Assessing the instructional quality of private tutoring and its effects on student outcomes: Analyses from the German National Educational Panel Study

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Background. A considerable proportion of secondary school students get additional support from private tutoring lessons. Empirical findings on the effectiveness of private tutoring are inconclusive. The instructional quality of the tutoring lessons might influence their effectiveness.

Aims. We analysed (1) whether students privately tutored in the subjects German or mathematics outperformed their non-tutored counterparts; (2) whether the instructional quality of the tutoring lessons can be described with the three dimensions, structure, challenge, and support; and (3) the effects of these quality dimensions on the students’ academic achievement and their global satisfaction with their school and family situation.

Sample. We used data from the German National Educational Panel Study (NEPS). From a total sample of \( N = 11,358 \) 10th-grade secondary school students, subsamples provided information about tutoring quality in mathematics (\( n_M = 1,714 \)), German (\( n_G = 148 \)), and English (\( n_E = 490 \)).

Methods. The model of three correlated dimensions of tutoring quality was evaluated with confirmatory factor analyses, and the effects on student outcomes were tested in a structural equation modelling framework.

Results. Analyses revealed neither global effects of private tutoring nor effects of its instructional quality on students’ grades in mathematics or German. However, the support dimension was positively related to students’ satisfaction with their school situation.

Conclusions. Private tutoring cannot be recommended as a generally effective strategy to improve academic achievement in school, but might be helpful to relieve the stress level induced by insufficient achievement in school.

School is not the only place where students may learn. During secondary schooling, many students get additional support from private tutoring. In Germany, about half of the student population receives private tutoring at some point of their school career (Hille,
Private tutoring refers to tutoring in academic subjects (e.g., languages, mathematics, or science) with the aim of improving academic achievement. It is provided by tutors for financial gain, and does not include extracurricular activities, such as sports, or remedial lessons in school (Bray, 2014).

Students and their families invest a lot of time and money in private tutoring. The vast majority of them state that it improves the child’s academic achievement (Entrich, 2018; Guill & Bos, 2014; Ireson & Rushforth, 2005; Silova & Bray, 2005). However, empirical findings on the effectiveness of private tutoring are rather contradictory. Among longitudinal studies that controlled for systematic differences between students with and without tutoring, some found a positive effect on achievement (Berberoğlu & Tansel, 2014; Ireson & Rushforth, 2005), but others found minimal effects or none at all (Park, Buchmann, Choi, & Merry, 2016; Ryu & Kang, 2013; Smyth, 2008). Therefore, it is not sufficient to ask whether private tutoring per se is effective in improving students’ achievement. Students’ prior knowledge and their motivation to learn, as well as the instructional quality of the tutoring lessons, are aspects that might influence its effectiveness. However, to the best of our knowledge, no studies have yet systematically investigated the instructional quality of private tutoring and its effect on students’ academic achievement. Therefore, the aim of this study was threefold: Drawing on data from the German National Educational Panel Study (NEPS; Blossfeld, Roßbach, & von Maurice, 2011), we first analysed whether students privately tutored in the subjects German or mathematics outperformed their non-tutored counterparts. Second, we analysed whether the instructional quality of the tutoring lessons can be described with the three dimensions, structure, challenge, and support. Third, we analysed the effects of the instructional quality on students’ academic achievement. Similar to school instruction, private tutoring has multicriterial goals. We therefore focused not only on achievement but also on the motivational effects of private tutoring.

**Theoretical background**

**Global effects of private tutoring on academic achievement**

Tutoring is generally believed to be effective because it gives students more time to learn (Kuan, 2011; Mischo & van Kessel, 2005). This argument is based on Carroll’s (1963) model of school learning, which posits that learning is a function of the ratio of the time actually spent on learning to the time needed to learn. The time needed depends on cognitive factors and the quality of instruction, while the time spent depends on the amount of time that is available and the student’s motivation to use it.

