

# Between-Teacher Differences in Homework Assignments and the Development of Students' Homework Effort, Homework Emotions, and Achievement

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The study examines whether teachers' homework objectives, implementation practices, and attitudes toward parental involvement are associated with the development of students' homework effort, homework emotions, and achievement during Grade 8. A total of 63 teachers (40 male, 23 female; mean teaching experience:  $M = 17.5$  years) of French as a 2nd language and their 1,299 Grade 8 students (51.2% female; mean age at first measurement point:  $M = 13.84$ ,  $SD = 0.56$ ) participated in the study. In multilevel models, teachers' homework attitudes and behaviors were specified to predict outcomes at the end of Grade 8, controlling for covariates at the beginning of Grade 8. A low emphasis on drill and practice tasks and a high emphasis on motivation were associated with favorable developments in homework effort and achievement. Controlling homework assignments were associated with less homework effort and more negative homework emotions; the opposite pattern was found for students whose teacher supported student homework autonomy rather than parental homework involvement. The authors call for a systematic integration of findings from homework research in teacher training.

*Keywords:* homework, teachers, effort, achievement, parental support

Given the practical significance of homework for students, teachers, and parents alike, the quantity of empirical research on the subject is surprisingly limited and its quality mixed (Buell, 2004; Cooper, 2001; Trautwein & Köller, 2003). The present article aims to fill critical gaps in scientific knowledge by examining the association between teachers' homework assignments and the development of students' homework effort, homework emotion, and achievement. Common sense and anecdotal evidence say that teachers differ considerably in their capacity to set appropriate homework assignments. Unfortunately, empirical studies to support this claim are lacking. We therefore conducted a study providing first insights into the differential development of homework effort, homework emotions, and achievement across classes, and into potential predictors of these differences. We specifically

focused on teachers' objectives in assigning homework, their homework implementation practices, and their attitudes toward parental help. Using a multilevel framework, we linked these teacher reports to student data on the development of homework effort, homework emotions, and achievement provided by 1,299 Grade 8 students in classes in French as a second language.

## Homework: A Short Overview of Recent Research

Homework is typically defined as "tasks assigned to students by school teachers that are meant to be carried out during non-school hours" (Cooper, 1989, p. 7). Currently, there is a renewed controversy about the positive and negative effects of homework. Critics such as Bennett and Kalish (2006) and Buell (2004) have argued that there is little evidence for positive effects of homework on achievement, but ample evidence that it negatively affects family life, overburdens many students, and causes negative emotions in parents and students. Furthermore, critics of homework point to major deficits in teachers' knowledge about its advantages and disadvantages. Despite these warnings, however, the majority of teachers, parents, and students remain convinced that homework is a valuable educational tool (Cooper, 1989; Cooper, Lindsay, Nye, & Greathouse, 1998), and several empirical studies seem to support this view (for reviews, see Cooper, 1989; Cooper, Robinson, & Patall, 2006; Keith, 1986). Most recently, using a sample of 2,216 students in 100 classes participating in a large educational assessment, Trautwein (2007) found that mathematics achievement developed more favorably in classes in which teachers set

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frequent (but not necessarily lengthy) rather than infrequent homework assignments. Similarly, the way students approach their assignments has been shown to have substantial effects on their school grades (Trautwein, 2007; Zimmerman & Kitsantas, 2005), with homework effort evidencing a stronger positive association with achievement than time spent on homework (Trautwein, 2007; Trautwein & Lüdtke, 2007; Trautwein, Lüdtke, Schnyder, & Niggli, 2006).

At the same time, many studies have failed to find positive homework effects (Buell, 2004; Cooper et al., 2006), and characteristics of most studies on the homework–achievement relationship (e.g., neglect of the multilevel structure and potential third variables, issues concerning the direction of causality in cross-sectional designs) threaten their internal or external validity (Cooper, 1989; Cooper et al., 2006; Trautwein & Köller, 2003). At the very least, the available evidence indicates that the effectiveness of homework assignments differs greatly across different samples and—possibly—across classes within studies, with between-teacher differences in homework characteristics being a likely source for this differential effectiveness. Based on a multilevel, longitudinal design, the present study aims at clarifying the existence and strengths of such differences.

Homework assignments are likely to be most effective if students are motivated to invest effort in completing them and if they do not experience negative emotions when doing so. But how can teachers enhance student homework effort and emotion? As yet, there is no coherent theoretical framework that articulates how teachers' homework beliefs and behaviors translate into students' homework outcomes. In the following study, we therefore report theoretical approaches and empirical results from three interrelated but separate strands of research: teachers' homework objectives, teachers' homework implementation, and teachers' attitudes toward parental involvement.

### Teachers' Reasons for Assigning Homework

The many reasons teachers report for assigning homework (e.g., Bempechat, 2004; Cooper, 1989; Epstein & Van Voorhis, 2001) can be grouped into three major categories: enhancing achievement, improving student motivation and self-regulation, and establishing a positive link between the school and the home. Not surprisingly, enhancing student achievement is teachers' stated reason number one for setting homework (Cooper, 1989). Drill and practice assignments, the main purpose of which is to rehearse and deepen the knowledge acquired in the previous lessons, seem to be the most prevalent form of homework assignments. A distinction has been made between homework containing same-day tasks and homework involving elements of practice and/or preparation (Cooper, 1989). The former is cognitively less demanding and focuses on repetitive exercises. In Cooper's differentiation, practice and/or preparation homework is cognitively more demanding because it covers material that has not been completely covered in class, or material dealt with in earlier lessons. Reviewing eight studies, Cooper (1989) found an average effect size of  $d = 0.14$  favoring cognitively more demanding homework assignments.

A second achievement-related purpose of homework assignments is their assumed potential to narrow the achievement gap between high- and low-achieving students. Some researchers (e.g., Keith, 1982) have suggested that low-ability students in particular

could benefit from spending more time on homework assignments, because low achievers need more time to reach the same level as more gifted students. Indeed, homework assignments have always been seen as providing leverage to close the achievement gap between high- and low-achieving students. Depending on cognitive factors such as aptitude and ability, every learner needs a certain amount of time to master a task (Carroll, 1984; see also Bloom, 1976). Given the same number of tasks to be completed and unlimited learning time—which is at least theoretically the case for homework assignments—the achievement gap between students can be expected to diminish. Homework is thus seen as offering additional learning opportunities in which learning time is individualized and in which students can theoretically continue working until their assignments are completed and they have acquired a deeper understanding of the content covered. In contrast, Walberg, Paschal, and Weinstein (1985) argued that homework assignments are equally beneficial to students of all achievement levels. In a large-scale longitudinal study, Trautwein, Köller, Schmitz, and Baumert (2002) found that the effect of homework length interacted significantly with the individual achievement level; extensive homework assignments tended to reduce intraclass variability in achievement, but they were also associated with a comparatively unfavorable development in the overall achievement of these classes.

