Record: 1

Article ID: *psp773548*

Title: Do Self-Fulfilling Prophecies Accumulate, Dissipate, or Remain Stable Over Time?

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Source: Journal of Personality and Social Psychology. Vol. 77 (3) September 1999, pp. 548-565. American Psychological Association

ISSN: 00223514

Digital Object ID: 10.1037/0022-3514.77.3.54810.1037/0022-3514.77.3.548

Article Type: Journal Article

Abstract: The authors examined whether self-fulfilling prophecies accumulate, dissipate, or remain stable over time by using data from more than 500 6th- through 12th-grade students in public school math classes. The authors used multiple regression analyses to assess the extent to which teacher perceptions predicted students' final math marks and standardized math-test scores from 6th through 12th grade. Control variables included 5 measures of student motivation and 2 measures of previous achievement. The results were consistent with both the dissipation and stability hypotheses. Implications for understanding the extent to which social perception creates social reality and the role of expectations in social problems are discussed.

Do Self-Fulfilling Prophecies Accumulate, Dissipate, or Remain Stable Over Time?

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This research was supported by National Institute of Child Health and Development (NICHD) Grant 1 R29 HD28401-01A1. Data collection was funded by grants from the National Institute of Mental Health, NICHD, and the National Science Foundation. We thank the personnel from all of the participating schools for their help with data collection. We also thank the following people for their aid in collecting and processing the data: Bonnie L. Barber, Christy Miller Buchanan, Harriet Feldlaufer, Connie Flanagan, Janis Jacobs, Dave Klingel, Doug MacIver, Carol Midgley, David Reuman, and Allan Wigfield. Finally, we thank Stephanie Madon, Dave Wilder, and Howard Leventhal for their comments and suggestions.

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A self-fulfilling prophecy occurs when a perceiver's false belief leads to its own fulfillment (Merton, 1948). Merton emphasized the role that self-fulfilling prophecies play in injustice and inequality, and research has documented the occurrence of self-fulfilling prophecies in both the laboratory and naturalistic situations (see reviews by Brophy, 1983; Jussim & Eccles, 1995; Snyder, 1984). However, despite continued claims emphasizing the power of false beliefs to create reality (Fiske & Taylor, 1991; Gilbert, 1995; Hamilton, Sherman, & Ruvolo, 1990; E. E. Jones, 1990), empirical evidence has demonstrated that expectancy effects are typically small, with average effect sizes (in terms of correlations or standardized regression coefficients) ranging from . 1 to . 3 (Jussim, 1991; Jussim & Eccles, 1995; Raudenbush, 1984; Rosenthal & Rubin, 1978).

Because self-fulfilling prophecies are typically neither powerful nor pervasive, researchers have searched for conditions under which self-fulfilling prophecies may be more powerful than on average. Self-fulfilling prophecies are often stronger among African American students, students with low socioeconomic status, and low achievers (see, e. g. , Jussim, Eccles, & Madon, 1996; Madon, Jussim, & Eccles, 1997); among perceivers who have a greater need to influence others and when there is an incentive to confirm one's expectations (Cooper & Hazelrigg, 1988); among perceivers who seek to arrive at stable and predictable impressions of targets (Snyder, 1992); and among perceivers who are not motivated to be accurate (Neuberg, 1989).

Another means by which expectancy effects could be more powerful than most studies indicate is if they accumulate over time. Accumulation means that a self-fulfilling prophecy triggered at one time exerts an increasingly larger influence over targets as time passes. The present research specifically examined whether self-fulfilling prophecies become more powerful, less powerful, or remain equally as powerful over time by using data from more than 500 students and approximately 100 teachers from public school math classes.

Hypotheses

Accumulation

The accumulation hypothesis is that a self-fulfilling prophecy process, once triggered by a perceiver's expectations, continues so that targets conform more and more to the perceiver's original expectations. That is, over time, a perceiver's initial false belief more strongly influences targets. Thus, the impact of self-fulfilling prophecies may transcend the original context of the interaction and profoundly influence targets (see, e. g. , Snyder, 1984).

For example, consider two students both starting 6th grade with IQs of 100. Suppose that the 6th-grade teacher believes that one of these students is bright and that the other is not. Also assume that teachers' expectations have an effect of . 2 on student achievement (an effect of . 2 is equivalent to one fifth of a standard deviation, and the standard deviation of IQ tests is 15). Thus, by the end of 6th grade, the "bright" student's IQ will be 103 and the "dull" student's IQ will be 97. If this small effect accumulates over time, then by the end of high school the "bright" student will have an IQ of 115 and the "dull" student will have an IQ of 85. In this example, in each year from 6th through 12th grade, the gap between the low and high expectancy students widens by 3 points. Thus, small expectancy effects have the potential to become much more powerful via accumulation.

Self-fulfilling prophecies could accumulate if multiple perceivers hold similar expectations for targets. Different perceivers may hold similar expectations for targets if (a) perceivers communicate their expectations to one another and/or (b) subsequent perceivers base their expectations on target behavior, which has been altered because of a self-fulfilling prophecy. For example, if a teacher believes that girls cannot excel at math (on the basis of inaccurate stereotypes), and if this belief is self-fulfilling, by the end of the year, the girls in that class will score lower on standardized tests and receive lower marks than they would have in the absence of the teacher's expectations. If the next teacher bases expectations on this "lowered performance" and these expectations are also self-fulfilling, over time, the gap between girls and boys in this example may continuously increase. Self-fulfilling prophecies may also accumulate if perceivers' beliefs enact enduring changes in targets' self-conceptions.

Dissipation

Self-fulfilling prophecies may also dissipate over time. The dissipation hypothesis is that the impact of a perceiver's originally false expectation on targets diminishes over time. As time progresses, the perceiver's expectations have less and less of an influence on targets.

For example, if an employer believes that an employee is not very talented, the employer may cause the employee to perform at a slightly lower level by the end of the year. If self-fulfilling effects for the next year occur in the reverse direction or do not occur, the employee's performance may return to baseline levels. In this case, the impact of the original perceiver's expectations on the employee's performance will decline over time.

Dissipation may occur for several reasons. First, over time, people interact with many perceivers. Different perceivers may hold competing expectations for targets. These competing expectations may cancel each other out.

Second, dissipation may occur because self-fulfilling effects are not powerful enough to overcome regression to the mean. Unless a causal process acts to maintain the self-fulfilling effects of the originally false expectation, the effect of the original expectation on the target will tend to decrease with time. For example, suppose two students (A and B) of equal ability have similar standardized test scores when entering 6th grade. Yet, for some reason, the 6th-grade teacher believes that Student A is brighter than Student B. Suppose that the 6th-grade teacher's expectations are self-fulfilling so that Student A receives a standardized test score that is 0. 5 *SD* above the mean at the end of 6th grade, whereas Student B scores 0. 5 *SD* below the mean. Thus, by the end of 6th grade, there is a difference of 1 *SD* between the scores of Student A and Student B, where there was no prior difference.

Now suppose that student achievement in 6th grade correlates about . 7 with student achievement in 7th grade (meaning that student achievement is not perfectly stable from year to year). In the absence of social or psychological processes sustaining the 1 *SD* difference between the students, by the end of 7th grade, Student A will now score 0. 35 *SD* above the mean and Student B will score 0. 35 *SD* below the mean on a standardized test. The difference between the scores of Student A and Student B has now decreased to 0. 7 *SD* when it had been 1 *SD*. If this process continued over time, the difference in achievement between Student A and Student B would eventually decline to virtually 0.

Finally, dissipation may also occur because targets may become less susceptible to perceivers' expectations over time. When targets first interact with perceivers, they are in a new situation. Thus, they may be unsure of themselves and, as a result, they may be initially more attentive to perceivers' expectations. Indeed, research has demonstrated that self-fulfilling prophecies are stronger for targets in new situations (see reviews by Jussim, 1990; Jussim et al., , 1996). However, over time, as targets become more comfortable and more familiar with the situation, they may become less susceptible to confirming perceivers' expectations.

Stability

The stability hypothesis is that self-fulfilling prophecies created by a perceiver's expectations at one time are simply maintained over time. That is, a perceiver's originally false belief influences targets to the same degree over time. Thus, self-fulfilling prophecies persist, but neither increase nor decrease in strength with time.

For example, suppose that a trainer holds inappropriately low expectations for a long-distance runner (Runner A) and inappropriately high expectations for another runner (Runner B). As a result, Runner A shows an initial decline in progress that persists over the following months. Thus, Runner A, who normally would have improved her time by 2 min each month, only improved her time by 30 s each month. In contrast, Runner B, who also would have typically improved her time by 2 min each month, actually improved her time by 2 min and 30 s each month. Consequently, by the end of the 4-month season, the trainer's expectations led to an 8-min gap between the two runners' times.

The next season, both Runner A and Runner B return to improving their times by 2 min each month. Although Runner A is now improving at expected levels, she will not make up for the deficit in performance due to the previous season unless she shows even greater improvement each month. Thus, other things being equal, the 8-min gap between Runners A and B persists over time (consistent with the stability hypothesis). Over time, the impact of the original perceiver's expectations on target behavior remains consistent.

Perceiver's expectations may influence targets to the same degree over time because of "ceiling" or "floor" effects. Although a perceiver may hold inappropriately high or low self-fulfilling expectations for a target, there may be a limit to the amount target behavior will change. In the above example, the runners' times did not decline or improve more and more over time (as would be consistent with accumulation), they simply remained at a lower (and higher) level than they would have without the impact of the original trainer's expectations.

Perceiver's expectations may also influence targets to the same degree over time because they may change targets' course of progress. For example, the trainer's inappropriately low expectations for Runner A diminished her improvement in times over the season. Although Runner A's improvement may return to expected levels in the next season, she may not be able to make up for the deficit caused by the previous season. Similarly, if a teacher holds inappropriately low expectations for a 7th-grade student in math, and that student only earns a C in the course, the student may be placed into a lower math class the next year. This setback may permanently reduce the amount of math material this student has the opportunity to learn from then through high school.

Evidence for Accumulation, Dissipation, and Stability

Many social psychological reviews have emphasized the power of expectations to create social reality in part because of the potential power of self-fulfilling prophecies to accumulate (see, e. g. , E. E. Jones, 1990; Snyder, 1992; Taylor, 1993). However, only four studies have actually empirically assessed the extent to which self-fulfilling prophecies accumulate, dissipate, or remain stable. We discuss these studies next.

Rosenthal and Jacobson (1968)In this study, experimenters led teachers to believe that some students, labeled *late bloomers,* would show dramatic increases in achievement by the end of the year. Although the late bloomers were chosen at random, they did show greater increases in IQ in comparison with control students by the end of the year.

