-efficacy beliefs and students’ academic achievement**

Since the seminal contributions promoted by the RAND Corporation (Armor et al., 1976; Berman, McLaughlin, Bass, Pauly, & Zellman, 1977) and the subsequent research of Ashton and Webb (1982, 1986), a number of studies have pointed to the influence of teacher’s self-efficacy beliefs on children’s cognitive achievements and success at school (Moore & Esselman, 1992, 1994; Muijs & Rejnolds, 2001; Ross, 1992, 1998). Teacher’s self-efficacy beliefs may influence a student’s achievement in several ways. Teachers with high self-efficacy beliefs are more likely than teachers with a low sense of self-efficacy to implement didactic innovations in the classroom and to use classroom management approaches and adequate teaching methods that encourage students’ autonomy and reduce custodial control (Cousins & Walker, 1995a,b; Guskey, 1988), to take responsibility for students with special learning needs (Allinder, 1994; Jordan, Kreaali-Iftar, & Diamond, 1993), to manage classroom problems (Chacon, 2005; Korevaar, 1990), and to keep students on task (Podell & Soodak, 1993).

Furthermore, teacher’s perceived self-efficacy has been found to be associated with enhanced student’s motivation (Ashton & Webb, 1986; Roeser, Arbreton, & Anderman, 1993), increased self-esteem (Borton, 1991), strong self-direction (Rose & Medway, 1981), ease in managing school transitions (Midgley, Feldlaufer, & Eccles, 1989), and more positive attitudes toward school (Miskel, McDonald, & Bloom, 1983). Teacher’s self-efficacy may also contribute to promote student’s sense of efficacy, fostering their involvement in class activities and their efforts in facing difficulties (Ross, 1998; Ross, Hogaboam-Gray, & Hannay, 2001).

In addition, other findings suggest a reciprocal effect between a teacher’s perceived self-efficacy and a student’s achievement, showing that teacher’s perceived self-efficacy is particularly high in schools with high-achieving and well-behaved students (Raudenbush, Rowan, & Cheong, 1992; Ross, 1998). As teachers of talented and disciplined students are more likely to be successful in their activities and tasks than teachers of students who present learning or disciplinary problems, the repeated experiences of success with students may enrich their experience and contribute to their robust sense of efficacy.
Teacher’s self-efficacy beliefs and job satisfaction

Teacher’s self-efficacy beliefs do not, of course, operate in isolation from other psychosocial determinants that affect their motivation and performance such as their professional aspirations, the recognition and respect they perceive to be accorded and ultimately, the satisfaction they draw from their profession. Previous findings support the critical influence of a teacher’s self-efficacy beliefs on their performance and motivation (Bandura, 1997; Ross, 1998; Tschannen-Moran & Woolfolk Hoy, 2001; Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998; Woolfolk & Hoy, 1990; Woolfolk, Rosoff, & Hoy, 1990; Woolfolk Hoy & Davis, 2006). A strong sense of teacher’s self-efficacy promotes a firm commitment to the profession and collaborative relationships with colleagues and parents (Coladarci, 1992; Hoover-Dempsey, Bassler, & Brissie, 1992; Imants & Van Zoelen, 1995), contributing fruitfully to the promotion of a rich and stimulating learning environment. Compared to teachers who doubt their efficacy, self-efficacious teachers are more inclined to appreciate other school constituents’ contribution to the functioning of the school, to view the principal, colleagues, staff, students and parents as behaving in accordance with their obligations, and to perceive the whole school as a system capable of pursuing its mission (Caprara, Barbaranelli, Borgogni, Petitta, & Rubinacci, 2003; Caprara, Barbaranelli, Borgogni, & Steca, 2003).

Previous research has also found that teachers’ sense of efficacy is related to their satisfaction with their choice of profession and their competence as rated by school superintendents (Trentham, Silvern, & Brogdon, 1985). Recent findings have shown that teachers’ self-efficacy beliefs have a crucial role in affecting and sustaining their commitment to school and their job satisfaction (Caprara, Barbaranelli, Borgogni, Petitta et al., 2003; Caprara, Barbaranelli, Borgogni, & Steca, 2003).

It is likely that job satisfaction accompanies teachers’ sense of efficacy and contributes to sustain their efforts towards pursuing children’s optimal scholastic attainments. As recently demonstrated by a study on over six thousand American teachers, pay satisfaction is positively related to academic performance measured at the school district-level (Currall, Towler, Judge, & Kohn, 2005).