Improving student motivation and self-regulation is the second major reason for assigning homework. In fact, as pointed out by Hoover-Dempsey et al. (2001) and Warton (2001), enhancing student motivation and self-regulation might be the primary reason for many teachers to assign homework. Elementary school teachers, in particular, see homework as a valuable tool for enhancing student self-regulation and time use. Similarly, Bempechat (2004) disputed the idea that achievement-related issues are the main purpose of homework; instead, she argued that “we need to pay as much attention to the development of skills that help children take initiative in their learning and maintain or regain their motivation when it wanes” (p. 190). However, Warton (2001) convincingly argued that many children may not be aware of this objective and that in many cases homework is more likely to undermine than to enhance student motivation (see also Corno, 1996).

Finally, improvement of the school–home link has been identified as a third important reason for assigning homework (Bempechat, 2004; Epstein & Van Voorhis, 2001; also see Hill & Taylor, 2004). Homework informs parents about what is taught at school, prompts communication about school matters, and communicates standards and expectations (Bempechat, 2004; Natriello & McDill, 1986). These effects are believed to be positively associated with school achievement.

### Implementing Homework Assignments

Previous empirical research has devoted little attention to how teachers' homework implementation practices affect homework completion and achievement (Trautwein & Köller, 2003). However, drawing on findings of research on learning and instruction in the classroom (see reviews by Brophy & Good, 1986; Weinert & Helmke, 1995) and on theoretical accounts of student motivation (e.g., Deci & Ryan, 2002), informed speculations about the effect of homework assignments on student effort and motivation are possible.

One important characteristic of homework assignment practices is the control of homework completion. Walberg et al. (1985) called for intensive control and grading of homework: "Homework benefits achievement and attitudes, especially if it is commented upon or graded" (p. 76). An intervention study by Elawar and Corno (1985) seems to support that claim. Elawar and Corno trained teachers in the experimental group to give a specific form of written feedback. The authors found improved achievement and attitudes in the experimental group relative to the control group; furthermore, improvement was observed at all ability levels.

The study by Elawar and Corno (1985) clearly illustrates the potential of sophisticated feedback on homework assignments. However, it remains unclear whether teachers' typical homework control practices are positively associated with student homework effort and motivation beyond this intervention setting. In fact, some theoretical accounts imply that grading and intensive control of homework completion might be at odds with the aim of increasing student motivation. For instance, self-determination theory (Deci, Koestner, & Ryan, 1999; Deci & Ryan, 2002; Ryan & Connell, 1989) differentiates between informational feedback, which is thought to have positive consequences, and controlling feedback and external rewards, which are believed to undermine students' intrinsic motivation (see Cameron & Pierce, 1994, for a critical account). In that sense, students' homework motivation and effort might be weakened by overcontrolling teacher behaviors, resulting in negative emotional states during homework. Conversely, and in line with both self-determination theory (Grolnick, 2003) and social cognitive theory (Bandura, 1997; Zimmerman, 2000), emphasizing that doing homework is students' responsibility and their "job" (Corno & Xu, 2004) might be associated with an increase in students' homework motivation and effort (Bempechat, 2004; Hoover-Dempsey et al., 2001; Warton, 2001; Zimmerman & Kitsantas, 2005).

In most existing studies on the effects of teachers' homework control on homework effort and motivation, students were the only source of information about teachers' homework control. In these studies, perceived homework control tended to be positively related to self-reported effort when operationalized as constructive or informational teacher behavior (e.g., "Our teacher makes sure that we all try hard on our homework"; see Trautwein, Lüdtke, Kastens, & Köller, 2006), but negatively related or unrelated to homework effort when measures alluded to controlling teacher responses (e.g., "If we haven't done our French homework, we get into trouble with our teacher"; see Trautwein, Lüdtke, Schnyder, et al., 2006).

### Recruiting Parental Homework Involvement

Parental homework involvement is of high theoretical and practical interest. Many parents perceive that teachers solicit parental help (see Hoover-Dempsey et al., 2001), and some researchers and educators believe it is a key ingredient in the development of beliefs and attitudes that help to foster academic achievement (Bempechat, 2004). However, researchers and educators are split about the extent to which parents should be involved in homework completion (e.g., Cooper, 2001; Corno, 1996; Grolnick, 2003; Grolnick & Slowiaczek, 1994; Hoover-Dempsey et al., 2001), and it remains unclear whether teachers are generally in favor of parental involvement.

What is clear is that, overall, parents have a considerable effect on the development of student attitudes, behaviors, and learning (Eccles & Wigfield, 2002; Hill & Taylor, 2004). Parental involvement in homework has proven to be a two-edged sword, however, producing both wanted and unwanted effects depending on the form of support provided (Grolnick, 2003). The association between parental homework involvement and homework motivation and behavior seems to be fairly consistent with theoretical predictions derived from self-determination theory (Deci & Ryan, 2002), which stresses students' needs for autonomy, affiliation, and competence. Clearly, certain forms of parental homework support are more likely to be congruent with these needs (Grolnick & Slowiaczek, 1994). Generally speaking, whereas more distal variables such as parental education and parent-child communication about school have been found to be positively related to achievement, school adjustment, and homework effort, more proximal variables such as homework support and control have yielded only mixed support for parental engagement in the homework process (Grolnick & Slowiaczek, 1994). For instance, in a study by Cooper, Lindsay, and Nye (2000), the frequency of direct parental involvement in homework was significantly negatively correlated with achievement in standardized test scores ( $r = -.18$ ) and class grades ( $r = -.11$ ), whereas parental autonomy support was associated with more homework completed. Similarly, Pomerantz, Wang, and Ng (2005) found a correlation of  $r = .35$  between frequency of parental help and child homework helplessness; the correlation between frequency of help and homework persistence was non-significant.

### The Present Study

Common sense and anecdotal evidence suggest that teachers are differentially successful in enhancing student morale with regard to homework assignments, but empirical evidence on the extent and predictors of such differences is lacking. We therefore conducted a study with a large sample of eighth graders studying French as a second language and their teachers. More specifically, we examined the development of student homework effort, homework emotions, and achievement between the beginning and end of the school year as a function of teachers' homework objectives, their implementation of assignments, and their attitudes toward parental involvement.

There were two main research questions. The first addressed teachers' objectives for setting homework, their homework implementation practices, and their attitudes toward parental involvement. Given the lack of prior research or standardized instruments, we developed a short questionnaire instrument to assess major characteristics of teachers' homework assignment practices. In the present study, we investigated the teachers' mean endorsement of several facets and the intercorrelations of these facets.

The second—and most central—research question concerned the association between the development of students' homework effort, emotion, and achievement, on the one hand, and teachers' reports about their homework assignment practices, on the other. We expected to find between-class differences in trajectories of homework effort, emotion, and achievement. Moreover, we expected that teachers' homework objectives, homework implementation practices, and attitudes toward parental homework involvement would help to explain these differences. Given the lack of

similar previous studies and the conflicting predictions and results found in the literature, however, no a priori predictions were formulated.