When analysing the effect of private tutoring, longitudinal data are essential because selection effects between tutored and non-tutored students regarding prior achievement and motivation need to be controlled for (Baker, Akiba, LeTendre, & Wiseman, 2001; Byun, Chung, & Baker, 2018; Entrich, 2014). However, even empirical studies using longitudinal data have reached inconsistent conclusions regarding the impact of available learning time during tutoring on academic achievement. There is some evidence of (weak) linear links (Ryu & Kang, 2013), missing links (Smyth, 2008), and a threshold amount of instruction time needed for successful learning (Heinrich & Nisar, 2013). Conversely, there appears to be a saturation threshold beyond which additional tutoring does not induce further learning (Liu, 2012). In keeping with Carroll’s model, it appears that motivated students are more likely to learn more through tutoring. Loyalka and Zakharov (2016) also found a positive interaction between students’ prior knowledge and
tutoring attendance. However, they postulated that this was due to the different quality of the tutoring classes that students with higher and lower prior achievement chose. Contrary to Carroll’s model, however, in some cases, more prior knowledge was associated with less success achieved with tutoring (Guill & Bonsen, 2010; Kuan, 2011; cf. Guill & Bos, 2014).

It is unclear whether and how private tutoring affects the total amount of time spent learning, in and outside school. Some authors have suggested that tutored students pay less attention during regular school classes and thus spend less time actively learning there, because they assume that tutoring will allow them to make up for what they have missed (Bray, 2009; Byun et al., 2018; Kenny & Faunce, 2004). It is also uncertain whether tutoring actually increases the total amount of time spent learning outside school or whether it merely displaces time that would otherwise be spent learning individually at home. Non-experimental studies on the effects of private tutoring should therefore control for both the learning time spent and the engagement shown outside private tutoring.

Based on Carroll’s model of school learning, we expected tutored students to outperform non-tutored students after controlling for central covariates such as prior achievement, motivation, and family background (Hypothesis 1a). We expected the positive effect of private tutoring to be stronger for higher achieving and for more motivated students (Hypothesis 1b).

**Instructional quality of private tutoring**

The time needed to learn depends not only on the characteristics of the student, but also on the quality of the instruction. In Germany, as in many countries, private tutoring classes are mostly remedial (Baker et al., 2001; Byun et al., 2018). Tutors do not introduce new material but rather revise, expand, and consolidate material covered in school lessons. Tutoring mostly takes place in a one-to-one or small-group setting. However, it has the same goal as regular classroom instruction, namely, to enhance students’ understanding. Therefore, the NEPS framework for out-of-school learning environments (Bäumer, Preis, Roßbach, Stecher, & Klieme, 2011) characterizes the instructional quality of private tutoring in the same manner as that of classroom lessons. It differentiates between the dimensions of structure, challenge, and support in private tutoring and is closely related to the framework of three basic dimensions of teaching quality (Lipowsky et al., 2009; Praetorius, Klieme, Herbert, & Pinger, 2018), which was developed for classroom instruction. Challenge means the cognitive activation of the learners, for example, with complex and challenging tasks and Socratic dialogue practice. It should thereby increase students’ learning gains. Support refers to specific aspects of the teacher–student relationship, such as constructive teacher feedback and a positive approach to students’ errors. Supportive teachers fulfill students’ basic needs for social relatedness, autonomy, and competence, and thereby foster their interest and intrinsic motivation and, even more generally, their well-being (Ryan & Deci, 2000). Structure comprises a well-structured presentation of learning content as well as effective classroom and time management to optimally use the learning time available (see also Fauth, Decristan, Rieser, Klieme, & Büttner, 2014).

Although a specific strength of the NEPS framework is its connection to research on instructional quality in the regular classroom, connections to research on other forms of one-to-one instruction are missing (Graesser, D’Mello, & Cade, 2011). The latter research also discusses the choice of adequate tasks for the tutoring sessions as part of its instructional quality; this aspect is closely related to the challenge domain. Additionally, it
emphasizes the quality of tutor–student dialogues. The common work of tutor and tutee on correcting an incorrect answer is underlined as a specific strength of the tutoring setting. Meanwhile, the high proportion of tutor explanations and the passive reception of the tutee is considered to be problematic. In future research, these aspects should be integrated into the challenge dimension of the NEPS framework.

When looking at student, teacher, and observer ratings of classroom instruction, this theoretically proposed structure of three correlated factors of instructional quality has been empirically confirmed (Fauth et al., 2014; Kunter et al., 2013; Praetorius et al., 2018). Moreover, at the class level, the correlations between the three factors were substantial. Nevertheless, up to now, the question of whether the instructional quality of private tutoring can be described by these factors equally well has not been investigated.