Although a large body of findings attests to the positive influence that both self-efficacy beliefs and satisfaction exert on performance in a variety of settings, including schools (Bandura, 1997; Cranny, Smith, & Stone, 1992; Judge, Thoresen, Bono, & Patton, 2001; Ostroff, 1992), we are not aware of any recent study that has addressed the effects that both teacher’s self-efficacy beliefs and job satisfaction exert on student’s academic achievement, despite the importance that is usually given to teacher’s morale and motivation at school. In Italy, for instance, a number of observers warn against the poor satisfaction of teachers pointing to the multiple and new obligations of teaching and to the declining prestige of the profession (Cavalli, 2000; Evans, 1998). Yet, policy makers seem to focus most on monetary incentives rather than on the importance of the sense of competence teachers derive from their profession to sustain their motivation and ultimately, to promote students’ achievements. As little attention is paid to self-efficacy beliefs as proxies of competence, few resources are given to interventions aimed at building teachers’ self-efficacy and schools’ collective efficacy.

One may guess that teachers’ self-efficacy accounts for their performance conducive to students’ achievements as well as for their satisfaction both directly and indirectly. On the one hand, students’ achievement most likely reflects teachers’ capacity to transfer knowledge and
experience and to promote students’ learning. On the other hand, teachers’ satisfaction is most likely to derive from their sense of competence. Ultimately, teachers’ self-efficacy influences their job satisfaction directly to the extent that it meets teachers’ intrinsic needs of competence (Ryan & Deci, 2000), and indirectly in being conducive to performance from which teachers may derive pride and rewards.

Aims

To address the above issues, the present study is part of a research program funded by the Italian Department of Public Education with the aim of providing new elements to compare and eventually to improve the functioning of junior high schools, drawing upon findings from schools representative of the whole country. The study was conceived to examine a conceptual model that assigns to teacher’s self-efficacy beliefs a crucial role in affecting their job satisfaction and student’s academic achievement, in line with social-cognitive principles and reasoning (Bandura, 1997, 2001; Caprara, 2002).

We examined teacher’s self-efficacy beliefs and job satisfaction as well as student’s achievement aggregated at the school level, focusing on global indicators of school functioning. In aggregating students’ achievement and teachers’ self-efficacy and job satisfaction, we highlight what we believe are appropriate indicators of school functioning, given the characteristics of junior high school in Italy. While teaching in most elementary schools relies on one main teacher, in junior high school, teachers of different disciplines deliver their courses in different classes and often across all three grades of junior high school. As the same teachers serve through grades and across classes, unique effects of teacher’s self-efficacy and satisfaction on students’ academic achievement are strongly interrelated with other teachers’ action serving in the same and different classes. Thus, it is common and appropriate to evaluate and compare the school’s performance at a national level in terms of average grades, retentions and dropouts.

We examined each school’s average grades at the end of the third year of junior high school, which in Italy represents an important time of transition, as it is the last year of compulsory education necessary to entering into the job market. Furthermore, one needs to consider that academic achievement at the end of this year is particularly crucial because the successful completion of junior high school discloses various educational pathways conducive to higher education.

In aggregating teachers’ evaluations of their perceived capabilities, we point to an important aspect of school collective efficacy, since “in appraising their personal efficacies, individuals inevitably consider group processes that enhance or hinder their efforts” (Bandura, 1997, p. 478). This seems particularly true in the Italian educational system where, as mentioned previously, students’ achievements largely rest on the action of multiple teachers who deliver their teaching across grades and classes. In this kind of system, the personal efficacy of each teacher largely depends on her or his capacity to contribute to collective endeavors either in integrating one’s own capabilities with other colleagues’ capabilities and in promoting the academic performance of different students in different classes. By aggregating measures of teachers’ satisfaction we highlight an important aspect of the general morale of the school, as teachers’ satisfaction certainly support and contribute to a positive teaching and learning environment.
Research hypotheses

Drawing on the above literature, we expected that teachers’ aggregated self-efficacy beliefs would contribute significantly to students’ aggregated academic achievement; specifically, to schools’ academic outcomes, even after controlling for previous outcomes. Furthermore, we expected that teachers’ aggregated self-efficacy beliefs would contribute to their job satisfaction, which in turn, exerts a positive influence on students’ aggregated academic achievement, although only in association with high self-efficacy beliefs.

As shown by the conceptual model presented in Fig. 1, we posited six specific hypotheses, referring to the pattern of influences among the considered variables along three times during two subsequent scholastic years (all details on times and scholastic years are in the Method section):

1. Students’ academic achievement at the end of junior high school cycle (time 1), as measured by average final grades, predicts students’ final academic achievement in the following year (time 3).
2. Students’ academic achievement (time 1) contributes to teachers’ self-efficacy beliefs during the following year (time 2). Although self-efficacy beliefs are knowledge structures that are built and remain relatively stable over the years, students’ achievement from 1 year to another contribute to certifying teachers’ capacities and to sustaining their sense of competence.
3. Students’ academic achievement (time 1) contributes to teachers’ job satisfaction during the following year (time 2). Although other sources such as parents’ and students’ recognition, principal’s appreciation, and collaborative relations with colleagues and staff also contribute to teachers’ job satisfaction, students’ achievement from 1 year to another further attests to the importance of others’ regard and respect, thus contributing to maintaining and enhancing teachers’ satisfaction.