## Method

### Sample

Most educational studies rely on convenience samples. In non-experimental research, this is frequently a point of criticism because the natural variation of the phenomenon under study is often restricted. The largely representative sample of teachers from three Swiss cantons and their classes used in the present study overcomes this restriction to a considerable extent. The study is part of a larger study on homework assignment and homework completion in French as a second language conducted in collaboration between researchers at the College of Teacher Education in Fribourg, Switzerland, and the Max Planck Institute for Human Development in Berlin, Germany. The local educational authorities of the three Swiss cantons in which the study took place strongly supported it; furthermore, the teachers in these cantons had little previous experience of empirical studies and were generally interested in the research. These two factors resulted in a very high participation rate. In two Swiss cantons (Fribourg and Valais), more than 90% of all Grade 8 classrooms with German as the school language participated; in addition, a small number of classes from a third canton (Lucerne) were included. Because of this high participation rate, the sample is largely representative of students of this age in Switzerland in terms of socioeconomic status, as well.

The total sample consists of 112 Grade 8 classrooms with 93 teachers and a total of 1,915 students attending compulsory lessons in French as a second language. Nine teachers and their classes had to be eliminated from the sample because the teacher questionnaire was not returned. An additional teacher and her students were dropped because it was a special education class. Moreover, because we were interested in naturally occurring homework effects, we excluded 20 teachers and their classes who were randomly selected to take part in a teaching effectiveness program while the present study was in progress.

The remaining sample consisted of 63 French teachers (40 male, 23 female; mean teaching experience:  $M = 17.50$  years,  $SD = 10.56$ ) and 1,299 eighth graders (51.2% female; mean age at first measurement point:  $M = 13.84$ ,  $SD = 0.56$ ) from 71 classes. For the majority of teachers, only one of their classes participated; for 8 teachers, however, student responses from 2 classes were available. Of the participating students, 93.8% were born in Switzerland; moreover, 88.7% of the students' mothers and 88.6% of fathers were born in Switzerland, and 92.4% of students reported speaking German with their parents most or all of the time. Finally, 28.2% of the fathers and 15.2% of the mothers had obtained a college degree—figures typical for this generation in Switzerland.

In Switzerland, students are assigned to different secondary tracks on the basis of their prior achievement. We distinguished two tracks: a higher and a lower track. Additionally, we dummy coded the region, using Valais as the reference category. The content of the French-as-a-second-language curriculum is very similar across the participating schools. It is important that teachers in all cantons and tracks could choose between only two—

rather similar—French textbooks. In fact, the major difference between the classes was the expected level of achievement, which is higher in the upper track.

### Procedure

The study was conducted during regular lesson time in intact classes in the 2003–2004 school year. Participation was voluntary for teachers and students. All participating teachers and students were extensively informed about the goals of the study and assured that their data would be used for scientific purposes only.

The first student questionnaire and achievement test and the teacher questionnaire were administered between August and October 2003 (Time 1); the second student questionnaire and achievement test were administered in May–June 2004 (Time 2). The achievement test and student questionnaire each took 1 hr of lesson time. A 30-min test of basic cognitive abilities was also administered at Time 1; the test scores were used as control variables (see below). Materials, including detailed written instructions on data collection, were mailed to the participating French teachers, who administered the student instruments. Immediately after testing, teachers collected the materials, put them in a sealed envelope, and mailed them back to the researchers. Teachers were sent their questionnaires in October and asked to return them by mail within two weeks. A written report about the study's main results was made available to the participating classes in the school year after the study took place.

### Instruments

*Teacher questionnaire.* Teachers were asked about their homework objectives, their homework implementation practices, and their attitudes toward parental homework involvement. A 4-point Likert-type scale (where 1 = *completely disagree* and 4 = *completely agree*) was used for all constructs. All items in the teacher homework scales are reported in the Appendix. The construction of the instrument and its eight subscales was theoretically driven; item and scale analyses were used to validate the instrument.<sup>1</sup>

Homework objectives were assessed by means of four subscales, the first two of which focus on achievement. Teachers who endorse the four items of the Drill and Practice scale tend to use homework assignments to repeat material covered in the previous lesson and to diagnose student progress. The scale focuses on

<sup>1</sup> We also conducted a confirmatory factor analysis with the eight teacher scales described below. In this factor analysis, all items were specified to have loadings on their theoretically predicted factor, and no cross-loadings or correlated uniquenesses were specified (i.e., a conservative approach was used). All teachers in the total sample with sufficient data for the analysis were included. Model fit for the postulated model with eight intercorrelated factors was acceptable, with  $\chi^2(271, N = 84) = 385.09$ , root-mean-square error of approximation (RMSEA) = .071. All standardized factor loadings were well above .30, with an average of .60. We also specified a set of more parsimonious alternative models in which two or more factors with comparably high intercorrelations (see Table 1) were collapsed into one factor, but all these models showed a weaker fit with the data. It should be noted, however, that caution is warranted in interpreting the results of the factor analyses with the teacher scales because of the small ratio between sample size and number of items.

same-day tasks, but the items do not explicitly refer to tasks with low potential for cognitive activation. The internal consistency of the scale score proved to be satisfactory ( $\alpha = .67$ ). The Closing the Achievement Gap scale ( $\alpha = .69$ ) consists of two items highlighting the potential of homework to help low-achieving students in particular. The third scale, labeled Motivation, consists of six items ( $\alpha = .68$ ) describing the potential of homework assignments to enhance student motivation. Finally, the two items of the School–Home Link scale ( $\alpha = .83$ ) reflect the idea that homework informs parents about school and stimulates communication between parents and students.

Teachers' homework implementation practices were assessed by means of two teacher self-report scales. First, the Emphasis on Student Responsibility scale (2 items,  $\alpha = .74$ ) consists of two items stressing that students and not teachers draw most benefit from the completion of homework assignments. Second, teachers high on the Controlling Homework Style scale (four items,  $\alpha = .67$ ) reported using homework assignments extensively to control student effort and for student evaluation.

Teachers' attitudes toward parental homework involvement were captured by two scales. Teachers high on Endorsement of Parental Homework Control (two items,  $\alpha = .72$ ) expressed a positive attitude toward parental control of homework completion. Conversely, teachers who endorsed the items of the Support for Student Homework Autonomy scale (four items,  $\alpha = .68$ ) consider homework to be particularly helpful when children do it on their own.

*Student questionnaire.* Most of the items used to assess student homework behavior and homework motivation were drawn from earlier studies (see Trautwein, Lüdtke, Schnyder, et al., 2006). A 4-point Likert-type scale (where 1 = *completely disagree* and 4 = *completely agree*) was used for all constructs.<sup>2</sup> The Homework Effort scale consisted of five items (sample item: "I always try to finish my French homework"). Students high on homework effort do their homework assignments carefully and do not copy from others. Internal consistency (Cronbach's alpha) of the scale score was adequate for Time 1 (.75) and Time 2 (.79). Students' negative homework emotions were assessed by means of 5 items (sample item: "Doing French homework often annoys me"); the Negative Homework Emotions scale describes negative emotional states that accompany the completion of homework assignments. Students high on this scale feel angry, uneasy, and tense when working on their assignments. Internal consistency of the scale score was adequate for Time 1 (.80) and Time 2 (.81).