The late bloomers and control students took IQ tests again 1 year later, at the end of 2nd grade. If self-fulfilling prophecies accumulated, then the late bloomers should have shown even greater increases in IQ compared with controls for the 1-year follow-up. This was not the case. Late bloomers gained 3. 18 more IQ points, on average, compared with controls in the first year of the study, but were only 2. 67 points higher in the second year. These results support the dissipation hypothesis.

However, because Rosenthal and Jacobson's study (1968) was experimental and involved the induction of false expectations, the relevance of this study to naturally occurring situations is unclear. This study did not indicate whether self-fulfilling prophecies dissipate under naturalistic conditions.

Rist (1970)Rist (1970) followed a class of inner-city students from kindergarten to 2nd grade. Because Rist's study did not include quantitative measures of student achievement, he used table assignment as a criterion for identifying the self-fulfilling effects of teachers' expectations on students. In kindergarten, students were divided among three tables. Table 1 (high group) was composed of the middle-class and best-dressed students, whereas Table 2 (middle group) was composed of poorer and less well-dressed students, and Table 3 (low group) was composed of the poorest and least well-dressed children.

In 1st grade, the teacher placed students from Table 1 at Table A (high group) and all of the students from Tables 2 and 3 at Table B (middle group). Only 1 of the students from the kindergarten class was placed at the lowest ability table, Table C, which was composed mostly of students repeating the grade. Thus, at this first transition, differences among students based on table assignment had declined. Although students from the high-ability table remained at a high-ability table, the students from the middle- and low-ability tables in kindergarten were combined into one middle-ability table in first grade.

In 2nd grade, students from Table A were assigned to the "Tigers" (high group) and students from Table B and C were assigned to the "Cardinals" (middle group). None of the students from the 1st-grade class were assigned to the "Clowns" (low group). In addition, that year, 2 students from the Tigers were moved down to the Cardinals and 2 students from the Cardinals were moved up to the Tigers. By the end of 2nd grade, initial differences between students (on the basis of table assignment) had decreased. Although Rist (1970) interpreted these results as supporting accumulation, the results, based on table assignment, support the dissipation hypothesis.

However, this study had several limitations that render its relevance to the accumulation issue unclear. The study did not include quantitative measures of teachers' expectations or student achievement. Rather, Rist (1970) inferred teachers' expectations and effects on student achievement from table assignment. In addition, Rist's observations were based on an extremely small sample size (initial $n = 30$), and there was also a great deal of attrition—by the end of 2nd grade, there were only 10 students remaining in the sample.

West and Anderson (1976)West and Anderson (1976) analyzed data that included information on teachers' expectations and student achievement from3,000 male students in their freshman, sophomore, and senior years of high school. Results from this study would have supported accumulation if the path coefficients relating freshman-year teachers' expectations to senior-year achievement were larger than the path coefficients relating freshman-year teachers' expectations to sophomore-year achievement.

This was not the case. The path coefficient relating teachers' expectations to sophomore-year achievement was . 12, whereas the path coefficient relating teachers' expectations to senior-year achievement was . 06. These results support the dissipation hypothesis. Teachers' expectations from freshman year predicted senior-year achievement less strongly than they predicted sophomore-year achievement.

However, West and Anderson (1976) reported no information on methodology (what types of teacher expectation measures were used, when they were taken, and whether any control variables, other than previous achievement, were used). In addition, they did not test to see if the differences among the path coefficients relating teacher perceptions to sophomore- and senior-year achievement were significantly different. These coefficients might have been different simply because of sampling error. Thus, although their results suggested that dissipation occurred, their results may also have reflected a pattern of stability.

Frieze, Olson, and Russell (1991)In this study, researchers examined the relationship between facial attractiveness and salaries of master's of business administration (MBA) graduates. Results indicated that attractive MBA graduates, both men and women, made increasingly more money over time than did less attractive MBA graduates. That is, the salary gap between attractive and unattractive MBA graduates continued to increase over time. These results support the accumulation hypothesis.

However, employers' expectations for attractive versus unattractive MBAs were never assessed. Consequently, we can only speculate that employers' expectations about attractiveness influenced the salaries employees received. Furthermore, because social skill correlates with attractiveness (Eagly, Ashmore, Makhijani, & Longo, 1991; Feingold, 1992), the fact that attractive MBAs earned higher salaries over time could be due to better interpersonal skills on the job rather than to false expectations on the part of the employers.

Research Overview

Our study examined the power of self-fulfilling prophecies over time. First, we examined whether self-fulfilling prophecies accumulate, dissipate, or remain stable over time with multiple perceivers. To do so, we examined the relationship between teacher perceptions and student achievement from 6th through 12th grade in public school math classes. Multiple perceivers' expectations were used because every year from 6th through 12th grade, students were the target of different teachers' expectations.

Second, we examined whether self-fulfilling prophecies accumulate, dissipate, or remain stable over time with the same perceiver. In this case, we examined the relationship between teacher perceptions and student achievement across two semesters within a single school year. Over the school year, students had the same math teacher, so there is the same perceiver at Time 1 (first semester) and Time 2 (second semester). This is a particular strength of the current research because no other study that we are aware of has examined self-fulfilling prophecies over time with the same perceiver. In all previous studies examining self-fulfilling prophecies over time, passage of time is confounded with number of perceivers (see Rist, 1970; Rosenthal & Jacobson, 1968; West & Anderson, 1976).

The mechanisms by which self-fulfilling prophecies accumulate, dissipate, or remain stable may differ when one or more perceivers is involved. With multiple perceivers over time, the original perceiver's expectations must be continually renewed or induce a deep change in targets to persist. However, with the same perceiver over time, the perceiver and target are continually in contact. Thus, in this article, we examined self-fulfilling prophecies over time with multiple perceivers and with the same perceiver. This research will help to clarify whether accumulation, dissipation, or stability characterizes relations between perceivers' beliefs and targets' behavior over time.

Method

Participants

This study is based on the Michigan Study of Adolescent Life Transitions Project, which included data obtained from 12 public school districts in southeastern Michigan (Eccles, 1988). These data consist of information from parents, teachers, and students pertaining to students' academic and social development.

First, we examined self-fulfilling prophecies with multiple perceivers from 6th through 12th grade. The data we used to examine this issue (depending on the analysis we performed) included between 545 and 1,728 students and approximately 98 teachers. Second, we examined self-fulfilling prophecies over time with the same perceiver (with semester marks from a single school year). The analyses examining the relationship between 6th-grade teacher perceptions and 6th-grade semester marks included data from 1,023 students and 65 teachers. The analyses examining the relationship between 7th-grade teacher perceptions and 7th-grade semester marks included data from 1,888 students and 50 teachers.

Creation of the Eight Samples for the Multiple Perceiver Analyses

We created eight samples to examine self-fulfilling prophecies with multiple perceivers from 6th through 12th grade. [1] We examined the relationship between teacher perceptions and student achievement separately for teacher perceptions in 6th grade and teacher perceptions in 7th grade.

We used five samples to examine the relationship between teacher perceptions in 6th grade and student achievement. Note that these five samples are not independent. For three of the samples, we examined final math marks as the outcome measure and for the remaining two samples, we examined math standardized test scores as the outcome measure. In the Marks67 sample, we examined the relationship between 6th-grade teacher perceptions and math marks from 6th to 7th grade. This sample included data from 1,728 students and was the most inclusive sample. In the Marks610 sample, we examined the relationship between 6th-grade teacher perceptions and math marks from 6th through 10th grade (n = 1,097). In the Marks612 sample, we examined the relationship between 6th-grade teacher perceptions and marks from 6th through 12th grade (n = 545). In the Tests610 sample, we examined the relationship between 6th-grade teacher perceptions and math standardized test scores from 6th through 10th grade (n = 1,184). Finally, for the Tests612 sample, we examined the relationship between 6th-grade teacher perceptions and math standardized test scores from 6th through 12th grade (n = 691).

In three samples we examined the relationship between 7th-grade teacher perceptions and student achievement. For two of these samples, final math marks was the outcome measure and in the remaining sample, the outcome measure was math standardized test scores. Note that these three samples were not independent. For Marks710, we examined the relationship between 7th-grade teacher perceptions and math marks from 7th through 10th grade (n = 1,185). For Marks712, we examined the relationship between 7th-grade teacher perceptions and math marks from 7th through 12th grade (n = 590). Finally, for Tests712 we examined the relationship between 7th-grade teacher perceptions and math standardized test scores from 7th through 12th grade (n = 782).

Figure 1 - Timeline including when measures were assessed and the measures that were included in each of the eight samples. Samples with "6" or "7" following "Marks" or "Tests" used 6th- or 7th-grade teacher perceptions. Std = standardized.

Figure 1 depicts the eight samples and the measures included in each.

Questionnaires

Teacher perceptions.

One questionnaire was administered in October of the 6th-grade year and again in October of the 7th-grade year to assess teacher perceptions of their 6th-grade students and 7th-grade students, respectively. Math teachers rated each student in their math class on three dimensions. Teachers reported their perceptions of each student's performance, talent, and effort in math.

We combined the three teacher-perception variables (performance, talent, and effort) into a single variable (Teacher-Perception Scale) by first standardizing each component (performance, talent, and effort) and then summing them. We calculated the Teacher-Perception Scale separately for each of the eight samples. The reliability of the Teacher-Perception Scale in Marks67 was . 87.

Student perceptions.

Student questionnaires were administered shortly before the teacher questionnaires in late September or early October of the 6th-grade year and 7th-grade year. Students reported self-perceptions of effort in math, time spent on math homework, and self-concept of ability in math. Students also reported how much they valued math personally (*interest value*) and how useful they thought that math would be in their future (*utility value*). Two questions assessed students' self-concept of math ability; two other questions assessed students' interest value of math; and three questions assessed students' utility value of math. For each of these, we combined students' responses to create scales. Cronbach's alphas, to assess the reliabilities of the self-concept of ability, interest value of math, and utility value of math scales for Marks612, were . 82, . 86, and . 72, respectively.

Measures of Student Achievement

Previous achievement.

Fifth-grade final math marks and math percentile scores on one of four standardized achievement tests taken at the end of 5th grade or beginning of 6th grade were measures of previous achievement for analyses using 6th-grade teacher perceptions. Sixth-grade final math marks and math scores on the Michigan Educational Assessment Program (MEAP), a standardized test taken at the beginning of 7th grade, were measures of previous achievement for analyses using 7th-grade teachers' perceptions.

Future achievement.

For analyses examining self-fulfilling prophecies over time with multiple perceivers, final math marks from 6th- through 12th-grade math (with the exception of 8th grade, for which no data were available) were one measure of future achievement. In addition, scores on the MEAP, average math standardized test scores from 9th and 10th grade, and average math standardized test scores from 11th and 12th grade were measures of future achievement for the multiple perceiver analyses. Finally, the total number of math courses that students completed in high school was another measure of future achievement for the multiple perceiver analyses.