![Fig. 1. Posited conceptual model.](image-url)
4. Teachers’ self-efficacy beliefs (time 2) contribute significantly to subsequent students’ final academic achievement (time 3), beyond the influence exerted from previous academic achievement (time 1).

5. Teachers’ self-efficacy beliefs positively influence teachers’ job satisfaction as evaluated at the same time (time 2), in accordance with previous findings (Caprara, Barbaranelli, Borgogni, & Steca, 2003).

6. Teachers’ self-efficacy beliefs play a moderating role with regard to the contribution of satisfaction to students’ academic achievement. Specifically, job satisfaction does not contribute to students’ academic achievement unless accompanied by high perceived self-efficacy.

All of the posited hypotheses rely on principles of social-cognitive theory (Bandura, 1997, 2001; Caprara, 2002) as well as on a broad literature supporting the influential role of teacher’s self-efficacy beliefs on his/her job satisfaction and student’s achievement. It is likely that the student’s academic achievement, in turn, contributes to the teacher’s perceived self-efficacy and satisfaction, although, several other factors may influence the teacher’s perceived competence and sense of gratification at work.

**Method**

**Participants and procedure**

Teachers were recruited from 102 junior high schools, representing 75% of a previously stratified random sample of Italian schools. Schools were selected in accordance with sampling procedures typically recommended by the procedures of the Italian Department of Public Education. Principals and teachers of each school were invited to respond to different sets of questionnaires.

The schools were contacted in two consecutive scholastic years, 1999/2000 and 2000/2001. The data was collected during three specific times: students’ academic achievement was collected at times 1 and 3 while teachers’ self-efficacy beliefs and job satisfaction were collected at time 2.

In particular, in the middle of the 1999/2000 scholastic year (time 2), principals were asked to complete a questionnaire aimed at providing a variety of information regarding the social context of their school (average conditions of living, economic resources, public services, etc.), their school’s functioning with respect to a variety of issues (such as budget, equipments, facilities, personnel absenteeism, etc.) and students’ performance records at the end of the third year, (including final grades, absenteeism, abandonments and retentions). We asked principals to refer to the previous scholastic year, 1998/1999 (time 1).

In the middle of the 1999/2000 scholastic year (time 2), principals distributed to each teacher an envelope including: 1) an introductory letter regarding the agency conducting the present research, namely, the “Centro Interuniversitario per lo Studio delle Motivazioni Prosociali e Antisociali” (“Interuniversity Center for the Study of Prosocial and Antisocial Motivation”),\(^1\) 2) a questionnaire; and 3) a self-addressed envelope for returning the

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\(^1\) This Center is a well-known research institute including several scholars from different Italian Universities.
completed questionnaire. In each school a box served to collect all teacher’s sealed questionnaires. Teachers were assured of the confidentiality of their responses. Questionnaires were returned before the end of 1999/2000 scholastic year.

In the following scholastic year, 2000/2001, school principals were re-contacted and invited to once again complete and update the same questionnaire including the final grades of students who concluded junior high school at the end of the previous year 1999/2000 (time 3).

Ultimately, 75 schools provided the complete set of data across the 2 years, namely, students’ average final grades, teachers’ self-efficacy beliefs and job satisfaction at time 2, and students’ average final grades at time 3. These schools were representative of the original sample of schools with respect to geographic location, number of classes, number of teachers, and number of students.

Overall, 2184 teachers participated in the study. As summarized in Table 1, a large majority of teachers were female, in their middle adulthood and had extensive experience in teaching. A number of teachers did not give information regarding their sex, age and years of teaching experience.

**Instruments**

The questionnaire comprised 90 items selected from a large pool of items whose psychometric properties have been ascertained in previous research (Caprara, Barbaranelli, Borgogni, Petitta et al., 2003; Caprara, Barbaranelli, Borgogni, & Steca, 2003). For each item, teachers rated on a 7-point response format (from 1 = “Strongly disagree,” to 7 = “Strongly agree”) their agreement with each question. Most of the items had been generated in previous research, as part of an extended survey with the aim of assessing teachers’ self-

<table>
<thead>
<tr>
<th>Table 1</th>
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<tbody>
<tr>
<td>Frequency distribution for teachers’ sex, age, and years of teaching experience</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>409</td>
<td>18.7</td>
</tr>
<tr>
<td>Female</td>
<td>1205</td>
<td>55.2</td>
</tr>
<tr>
<td>Did not indicate gender</td>
<td>570</td>
<td>26.1</td>
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</table>