*French achievement test.* Students' French skills were assessed at two points of measurement (beginning and end of Grade 8) using a standardized achievement measure (Neumann et al., 2007). Test scores were scaled according to item response theory using the ConQuest package (Wu, Adams, & Wilson, 1998). The French test was designed to provide a broad overview of students' command of the language by assessing a range of skills (reading comprehension, listening comprehension, and writing proficiency) and levels of language. Different response formats were used: Multiple choice tasks were combined with tasks requiring sentences to be completed, generated from words provided, put in the right order, or translated from French into German. Achievement scores were calculated on the basis of 62 items at Time 1 and 48 items at Time 2, with 13 items serving as anchor items. The reliability of the test scores was high at both points of measure-

ment. The internal consistency (Kuder-Richardson Formula 20 [KR-20]) was .89 at Time 1 and .91 at Time 2.

*Cognitive ability.* Teachers can be expected to adapt their homework assignments to the ability level of their students. In addition, there may be regional differences in homework assignments and student homework outcomes. In the present study, effects of such variables would constitute unwanted confounding (or third-variable) influences. To minimize such effects, we administered a measure of cognitive abilities at Time 1. The verbal subscales of the Cognitive Abilities Test 4–13 (Heller, Gaedike, & Weindlader, 1976) were used to tap basic cognitive abilities, with a total of 95 multiple-choice items (finding analogies, similarities, opposites, and missing words in a sentence) administered. Internal consistency was high (KR-20 = .89).

### Statistical Analyses

*Statistical models.* We conducted multilevel regression analyses to predict homework effort, negative homework emotions, homework expectancy beliefs, and homework value beliefs. In most studies in school settings, individual student characteristics are confounded with classroom or school characteristics because individuals are not randomly assigned to groups. This clustering effect introduces problems related to appropriate levels of analysis, aggregation bias, and heterogeneity of regression (Raudenbush & Bryk, 2002). Particularly when major variables represent different levels, it is important to use appropriate multilevel statistical procedures for data analysis. Multilevel modeling, a special form of regression analysis, provides a powerful methodology for handling hierarchical data of this kind. Multilevel analyses were computed with the computer program HLM 6 (Raudenbush, Bryk, Cheong, & Congdon, 2004).

The HLM output does not report standardized regression coefficients. To enhance the interpretability of the resulting regression coefficients, we standardized ( $M = 0$ ,  $SD = 1$ ) all continuous variables before performing the multilevel analyses. Dichotomous variables were retained in their original metric. All models reported are random-intercept models. Hence, the random part of the intercept was freely estimated to reflect between-classroom differences in students' reports about homework; teachers' homework scales were used as predictors of between-classroom differences. Because we had no a priori hypotheses concerning between-classroom differences in the predictive power of the predictor variables, we did not estimate the random parts of the slopes. Restricted maximum likelihood estimation was used in all models.

*Missing data.* Missing data represent a potentially serious methodological problem in many empirical studies. For each of the variables considered here, the percentage of missing data was below 10%; on average, 3.7% of the data were missing. Only 7.4% of the participants had more than two missing values on the total of 19 variables used; 73.5% had valid data on all variables; 19.1% had either one or two missing values. In the methodological literature on missing data (Little & Rubin, 1987; Schafer, 1997),

<sup>2</sup> Again, we also specified confirmatory factor analyses. For the student questionnaire data, the fit for the postulated model with two intercorrelated factors (homework effort and homework emotions) was acceptable, with  $\chi^2(34, N = 1299) = 212.55$ , RMSEA = .066 for Time 1, and  $\chi^2(34, N = 1299) = 290.76$ , RMSEA = .072 for Time 2.

there is growing consensus that multiple imputation of missing data is superior to traditional pairwise and listwise deletion methods. We therefore opted for the multiple imputation procedure (Schafer, 1997) and used the NORM software (Version 2.03; see Schafer & Graham, 2002) to generate five data sets in which all missing data were replaced by estimated values. All subsequent statistical analyses were conducted separately for each of the five data sets. Parameters and their standard errors were then automatically combined by the HLM 6.0 program, using procedures described by Schafer and Graham (2002). The overall estimates and standard errors reported thus take into account the uncertainty of missing data.

*Effect sizes of teacher variables.* Effect sizes have found increasing use in educational research. The statistical significance of a finding says little about its substantive meaning or real-world importance (see Kline, 2004). Effect sizes allow the meaningfulness of an empirical result to be presented clearly and the findings of empirical studies to be more readily appreciated; they also help politicians and policy makers in their decision making (McCartney & Rosenthal, 2000).

How can the meaningfulness of results from multilevel modeling be determined? In our study, we used three indicators of effect size. First, in analogy to the measure of explained variance in ordinary linear regression models, we report the proportion of variance explained by the predictor variables at each level for each model. This measure is determined by calculating the proportion of the variance that is explained at each of the levels when the predictor variables are introduced into the specific model (see Snijders & Bosker, 1999).

Second, we report easily interpretable regression coefficients for Level-1 variables. Because we standardized all continuous Level-1 predictor and outcome variables before entering them in our multilevel models, the coefficients of the continuous Level-1 variables can be interpreted in almost the same way as the standardized regression coefficients resulting from ordinary regression analysis. Because gender was not standardized, the regression coefficients for gender show the differences in girls' and boys' outcome variables in standard deviations, controlled for the other predictor variables.

Third, the class-level regression weights show change in the dependent variables corresponding to an increase of one unit (1 *SD*) in the predictor variables. Given the complexity of the regression weights at the class level and the resemblance of classes and treatment groups in experimental research, there has recently been growing interest in the application of effect sizes in multilevel models; effect sizes are familiar to psychological researchers and are easily interpretable. Tymms (2004) proposed that the effect size for continuous Level-2 predictors in multilevel models, which is comparable to Cohen's *d*, be calculated using the following formula:

$$\Delta = 2 \times B \times SD_{\text{predictor}} / \sigma_e,$$

where *B* is the unstandardized regression coefficient in the multilevel model, *SD*<sub>predictor</sub> is the standard deviation of the predictor variable at the class level, and  $\sigma_e$  is the residual standard deviation at the student level. To give an example, let the regression coefficient at the class level be *B* = 0.30, its standard deviation *SD* = 0.35, and the residual standard deviation at the student level  $\sigma_e$  = 0.80. Inserting these values into the formula yields

$$\Delta = 2 \times 0.30 \times 0.35 / 0.80 = 0.26.$$

An effect size of  $\Delta = 0.26$  indicates that the difference in the dependent variable between two classes that differ two standard deviations on the predictor variable amounts to 0.26. Applying Cohen's (1988) conventions, this would constitute a small effect. Research in the field of teaching generally yields rather small effect sizes (Brophy & Good, 1986), reflecting the fact that changes in student outcome variables are multiply determined. For this reason, small effect sizes are typically considered meaningful in this research field, especially if they are associated with teaching characteristics that are modifiable (see also the Discussion section). We thus suggest that a small effect size of  $\Delta = 0.20$  should also be considered meaningful in the present research.