As Kunter et al. (2013) have shown, instructional quality depends on teachers’ content knowledge (a thorough understanding of the subject matter), pedagogical content knowledge (a solid grasp of teaching methods), and pedagogical knowledge (knowledge of educational psychology; see also Shulman, 1986), which, in turn, are positively related to teachers’ formal qualifications (Baumert & Kunter, 2006; Kunter et al., 2013). Quasiexperimental studies on one-to-one tutoring have shown that trained teachers scored higher on several measures of diagnostic competence than university students in teacher training (Herppich, Wittwer, Nückles, & Renkl, 2013). We can expect tutors to be even more heterogeneous, because tutoring is provided not only by trained teachers, but also by secondary school and university students (Guill, 2012), who know less about the subject matter and are less familiar with methodology. The quality of tutoring and thus also learning outcomes is likely to differ depending on tutors’ formal qualifications.

Given the close relationship between instruction in school and in private tutoring, we expected that the instructional quality of private tutoring can be described with the three correlated factors, structure, challenge, and support (Hypothesis 2a). We further expected formally higher qualified tutors (university students, teachers) to offer better instruction than less qualified tutors (Hypothesis 2b).

**Effects of the instructional quality of private tutoring classes**

The differentiation between the three dimensions of instructional quality is not only of theoretical interest. As elaborated above, these dimensions have differential effects on student outcomes: Challenge and structure are predictive of positive learning outcomes, while support is predictive of students' motivation (Fauth et al., 2014; Keller, Neumann, & Fischer, 2017) and even their general school adjustment (Aldrup, Klusmann, Lüdtke, Göllner, & Trautwein, 2018), although this is only partly supported by previous research (Praetorius et al., 2018).

No empirical research has been conducted to determine whether the three dimensions of instructional quality are equally relevant for successful learning in private tutoring. However, concerning motivational effects, it has been argued that, in tutoring, one-to-one or small-group instruction makes it easier to identify progress and provide feedback measured against the student’s earlier performance (individual frame of reference; Rheinberg & Engeser, 2010; Rheinberg & Fries, 2010). This could have a positive impact on academic self-concept, motivation, and performance anxiety. Haag (2001) demonstrated that, relative to the control group, students who were tutored for nine months showed these improvements. In turn, a positive ability self-concept has been shown to be predictive of students' valuing of school (Schütte, Zimmermann, & Köller, 2017). Feedback with an individual frame of reference is part of the support dimension.
Additionally, some studies have investigated the effects of tutors’ formal qualifications on student outcomes. Streber, Haag, and Götz (2011) revealed that, in Germany, there was no difference in the effectiveness of tutoring provided by university students, trained teachers, or other individuals. In contrast, in the United States, tutoring centres that employed a higher percentage of trained teachers were shown to produce higher rates of student learning (Chappell, Nunnery, Pribesh, & Hager, 2011).

We expected more structured and more challenging tutoring to have a positive effect on student achievement (Hypothesis 3a) and more supportive tutoring to have a positive effect on student motivation. However, the NEPS data of the relevant wave do not include specific scales for interest or intrinsic motivation. Given that a supportive environment also influences students’ well-being (Ryan & Deci, 2000), we expected more supportive tutoring to have a positive effect on students’ global evaluation of their school and family situation (Hypothesis 3b). In exploratory analyses, we also examined whether subgroups of average, below-average, or above-average performing students profited differently from high levels of instructional quality.

Method

Study and sample

For our analyses, we used the data from Wave 1 to Wave 5 of a NEPS cohort (Starting Cohort 4, Blossfeld et al., 2011). Data were collected at the beginning of Grade 9 in autumn 2010 (Wave 1), in spring 2011 (Wave 2), in Grade 10 in spring 2012 (Wave 3), and at the beginning of Grade 11 in autumn 2012 (Wave 5). Students were mostly tested and interviewed with written questionnaires in their schools. Students at special schools were excluded from the sample.

Cross-sectional data on private tutoring attendance and quality were collected in Wave 3. Therefore, we restricted our analyses to students in the general school system (N = 11,358) as private tutoring data were only available for those students. If students left a NEPS sampled school before Wave 3, they were tracked individually via mail (4.4%). Students who left the general school system after Grade 10 (50.3%) were interviewed via telephone or personal communication; 51.1% of the students were female; 40.6% attended academic track schools, and n = 2,679 (23.6%) answered that they received private tutoring in some subject in Grade 10.