For analyses examining self-fulfilling prophecies over time with the same perceiver, first- and second-semester math marks from 6th grade were measures of future achievement for the 6th-grade analyses. Similarly, first- and second-semester math marks from 7th grade served as measures of future achievement for the 7th-grade analyses. Standardized test scores could not be used to examine the accumulation, dissipation, or stability of self-fulfilling prophecies over a single school year because standardized tests were taken only once during each school year.

Achievement variables.

We combined math percentile scores from standardized achievement tests taken in high school to form a single variable for 9th and 10th grade achievement and a second variable for 11th and 12th grade achievement. We combined standardized test data across years because there were too few students (less than 200) with valid data for each year of high school through 12th grade to examine the grade levels separately. In addition, a subsample size of 200 would have resulted in a loss of statistical power. So, by combining the standardized test data for 9th and 10th grade and for 11th and 12th grade, we included at least 500 students in every analysis through twelfth grade. [2]

To create the achievement variable for standardized tests taken in 9th or 10th grade, we averaged each student's math standardized tests scores from 9th and 10th grade. Thus, the variable for standardized tests taken in 9th or 10th grade could be equal to one score (if students took only one standardized test during 9th and 10th grade) or to an average of two or three scores (for students who took two or three standardized tests during 9th and 10th grade). We also used this procedure to create the achievement variable for standardized tests taken in 11th or 12th grade. Unfortunately, there were no available standardized test scores for 7th or 8th grade.

We computed final math marks in high school (9th through 12th grade) by averaging semester marks separately for each grade level. To compute final math marks in 9th grade, we averaged first- and second-semester math marks in 9th grade. The average could be equal to first-semester marks if students were missing second-semester marks, second-semester marks if students were missing first-semester marks, or to an average of both first- and second-semester marks. There were fewer students with marks from both semesters than with marks from a single semester. Thus, by including students who had valid marks for only one semester, we increased the number of students who were included in the analyses.

Results

Analyses with Multiple Perceivers

Preliminary analyses.

Table 1 presents descriptives for all variables by sample. Table 2 presents correlations for Marks67.

Assessing accumulation, dissipation, and stability across years.

A series of multiple regression analyses was used to test the accumulation, dissipation, and stability hypotheses. These analyses examined the relationship between teacher perceptions and student achievement from 6th through 12th grade or from 7th through 12th grade. For all analyses, the regression model included teacher perceptions, student motivation variables (self-concept of ability, self-perceptions of effort, time spent on homework, and interest and utility value of math), previous achievement (final math marks and math standardized test scores from the year prior to the year that teacher perceptions were assessed), and classroom dummy variables. Because teachers rated all of the students in their math classes, teacher perceptions were not independent of one another. Therefore, to render teacher perceptions independent of classroom, we included classroom dummy variables in all analyses. [3]

Results would be consistent with the accumulation hypothesis if the regression coefficients relating teacher perceptions to student achievement increased in magnitude each year. Results would be consistent with the dissipation hypothesis if the regression coefficients relating teacher perceptions to student achievement decreased in magnitude each year. Results would be consistent with the stability hypothesis if the regression coefficients relating teacher perceptions to student achievement remained of similar magnitude each year.

Marks: 6th through 7th grade.

A series of multiple regressions examined whether 6th-grade teacher perceptions led to self-fulfilling prophecies that accumulated, dissipated, or remained stable over time. In the first set of analyses, we examined Marks67.

Table 3 presents the results for the analysis of Marks67. The regression analyses demonstrated that teacher perceptions predicted final math marks in 7th grade less strongly than in 6th grade (βs = . 38 and . 27, *b*s = . 37 and . 31, respectively), *t*s(1606) > 9. 63, *p*s < . 001. This pattern of results suggests that self-fulfilling prophecies dissipated over time. To further examine this pattern, we performed additional analyses in LISREL8.

Testing differences among the regression coefficients.

We tested for differences among the regression coefficients using LISREL analyses. The sole purpose of these analyses was to determine whether the regression coefficients relating teacher perceptions to future achievement significantly differed in magnitude across years. We performed these analyses using LISREL models that included teacher perceptions, student motivation, and previous achievement as predictors of future achievement. In the LISREL analyses, there were no latent (unmeasured) variables. All variables—teacher perceptions, student motivation, previous achievement, and future achievement—were measured.

For the LISREL analyses, we used the same model as for the regression analyses (see Tables 3-10) with the following difference: To control for classroom in the LISREL analyses, we used residuals for all predictor variables in the model (i. e. , teacher perceptions, student motivation, and previous achievement). To obtain the residual variables, we regressed the predictors on the dummy variables controlling for classroom. Thus, we partialed out classroom for each predictor in the LISREL analyses.

For each sample, we tested whether the coefficients relating teacher perceptions to student achievement outcomes differed across years. We did so by specifying a model that assumed the path from teacher perceptions to achievement at Time 1 equaled the path from teacher perceptions to achievement at Time 2 and so on. For example, for Marks67, 6th-grade teacher perceptions, student motivation in 6th grade, and 5th-grade achievement predicted final math marks in 6th and 7th grade. We then estimated a model that assumed that the coefficients relating teacher perceptions to 6th- and 7th-grade final marks were identical.

If the equality assumption is viable, the chi-square value (which is an estimate of the model's goodness of fit) would be small and nonsignificant. If it is not viable to assume that the coefficients are the same, the chi-square value would be large and significant (indicating the model's poor fit). A significant chi-square means that the coefficients being compared are indeed significantly different.

For Marks67, the LISREL analyses indicated a marginally significant difference in the relationship of 6th-grade teacher perceptions to final math marks in 6th and 7th grade, $?^2(1, N = 1{,}728) = 2.\ 66$, $p = .\ 10$. The decline in the relationship of teacher perceptions to final marks in 6th and 7th grade (. 38 vs. . 27, standardized; . 37 vs. . 31, unstandardized) did not reach conventional levels of statistical significance. This failure to reach statistical significance is most consistent with the stability hypothesis. However, these results are partially consistent with the dissipation hypothesis because the decline in the relations between teacher perceptions and marks was approaching statistical significance.

Marks: 6th through 12th grade.

We performed two additional sets of analyses to examine the relationship between 6th-grade teacher perceptions and student marks. In the first, we examined Marks610, and in the second, Marks612. For all analyses, we did not examine achievement outcomes in 8th grade because we did not have data on 8th-grade final marks.

Table 4 presents the results for Marks610. The regression analyses demonstrated that teacher perceptions predicted final math marks less strongly each year from 6th through 10th grade (ßs = . 37, . 26, . 17, and . 10, respectively; *b*s = . 32, . 27, . 18, and . 12, respectively), *t*s(979) > 2. 37, *p*s < . 05. Analyses in LISREL indicated that the relationship between 6th-grade teacher perceptions and final math marks was different from 6th through 10th grade, $?^2(3, N = 1097) = 15.\ 34$, $p < .\ 01$. These results clearly support the dissipation hypothesis.

Table 5 presents the results for Marks612. The relations of teacher perceptions to final math marks weakened each year through 10th grade, but then leveled off through 12th grade (ßs = . 33, . 27, . 23, . 13, . 14, and . 17, respectively; *b*s = . 26, . 28, . 24, . 15, . 16, and . 20, respectively), *t*s(449) > 2. 30, *p*s < . 05. The LISREL analyses, however, indicated that the relationship between 6th-grade teacher perceptions and final math marks was not significantly different from 6th through 12th grade, $?^2(5, N = 545) = 4.\ 28$, $p = .\ 51$. The pattern of regression coefficients seems to be consistent with dissipation, but the differences among these coefficients (according to the LISREL analyses) were not significant.

The lack of statistically significant differences among the coefficients relating teacher perceptions to student achievement over time (the LISREL result) is most consistent with the stability hypothesis. Nonetheless, the pattern of regression coefficients relating teacher perceptions to student achievement seemed strikingly downward, going from a high of . 33 in 6th grade to lows of . 13 and . 17 in high school. Thus, the pattern of coefficients systematically declined from 6th through 12th grade. Such a pattern can probably best be interpreted as partially consistent with both the stability and dissipation hypotheses.

Standardized tests: 6th through 12th grade.

We used two sets of multiple regression analyses to examine the relationship between 6th-grade teacher perceptions and standardized math test scores from 6th through 12th grade (recall that standardized test data were not available for 7th or 8th grade). In the first set of regression analyses, we examined Tests610 and in the second, Tests612.

Table 6 presents the results for Tests610. Teacher perceptions predicted math standardized test scores equally as strongly for 6th as for 10th grade (ßs = . 09 and . 10, respectively); *b*s = 1. 00 and . 95, respectively), *t*s(1073) > 3. 06, *p*s < . 01. The LISREL analyses confirmed this pattern, $?^2(1, N = 1184) = 0.\ 013$, $p = .\ 91$, demonstrating results consistent with the stability hypothesis. Table 7 presents the results for Tests612. Teacher perceptions did not significantly predict student math standardized test scores for 6th, 10th, or 12th grade (*p*s > . 07). Thus, there was nothing to accumulate, dissipate, or remain stable over time.

Seventh-grade teachers' expectations.

We conducted the 7th-grade analyses in essentially the same manner as the 6th-grade analyses. Achievement outcomes included final marks in math from 7th through 12th grade (with the exception of 8th grade, for which no data were available) and average math standardized test scores from 9th and 10th grade and from 11th and 12th grade, respectively. Predictors of achievement outcomes included 7th-grade teacher perceptions, 7th-grade measures of student motivation, and final marks from 6th-grade math and math scores on the MEAP.

Marks: 7th through 12th grade.

We used two sets of multiple regression analyses to examine the relationship between 7th-grade teacher perceptions and final math marks from 7th through 12th grade. In the first set of regression analyses, we examined Marks710, and in the second, Marks712.

Table 8 presents the results for Marks710. The relations of 7th-grade teacher perceptions to final math marks weakened from 7th to 9th grade and then remained the same from 9th through 10th grade (ßs = . 46, . 23, and . 22, respectively; *b*s = . 51, . 26, and . 26, respectively), *t*s(1055) > 6. 25, *p*s < . 001. The LISREL analyses demonstrated that the relationship between 7th-grade teacher perceptions and final math marks was significantly different from 7th through 10th grade, $?^2(2, N = 1185) = 39.38$, $p < .01$. These results demonstrate initial dissipation followed by a pattern of stability from 9th through 10th grade.