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<thead>
<tr>
<th>Age</th>
<th>N</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>Under 25 years old</td>
<td>3</td>
<td>.1</td>
</tr>
<tr>
<td>25 to 34 years old</td>
<td>56</td>
<td>2.6</td>
</tr>
<tr>
<td>35 to 44 years old</td>
<td>442</td>
<td>20.2</td>
</tr>
<tr>
<td>45 to 54 years old</td>
<td>938</td>
<td>42.9</td>
</tr>
<tr>
<td>Over 54 years old</td>
<td>181</td>
<td>8.3</td>
</tr>
<tr>
<td>Did not indicate age</td>
<td>564</td>
<td>25.8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of teaching experience</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 years</td>
<td>67</td>
<td>3.1</td>
</tr>
<tr>
<td>5 to 14 years</td>
<td>250</td>
<td>11.4</td>
</tr>
<tr>
<td>15 to 24 years</td>
<td>703</td>
<td>32.2</td>
</tr>
<tr>
<td>25 years or more</td>
<td>610</td>
<td>27.9</td>
</tr>
<tr>
<td>Did not indicate years of teaching experience</td>
<td>554</td>
<td>25.4</td>
</tr>
</tbody>
</table>
and collective-efficacy beliefs, their perceptions of their colleagues’ competence and of that of other school constituencies, and their job satisfaction. In this study, we consider only the data regarding teachers’ perceived self-efficacy and job satisfaction.

**Self-efficacy beliefs**

Twelve items measured teachers’ beliefs in their ability to effectively handle various tasks, obligations, and challenges related to their professional role (continue previous paragraph). In the development of the items we mainly relied on Bandura’s (1997) guidelines and drew largely upon existing questionnaires for measuring teacher’s self-efficacy beliefs (i.e. Tschannen-Moran et al., 1998). We applied the “critical incident” technique developed by Flanagan (1954) to generate items most suitable to the Italian school context. Several groups of junior high school teachers, attending advanced seminars of personal development, were invited first to identify a number of situations and tasks in their daily school activities that seriously challenged their expertise and capacities and then, to focus on the specific abilities that they retained most effective and necessary in order to manage those situations and master their profession.

Selected items refer to different settings and to various relationships, with the aim of assessing teacher’s perceived capability: a) to cope with didactical tasks (e.g. “I am capable of overcoming all the challenges I encounter in meeting my teaching objectives”); b) to handle discipline problems in the class (e.g., “I can make my students respect rules and codes of conduct”); c) to earn appreciation from colleagues and families (e.g., “I am able to earn the trust and appreciation of all my colleagues”); and d) to take advantage of innovations and technologies to better their work (e.g., “I am capable of taking full advantage of technological innovations in my teaching”).

**Job satisfaction**

Four items measured teachers’ satisfaction with their job (e.g., “I am fully satisfied with my job”). Theses items were selected and adapted from the Italian version (Borgogni, 1999) of the Job Descriptive Index (Smith, Kendall, & Hulin, 1969).

**Academic achievement**

To assess students’ achievement we used their final examination grades at the end of the third year of junior high school. These grades summarize students’ performance across various disciplines and result from collegial decisions of different teachers; they range from 1 (= very poor) to 5 (= excellent), and are standardized across Italy. Grades were aggregated at the school level to provide an overall indicator of each school’s academic performance.

The 16 items designed to measure teachers’ self-efficacy beliefs and job satisfaction were subjected to several preliminary factor analyses: at the end, 7 items were selected as the best items for measuring teachers’ perceived self-efficacy and satisfaction. Table 2 presents descriptive statistics for the selected items measuring teachers’ self-efficacy and job satisfaction, and for students’ academic achievement evaluated at time 1, time 2, and time 3. All of the items were normally distributed except for one satisfaction item, “I am happy with the way my colleagues and superiors treat me”, which showed a high kurtosis.
We also compared the 75 schools that provided a full set of data across the three research times with the 27 schools that did not return data on time 3. No significant differences were found on any of the considered variables, confirming that the 75 schools were a representative sample and that the missing schools could be considered completely missing at random.

Results

The data gathered in this study have a clear clustered multi-level, or hierarchical, structure. In fact, all teachers are nested within their respective schools. It is reasonable to believe that individuals belonging to the same school tended to be more similar on many important variables than individuals from different schools.

A measure of clustering effect due to the contextual level (i.e., in our case the level of the schools) is obtainable by the Intraclass Correlation Coefficient (ICC). Thus, the ICC was computed to assess the percent of variance for the individual variables in the model due to differences between the schools. The ICC is the commonly used statistic to provide a measure of the degree of group homogeneity in hierarchical data (Heck, 2001; Heck & Thomas, 2000; Hox, 2002). As suggested by Hox (2002), general case coefficients from .05 to .09 indicate a low effect, coefficients from .10 to .14 a moderate effect, coefficients from .15 indicate a large effect. Despite the fact that the individual variables in our study have both a between school and a within school part, all variables showed ICCs below the threshold of .05 with the exception of item 1 of the satisfaction measure which had an ICC of .09. Thus, since all study variables had a less than small grouping effect (and only one variable demonstrated a small effect), the advantages of doing a multilevel analysis seemed marginal considering the fact that the variable we intended to explain is a “between school” variable.