Instruments

Items on private tutoring

Students who indicated that they were currently receiving private tutoring were asked to state the formal qualification of their tutor (five options). The instructional quality of the tutoring lessons in one subject chosen by the students was measured by 11 items on a four-point rating scale (from 1 = does not apply at all to 4 = fully applies). The structure scale

1 Wave 4 focused only on Grade 9 school leavers, who did not have any data on private tutoring quality and were therefore not included in our sample.

2 Verbatim: ‘Are you receiving private tutoring [Nachhilfeunterricht] at the moment?’ In contrast to Bray’s (2014) definition, the item does not differentiate explicitly between paid and unpaid forms of private tutoring. The item relies on an intuitive understanding of the term Nachhilfeunterricht, referring to lessons outside regular school hours and in many cases paid for by the parents. However, about 5% of the tutored students stated that they received private tutoring within school and by a trained teacher. As it is possible that these students mixed up private tutoring and remedial lessons, we checked whether our findings were stable, even if these unclear cases were excluded. Indeed, this was the case.
comprised three items. The challenge scale comprised four items on study techniques, cognitively activating tasks, and challenging practice, adapted from the German extension of the PISA 2003 study (Ramm et al., 2006; see also Guill, Lüdtke, & Köller, 2017). The support scale comprised four items on motivation (adapted from PISA 2003), the handling of student errors, teacher support, and feedback in reference to students’ prior achievement. All items on tutoring quality are reported in the Appendix 1. Tutoring intensity was dummy-coded, ranging between up to two and more than two hours of tutoring per week. Prior tutoring in mathematics or German was identified in parent interviews at the beginning of Grade 9.

**Academic achievement**
As grades are the only feedback students get about their achievement and due to their decisive role for graduation from school and grade repetition, we used them as the indicator of academic achievement. German and mathematics grades for midterm (Wave 3) and end-of-year Grade 10 (Wave 5) were stated by the students and were recoded to range from 1 = *failed* to 6 = *very good*. English midterm grades were not available.

**Motivational variables**
Due to its close relationship to intrinsic motivation, students’ motivation to profit from the tutoring lessons (Hypotheses 1a and 1b) was measured by their subject-related interest in mathematics and German (Ryan & Deci, 2000). Interest was measured in Wave 2 with four items, each on four-point rating scales, for example, ‘I enjoy figuring out a mathematical problem’. Reliability was high, with $\alpha = .85$ for mathematics and $\alpha = .83$ for German.

To operationalize students’ well-being as a result of tutoring quality (Hypothesis 3b), we used two one-item measures of students’ satisfaction with their school and family situation (‘How satisfied are you with your situation in school?/...with your family life?’), measured on an 11-point rating scale ranging from 0 = *completely dissatisfied* to 10 = *completely satisfied*, in Wave 2 (before private tutoring had commenced or after some private tutoring) and in Wave 3 (after some private tutoring). It has been shown that satisfaction in specific domains can be reliably measured with single-item measures (Gogol et al., 2014; Wanous, Reichers, & Hudy, 1997).

**Control variables**
Students’ basic cognitive abilities, as a further indicator of their ability to improve their grades, were measured in Wave 2 by a short matrices test (12 items, $\alpha = .84$) developed for NEPS to assess reasoning (Lang, Kamin, Rohr, Stünkel, & Williger, 2014). Helplessness with regard to mathematics and German was measured in Wave 2 with five items each on four-point rating scales. The items were developed for NEPS and are closely related to scales on academic self-concept, for example ‘It is not worth practicing mathematics for a test because I will come off badly again anyway’. Reliability measured by Cronbach’s alpha was high, with $\alpha = .91$ for mathematics and $\alpha = .84$ for German. Students’ academic aspiration, as an indicator of their extrinsic motivation for the tutoring subjects, was measured by one item in Wave 1 on whether they aimed to qualify for university admission (*Abitur*).
Gender was coded as 0 = male students and 1 = female students. Students’ socioeconomic background was operationalized by the families’ highest socioeconomic index (HISEI; range from 16 to 90), which was based on the ISCO-2008 coding of the parents’ statements about their profession (Ganzeboom & Treiman, 2003). In Germany, secondary schools are either primarily oriented to qualify students for university admission (academic track schools) or to prepare students for further vocational education, sometimes combined with an option to qualify for university admission (Lohmar & Eckhardt, 2015). Track attendance was distinguished between academic track (1) and non-academic track (0). All NEPS instruments are documented on the NEPS homepage.3

**Analyses**

To analyse the global effect of private tutoring on students’ grades in mathematics and German at the end of Grade 10 (Hypotheses 1a and 1b), we specified two regression models, controlling for the most important predictors of academic achievement (see Instruments). The interaction terms between private tutoring and midterm grades or subject-related interest, respectively, were included in the model. Grades and interest were centred at the sample mean to ease interpretation of the interaction effects.