Table 9 presents the results for Marks712. The relation of 7th-grade teacher perceptions to final math marks weakened each year from 7th through 9th grade and then leveled off from 10th through 12th grade (ßs = . 49, . 23, . 30, . 28, and . 26, respectively; *b*s = . 52, . 25, . 35, . 32, and . 32, respectively), *t*s(489) > 4. 73, *p*s < . 001. According to analyses in LISREL, the relationship between 7th-grade teacher perceptions and final math marks was significantly different from 7th through 12th grade, $?^2(4, N = 590) = 19.81$, $p < .01$. These results demonstrate an initial pattern of dissipation, followed by stability from 9th through 12th grade.

Standardized tests: 7th through 12th grade.

Using another set of multiple regression analyses, we examined the relationship between 7th-grade teacher perceptions and standardized math test scores from 9th through 12th grade. Table 10 presents the results from Tests712. Seventh-grade teacher perceptions predicted student math standardized test scores less strongly from 9th through 12th grade (ßs = . 16 and . 09, respectively; *b*s = 1. 41 and . 93, respectively), *t*s (676) > 2. 54, *p*s < . 05. However, the LISREL analyses indicated that the relationship between 7th-grade teacher perceptions and math standardized test scores did not differ from 10th through 12th grade, $?^2(1, N = 782) = 1.38$, $p = .24$. Although the pattern of regression coefficients suggests dissipation, the differences among the coefficients were not significant, demonstrating a pattern that is consistent with the stability hypothesis.

Analyses examining high school math courses.

We examined the potential long-term consequences of teacher perceptions on student achievement via another route. If teacher perceptions influence students' involvement and motivation in math class, they may affect whether students choose to further pursue their math education. Thus, we investigated the potential enduring effects of teacher perceptions on students' academic experience by examining the number of math courses that students took in high school. In high school, after students meet requirements, they usually can select their class schedule. Perhaps students who had more positive experiences in 6th- and 7th-grade math classes took a greater number of math courses in high school.

Using multiple regression analyses, we examined the relationship between teacher perceptions in 6th grade and the total number of nonremedial math courses that students took in high school. We excluded remedial math courses (e. g. , general math and pre-algebra) from the total number of math courses that each student took because students in these classes are generally required to take them. For all analyses, the regression model included teacher perceptions, student motivation, and previous achievement as predictors of the number of nonremedial math courses that students took in high school. The analyses indicated that 6thgrade teacher perceptions did not significantly predict the number of nonremedial math courses that students took in high school ($p > .06$).

However, 7th-grade teacher perceptions did significantly predict the number of nonremedial math courses that students took in high school (ß = . 13), $t(588) = 3.23$, $p < .01$ (see Table 11). As 7th-grade teacher perceptions of students increased, the total number of math courses they took in high school also increased. For every 1 *SD* increase in teacher perceptions, students took an average of 0. 25 more math courses in high school. Although not directly testing the accumulation, dissipation, or stability hypotheses, these analyses did demonstrate a long-term, enduring impact of teacher perceptions.

Analyses With the Same Perceiver Over Time

In addition to examining the relationship between teacher perceptions and student achievement across school years with multiple perceivers, we also examined the relationship between teacher perceptions and student achievement over the course of a single school year with the same perceiver. We used multiple regression analyses to examine whether teacher perceptions predicted changes in students' marks more strongly (accumulation), less strongly (dissipation), or to the same degree (stability) across semesters over the course of 1 school year. The regression models for the 6th- and 7th-grade semester analyses were identical to the those used in the multiple perceiver analyses (for 6th and 7th grade, respectively). The only difference was the outcome variable. In this case, it was semester marks. Subsequent analyses in LISREL compared whether the relationship between teacher perceptions and first-semester marks was significantly different from the relationship between teacher perceptions and second-semester marks for the 6th- and 7th-grade analyses.

Teacher perceptions predicted second-semester marks less strongly than they predicted first-semester marks in 6th-grade math (ßs = . 49 and . 34, respectively; *b*s = . 44 and . 33, respectively), *t*s(942) 10. 79, *p*s < . 001. Table 12 presents the results from this set of regression analyses. Follow-up LISREL analyses indicated that the relationship between 6th-grade teacher perceptions and 6th-grade first-semester math marks was significantly different from the relationship between 6th-grade teacher perceptions and 6th-grade second-semester math marks, $?^2(1, N = 1{,}023) = 13.25$, $p < .01$. These results support the dissipation hypothesis.

We used multiple regression analyses to also examine the relationship between teacher perceptions in 7th grade and students' 7th-grade semester marks in math. Teacher perceptions predicted second-semester marks less strongly than first-semester marks in 7th-grade math (ßs = . 51 and . 40, respectively; *b*s = . 60 and . 50, respectively), *t*s(1761) > 18. 07, *p*s < . 001. Table 12 also presents the results from this set of regression analyses. Once again, LISRELanalyses demonstrated that the relationship between 7th-grade teacher perceptions and first-semester math marks in 7th grade was significantly different from the relationship between 7th-grade teacher perceptions and 7th-grade second-semester marks, $?^2(1, N = 1{,}888) = 12.88$, $p < .01$. These results also support the dissipation hypothesis.

Discussion

Results were consistent with both the dissipation and stability hypotheses. All but one analysis demonstrated a pattern consistent with the dissipation hypothesis. The relationship between teacher perceptions and future student achievement declined over time. This pattern of results reached statistical significance in three of the seven multiple-perceiver analyses (three of the five analyses with marks, neither of the two analyses with standardized test scores) conducted over 2 or more school years. This pattern of results also reached statistical significance in both same-perceiver analyses conducted over a single school year. Thus, dissipation was not restricted to situations in which multiple perceivers are involved. For an illustration of this pattern, see

Figure 2 - Results for all analyses examining marks. The figure illustrates a pattern consistent with dissipation. Teacher perceptions predicted math marks less strongly over time. Values after bars are standardized regression coefficients. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 2.

Results consistent with stability were also found. Three of the seven multiple-perceiver analyses (two of the five analyses with marks, one of the two analyses with standardized test scores) showed that the decline in the relationship of teacher perceptions to future student achievement across school years was not statistically significant (one analysis found no evidence of self-fulfilling prophecies at all). For an illustration of this pattern, see

Figure 3 - Results for all analyses examining standardized test scores. The figure illustrates a pattern consistent with dissipation and stability. Values after bars are standardized regression coefficients. Betas relating 6th-grade teacher perceptions to standardized test scores in 6th (. 08) and 10th grade (. 07) are marginally significant at $p < .08$. * $p < .05$. ** $p < .01$. *** $p < .001$.

Figure 3.

Whether the pattern of results was consistent with dissipation or stability, the results from this study demonstrate that teacher perceptions had long-lasting effects on student achievement. The strength of the relationship between 6th-grade teacher perceptions and student math marks in high school initially diminished and then remained steady through 12th grade with an effect size of around . 15. Similarly, the strength of the relationship between 7th-grade teacher perceptions and student marks diminished from 7th through 9th grade, but then hovered around an effect size of . 25 through 12th grade. We also found that students who were the targets of higher expectations in 7th grade took a greater number of nonremedial high school math courses than students who were the targets of lower expectations. Thus, although we found no support for the accumulation hypothesis, our results were consistent with the conclusion that self-fulfilling prophecies can have long-lasting effects. Taken together, these results raise the possibility that perceivers' expectations influence target behavior long after contact between perceiver and target has ceased.

Limitations

Perceiver data.

This study has several important limitations. One limitation is that perceiver data (teacher perceptions) was available only from 6th and 7th grade. Although these data provided the opportunity to examine self-fulfilling prophecies over time, it did not afford the opportunity to examine self-fulfilling prophecies produced by teachers' expectations before 6th grade or after 7th grade. However, previous studies have shown that dissipation occurs with teacher perceptions in early elementary school (kindergarten through 2nd grade; see, e. g. , Rist, 1970; Rosenthal & Jacobson, 1968) and in high school (9th grade to 12th grade; see, e. g. , West & Anderson, 1976).

Omitted variables.

Another important limitation involves omitted variables. Path coefficients only reflect causal effects when all relevant causes of student achievement have been included in the model. If teacher expectations and student achievement are caused by a third variable that has been omitted from the model, then the model may yield inflated path coefficients relating teacher expectations to student achievement (i. e. , a spurious relation). Unfortunately, no matter how many potential sources of spuriousness are assessed, it is impossible to know if all such sources have been included.

Although this problem can never be completely overcome, it can be minimized by including extensive control variables. Few naturalistic studies have included more controls (including previous achievement test scores and grades, in addition to five student-motivation variables) than we have. Thus, these findings provide some of the clearest evidence to date consistent with the conclusion that teacher expectations can have long-term influences on the achievement of some students. Such a conclusion will warrant revision when future research demonstrates empirically that there are important sources of accuracy in teacher perceptions other than those assessed in this study.

It is also important to understand the nature of the omitted-variables limitation for understanding our research. Suppose that we omitted important variables that cause both student achievement and teacher expectations. This has a very specific implication—that teachers' expectations are more accurate and even less self-fulfilling than we have suggested. Conceptually, this omitted variable "critique" strengthens the overall conclusion reached by nearly all naturalistic studies of teacher-expectation effects (Jussim, 1989; Jussim & Eccles, 1992; Jussim et al. , 1996; Smith et al. , 1998; West & Anderson, 1976; Williams, 1976), including the present study: The self-fulfilling prophecies produced by teacher expectations are typically small and generally become even smaller over time. Nonetheless, it is important to keep these limitations in mind when interpreting our findings, because the potential for an omitted-variable problem is always present in naturalistic research.

Attrition.

Another limitation of this study is attrition. Data from about 400 students from 6th through 12th grade were not available. We may have underestimated self-fulfilling prophecies in this study if students for whom self-fulfilling prophecies are more powerful were disproportionately less well-represented in the data set through 12th grade.

However, to minimize this limitation, we used eight separate samples to maximize the number of students included in each analysis. Total attrition was considerably less from 6th to 7th grade than it was from 6th through 12th grade. If attrition led us to underestimate self-fulfilling prophecies, one would expect that regression coefficients relating teacher perceptions to student achievement would be smaller for the samples extending through 12th grade than for the samples extending through 7th and 10th grade. This was not the case. The magnitudes of these regression coefficients were quite similar across samples, suggesting that self-fulfilling prophecies were not underestimated in the smaller samples. And, despite attrition, effect sizes were comparable to those typically found in other studies (e. g. , see Rosenthal & Jacobson, 1968; West & Anderson, 1976; Williams, 1976; see Brophy, 1983; Jussim, 1991, for reviews; see Raudenbush, 1984; Rosenthal & Rubin, 1978, for meta-analyses). This suggests that attrition did not likely have a large impact on our results.

Shared method variance between teacher perceptions and marks.