Table 2
Descriptive statistics for teachers’ self-efficacy beliefs and job satisfaction items and for students’ achievement

<table>
<thead>
<tr>
<th>Items</th>
<th>Min.</th>
<th>Max.</th>
<th>M</th>
<th>SD</th>
<th>Skw</th>
<th>SE</th>
<th>Kurt</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers’ self-efficacy beliefs</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>I1. I am able to earn the trust and appreciation of all my colleagues</td>
<td>3.00</td>
<td>4.29</td>
<td>3.64</td>
<td>.27</td>
<td>−.02</td>
<td>.28</td>
<td>−.28</td>
<td>.55</td>
</tr>
<tr>
<td>I2. I am capable of overcoming all the challenges I encounter in meeting my teaching objectives</td>
<td>3.44</td>
<td>5.07</td>
<td>4.52</td>
<td>.32</td>
<td>−.37</td>
<td>.28</td>
<td>.16</td>
<td>.55</td>
</tr>
<tr>
<td>I3. As a teacher, I am capable of getting recognition and appreciation from my students</td>
<td>3.33</td>
<td>4.44</td>
<td>3.89</td>
<td>.25</td>
<td>.02</td>
<td>.28</td>
<td>−.34</td>
<td>.55</td>
</tr>
<tr>
<td>I4. I can make my students respect rules and codes of conduct</td>
<td>4.00</td>
<td>5.30</td>
<td>4.80</td>
<td>.28</td>
<td>−.71</td>
<td>.28</td>
<td>.51</td>
<td>.55</td>
</tr>
<tr>
<td>I5. I am capable of engaging even the most reluctant and difficult students in my class activities</td>
<td>3.50</td>
<td>5.04</td>
<td>4.41</td>
<td>.34</td>
<td>−.38</td>
<td>.28</td>
<td>.06</td>
<td>.55</td>
</tr>
<tr>
<td>Teachers’ job satisfaction</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I1. I feel good at work</td>
<td>3.13</td>
<td>5.55</td>
<td>4.74</td>
<td>.47</td>
<td>−.98</td>
<td>.28</td>
<td>1.10</td>
<td>.55</td>
</tr>
<tr>
<td>I2. I am happy with the way my colleagues and superiors treat me</td>
<td>3.13</td>
<td>5.33</td>
<td>4.65</td>
<td>.39</td>
<td>−.94</td>
<td>.28</td>
<td>2.25</td>
<td>.55</td>
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<tr>
<td>Students’ achievement</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average academic achievement at Time 1</td>
<td>1.53</td>
<td>2.72</td>
<td>2.05</td>
<td>.23</td>
<td>.23</td>
<td>.28</td>
<td>.10</td>
<td>.55</td>
</tr>
<tr>
<td>Average academic achievement at Time 2</td>
<td>1.46</td>
<td>2.53</td>
<td>2.06</td>
<td>.20</td>
<td>.04</td>
<td>.28</td>
<td>.5</td>
<td>.55</td>
</tr>
</tbody>
</table>
Accordingly, a special analytical feature of the software Mplus v.3 (Muthén & Muthén, 1998) was used for performing an aggregated analysis. In clustered data samples, such as our sample, the MPLUS command “TYPE=COMPLEX” allows the use of an estimation procedure that “includes a Taylor series-like function to provide a normal theory covariance matrix for analysis” (Stapleton, 2006, p. 352). Thus, correct estimates, standard errors, parameter estimates and test statistics are computed.

In the measurement part of the model we posited two factors: a factor measured by the five self-efficacy items and a factor measured by the two satisfaction items, selected through preliminary factor analyses. All cross-loadings and all covariance among the uniqueness were fixed to 0. For each factor, one loading was fixed to 1 for identification purposes.

In the structural part of the model the following paths were posited:

— time 1 students’ academic achievement influences time 3 students’ academic achievement, time 2 teachers’ self-efficacy beliefs and time 2 teachers’ job satisfaction;
— time 2 teachers’ self-efficacy beliefs influence time 3 students’ academic achievement and time 2 teachers’ job satisfaction;
— time 2 teachers’ satisfaction influences time 3 students’ academic achievement.

These paths reflect the relations among constructs according to our theoretical hypotheses depicted in Fig. 1.

This model resulted in a good fit, $\chi^2 (23, N=2184)=163.50, p<.001$, TLI=.92, CFI=.95, RMSEA=.054, SRMR=.032. A more conservative model, where the items of the two constructs were considered tau equivalent, was tested. In this model, all loadings for efficacy (except the loading for item 52 that was fixed to 1 for identification purposes) were constrained to be equal. Similarly, the loadings of the two items of satisfaction were constrained to be equal (here we fixed the variance of the factor to 1 for identification purposes). The more parsimonious model resulted in a better fit than our first model, with a $\chi^2 (27, N=2184)=171.39, p<.001$, TLI=.93, CFI=.95, RMSEA=.05, SRMR=.038.

The difference among the chi-squares of the original and the restricted model was $\Delta \chi^2 (4)=5.04, p=.28$. Thus, the more parsimonious model can be considered better than the original model. Unstandardized parameter estimates and standard errors appear in Table 3. Fig. 2 gives a graphical representation of the solution with standardized estimates.