Concerning Hypothesis 2a, for each of the three subjects, mathematics, German, and English, we specified a measurement model with three correlated latent factors for the three dimensions, structure, challenge, and support, and regressed the factors on the tutors’ formal qualifications (Hypotheses 2a and 2b). In addition to the chi-square statistic, we report the comparative fit index (CFI; >.90 indicates an acceptable model fit), the root mean square error of approximation (RMSEA; <.08 indicates an acceptable model fit), and the standardized root mean square residual (SRMR, <.08 indicates an acceptable model fit; Hu & Bentler, 1999).

To analyse the effect of the instructional quality of the tutoring lessons (Hypotheses 3a and 3b), for each subject, mathematics and German, we regressed end-of-year grades and satisfaction with school and family life simultaneously on the latent quality factors, controlling for prior satisfaction and grades, tutoring intensity, and variables from the regression analyses described above. Additionally, for tutoring in mathematics, we used multigroup analyses with three subgroups of students: above-average (midyear grades: good/very good; 11.6%), average (midyear grades: satisfactory; 32.4%), and below-average performing students (midyear grades: sufficient, insufficient, failed; 56.0%). The sample of students with private tutoring in German was too small for multigroup analyses.

All analyses were conducted with lavaan 0.6-3 (Rosseel, 2012) in the R software environment (R Core Team, 2017). Missing data stemmed from individual non-responses. The missing data rates were low (up to 10%) for private tutoring, prior grades, cognitive abilities, gender, track, and motivational constructs; they were moderate for HISEI and end-of-year grades (about 25%), and they were high for prior tutoring (about 66%). Missing data were handled using full-information maximum-likelihood estimation (FIML; Enders, 2010) integrated in lavaan.

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3 https://www.neps-data.de/de-de/datenzentrum/datenunddokumentation/startkohorteklasse9/dokumentation.aspx
Results

Global effects of private tutoring on students' achievement

Students with private tutoring had, on average, lower midterm grades and cognitive abilities, and showed more helplessness and less interest in the tutoring subject than students without private tutoring (for further descriptive statistics, see Table 1). As the regression models for students’ grades at the end of Grade 10 reveal (see Table 2), contrary to Hypothesis 1a, tutored students did not outperform non-tutored in any of the subjects. Tutored students even had significantly lower grades than non-tutored students. There was no interaction between students’ interest in mathematics or German and their tutoring. However, there was a significant interaction between students’ midterm grades and their tutoring, showing that, contrary to Hypothesis 1b, especially tutored students with lower midterm grades had higher grades at the end of the school year.4

As expected, midterm grades were the strongest predictor of end-of-year grades, but nearly all control variables also had small effects. Prior private tutoring was negatively associated with students’ grades.

Instructional quality of private tutoring lessons

Confirmatory factor analyses that tested a model of three correlated factors of instructional quality revealed a satisfactory model fit for the three subjects, (M) mathematics, (G) German, and (E) English (see Figure 1, Hypothesis 2a). The three dimensions, structure, challenge, and support were highly correlated (between $r = .68$ and $r = .91$) but separable (see also Guill et al., 2017). Model fit was worse for a one-dimensional solution (M: $\chi^2$ [df = 44] = 376.57; $p < .001$; CFI = .889; RMSEA = .066; SRMR = .043; G: $\chi^2$ [df = 44] = 81.08; $p = .001$; CFI = .897; RMSEA = .075; SRMR = .063; E: $\chi^2$ [df = 44] = 133.45; $p < .001$; CFI = .883; RMSEA = .064; SRMR = .047).

There was only partial evidence for an effect of tutors’ formal qualifications (see Table 3; Hypothesis 2b). Regarding mathematics tutoring, students stated that they found tutoring more challenging if the tutor was a teacher or had an unknown qualification rather than being a university student. Regarding German tutoring, secondary school student tutors’ lessons were described as being less challenging than university students’ lessons. Regarding English tutoring, the lessons of tutors with an unknown qualification were described as being less structured than university students’ lessons.