Shared method variance between teacher perceptions and marks may provide an alternative explanation for our results consistent with dissipation. In the first year of assessment (either 6th or 7th grade), teachers rated student performance, talent, and effort, and assigned student math marks. Individual differences among teachers in the use of rating scales (whether regarding researcher-generated perception scales or traditional marks) could artificially inflate the relations of teacher perceptions to marks in the first year of assessment. If these relations are artificially inflated, then the relations between teacher perceptions and marks in subsequent years may be smaller. This may occur not because of any true decline in expectancy effects, but rather because the artificial inflation that results when the same teacher provides perceptions and marks evaporates when a different teacher (in subsequent years) provides marks.

However, there are several points that one could use to argue against this interpretation of our results. First, we found evidence of dissipation with the same teacher within the same school year. In this case, we found dissipation even when the same teacher assigned marks at Time 1 and Time 2. Furthermore, we found that the decline in relations between teacher perceptions and marks over a single school year was about the same or even larger in magnitude than the decline in relations between teacher perceptions and marks across years. This means that dissipation does not simply occur because a different teacher assigns marks at Time 1 than at Time 2. Second, the drop in the relations of teacher perceptions in marks in 6th and 7th grade was not even statistically significant. This fails to support the method variance explanation. Overall, therefore, although shared method variance may account for a small portion of the evidence of dissipation, it cannot account for the clear and consistent evidence of dissipation we found both within the same year (teacher) and across many years (teachers).

Why Dissipation?

Multiple perceivers.

Dissipation may have occurred because there were multiple perceivers over time. Each year from 6th through 12th grade, students had different teachers (perceivers). Thus, for the original perceiver's false expectation to be maintained, subsequent perceivers would have to hold very similar expectations for targets. This means that for 6th-grade teachers' expectations to continue to influence students (or to accumulate), it was necessary that they were continually renewed by other teachers with similar expectations. If different perceivers hold different expectations, the original self-fulfilling prophecy from Time 1 may not accumulate. Rather, it may be replaced or diluted by the effect of subsequent self-fulfilling prophecies. Thus, dissipation may occur simply because the original self-fulfilling prophecy is not maintained.

It is also clear, however, that the multiple-perceiver explanation cannot provide a full explanation of our results supporting dissipation. We explicitly examined self-fulfilling prophecies over time with the same perceiver and also found support for dissipation. Thus, even with the same perceiver over time, self-fulfilling prophecies became weaker. These results suggest that factors other than multiple perceivers holding conflicting expectations may help explain why dissipation, rather than accumulation occurred.

Regression to the mean.

We may have found results consistent with dissipation because of regression to the mean. *Regression to the mean* refers to the general tendency for extreme performances to return toward the average. Self-fulfilling prophecies can be considered as pushing students' achievement away from their average achievement—either because negative perceptions lower achievement gains or because positive perceptions raise achievement gains. Unless some causal process acted to strengthen or maintain the relationship between 6th-grade teachers' originally false perceptions and student achievement, student achievement would tend to return to what it was prior to the effect of teacher perceptions. This tendency would lead the self-fulfilling induced differences between students who were the targets of high and low expectations in 6th and 7th grade to lessen in each following year—that is, to dissipate.

Decreased target susceptibility.

Dissipation could also result from decreased target susceptibility over time (especially over time with the same perceiver). Students may be more susceptible in the beginning of the year to teachers' expectations, but less so as the year progresses. Previous research suggests that targets are more susceptible to self-fulfilling prophecies when they are in a new situation. Evidence of the strongest self-fulfilling prophecies has been found among new military trainees (Eden & Ravid, 1982) and among students in 1st, 2nd, and 7th grade (Raudenbush, 1984; Rosenthal & Jacobson, 1968). In each of these cases, targets were in a novel environment. It may be that when targets are in a new situation, they pay especially close attention to perceivers' expectations for clues on how to act. However, as targets become more comfortable in their roles and feel that they know how to behave, they may become less susceptible to perceivers' expectations.

This explanation is also consistent with results from a meta-analysis demonstrating that teacher perceptions led to more powerful self-fulfilling prophecies when they were induced early, rather than later in the year (Raudenbush, 1984). Raudenbush's interpretation of these results was that early in the year, teachers did not know students well, so that the induction of false expectations was more credible, and thus more effective. However, it is also possible that students became less susceptible to teachers' expectations as the year continued. The above two explanations are not mutually exclusive. More research is necessary to examine how target susceptibility to perceivers' expectations varies over time.

Why Were Effects Long Lasting?

Even though our results supported dissipation and stability, they also demonstrated that teacher perceptions continued to predict student achievement for up to 7 years. Such enduring impact is striking. There are several possible explanations for these long-lasting effects, including target vulnerability and external factors such as school policy.

Target vulnerability.

Targets may be more susceptible to confirming perceivers' beliefs not only at the beginning of a relationship, but also when targets are unsure of themselves. It may be that 6th- and 7th-grade years are particularly vulnerable times for students. Usually at this time, students are making the transition from elementary school to junior high, when more advanced math topics, such as algebra and logic, are introduced. It may be that students are more likely to confirm false teacher perceptions at this time because students are unsure of their ability at more advanced math. Research suggests that students' self-concepts of math ability do indeed become less stable during the transition to junior high (Eccles et al. , 1989, 1993). Research also demonstrates that self-fulfilling prophecies are more likely to occur when targets hold weak self-concepts (Swann & Ely, 1984). If students' self-concepts are influenced by teacher perceptions in junior high school and these self-fulfilling prophecies alter student self-concepts, the effects of self-fulfilling prophecies may persist through high school.

School policy.

Changes in student achievement due to self-fulfilling prophecies in 6th or 7th grade may be maintained by school policy so that they do not completely dissipate over time. A self-fulfilling prophecy that occurs in 6th or 7th grade may affect student placement in math. For example, if a teacher has inappropriately low expectations for a student, that teacher may place the student in a lower level math class. Because placement in math is usually based on previous knowledge, once a student is placed in a lower track or a lower level class, that student may not be able to catch up to students in higher tracks or to those who originally took a higher level class. In this way, self-fulfilling prophecies in 6th or 7th grade may create differences that are maintained through high school.

Implications

Many studies have demonstrated that self-fulfilling prophecies are typically neither powerful nor pervasive (see reviews by Brophy, 1983; Jussim, 1991; Jussim & Eccles, 1995). On average, self-fulfilling prophecies generally have an effect of about . 2 on target behavior (see reviews by Jussim, 1991; Jussim & Eccles, 1995; meta-analysis by Rosenthal & Rubin, 1978). Our study suggests that although the power of self-fulfilling prophecies in terms of effect size may be relatively small (ranging from . 15 to . 25 in our study), their presence over time is quite remarkable. The current literature examining the power of self-fulfilling prophecies has only done so within the context of brief, experimental situations or over a limited time frame in naturalistic settings. This study is the first to examine the relationship between teacher perceptions and student achievement over a span of 7 years. Our study demonstrated that perceivers' beliefs influenced targets up to 6 years after the original contact between perceiver and target. When a perceivers' false beliefs continue to influence a target with whom the perceiver has no contact 6 years later, even if the effect size is only . 2, its impact may be considered dramatic.

Expectancy effects and social problems.

Our results also have indirect implications for the idea that self-fulfilling prophecies contribute to social problems. Hypothetically, self-fulfilling prophecies may contribute to social problems through accumulation. For example, perceivers may expect more from targets belonging to certain groups (e. g. , Whites, men) than from targets belonging to other groups (e. g. , African Americans, women). If the self-fulfilling prophecies produced by those expectations accumulate over time, they could ultimately lead to large differences between groups.

Three previous studies examined whether the self-fulfilling prophecies produced by teacher expectations accumulate (Rist, 1970; Rosenthal & Jacobson, 1968; West & Anderson, 1976). Like the present study, all three found evidence of dissipation—relations of teacher expectations to students' achievement declined over time. A fourth study found evidence consistent with accumulation (Frieze et al. , 1991), but this study did not (a) examine teacher expectations and student achievement (it examined the income of people with MBA degrees); or (b) measure perceivers' expectations, leaving open the possibility of alternative explanations for results seemingly supporting accumulation (see Jussim & Eccles, 1995, for a detailed critique).

Regardless of one's interpretation of Frieze and colleagues' (1991) study, there is no evidence that teacher expectation effects accumulate over time. The research on teacher expectations, therefore, provides little support for common claims suggesting that self-fulfilling prophecies are a major, driving force behind social problems (e. g. , Chen & Bargh, 1997; Devine, 1995; E. E. Jones, 1986, 1990; J. Jones, 1997; Snyder, 1984). Nonetheless, the enduring nature of the self-fulfilling prophecies we did find suggests that expectancy effects could provide a modest contribution to social problems. The self-fulfilling prophecy effects that occur in 1 year may, on average, lead to small differences between targets of high and low expectations that endure for a very long period of time.

These conclusions, however, currently must be restricted to the classroom context. Future research is necessary to examine self-fulfilling prophecies over time in other contexts. Whether parents' expectations for their children, employers' expectations for their employees, or clinicians' expectations for their clients lead to self-fulfilling prophecies that accumulate, dissipate, or remain stable over time is currently unknown.

Expectancy effects in the classroom.

Because of the alleged power of expectancy effects to create social problems, teachers have sometimes been accused of being perpetrators of injustices (e. g. , Gilbert, 1995; Hofer, 1994; Rist, 1970; Taylor, 1993). Nonetheless, research from the last 25 years has shown that teacher perceptions predict student achievement far more because of accuracy than because of self-fulfilling prophecy (see reviews by Brophy, 1983; Jussim, 1991). Even teacher perceptions of differences among students from different demographic groups are mostly accurate (Jussim et al. , 1996; Madon et al. , 1998). Furthermore, even when inaccurate, teacher perceptions do not usually influence students all that much (Brophy, 1983; Jussim, 1991; Jussim et al. , 1996). When they do influence students, teacher perceptions may be more likely to help than to harm students (especially low achievers; see Madon et al. , 1997), and they are likely to dissipate over time.

Conclusion

The current study provided the most rigorous test of the accumulation of self-fulfilling prophecies to date. In the present research, we analyzed data from students for up to 7 years to track the effects of teachers' expectations on student achievement. In addition, we examined two separate starting points for accumulation, using teachers' expectations in both 6th and 7th grade. This research also examined the accumulation issue in two ways: once with multiple perceivers and again with the same perceiver over time. Furthermore, we included the most extensive controls to date in studies of this kind, as well as two outcome measures of achievement (final math marks and standardized math test scores).

Despite the evidence of dissipation, a second striking pattern emerged. Our results were consistent with the conclusion that self-fulfilling prophecies occurring in 1 year endured up to 6 years later (even if in diluted form). These long-lasting relations occurred in a situation in which perceivers had a wealth of objective information about targets and in which there was a great deal of contact among perceivers and targets. Expectancy effects that persist so long in such a context are quite remarkable.