## Results

### *Descriptive Analyses*

Students reported lower homework effort (*M* = 2.97, *SD* = 0.61) at the end of Grade 8 than at the beginning (*M* = 3.19, *SD* = 0.53),  $t(62) = 10.55, p < .001$ ; significance test performed with HLM to take account of the hierarchical character of the data. At the same time, the occurrence of negative feelings when doing homework increased (Time 1: *M* = 1.95, *SD* = 0.63; Time 2: *M* = 2.06, *SD* = 0.67),  $t(62) = -4.59, p < .001$ . French achievement increased by slightly more than one third of a standard deviation over the school year (Time 1: *M* = 0.00, *SD* = 1.10; Time 2: *M* = 0.40, *SD* = 1.38),  $t(62) = -6.18, p < .001$ .

### *Teachers' Homework Objectives, Implementation Practices, and Attitudes Toward Parental Involvement*

The first research question concerned teachers' overall endorsement of various homework objectives, implementation practices, and attitudes toward parental involvement. Table 1 reports means and standard deviations for the teacher variables. With regards to homework objectives, teachers strongly endorsed the items from the Drill and Practice scale, and generally saw the school-home link as a less compelling reason for setting homework. The means of the Enhancing Student Motivation and Closing the Achievement Gap scales fell between these two scales. For homework implementation, the majority of teachers reported placing an emphasis on student responsibility for homework completion. The average score for Controlling Homework Style was somewhat lower, but still above the scale midpoint of 2.5. Finally, in terms of parental involvement in homework, the majority of teachers showed support for student homework autonomy; at the same time, as indicated by a mean of 2.49 and a comparatively high standard deviation, teachers were split on whether to welcome or reject parental homework control.

Table 1 also reports the correlations between these constructs; our observations focus on two findings that seem to be of particular relevance. First, as indicated by the positive correlations between the homework objectives scales, most of which are statistically significant, teachers did not consider the different objectives to be antagonistic. Second, there was a tendency for teachers who endorsed the Drill and Practice scale to score high on the Endorsement of Parental Homework Control and Controlling Homework Style scales.

Table 1  
*Teachers' Homework Objectives, Homework Implementation Practices, and Attitudes Toward Parental Involvement: Means, Standard Deviations, and Intercorrelations*

Scales	M	SD	1	2	3	4	5	6	7	8
1. Closing the achievement gap	2.38	0.62	—							
2. School-home link	2.18	0.65	0.49	—						
3. Drill and practice	3.27	0.42	0.35	0.30	—					
4. Motivation	2.54	0.41	0.46	0.41	0.26	—				
5. Emphasis on student responsibility	3.31	0.60	0.08	-0.01	0.25	0.32	—			
6. Controlling homework style	2.76	0.53	0.29	0.29	0.41	0.38	0.35	—		
7. Endorsement of parental homework control	2.49	0.71	-0.12	0.03	0.29	0.02	0.14	0.35	—	
8. Support for student homework autonomy	3.12	0.51	-0.18	-0.41	-0.08	-0.04	0.36	-0.12	-0.17	—

Note. Correlations > .25 are statistically significant at  $p < .05$ .

*Predicting Homework Effort*

We now turn to the second research question: Are there systematic differences in the development of homework effort, homework emotions, and achievement across different school classes? And if so, do the teacher variables predict these outcomes when controlling for a host of potentially important other predictor variables?

We started with Time 2 homework effort as the outcome variable (see Table 2). In the first model, the empty (or null) model, only the dependent variable was introduced; this model gives a baseline estimation of the variance components within and between classes (see Snijders & Bosker, 1999). A total of 12% of the variance in student-reported homework effort at Time 2 was be-

tween teachers, indicating that students taught by different French teachers differed substantially on homework effort.

In the second model, we introduced all student-level predictor variables and the teacher-level control variables (track and region); in addition to regression weights for the predictor variables included, this second model gives an estimate of interclass differences in Time 2 effort after controlling for important Time 1 variables. As expected, Time 1 homework effort strongly predicted Time 2 homework effort ( $B = 0.52$ ); no other variable had a statistically significant regression weight. At the student level, the predictor variables explained 26% of the student-level variance in Model 2. At the teacher level, 60% of the variance was explained;

Table 2  
*Predicting Time 2 Homework Effort: Results From Multilevel Modeling*

Variable	Model 1	Model 2		Model 3		Model 4		Model 5	
		B	SE(B)	B	SE(B)	B	SE(B)	B	SE(B)
<b>Region</b>									
Canton: Fribourg		-0.10	0.08	-0.08	0.08	-0.04	0.07	-0.08	0.08
Canton: Lucerne		-0.19	0.13	-0.15	0.11	-0.25*	0.10	-0.22	0.11
Upper track		0.00	0.09	-0.04	0.09	-0.12	0.09	-0.01	0.08
<b>Homework objectives</b>									
Closing the achievement gap				-0.02	0.03				
School-home link				-0.07*	0.04				
Drill and practice				-0.08*	0.03				
Motivation				0.07*	0.03				
<b>Homework implementation practices</b>									
Student responsibility						0.10*	0.04		
Controlling homework style						-0.15***	0.03		
<b>Attitudes toward parental involvement</b>									
Endorsement of parental homework control								-0.05	0.04
Support for student homework autonomy								0.07*	0.03
<b>Student level</b>									
Gender: Male		-0.08	0.05	-0.08	0.05	-0.08	0.05	-0.08	0.05
Basic cognitive abilities		0.00	0.03	-0.01	0.03	0.00	0.03	0.00	0.03
Homework effort (Time 1)		0.52***	0.03	0.52***	0.03	0.52***	0.03	0.51***	0.03
<b>Residual variance</b>									
Teacher level		0.12	0.05	0.04	0.03	0.03	0.04	0.04	0.04
Student level		0.88	0.66	0.66	0.66	0.66	0.66	0.66	0.66
<b>Explained variance</b>									
Teacher level			0.60	0.69	0.72	0.67	0.67	0.67	0.67
Student level			0.26	0.26	0.26	0.26	0.26	0.26	0.26

\*  $p < .05$ . \*\*\*  $p < .001$ .

teacher-level variance can be explained by both student-level and teacher-level predictor variables (see Snijders & Bosker, 1999). After controlling for the variables included in Model 2, there was still a meaningful variance component at the teacher level; the residual intraclass correlation coefficient (the ratio of residual variance at the teacher level and total residual variance) amounted to .07; this indicates that the development of homework effort differed meaningfully between students taught by different teachers.

In the next three models, we sequentially introduced the teacher variables. In Model 3, we included teachers' homework objectives; in Model 4, we entered the homework implementation variables; finally, in Model 5, we introduced teachers' attitudes toward parental homework involvement. Critically, in each of these models, we included Time 1 homework effort as a predictor variable to control for differences already present at Time 1.