Regarding the measurement part of the model, all equality constraints were tenable (with non-significant modification indices associated) and all loadings were high. Reliability estimates for the two factors were also computed, using the formulas developed by Bagozzi (1994, Eq. 9.6, p. 324). Reliability estimates were .81 and .86 for teachers’ perceived self-efficacy and job satisfaction, respectively.

Regarding the structural part of the model, time 1 students’ achievement did not predict time 2 teachers’ job satisfaction, $t=-1.27$ and evidenced a low but significant effect on time 2 teachers’ self-efficacy beliefs, $t=2.05$. As expected, the impact of time 1 students’

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2 Chi-square difference was computed using the scaling factors suggested by Muthén and Muthén (1998) which are taken from the MPLUS output.
achievement on time 3 achievement was significant, $t=8.45$. The influence of time 2 teachers’ perceived self-efficacy on their job satisfaction was positive and significant, $t=9.55$. Time 2 teachers’ perceived self-efficacy was a significant predictor of time 3 students’ academic achievement, $t=3.12$, but their job satisfaction was not significantly associated to students’ achievement, $t=-1.41$. The percentage of explained variance for time 3 students’ academic achievement was 48%. The percentages of explained variance for time 2 teachers’ job satisfaction was 28% whereas the percentage of explained variance for time 2 teachers’ self-efficacy beliefs was 1%.

One may question whether the percentage of explained variance of time 3 students’ achievement was mainly due to previous achievement. To ascertain this possibility, a model was tested where only time 2 teachers’ self-efficacy beliefs directly influenced time 3 achievement while the direct effect of time 1 academic achievement and of time 2 satisfaction was fixed to zero. In this model, the percentage of time 3 achievement explained variance was 8.2% whereas the percentage of explained variance for time 2 teachers’ self-efficacy beliefs was 1%

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Items</th>
<th>Loading</th>
<th>Standard error</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-efficacy beliefs</td>
<td>1</td>
<td>.815</td>
<td>.028</td>
<td>28.75</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.815</td>
<td>.028</td>
<td>28.75</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>.815</td>
<td>.028</td>
<td>28.75</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>.815</td>
<td>.028</td>
<td>28.75</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Job satisfaction</td>
<td>1</td>
<td>.848</td>
<td>.042</td>
<td>20.295</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.848</td>
<td>.042</td>
<td>20.295</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Path</th>
<th>beta</th>
<th>Standard error</th>
<th>$t$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time 1 Achievement $\rightarrow$ time 3 achievement</td>
<td>.538</td>
<td>.064</td>
<td>8.45</td>
</tr>
<tr>
<td>Time 1 achievement $\rightarrow$ time 2 self-efficacy beliefs</td>
<td>.321</td>
<td>.157</td>
<td>2.054</td>
</tr>
<tr>
<td>Time 1 achievement $\rightarrow$ time 2 job satisfaction</td>
<td>-.438*</td>
<td>.345</td>
<td>-1.27</td>
</tr>
<tr>
<td>Time 2 self-efficacy beliefs $\rightarrow$ time 3 achievement</td>
<td>.024</td>
<td>.008</td>
<td>3.123</td>
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<tr>
<td>Time 2 self-efficacy beliefs $\rightarrow$ time 2 job satisfaction</td>
<td>.741</td>
<td>.078</td>
<td>9.511</td>
</tr>
<tr>
<td>Time 2 job satisfaction $\rightarrow$ time 3 achievement</td>
<td>-.011*</td>
<td>.008</td>
<td>-1.413</td>
</tr>
</tbody>
</table>

Note. Underlined coefficients were fixed to 1 for identification purposes. All coefficients are statistically significant ($p<.05$), except those marked with asterisks.

We then considered the indirect effects in our model. In particular, we were interested in the indirect effect that academic achievement at time 1 has on academic achievement at time 3 through the mediation of self-efficacy at time 2. Another interesting effect that was tested was that of self-efficacy at time 2 on time 3 achievement through the mediation of time 2 job satisfaction. Both effects were tested by means of MPLUS “MODEL INDIRECT” command. The indirect effect of academic achievement at time 1 on academic achievement at time 3 through the mediation of self-efficacy was not significant, $t=1.703$. Also, the indirect effect of time 2 teachers’ self-efficacy beliefs on time 3 students’ achievement through the mediation of
their satisfaction did not reach the significance level, $t = -1.15$. Thus, only direct effects were statistically significant in our target model.

Finally, we tested the hypothesis of a moderating role of teachers’ self-efficacy with regard to the contribution of their satisfaction on students’ academic achievement, including in the target model the interaction between time 2 self-efficacy beliefs and job satisfaction.