However, the claim or implication that self-fulfilling prophecies accumulate has long been presented as a rationale supporting the conclusion that self-fulfilling prophecies are powerful and important contributors to social problems (Jussim, 1991; Merton, 1948; Snyder, 1984). Our results, however, did not provide any evidence of accumulation. Of the four studies (ours included) that have examined this issue in classrooms, none has found evidence of accumulation (Rist, 1970; Rosenthal & Jacobson, 1968; West & Anderson, 1976). Thus, it is no longer necessary to speculate on what may happen if self-fulfilling prophecies accumulate. At least in the classroom, they do not. And, although it is possible that self-fulfilling prophecies may accumulate in contexts other than the classroom, a lack of evidence on this issue does not provide a firm basis for concluding that self-fulfilling prophecies accumulate in these areas. A challenge for future empirical research, therefore, is to discover whether conditions actually exist under which self-fulfilling prophecies accumulate over time.

Footnotes

1

Attrition was an important concern regarding the multiple perceiver analyses because to be included in the analyses students had to have valid data through 12th grade. For example, to examine the relationship between teacher perceptions and student achievement from 6th to 12th grade, it is necessary that the same students are in all of the analyses (e. g. , analyses using teacher perceptions to predict achievement in 6th, 7th, 9th, 10th, 11th, and 12th grade). Data through 12th grade were not available for students who moved, changed school districts, or had been held back in school. The average attrition rate in the data set was about 20% each year. For example, there were 957 students with valid data from 6th through 10th grade and 744 students with valid data from 6th through 11th grade. Thus, we used eight different samples in order to maximize the number of students who could be included in the analyses.

2

We converted all of the high school standardized test scores to percentiles so that scores on different tests were comparable. Districts administered the following tests in either 9th or 10th grade: (a) the California Achievement Test (CAT, administered in both 9th and 10th grade) and (b) the MEAP (administered in 10th grade). Districts administered the following tests in either 11th or 12th grade: (a) the CAT (administered in 11th grade); (b) the California Test of Basic Skills (administered in 11th grade); (c) the Preparatory Scholastic Aptitude Test (administered in 11th grade); and (d) the American College Testing Program (administered in 11th or 12th grade).

3

Using dummy codes to control for classroom variation removes nonindependence among classrooms, but treats classroom as a fixed, rather than a random, variable. This may limit the generalizability of our conclusions.

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Received: September 29, 1998. Revised: April 6, 1999. Accepted: April 6, 1999.

Source: Journal of Personality and Social Psychology. Vol. 77 (3) September 1999, pp. 548-565
Accession Number: ***psp773548*** **Digital Object Identifier:** 10.1037/0022-3514.77.3.54810.1037/0022-3514.77.3.548

Table 1

Descriptives by Sample for the Multiple Perceiver Analyses

	Marks67		Marks610		Marks612		Marks710		Marks712		Tests610		Tests612		Tests712	
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Teacher perceptions	0.00	2.68	0.00	2.68	0.00	2.68	0.00	2.63	0.00	2.64	0.00	2.68	0.00	2.68	0.00	2.61
Self-ability	10.17	2.46	10.40	2.34	10.67	2.18	10.34	2.29	10.63	2.19	10.30	2.36	10.78	2.11	10.64	2.22
Self-effort	5.73	1.31	5.77	1.28	5.83	1.31	5.28	1.45	5.31	1.42	5.74	1.31	5.82	1.28	5.36	1.40
Time on homework	2.45	0.87	2.45	0.87	2.41	0.88	2.43	0.84	2.40	0.82	2.46	0.86	2.41	0.85	2.43	0.83
Utility math value	18.35	3.12	18.50	3.02	18.66	2.85	17.56	3.54	17.82	3.37	18.53	2.99	18.64	2.90	17.67	3.46
Interest math value	9.45	3.45	9.62	3.34	9.67	3.31	9.35	3.19	9.49	3.21	9.50	3.41	9.72	3.20	9.43	3.23
Marks for each grade																
5th	11.45	2.48	11.88	2.23	12.39	2.06					11.71	2.29	12.38	1.97		
6th	11.51	2.58	12.04	2.32	12.43	2.13	11.91	2.39	12.30	2.21					12.39	2.10
7th	10.28	3.11	10.93	2.83	11.47	2.76	10.80	2.92	11.33	2.79						
9th			10.06	2.88	10.77	2.82	9.98	2.91	10.69	2.83						
10th			9.66	3.10	10.41	3.06	9.58	3.16	10.31	3.08						
11th					10.27	3.04			10.18	3.05						
12th					9.67	3.24			9.54	3.30						
5th-percentile rank	61.41	25.54	66.01	24.12	72.89	21.95					65.16	24.47				
MEAP in 7th grade							23.45	4.29	24.26	3.88	23.56	4.27	71.95	21.68	24.45	3.50
10th-percentile rank											50.73	25.43	58.40	22.98	58.05	22.78
12th-percentile rank													56.16	26.66	55.66	26.68

Note. Higher values reflect higher scores for all measures. Empty cells do not have data for the particular sample. We computed teacher perceptions by summing teacher perceptions of performance, talent, and effort, after standardizing each. Percentile rank = standardized test scores; MEAP = Michigan Educational Assessment Program.

Table 2

Correlations Among 6th-Grade Teacher Perceptions and Final Math Marks From 6th Through 7th Grade (Marks67; n = 1,728)

Variable	1	2	3	4	5	6	7	8	9	10
1. Teacher perceptions	—	.63	.58	.72	.55	.15	−.15	.47	.20	.24
Achievement										
2. 5th-grade percentile rank[a]	.65	—	.62	.63	.56	.05	−.12	.41	.15	.17
3. 5th-grade marks	.58	.58	—	.65	.60	.12	−.08	.39	.14	.19
4. 6th-grade marks	.74	.64	.66	—	.63	.16	−.11	.16	.18	.25
5. 7th-grade marks	.57	.54	.57	.66	—	.12	−.10	.12	.11	.18
Student motivation										
6. Effort in math	.16	.04	.11	.17	.13	—	.12	.27	.27	.27
7. Time spent on homework	−.15	−.15	−.13	−.15	−.12	.12	—	−.11	.07	−.01
8. Self-concept of ability	.49	.42	.40	.49	.35	.26	−.12	—	.25	.43
9. Utility math value	.22	.17	.16	.20	.13	.26	.08	.25	—	.33
10. Interest math value	.29	.24	.25	.32	.21	.28	−.04	.45	.33	—

Note. Correlations ≥|.05| were significant at $p \leq .05$. To the left of the diagonals, correlations are reported for residual variables (controlling for class). To the right of the diagonal, correlations are reported between variables (not controlling for class).

[a] Standardized tests taken in 5th or early 6th grade.

Table 3
Sixth-Grade Teacher Perceptions Predicting Final Math Marks From 6th Through 7th Grade (Marks67; n = 1,728)

	6th-grade math marks			7th-grade math marks		
Predictor variable	β	*b*	*t*(1606)	β	*b*	*t*(1606)
Teacher perceptions	.38	.37	18.88***	.27	.31	9.63***
Self-concept of ability	.07	.07	3.94***	.01	.01	.25
Self-perception of effort	.03	.06	2.13*	.05	.12	2.57*
Time on homework	−.02	−.05	−1.05	−.02	−.05	−0.75
Utility math value	−.00	−.00	−0.20	−.02	−.02	−1.02
Interest math value	.04	.03	2.55*	.00	.00	0.14
5th-percentile rank[a]	.18	.02	8.62***	.20	.03	7.12***
5th final marks	.28	.29	14.69***	.32	.40	12.37***

Note. Sixth grade $R^2 = .74$, $\Delta R^2 = .49$; 7th grade $R^2 = .52$, $\Delta R^2 = .37$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables.
[a] Standardized tests taken in 5th or early 6th grade.
* $p < .05$. *** $p < .001$.

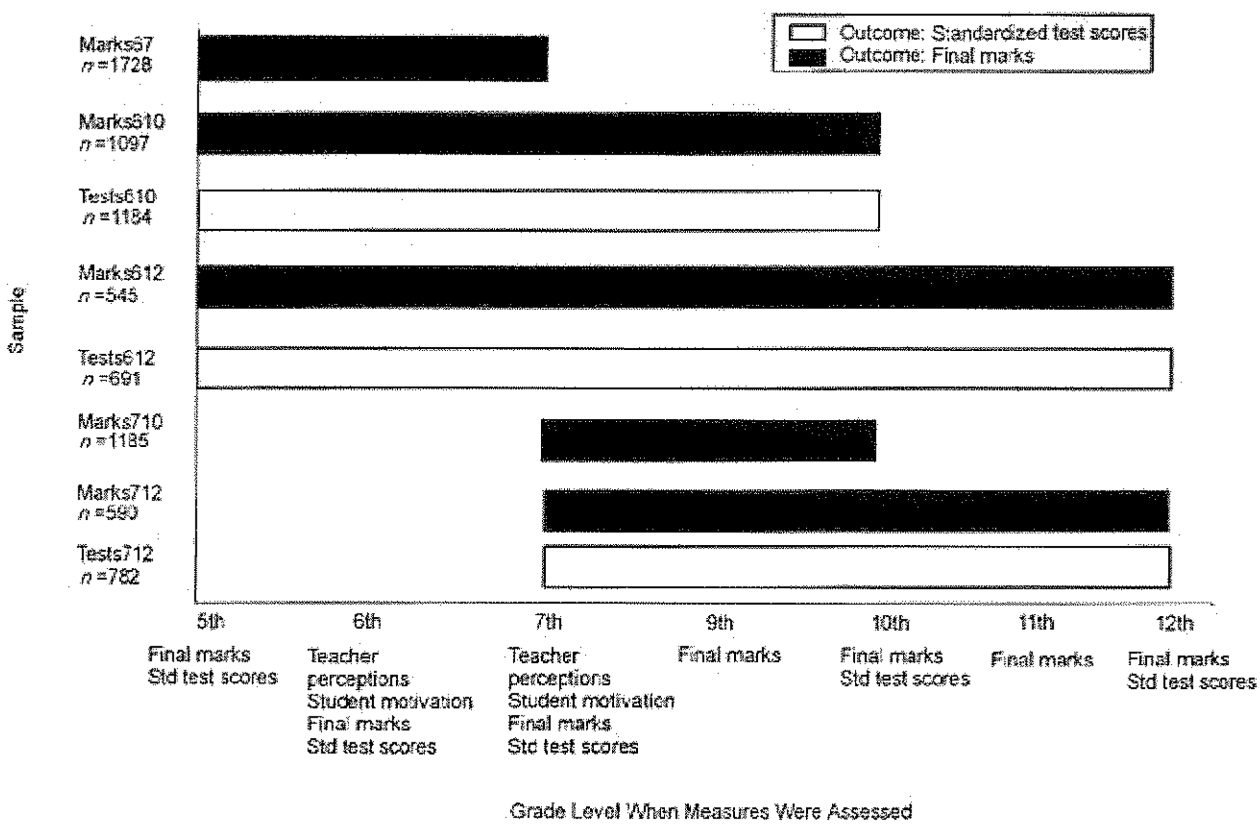


Table 10

Seventh-Grade Teacher Perceptions Predicting Math Standardized Test Scores Through 12th Grade (Tests712; n = 782)

	Percentile rank					
	10th grade			12th grade		
Predictor variable	β	b	$t(676)$	β	b	$t(676)$
Teacher perceptions	.16	1.41	4.81***	.09	.93	2.54*
Self-concept of ability	.07	.68	2.07*	.17	2.03	4.92***
Self-perception of effort	−.03	−.47	−1.03	−.00	−.03	−0.05
Time on homework	−.12	−3.38	−4.00***	−.12	−3.90	−3.69***
Utility math value	−.01	−.06	−0.33	−.02	−.18	−0.74
Interest math value	.01	.04	0.16	−.02	−.17	−0.60
6th MEAP score[a]	.26	1.71	7.86***	.27	2.04	7.47***
6th final marks	.11	1.23	3.06**	.11	1.42	2.83**

Note. Tenth grade $R^2 = .62$, $\Delta R^2 = .17$; 12th grade $R^2 = .56$, $\Delta R^2 = .17$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables. 10th-grade percentile rank represents an average of 9th and 10th grades. 12th-grade percentile rank represents an average of 11th and 12th grades.