Effects of the instructional quality of private tutoring lessons

Structural equation modelling did not reveal many significant effects of the instructional quality of private tutoring in mathematics (see Figure 2, Hypotheses 3a and 3b). Support in private tutoring was positively associated with satisfaction with school, while tutoring intensity was negatively associated with satisfaction with school. However, the effects were small. Tutoring intensity also had small but only marginally significant effects on satisfaction with family life. The full model is presented in the Supplemental Online Material (Table S3). Concerning the analysis of tutoring effects in subgroups, measurement invariance was found in the factor loadings of the three groups of average, above-

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4 The main and interaction effects of private tutoring were robust, even if students who might have received remedial lessons instead of private tutoring were excluded (see Tables S1 and S2 in the Supplemental Online Material).
### Table 1. Students with and without private tutoring in mathematics or German (complete cases, $N_{\text{max}} = 11,358$)

|                        | Mathematics                  | German                        |
|------------------------|------------------------------|-------------------------------|
|                        | With tutoring $(N = 1,944)$  | With tutoring $(N = 311)$     | Without tutoring $(N = 10,939)$ |
| Midterm grade          | $M$  3.44, $SD$  0.91        | $M$  3.62, $SD$  0.87         | $M$  4.20, $SD$  0.83         |
|                        | Without tutoring $(N = 9,306)$|                              |                              |
| General cognitive abilities | $M$  8.41, $SD$  2.35      | $M$  8.42, $SD$  2.44         | $M$  9.00, $SD$  2.26         |
| Perceived helplessness | $M$  1.98, $SD$  0.79        | $M$  1.94, $SD$  0.68         | $M$  1.65, $SD$  0.59         |
| Interest               | $M$  1.79, $SD$  0.69        | $M$  2.07, $SD$  0.69         | $M$  2.24, $SD$  0.79         |
| Aspiration to qualify for university | $66.81\%$  | $52.60\%$  | $67.29\%$  |
| Gender                 | $63.55\%$  | $40.13\%$  | $51.43\%$  |
| HISEI                  | $53.74$, $SD$  19.16       | $50.28$, $SD$  21.28         | $53.11$, $SD$  20.44         |
| Prior tutoring         | $42.80\%$  | $35.33\%$  | $2.00\%$  |
| Academic track         | $40.66\%$  | $19.73\%$  | $43.23\%$  |

*Note.* All mean differences are significant effects ($p < .05$) with the exception of aspiration to qualify for university, HISEI, and academic track attendance for students with or without tutoring in mathematics.
The results of the three groups were similar (detailed results available in the Supplemental Online Material, Table S5a–c). For tutoring in German, a structural equation model did not converge successfully, probably due to the small sample size. We therefore specified a path model using manifest scale mean scores ($a_{structure} = .50$, $a_{challenge} = .77$, $a_{support} = .57$). Support in private tutoring was positively associated with satisfaction with school and had a marginally positive effect on satisfaction with family life. There were no significant effects on end-of-year grades (see Figure 2 and Supplemental Online Material, Table S4).

**Table 2.** Global effects of private tutoring attendance in mathematics or German on the respective end-of-year grades ($N = 11,358$)