In MPLUS, this can be done by adding a multiplicative term “self-efficacy beliefs and satisfaction” to the above model. Unfortunately, in the case of multiplicative models, MPLUS does not give the usual fit indexes. However, the critical issue in this model was the effect of the multiplicative component “time 2 self-efficacy beliefs X satisfaction” on academic achievement at time 3. This interaction effect was not significant, $b = -0.007$, SE = 0.004, $t = -1.801$. Moreover, none of the other terms were changed substantively. Thus, results did not support the hypothesis of moderation.

**Discussion and conclusions**

Results of the present study further corroborate the contribution of teachers’ self-efficacy beliefs on their job satisfaction (Caprara, Barbaranelli, Borgogni, Petitta et al., 2003; Caprara, Barbaranelli, Borgogni, & Steca, 2003) and provide new elements that attest to the influence that their perceived self-efficacy in the ability to effectively handle various tasks, obligations, and challenges related to their professional role exert on students’ academic achievement at the school level.
The findings of this study supported the posited model only in part. As expected, previous student’s academic achievement predicted subsequent achievement as well as teacher’s self-efficacy beliefs, which, in turn, contributed significantly to student’s achievement and teacher’s job satisfaction. In contrast with our expectations, previous academic achievement did not contribute to teacher’s job satisfaction, nor did satisfaction contribute to student’s later academic achievement.

Because we examined the contribution of teacher’s self-efficacy beliefs and satisfaction at the school level, our findings have important implications for policies aimed to creating and maintaining an effective learning environment. An extensive review of the literature has clearly documented that teachers with a strong sense of efficacy exhibit high levels of planning and organization (Allinder, 1994), are open to new ideas and are more willing to experiment with new methods to better meet the needs of their students (Cousins & Walker, 1995a, b; Guskey, 1988; Stein & Wang, 1988). These teachers also exhibit enthusiasm for teaching (Allinder, 1994), are more committed to their profession, and likely exert a positive influence on students’ achievements and their own sense of efficacy (Ashton & Webb, 1986; Podell & Soodak, 1993; Tschannen-Moran & Woolfolk Hoy, 2001).

Our findings point to the contribution of teachers’ aggregated self-efficacy beliefs on a global indicator of school functioning, the average grades of students at the end of junior high school, namely, an important turning point in the Italian educational system. Whereas average grades represent a common indicator of schools’ outcomes that allows comparisons with other schools at a national level, the end of junior high school has marked, till very recently, the end of compulsory education and remains a crucial transition to diverse educational pathways leading directly to work or to university education. To fully appreciate the importance of our findings, one needs to remember that in considering students’ average academic achievement in grade eight in two subsequent years, we pointed to the outcomes of the same schools but to the performance of different students. Thus, the correlations between the two outcomes do not attest to the stability of performance of same students but rather, to the performance and properties of the learning environments. Average grades at the end of junior high schools attests to their global functioning and contributes to their reputation.

In aggregating teachers’ self-efficacy beliefs, we highlighted an important component of school collective efficacy, on the premise that in judging their personal efficacy, teachers cannot avoid referring to the contribution of other colleagues to their capabilities (Bandura, 1997). The present findings further confirm previous findings (Caprara, Barbaranelli, Borgogni, Petitta et al., 2003; Caprara, Barbaranelli, Borgogni, & Steca, 2003) documenting that teachers’ beliefs in their capacity to efficaciously manage class situations, didactical tasks, and interpersonal relationships with the other school members strongly influences their level of satisfaction with job conditions and likely, the morale of the whole school as resulting from aggregated teachers’ job satisfaction.

Teachers with high levels of self-efficacy beliefs are more likely to be able to create the conditions and to promote the interpersonal networks that nourish and sustain their work satisfaction. This seems particularly true today in many countries, including Italy, in which teachers’ job satisfaction is often at risk, due to the many new responsibilities and to the scarcity of external rewards. In this context, it is likely that teachers’ perceived sense of competence is a primary source of intrinsic motivation and satisfaction. The relation between teachers’ self-efficacy beliefs and their job satisfaction further corroborate this reasoning. There may be
individual teachers who feel efficacious, although unsatisfied with their job, but this is quite unusual. Thus, it is likely that gathering together efficacious teachers leads to higher satisfaction than gathering together teachers who doubt their capacities. Whereas individual self-efficacy beliefs lead to pursuing the conditions that lead to being satisfied with one’s own job, joining schools and associating with other teachers that value their capabilities, unavoidably leads to potentiate the conditions that may bring them satisfaction.

Teachers’ aggregated job satisfaction did not, however, exert any significant influence on schools’ academic outcomes, nor was it linked to students’ achievement moderated by teachers’ self-efficacy beliefs. Although one cannot totally exclude the possibility that teachers’ satisfaction might contribute to sustain their efforts in promoting children’s involvement in school activities, students’ academic achievement mostly rests on teachers’ sense of competence.