[a] Standardized scores on the Michigan Educational Assessment Program (MEAP).

$^* p < .05$. $^{**} p < .01$. $^{***} p < .001$.

Table 4

Sixth-Grade Teacher Perceptions Predicting Final Math Marks From 6th Through 10th Grade (Marks610; n = 1,097)

	Math marks											
	6th			7th			9th			10th		
Predictor variable	β	b	$t(979)$	β	b	$t(979)$	β	b	$t(979)$	β	b	$t(979)$
Teacher perceptions	.37	.32	13.81***	.26	.27	7.34***	.17	.18	3.91***	.10	.12	2.37*
Self-concept of ability	.08	.08	3.51**	−.01	−.01	−0.21	.01	.02	0.38	.01	.01	0.28
Self-perception of effort	.03	.06	1.57	.06	.14	2.43*	.09	.20	2.88**	.05	.11	0.14
Time on homework	−.02	−.04	−0.76	.00	.01	0.09	−.01	−.05	−0.44	−.01	−.04	−0.32
Utility math value	−.02	−.02	−1.20	.03	.02	0.98	−.01	−.01	−0.39	−.05	−.05	−1.44
Interest math value	.05	.04	2.36*	−.01	−.01	−0.38	.03	.02	0.83	.06	.06	1.86
5th-percentile rank[a]	.17	.02	6.30***	.23	.03	6.44***	.08	.01	1.80	.22	.03	5.15***
5th final marks	.29	.30	12.05***	.30	.39	9.42***	.23	.30	5.91***	.18	.25	4.69***

Note. Sixth grade $R^2 = .73$, $\Delta R^2 = .47$; 7th grade $R^2 = .52$, $\Delta R^2 = .36$; 9th grade $R^2 = .30$, $\Delta R^2 = .15$; 10th grade $R^2 = .32$, $\Delta R^2 = .16$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables.

[a] Standardized tests taken in 5th or early 6th grade.

$^* p < .05$. $^{**} p < .01$. $^{***} p < .001$.

Table 5

Sixth-Grade Teacher Perceptions Predicting Final Math Marks From 6th Through 12th Grade (Marks612; n = 545)

	Math marks																	
	6th			7th			9th			10th			11th			12th		
Predictor variable	β	b	$t(449)$	β	b	$t(449)$	β	b	$t(449)$	β	b	$t(449)$	β	b	$t(449)$	β	b	$t(449)$
Teacher perceptions	.33	.26	8.37***	.27	.28	5.47***	.23	.24	3.92***	.13	.15	2.30*	.14	.16	2.37*	.17	.20	2.79**
Self-concept of ability	.10	.09	2.77**	−.05	−.06	−1.10	−.10	−.13	−1.87	.02	.03	0.58	−.01	−.02	−0.26	−.06	−.09	−1.07
Self-perception of effort	.00	.01	0.10	−.02	−.03	−0.40	.05	.10	1.06	.08	.19	1.80	.05	.11	1.00	.03	.08	0.73
Time on homework	−.04	−.09	−1.22	−.02	−.06	−0.47	−.07	−.21	−1.38	−.06	−.20	−1.28	−.08	−.27	−1.60	−.03	−.10	−0.55
Utility math value	.03	.02	0.92	.07	.06	1.65	.04	.04	0.79	−.07	−.08	−1.57	−.02	−.02	−0.31	−.03	−.03	−0.52
Interest math value	.04	.03	1.35	.00	.00	0.08	.09	.08	1.98*	.07	.06	1.51	.04	.03	0.72	.05	.05	1.06
5th-percentile rank[a]	.15	.02	3.95***	.21	.03	4.37***	.09	.01	1.63	.28	.04	5.12***	.17	.02	2.90**	.11	.02	1.86
5th final marks	.30	.31	8.55***	.25	.35	5.48***	.23	.32	4.35***	.14	.20	2.65**	.17	.26	3.17**	.06	.10	1.17

Note. Sixth grade $R^2 = .73$, $\Delta R^2 = .41$; 7th grade $R^2 = .57$, $\Delta R^2 = .27$; 9th grade $R^2 = .40$, $\Delta R^2 = .08$; 10th grade $R^2 = .43$, $\Delta R^2 = .10$; 11th grade $R^2 = .35$, $\Delta R^2 = .14$; 12th grade $R^2 = .37$, $\Delta R^2 = .06$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables.

[a] Standardized tests taken in 5th or early 6th grade.

$^* p < .05$. $^{**} p < .01$. $^{***} p < .001$.

Table 6
Sixth-Grade Teacher Perceptions Predicting Standardized Test Scores From 6th Through 10th Grade (Tests610; n = 1,184)

	6th-grade MEAP scores[a]			10th-grade percentile rank		
Predictor variable	β	b	t(1073)	β	b	t(1073)
Teacher perceptions	.09	1.00	3.06**	.10	.95	3.36***
Self-concept of ability	.02	.24	0.78	.07	.74	2.72**
Self-perception of effort	−.01	−.15	−0.32	−.01	−.18	−0.42
Time on homework	−.01	−.36	−0.48	.00	.10	0.15
Utility math value	.02	.15	0.71	−.02	−.13	−0.72
Interest math value	.01	.07	0.32	−.00	−.01	−0.05
5th-percentile rank[b]	.50	.61	16.94***	.47	.49	15.65***
5th final marks	.16	2.05	3.06**	.14	1.55	5.14***

Note. Sixth grade $R^2 = .58$, $\Delta R^2 = .34$; 10th grade $R^2 = .62$, $\Delta R^2 = .32$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables. 10th-grade percentile rank represents an average of 9th and 10th grades.
[a] MEAP = Michigan Educational Assessment Program. [b] Standardized tests taken in 5th or early 6th grade.
** $p < .01$. *** $p < .001$.

Table 7
Sixth-Grade Teacher Perceptions Predicting Standardized Test Scores From 6th Through 12th Grade (Tests612; n = 691)

	6th-grade MEAP scores[a]			10th-grade percentile rank			12th-grade percentile rank		
Predictor variable	β	b	t(590)	β	b	t(590)	β	b	t(590)
Teacher perceptions	.08	.40	1.81	.07	.63	1.79	.02	.24	0.56
Self-concept of ability	−.06	−.40	−1.62	.07	.79	2.08*	.11	1.41	3.08**
Self-perception of effort	−.01	−.02	−0.24	.00	.06	0.11	−.00	−.02	−0.04
Time on homework	−.05	−.22	−1.58	−.02	−.51	−0.59	−.01	−.34	−0.32
Utility math value	−.02	−.02	−0.51	−.05	−.38	−1.49	−.03	−.31	−1.00
Interest math value	.04	.04	1.05	.06	.40	1.57	.01	.06	0.21
5th-percentile rank[b]	.48	.08	11.21***	.43	.46	10.54***	.49	.60	11.49***
5th final marks	.09	.16	2.42*	.13	1.51	3.56***	.09	1.24	2.42*

Note. Sixth grade $R^2 = .57$, $\Delta R^2 = .24$; 10th grade $R^2 = .60$, $\Delta R^2 = .27$; 12th grade $R^2 = .57$, $\Delta R^2 = .27$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables. 10th-grade percentile rank represents an average of 9th and 10th grades. 12th-grade percentile rank represents an average of 11th and 12th grades.
[a] MEAP = Michigan Educational Assessment Program. [b] Standardized tests taken in 5th or early 6th grade.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 8

Seventh-Grade Teacher Perceptions Predicting Final Math Marks From 7th Through 10th Grade (Marks710; n = 1,185)

	Math marks								
	7th			9th			10th		
Predictor variables	β	b	t(1055)	β	b	t(1055)	β	b	t(1055)
Teacher perceptions	.46	.51	20.14***	.23	.26	6.48***	.22	.26	6.25***
Self-concept of ability	.11	.14	5.07***	.03	.04	0.88	.08	.10	2.22*
Self-perception of effort	.05	.09	2.30*	.04	.09	1.49	−.03	−.06	−0.94
Time on homework	−.05	−.16	−2.43*	−.05	−.19	−1.80	.00	−.01	−0.08
Utility math value	.02	.01	0.93	−.02	−.02	−0.71	−.01	−.01	−0.42
Interest math value	.00	.00	−0.01	.06	.06	1.81	.02	.02	0.48
6th MEAP score[a]	.16	.11	6.74***	.08	.05	2.05*	.08	.06	2.14*
6th final marks	.26	.32	10.56***	.17	.20	4.33***	.15	.20	4.10***

Note. Seventh grade $R^2 = .73$, $\Delta R^2 = .49$; 9th grade $R^2 = .34$, $\Delta R^2 = .15$; 10th grade $R^2 = .39$, $\Delta R^2 = .13$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom. ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables.
[a] Standardized scores on the Michigan Educational Assessment Program (MEAP).
* $p < .05$. *** $p < .001$.