| Dependent variable | Mathematics (End-of-year grade) |  | German (End-of-year grade) |  |
|--------------------|---------------------------------|--|-----------------------------|--|
| Intercept          | $3.974 \pm 0.043$               | 0.000 | $4.285 \pm 0.037$           | 0.000 |
| Predictors         |                                 |     |                             |     |
| Private tutoring   | $-0.173 \pm 0.025$              | $-0.065$ | $-0.186 \pm 0.049$          | $-0.037$ |
| Midterm grade      | $0.656 \pm 0.008$               | $0.681$ | $0.586 \pm 0.008$           | $0.605$ |
| General cognitive ability | $0.028 \pm 0.004$     | $0.063$ | $0.010 \pm 0.003$           | $0.029$ |
| Perceived helplessness | $-0.101 \pm 0.012$  | $-0.071$ | $-0.153 \pm 0.012$          | $-0.112$ |
| Interest           | $0.059 \pm 0.009$               | $0.058$ | $0.053 \pm 0.007$           | $0.065$ |
| Aspiration to qualify for university | $0.041 \pm 0.020$   | $0.019$ | $0.017 \pm 0.017$           | $0.010$ |
| Gender             | $-0.018 \pm 0.015$              | $-0.009$ | $0.123 \pm 0.013$           | $0.076$ |
| HISEI              | $0.002 \pm 0.000$               | $0.034$ | $0.002 \pm 0.000$           | $0.050$ |
| Prior tutoring     | $-0.061 \pm 0.029$              | $-0.020$ | $-0.107 \pm 0.052$          | $-0.022$ |
| Academic track     | $-0.043 \pm 0.018$              | $-0.021$ | $-0.039 \pm 0.015$          | $-0.024$ |
| Interaction terms  |                                 |     |                             |     |
| PT x midterm grade | $-0.141 \pm 0.021$              | $-0.062$ | $-0.164 \pm 0.046$          | $-0.034$ |
| PT x interest      | $-0.014 \pm 0.023$              | $-0.005$ | $-0.012 \pm 0.047$          | $-0.002$ |

**Notes.** Significant effects ($p < .05$) are printed in bold. $b = \text{unstandardized coefficient}$. $\beta = \text{standardized coefficient}$.

In mathematics resp. German language or reading.

Reference: no aspiration to qualify for university admission.

Reference: male student.

Reference: non-academic track attendance.

and below-average performing students ($\Delta \chi^2[\text{df} = 16] = 29.003, p = .023, \Delta \text{CFI} = .005$). The results of the three groups were similar (detailed results available in the Supplemental Online Material, Table S5a–c).

For tutoring in German, a structural equation model did not converge successfully, probably due to the small sample size. We therefore specified a path model using manifest scale mean scores ($a_{structure} = .50$, $a_{challenge} = .77$, $a_{support} = .57$). Support in private tutoring was positively associated with satisfaction with school and had a marginally positive effect on satisfaction with family life. There were no significant effects on end-of-year grades (see Figure 2 and Supplemental Online Material, Table S4).

**Discussion**

**Private tutoring and student outcomes**

Contrary to Hypothesis 1a, but in line with some previous findings (Hof, 2014; Park et al., 2016; Ryu & Kang, 2013; Smyth, 2008), we did not find a positive main effect of private tutoring on students’ grades. Our regression models revealed the expected effects of the most important predictors of academic achievement (Wang, Haertel, & Walberg, 1993). Nonetheless, students with lower prior grades did seem to profit minimally from the private tutoring lessons (contrary to Hypothesis 1b). Possibly, tutors and students invest more effort in the case of low-performing students because the risk of grade repetition is
high. Additionally, basic measures such as consistent homework completion supported by the tutor might be more helpful in improving low grades than grades that are already higher.

Given the limitations of these global models when measuring the effectiveness of private tutoring, we expected a closer look at the subsample of tutored students and the tutoring quality to be fruitful. Indeed, the instructional quality of private tutoring lessons can be described by the factors, structure, challenge, and support (Hypothesis 2a). Even though correlations were high, the three factors were separable. This was shown for tutoring in the three subjects, mathematics, German, and English. Contrary to our expectations (Hypothesis 3a), neither structure nor challenge predicted students’ grades. Concerning structure, this is perhaps because private tutoring lessons are often closely related to the current school lessons and are thereby shaped by the learning material presented there. Therefore, even if the tutor does not explicitly state the goal of a tutoring lesson, most students should know what to expect. Concerning the time-management aspect of the structure dimension, a more differentiated instrument with a closer focus on time lost on non-learning activities such as chatting should be used in future studies.

Given that the one-to-one or small-group setting of tutoring lessons offers excellent conditions for cognitively activating instruction, it was rather disappointing to find no effect of the challenge dimension. However, private tutoring is only a minor aspect of NEPS. NEPS did not include an additional interview of the tutors. Given that students may have difficulty differing between cognitively stimulating instruction and their personal problems with the learning content, data on the tutors’ perspective – or even the observer perspective – could provide more valid information on this dimension (Clausen, 2002; Kunter & Baumert, 2006; Praetorius et al., 2018).