In our study, students’ previous academic achievement contributed to teachers’ self-efficacy beliefs, although moderately, in accordance with social-cognitive theory that points to experience and previous attainments as the most important sources of self-efficacy beliefs (Bandura, 1997). Once achieved, a robust sense of personal efficacy in dealing with students, families and colleagues, as well as the firm belief in one’s own capacities to best orchestrate personal talents and situational opportunities, enables teachers to adjust successfully across different contexts. Thus, stability does not contrast with flexibility as teachers’ perceived efficacy continuously accords with experience.

On the contrary, students’ previous academic achievement did not contribute to teachers’ job satisfaction. It is likely that job satisfaction result from evaluative judgments that depend on other sources beyond students’ achievement such as on evaluations that crystallize over time through repeated experiences of success and gratification. Furthermore, it is unlikely that teachers derive great satisfaction from students’ achievement unless they believe that it depends on their competence.

Our posited model did not aim nor allow us to fully test the reciprocity of effects between student’s academic achievement and teacher’s self-efficacy beliefs. Rather, it is limited to corroborating the influence of teacher’s self-efficacy beliefs on a student’s academic achievement, while controlling for previous academic achievement. However, our findings, while attesting to the positive influence of a teacher’s self-efficacy beliefs over a student’s academic achievement, suggest that a student’s previous achievement might also be influenced by the teacher’s self-efficacy beliefs. Furthermore, as a student’s previous achievement contributes to the teacher’s self-efficacy beliefs, albeit modestly, this suggests that the teacher’s self-efficacy beliefs might also reflect the influence over time of a student’s achievement. Ultimately, our findings suggest a reciprocal influence between teacher’s self-efficacy beliefs and student’s academic achievement, in accordance with social-cognitive theory that argues that the most important sources of self-efficacy beliefs are experiences of success.

The above findings carry important practical implications particularly relevant for public policy aimed to improve education. The large number of teachers that participated in the research, drawn from schools representative of the entire national scholastic system, make these findings relevant for other cultural contexts characterized by the same principles of site-based school management: broad collegiality among teachers, high family involvement, and service to community.
Social-cognitive theory provides a framework consistent with the proven influence of teachers’ self-efficacy beliefs in sustaining their satisfaction and children’s achievement, even after controlling for previous achievement (Bandura, 2001); this theoretical stance can guide interventions aimed to promote teacher’s well-being at school and student’s learning.

One should bear in mind that the perceived teacher’s self-efficacy we have examined is rather broad, including a variety of teacher’s beliefs related to interpersonal and organizational skills — as the ones needed to handle discipline matters, to promote collaboration with colleagues, and to gain participation and respect from students and parents. It is a domain rather than task- or topic-specific construct, related to the perceived capacity to orchestrate challenges and obligations of one’s own profession. We cannot say whether assessing efficacy beliefs at this domain level, rather than at a task-specific level, may have sacrificed predictive power. Yet, we believe that the beliefs teachers have in their capacity to master their profession, namely, to cope effectively with the variety of interrelated tasks and circumstances it may carry, are ultimately decisive in supporting children’s academic achievement. Academic achievement does not rest only on learning, but as much on behaving appropriately with others — on interpersonal skills no less than on cognitive skills. To this aim, efficacious teachers not only promote learning but also promote personal development, enthusiasm, and responsibility while serving as models of appropriate and successful behaviors.

The influence of teacher’s perceived self-efficacy on student’s academic achievement at the class level was beyond our goal. Yet, we acknowledge the importance of extending further research to analyze intraclass students’ achievement variation and its interconnections with teachers’ self-efficacy. We are also aware that in aggregating individual teacher’s self-efficacy beliefs, we captured collective efficacy only in part. In particular, we do not underestimate the influence that perceived collective efficacy and self-efficacy beliefs exert reciprocally and in concert over school morale and students’ achievement. In addition, we acknowledge that further studies are needed to test the generalizability of the same path of influence among considered constructs to settings other than schools. In particular, future studies should clarify the extent to which self-efficacy beliefs account for job satisfaction and performance in activities other than teaching.

Although it is unlikely that teacher’s satisfaction in itself, unless supported by a solid sense of competence might contribute to student’s learning, one cannot exclude the possibility that worker’s satisfaction in itself might contribute to performance in activities that mostly depend on individual’s positive feelings other than feeling competent. In particular, this may happen in work settings that require low skills and high interdependence and where satisfaction mostly derives from being well together rather than from feeling competent. Yet, this is far from being the case in an activity such as teaching and transmitting knowledge, whose outcome cannot depend on sources other than teacher’s competence. Although today teacher’s decisions are more collegial than in the past, student’s learning still largely depends on individual teacher’s capacity to transmit knowledge.

Finally, we are aware that researchers should examine the extent to which the same path of influence among examined variables hold in other cultural settings as well as in other scholastic systems. Yet, the above findings are quite compelling in assigning high priority to investments and interventions aimed to promote teacher’s sense of competence to improve the morale of our schools and to enhance the quality of their outcomes. To this aim, social-
cognitive theory provides a theoretical framework as well as a variety of experiences that can guide interventions designed to strengthen teacher’s capacity to meet the continuous challenges of their profession.

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References