Table 9

Seventh-Grade Teacher Perceptions Predicting Final Math Marks From 7th Through 12th Grade (Marks712; n = 590)

	Math marks														
	7th			9th			10th			11th			12th		
Predictor variable	β	b	t(489)	β	b	t(489)	β	b	t(489)	β	b	t(489)	β	b	t(489)
Teacher perceptions	.49	.52	15.02***	.23	.25	4.73***	.30	.35	6.44***	.28	.32	1.48	.26	.22	4.89***
Self-concept of ability	.08	.10	2.55*	.05	.07	1.14	.06	.09	1.46	.14	.19	2.86**	.04	.05	0.80
Self-perception of effort	.05	.09	1.71	.04	.06	1.07	−.03	−.05	−0.64	−.05	−.11	−1.24	.01	.03	0.31
Time on homework	−.04	−.12	−1.32	.00	.01	0.08	−.02	−.08	−0.54	−.03	−.11	−0.64	.04	.16	0.86
Utility math value	.02	.02	0.66	−.03	−.02	−0.62	.04	.04	1.06	−.09	−.09	−2.21*	−.08	−.08	−1.02
Interest math value	.00	.00	0.02	.05	.04	1.05	.07	.07	1.21	.02	.02	0.45	.05	.05	1.02
6th MEAP score[a]	.20	.14	6.00***	.06	.04	1.16	.14	.11	2.90**	.14	.11	2.62**	.07	.06	1.22
6th final marks	.20	.25	5.78***	.25	.32	4.79***	.30	.35	6.44***	.08	.11	1.48	.10	.14	1.75

Note. Seventh grade $R^2 = .76$, $\Delta R^2 = .44$; 9th grade $R^2 = .46$, $\Delta R^2 = .17$; 10th grade $R^2 = .58$, $\Delta R^2 = .19$; 11th grade $R^2 = .41$, $\Delta R^2 = .08$; 12th grade $R^2 = .38$, $\Delta R^2 = .11$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables.
[a] Standardized scores on the Michigan Educational Assessment Program (MEAP).
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 11

The Relationship Between Teacher Perceptions in 6th and 7th Grade and the Number of Math Courses (Excluding Remedial Courses) Students Took in High School

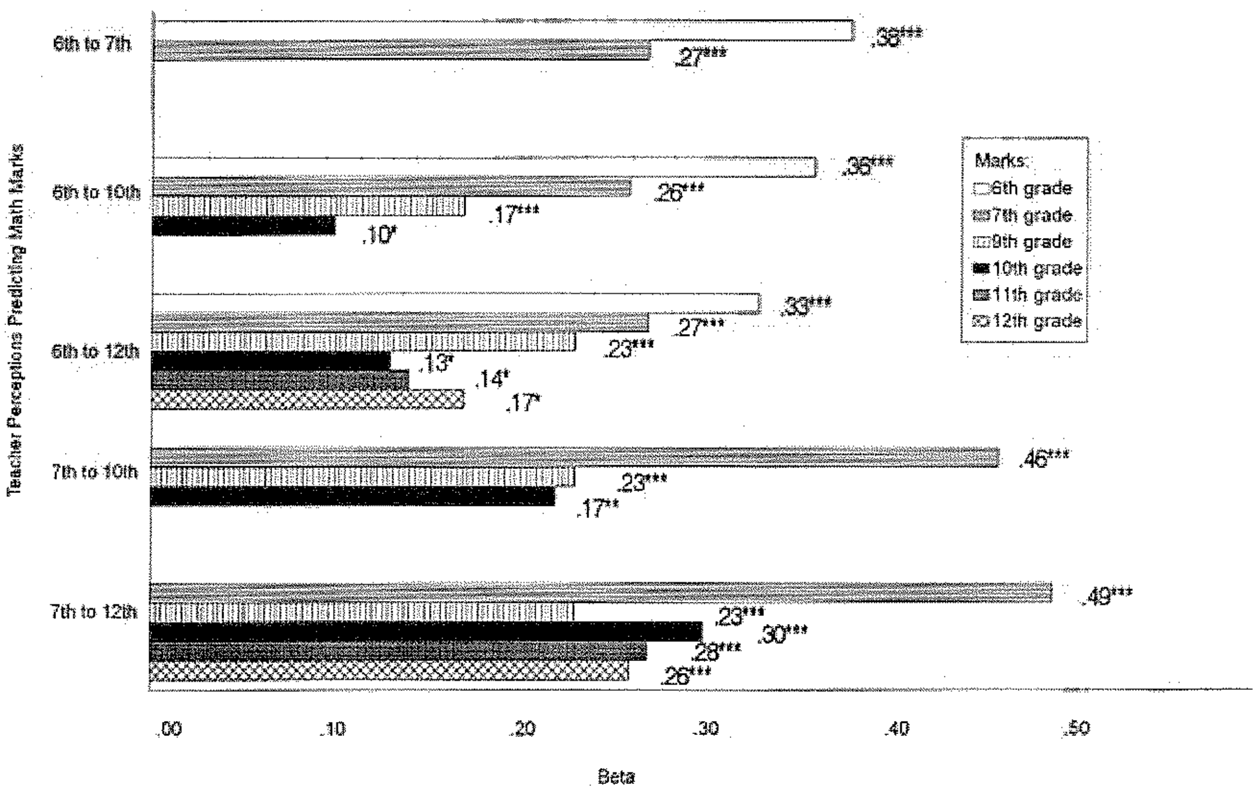
	6th-grade predictors (n = 615)			7th-grade predictors (n = 694)		
Predictor variable	β	b	t(514)	β	b	t(588)
Teacher perceptions	.09	.16	1.76	.13	.25	3.23**
Self-concept of ability	.06	.05	1.41	.18	.15	4.37***
Self-perception of effort	.01	.01	0.17	.00	.00	0.02
Time on homework	−.02	−.03	−0.37	−.05	−.11	−1.34
Utility math value	.06	.04	1.42	.03	.01	0.69
Interest math value	.02	.01	0.44	.01	.00	0.14
Previous standardized test scores[a]	.31	.03	6.37***	.17	.09	4.00***
Final marks from previous grade	.08	.08	1.93	.06	.05	1.23

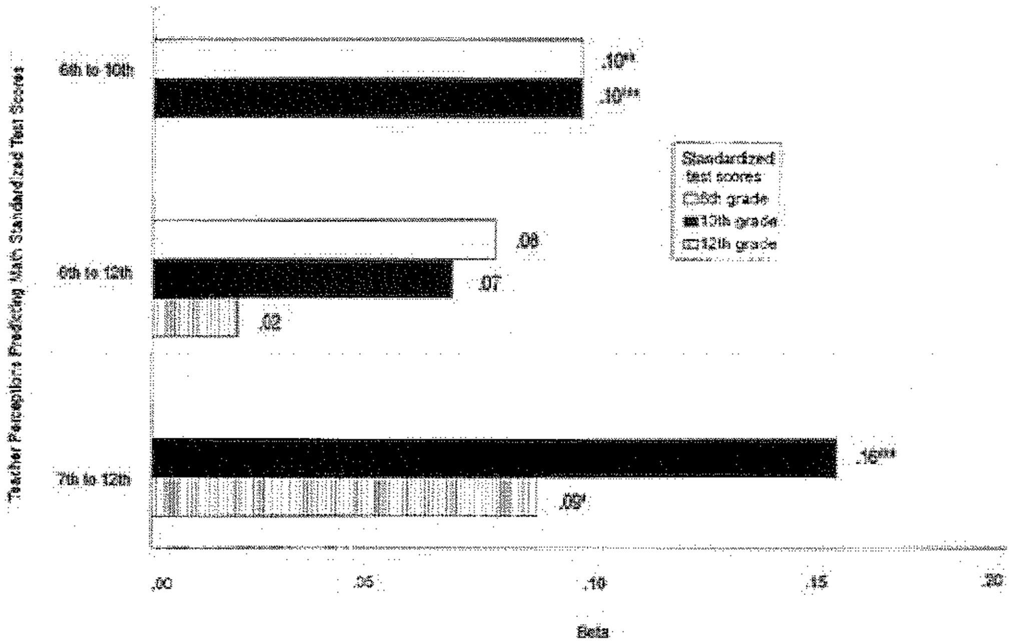
Note. Sixth grade $R^2 = .49$, $\Delta R^2 = .16$; 7th grade $R^2 = .48$, $\Delta R^2 = .12$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables.
[a] For 6th grade, 5th-grade standardized test scores; for 7th grade, 6th grade standardized test scores on the Michigan Educational Assessment Program.
** $p < .01$. *** $p < .001$.

Table 12
Sixth- and 7th-Grade Teacher Perceptions Predicting Semester Marks in Math for 6th and 7th Grade

	Math marks											
	6th first semester (n = 1,023)			6th second semester (n = 1,023)			7th first semester (n = 1,888)			7th second semester (n = 1,888)		
Predictor variable	β	*b*	*t*(942)	β	*b*	*t*(942)	β	*b*	*t*(1761)	β	*b*	*t*(1761)
Teacher perceptions	.49	.44	18.31***	.34	.33	10.79***	.51	.60	27.85***	.40	.50	18.07***
Self-concept of ability	.09	.09	3.89***	.06	.06	2.23*	.10	.13	5.91***	.08	.12	4.07***
Self perception of effort	.03	.05	1.44	.04	.09	1.94	.02	.04	1.39	.02	.04	1.12
Time on homework	−.03	−.08	−1.43	−.01	−.02	−0.22	−.00	−.01	−0.13	−.03	−.12	−1.71
Utility math value	.01	.01	0.48	.01	.01	0.48	−.01	−.01	−0.86	−.01	−.01	−0.33
Interest math value	.01	.01	0.51	.03	.02	1.11	.02	.02	1.23	−.02	−.02	−0.81
Previous standardized test scores[a]	.14	.01	5.14***	.15	.02	4.57***	.15	.10	8.34***	.18	.13	8.11***
Final marks from previous grade	.21	.21	8.20***	.30	.33	10.37***	.27	.33	13.39***	.27	.35	11.13***

Note. Sixth grade, 1st semester $R^2 = .73$, $\Delta R^2 = .47$, 2nd semester $R^2 = .63$, $\Delta R^2 = .38$; 7th grade, 1st semester $R^2 = .73$, $\Delta R^2 = .53$, 2nd semester $R^2 = .61$, $\Delta R^2 = .41$; all $ps < .001$. R^2 = total variance explained by the regression model, including all predictor variables and dummy variables controlling for classroom; ΔR^2 = variance explained when the predictor variables displayed in the tables were added to a model that included only classroom dummy variables.
[a] For 6th grade, 5th-grade standardized test scores; for 7th grade, 6th-grade standardized test scores on the Michigan Educational Assessment Program.
* $p < .05$. *** $p < .001$.




Teacher Perceptions Predicting Math Standardized Test Scores
6th to 10th
.10**
.10***
6th to 12th
.08
.07
.02
7th to 12th
.16***
.09*
Standardized
test scores
8th grade
10th grade
12th grade
.00
.05
.10
.15
.20
Beta