Three of the four homework objective variables entered in Model 3 statistically significantly predicted Time 2 homework effort when we controlled for the other variables in the model. The largest absolute value was found for the Drill and Practice scale. We calculated the effect size of this coefficient using the formula described previously. With a standard deviation of the Drill and Practice scale of  $SD = 1.00$  at the teacher level and a residual standard deviation of  $\sigma_e = 0.81$  at the student level, we found

$$\Delta = 2 \times -0.08 \times 1.00 / 0.81 = -0.21.$$

Applying the criteria for a meaningful effect sized described above,  $\Delta = -0.21$  indicates a small but meaningful effect. Hence, controlling for the other variables in Model 3, the development of students' homework effort was comparatively unfavorable in classes taught by teachers who scored high on the Drill and Practice scale. A negative association with Time 2 homework effort was also found for the School-Home Link scale. With  $\Delta = -0.18$ , the respective effect size was marginally below the value of 0.20. A more positive development in homework effort was found in classes whose teacher emphasized the potential of homework to enhance student motivation; again, however, at  $\Delta = 0.17$  the effect size was rather small. Overall, the explained variance in Model 3 was .69 at the teacher level and .26 at the student level.

In Model 4, we replaced teachers' homework objectives by the homework implementation practices scales. Most importantly, a controlling homework style was found to be associated with an unfavorable development of homework effort ( $B = -0.15$ ); with  $\Delta = -0.38$ , the effect approached a medium size. Conversely, an emphasis on student responsibility positively predicted Time 2 homework effort; the effect size was  $\Delta = 0.24$ . Interestingly, relative to the reference group (students from Valais), students from Lucerne evidenced a less favorable development of homework effort. The total amount of variance explained at the teacher level in Model 4 was .72.

Finally, teachers' attitudes about parental involvement were considered in Model 5. As shown in Table 2, teacher support for student homework autonomy was positively associated with Time 2 homework effort after controlling for the other predictors in Model 5; the effect size was  $\Delta = 0.18$ . At  $R^2 = .67$ , the amount of explained variance at the teacher level was somewhat smaller than in Model 4.

### *Predicting Negative Emotions During Homework*

Applying the same set of analyses, we next predicted Time 2 negative homework emotions. The results of these analyses are reported in Table 3. The unconditional model (Model 1) indicated that a total of 10% of the variance in the dependent variable was between classes. In Model 2, the high regression coefficient for Time 1 negative homework emotions indicated that there was considerable stability between Time 1 and Time 2 in students' experience of negative emotions when doing homework. Somewhat unexpectedly, we also found a statistically significant effect for female gender, indicating a more unfavorable development of homework emotions in boys than in girls during Grade 8. The variance explained at the teacher level was .67. The remaining teacher-level variance component was ( $p < .001$ ) different from zero, and the residual intraclass correlation coefficient was .05, indicating that the development of homework emotions differed meaningfully between students with different teachers.

In Models 3, 4, and 5, three statistically significant regression coefficients were found for the teacher homework scales. First, when we controlled for the stability effects, students in classes in which the teacher endorsed the enhancement of the school-home link as an important reason for setting homework showed a comparatively unfavorable development in homework emotions ( $B = 0.09$ ; see Model 3). We again calculated the effect size for this coefficient. With a standard deviation of the School-Home Link scale of  $SD = 1.00$  and a residual standard deviation at the student level of  $\sigma_e = 0.78$ , we found a small, but meaningful effect size of  $\Delta = 0.23$ . Second, in Model 4, a controlling homework style was associated with an increase in negative student emotions during homework completion. The effect size was small, but meaningful ( $\Delta = 0.21$ ). Third, in Model 5, we found a comparatively positive development of homework emotions in classes whose teachers strongly endorsed student homework autonomy. The effect size amounted to  $\Delta = -0.26$ . At  $R^2 = .77$ , the explained variance at the teacher level was larger than in Models 2, 3, or 4.

### *Predicting French Achievement*

Finally, we repeated the same set of analyses with French achievement at Time 2 as the outcome variable (see Table 4). The empty model indicated that 63% of the total variance in Time 2 achievement was between students with different teachers, reflecting the expected achievement differences across classes in tracked systems (e.g., Trautwein, Lüdtke, Marsh, Köller, & Baumert, 2006). Model 2 showed substantive stability in achievement, as indicated by the regression weight of Time 1 achievement. In addition, we found basic cognitive abilities at Time 1 and gender to significantly predict Time 2 achievement when controlling for the other predictor variables. Higher cognitive abilities and female gender were associated with favorable change in achievement. Achievement gains were most favorable in students in the upper track and from the canton of Valais, the reference group. A total of 92% of the variance at the teacher level was explained by the inclusion of the student and teacher variables. The remaining teacher-level variance component was still statistically significant ( $p < .001$ ); the residual intraclass correlation was .22.

Three of the four homework objective variables entered in Model 3 predicted Time 2 homework effort when the other vari-

Table 3  
*Predicting Time 2 Negative Homework Emotions: Results From Multilevel Modeling*

Variable	Model 1	Model 2		Model 3		Model 4		Model 5	
		<i>B</i>	<i>SE(B)</i>	<i>B</i>	<i>SE(B)</i>	<i>B</i>	<i>SE(B)</i>	<i>B</i>	<i>SE(B)</i>
Region									
Canton: Fribourg		0.00	0.07	-0.03	0.06	-0.03	0.07	-0.04	0.07
Canton: Lucerne		0.12	0.11	0.10	0.08	0.15	0.09	0.13	0.07
Upper track		-0.05	0.08	-0.02	0.07	0.02	0.08	-0.05	0.07
Homework objectives									
Closing the achievement gap				-0.04	0.04				
School-home link				0.09**	0.03				
Drill and practice				0.05	0.03				
Motivation				-0.03	0.03				
Homework implementation practices									
Student responsibility						-0.05	0.03		
Controlling homework style						0.08*	0.04		
Attitudes toward parental involvement									
Endorsement of parental homework control								0.01	0.03
Support for student homework autonomy								-0.10**	0.03
Student level									
Gender: Male		0.17**	0.05	0.15**	0.05	0.17**	0.05	0.17**	0.05
Basic cognitive abilities		-0.02	0.03	0.00	0.03	-0.01	0.03	0.00	0.03
Negative homework emotions (Time 1)		0.57***	0.02	0.56***	0.03	0.58***	0.02	0.57***	0.02
Residual variance									
Teacher level	0.10	0.03		0.03		0.03		0.02	
Student level	0.90	0.60		0.60		0.60		0.60	
Explained variance									
Teacher level		0.67		0.71		0.71		0.77	
Student level		0.33		0.33		0.33		0.33	

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

ables in the model were controlled. Paralleling the findings for homework effort, the largest absolute value was found for the Drill and Practice scale ( $\Delta = -0.37$ ). Hence, when we controlled for the other variables in Model 3, the development of students' achievement was comparatively unfavorable in classes taught by teachers who scored high on the Drill and Practice scale. A positive association with Time 2 achievement was found in classes whose teacher emphasized the potential of homework to close the achievement gap between high- and low-performing students ( $\Delta = 0.32$ ) and considered homework to be a valuable tool for enhancing student motivation ( $\Delta = 0.28$ ). Overall, the variance explained in Model 3 was .93 at the teacher level and .50 at the student level.

In Model 4, we replaced teachers' homework objectives by the homework implementation practices scales. However, these two scales proved not to be associated with Time 2 achievement after controlling for the other variables in the model. Finally, teachers' attitudes about parental involvement were considered in Model 5. As shown in Table 4, teacher endorsement of parental homework control was negatively associated with Time 2 achievement when we controlled for the other predictors in Model 5; the effect size was  $\Delta = -0.27$ .

## Discussion

### *Effective Homework Assignments*

The present study indicates that what teachers think and do about homework is associated with the development of students' homework effort, homework emotions, and achievement. The ef-

fect sizes found were mostly small but meaningful. In the following section, we focus on five of the eight teacher scales that were statistically significantly associated with more than one student outcome; the remaining three predictors were associated with one outcome.

There were several predictive effects of homework objectives. Drill and practice assignments were associated with comparatively negative developments in homework effort and achievement. This finding does not imply that homework assignments should not involve any drill and practice—as the descriptive results show, most teachers endorsed drill and practice as a major objective of assigning homework. However, when teachers scored especially high on this scale, student homework effort and achievement tended to suffer. Conversely, students whose French teacher strongly endorsed the enhancement of student motivation evidenced comparatively favorable developments in homework effort and achievement over the course of Grade 8. Several researchers (e.g., Bempechat, 2004; Cooper, 1989; Corno & Xu, 2004; Warton, 2001) have emphasized that effective homework assignments should promote student self-regulation and motivation; the present results support this view.

Our study also contributes to a controversial issue in homework research (Bennett & Kalish, 2006; Buell, 2004; Cooper, 2001), namely the extent to which homework should be seen as a means to tighten the school-home link. In our study, students whose teachers did not see the enhancement of the school-home link as a major reason for assigning homework showed somewhat more favorable developments in homework effort and homework emo-

Table 4  
*Predicting Time 2 French Achievement: Results From Multilevel Modeling*

Variable	Model 1	Model 2		Model 3		Model 4		Model 5	
		<i>B</i>	<i>SE(B)</i>	<i>B</i>	<i>SE(B)</i>	<i>B</i>	<i>SE(B)</i>	<i>B</i>	<i>SE(B)</i>
Region									
Canton: Fribourg		-0.13*	0.06	-0.12*	0.05	-0.13*	0.06	-0.11*	0.06
Canton: Lucerne		-0.54**	0.15	-0.56***	0.12	-0.55***	0.15	-0.58***	0.14
Upper track		0.38***	0.08	0.34***	0.07	0.39***	0.09	0.37***	0.08
Homework objectives									
Closing the achievement gap				0.07*	0.03				
School-home link				-0.03	0.03				
Drill and practice				-0.08*	0.04				
Motivation				0.06*	0.02				
Homework implementation practices									
Student responsibility						0.02	0.03		
Controlling homework style						0.00	0.03		
Attitudes toward parental involvement									
Endorsement of parental homework control								-0.06*	0.02
Support for student homework autonomy								0.04	0.04
Student level									
Gender: Male		-0.07*	0.03	-0.07*	0.03	-0.07*	0.03	-0.07*	0.03
Basic cognitive abilities		0.10***	0.02	0.10***	0.02	0.10***	0.02	0.10***	0.02
French achievement (Time 1)		0.64***	0.02	0.64***	0.02	0.64***	0.02	0.64***	0.02
Residual variance									
Teacher level	0.63	0.05		0.05		0.05		0.05	
Student level	0.37	0.18		0.18		0.18		0.18	
Explained variance									
Teacher level		0.92		0.93		0.92		0.93	
Student level		0.50		0.50		0.50		0.50	

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

tions. Hence, the more teachers intended to establish a close link with parents and to involve them in the homework process, the less positive the student outcomes were. Interestingly, the pattern of results for the two attitudes toward parental involvement scales point into the same direction. Students whose teachers believed that students should do their homework assignments on their own, without parental help, showed comparatively favorable developments in homework effort and homework emotions, whereas there was comparatively unfavorable development of achievement in classes in which the teacher endorsed parental homework control. Overall, this pattern of results runs counter to some educators' calls (e.g., Bempechat, 2004) for increased parental involvement in homework. At the same time, it is compatible with self-determination theory (Deci & Ryan, 2002) and other theoretical approaches (e.g., Bandura, 1997) that emphasize the need for student autonomy and self-regulation. Parental homework support has already been shown to be a double-edged sword. For instance, as research by Pomerantz and colleagues (e.g., Ng, Kenney-Benson, & Pomerantz, 2004; Pomerantz et al., 2005; Pomerantz & Eaton, 2001) indicates, although parental help can be beneficial to students, homework help is frequently intrusive and likely to have negative effects on students' self-concept of ability. These negative effects might apply particularly to adolescents. Prior research on parental involvement in homework has focused on elementary school students. It is possible that parental involvement may be more beneficial to student development in students younger than the eighth graders who participated in the present study.

For the homework implementation practices variables, three statistically significant predictive effects were found. We found a

controlling homework style to be negatively associated with homework effort, whereas an emphasis on student responsibility positively predicted homework effort; the effect size for controlling homework style, in particular, was quite pronounced. Furthermore, a controlling homework style also predicted an increase in negative homework emotions. Again, this pattern of results seems to be compatible with self-determination theory and other theoretical approaches that predict overcontrolling to be associated with maladaptive outcomes. At the same time, this finding runs counter to the assumption articulated by Walberg (1991), who predicted that collecting and grading of homework would be associated with positive outcomes. At first glance, the pattern of results may seem surprising. In classes where teachers grade homework assignments, students would be especially ill-advised to come to class without them; hence, homework morale might be expected to increase in these classes. However, homework control may have negative side effects: when homework is graded or the teacher is experienced as overcontrolling, students may feel tempted to copy from high-achieving classmates to escape negative consequences. This is not to say that homework control is bad per se: the quality of control is likely to be crucial. For instance, informational feedback may have positive effects. Indeed, an experimental study by Elawar and Corno (1985), who used an elaborate feedback system including positive feedback, showed that teachers' homework control can enhance student morale and achievement. In nonexperimental settings such as the present one, however, a particularly strong emphasis on controlling and grading homework might be associated with undesired outcomes.

### *Practical Implications and Meaningfulness of Effect Sizes*

Although the effect sizes for the teacher variables were mostly small, the effects found are meaningful and have clear practical implications. It is important that the differences in the development of students with different teachers were substantial for all dependent variables. Moreover, the effect sizes for the teacher variables were statistically significant and of meaningful magnitude, despite the fact that we controlled for corresponding Time 1 variables and a host of additional predictor variables. When interpreting the teacher-level predictor variables, it is important to bear in mind that changes in homework effort, homework emotion, and achievement are multiply determined (Ahadi & Diener, 1989); as Swann, Chang-Schneider, and McClarty (2007) recently observed, "complaints about small effect sizes routinely overlook the fact that when studies are conducted in naturally occurring settings rather than relatively impoverished laboratory settings, the number of causes that influence outcome variables increase dramatically" (p. 89). Furthermore, cross-lagged effects are potentially cumulative over time: The specific effect of a small beta coefficient may be quite substantial if the effect continues over longer periods of time (Neyer & Asendorpf, 2001; Prentice & Miller, 1992).

Given the statistical significance and meaningfulness of our findings, it seems worth considering how they can be translated into practical educational applications. In our view, it is essential to systematically include critical discussion of homework and its potential benefits and costs in all preservice teacher training curricula; somewhat surprisingly, this is not yet standard practice (Bennett & Kalish, 2006; Cooper, 1989). In addition to findings on the relationship between the quantity of homework and student outcomes (e.g., Cooper et al., 2006; Trautwein, 2007), it seems particularly important to consider the limited number of studies that have analyzed the association between quality characteristics of homework and student outcomes (e.g., Corno & Xu, 2004; Elawar & Corno, 1985; Trautwein, Lüdtke, Schnyder et al., 2006; Warton, 2001; Xu, 2005). One important message from these studies is that teachers assigning homework should always bear in mind the potential positive and negative consequences for motivation.

### *Limitations and Future Research*

The present research provides initial evidence for teacher effects on students' homework completion. At the same time, several limitations should be noted. First and foremost, although we used a longitudinal design and data from two sources (teachers and students), our study cannot fully satisfactorily address the issue of causation. In that respect, our study suffers from a limitation facing practically all nonexperimental research: the possibility of third-variable explanations. It is important to note that other predictor variables might have had an effect on the outcome variables had we included them. Furthermore, it is possible that a third variable impacted both the students' answers to the questionnaire items and teachers' endorsement of the various homework scales. Unfortunately, there is no ideal solution to the third-variable problem in the present research (or indeed in nonexperimental studies in general).

Generalizability is also an issue. Although our sampling procedure resulted in a sample fairly representative of children in the German-speaking part of three Swiss cantons, there are clear limitations to its generalizability. Most notably, our study involved Grade 8 students in

French-as-a-second-language classes only, and it is quite possible that homework characteristics are differently related to student outcomes in lower or higher grades or in other subjects. For instance, teachers' endorsement of parental homework involvement might be more positively related to student outcomes in lower grades (e.g., Bempechat, 2004). Further research is needed to address this issue. Moreover, it is unclear to what extent cultural differences might affect the results. Although no previous studies have documented major differences between homework practices in Switzerland and, for instance, the United States, cross-cultural studies might detect such differences. Moreover, effects may differ for various ethnic groups within one country. Hence, we would like to see similar studies in diverse samples.

In addition, although we looked at teacher homework variables from three broad areas, the present study was restricted to a limited number of these variables, and future studies might benefit from including additional constructs. Furthermore, the internal consistencies of some of the scale scores should be improved by refining the items and adding more items. Given the brevity of the scales, the internal consistencies of the scale scores were satisfactory, ranging between .67 and .83. However, the variance explained by these predictor variables may well have been even larger if we had used longer scales with higher internal consistency. We therefore suggest that a broader, psychometrically sound instrument with more items per scale be developed, using a larger number of teachers. Given the predictive validity of the scale scores documented in the present study, the items we used provide a useful starting point for an extended instrument. In addition to teachers' views of homework, future research should also seek to collect parents' attitudes toward homework and their homework behaviors.

Finally, our study relied in part on self-report data, the validity of which is sometimes questioned. In our view, however, concerns about the validity of self-report data only partially apply to our study. In fact, the simultaneous use of three different data sources (teacher report, student report, standardized achievement tests) is a notable strength of our study. Furthermore, we specifically asked teachers about their homework beliefs and attitudes. Self-report is arguably the most valid assessment method for such constructs. Similarly, student self-report is arguably the best way to tap students' homework emotions. Finally, we would argue that self-report is probably the most valid data source of data on students' homework effort. However, students' self-reports also correlate with third-party reports. Data from an unrelated (unpublished) study conducted in our lab indicate a substantive correlation of .49 between student and teacher reports.

To conclude, the present study significantly extended prior research by establishing a link between what teachers think and do about homework and student outcomes. Most important, a comparably low emphasis on drill and practice tasks and a high emphasis on motivation was associated with favorable developments in students' homework effort and achievement, whereas a controlling homework style was associated with less homework effort and more negative homework emotions. Moreover, contrasting patterns of results were found for students whose teacher endorsed student homework autonomy and students whose teacher endorsed parental homework involvement. More generally, it seems that teachers who emphasized the control of homework completion as well as drill and practice were less successful than teachers who emphasized student motivation as well as increasing student responsibility and autonomy via homework assign-

ments. Despite the reasonably consistent pattern of results, more research is clearly needed to identify the defining characteristics of effective homework assignments and to ensure that time spent on homework is not wasted. We hope that our study will mark the beginning of a more concentrated research effort to determine the role of teachers and their homework assignments for student learning and motivation.

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## Appendix

### Teacher Items

#### Homework Objectives

##### *Drill and Practice*

- One of my main reasons for setting homework is . . .
- . . . to drill, practice, and consolidate the material covered in the previous lesson.
  - . . . that it is very effective to have students practice the material covered in the lesson again at home.
  - . . . to check that the students are keeping up.
  - . . . that the assignments help me to see what students have not understood.

##### *Closing the Achievement Gap*

- One of my main reasons for setting homework is . . .
- . . . that it enables students who do not otherwise contribute much to participate.
  - . . . that it helps to close achievement gaps between high- and low-achieving students.

##### *Motivation*

- One of my main reasons for setting homework is . . .
- . . . that it promotes student responsibility and independence.
  - . . . that I want to increase the students' interest in the subject.
  - . . . that the students can work together and learn from one another.
  - . . . that interesting assignments can enhance student motivation.

- . . . that students can become more independent by doing homework assignments without the teacher's help.
- . . . that it helps me to see which students have motivational problems.

##### *School–Home Link*

- One of my main reasons for setting homework is . . .
- . . . that it informs parents about the curriculum and their children's activities at school.
  - . . . that it encourages parent-child communication on school matters.

#### Homework Implementation Practices

##### *Emphasis on Student Responsibility*

- I have explained to my students why it is important for them to do homework.
- I have explained to my students that they do the homework for themselves and not for the teacher.

##### *Controlling Homework Style*

- I can soon tell how much effort a student has made by looking at his or her homework assignments.
- I take homework completion into account when assigning grades.
- I often ask students to hand in their homework so that I can check their work.
- In my classes, students who do homework are particularly well prepared for tests and exams.

### Attitudes About Parental Homework Involvement

#### *Endorsement of Parental Homework Control*

Parents should have their children show them their homework to make sure that it has been done properly.

It is important for parents to control their children's homework completion.

#### *Support for Student Homework Autonomy*

Students should do their homework without help, because that is how they learn most.

Homework should be a school matter, and not a matter for parents.

Parents should only help with homework if their children ask them explicitly.

Parents should support their children indirectly by encouraging them with their homework, rather than by doing the assignments together.

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