Figure 1. Measurement models of the instructional quality of private tutoring in mathematics (N = 1,714), German (N = 148), and English (N = 490).

\[ \chi^2 [df = 41] = 265.29/70.62/106.05, p < .003 \]
\[ CFI = 0.925/0.918/0.915 \]
\[ RMSEA = 0.056/0.070/0.057 \]
\[ SRMR = 0.038/0.059/0.045 \]
Table 3. Differences in the effects of private tutors with different formal qualifications on the (standardized) tutoring quality in mathematics ($N = 1,719$), German ($N = 148$), and English ($N = 491$)

|                     | Mathematics | German | English |
|---------------------|-------------|--------|---------|
|                     | Structure   | Challenge | Support | Structure | Challenge | Support | Structure | Challenge | Support |
| Secondary school student | -0.09       | -0.10   | -0.20   | -0.58     | **1.76**   | -1.16    | -0.49     | -0.39     | -0.41   |
| University student   |             | **0.16** | -0.15   | 0.58      | -0.05     | 0.10     | -0.15     | -0.12     | -0.13   |
| Teacher              | -0.04       | 0.02    | -0.06   | 0.04      | -0.56     | -0.23    | -0.37     | -0.08     | -0.05   |
| Other                |             |         |         |           |           |          |           |           |         |

Note. Significant effects ($p < .05$) are printed in bold and marginally significant effects ($p < .10$) in italics.
Concerning the support dimension, we found a positive effect on students’ global evaluation of their situation in school and – only for tutoring in German – in their family (Hypothesis 3b). A positive attitude of the tutor, praise of the students’ effort, a positive approach to their mistakes, and patient explanations of the learning material seem to support students’ basic needs for autonomy, social relatedness, and competence, and even transfer to their general well-being (Ryan & Deci, 2000). These results corroborate and extend earlier descriptive findings that students profit from the relationship with the tutor (Ireson & Rushforth, 2005) and findings that students’ perception of social support from an individual teacher predicts their school satisfaction (Aldrup et al., 2018). Thus, even though there is no evidence that private tutoring directly fosters students’ achievement in school, this positive effect on students’ motivation may facilitate future learning. Interestingly, very time-consuming private tutoring in mathematics, which might interfere with leisure-time activities (Bray, 2009), has the opposite effect on students’ evaluations of their school situation.

**Strengths and limitations**

Given the systematic differences between tutored and non-tutored students, a major strength of our analyses is that we used longitudinal data that made it possible to control for differences in prior achievement and motivation. However, in NEPS, no data are available on short-term declines in academic achievement just before the decision to start private tutoring. Although students’ subject-specific interest was globally controlled for, their specific learning behaviour before the onset of tutoring could not be controlled for. If students just shift their learning time from self-regulated to tutor-supported learning, substantial advantages of tutoring lessons cannot be expected.

To analyse tutoring quality, we relied on a unique data set. We are not aware of a large-scale data set that includes as many items on tutoring quality. One limitation of our study...
may be that the scales used were rather short to fully represent the constructs of structure, challenge, and support (Praetorius et al., 2018). Future studies could aim to achieve a more differentiated representation, for example, by integrating items on Socratic dialogue praxis into the challenge scale (Graesser et al., 2011) instead of mostly focusing on task selection. Furthermore, as stated above, the integration of the tutor perspective on the instructional quality would be useful.

Analyses on the effects of private tutoring often focus on academic achievement (cf. Haag, 2001). We extended these analyses to include motivational variables. However, students’ satisfaction with their school and their family situation are very global constructs. Future studies should integrate constructs more closely related to the tutoring aims and more established in educational psychological research, such as subject-specific interest or self-regulated learning behaviour. Furthermore, independent measures of academic achievement, in addition to grades, might help to identify small learning gains achieved by private tutoring.

Lastly, our findings may not be transferable to countries with very different patterns of private tutoring attendance, for example South-East Asian countries where even high-performing students attend tutoring to qualify for excellent universities (Bray, 2009). Further research on the generalizability of our findings is therefore necessary.

**Conclusion**

On a theoretical level, our findings show that a model of the instructional quality of classroom lessons can be adapted for private tutoring lessons and successfully integrated into a large-scale assessment. Even though the NEPS study was not designed for a rigorous evaluation of the effect of private tutoring on students’ academic achievement and motivation, with its longitudinal design and its 11 items on tutoring quality, it offers a promising starting point for future more differentiated studies on the quality of private tutoring lessons.

On a practical level, neither the current state of research (Park et al., 2016) nor our own analyses provide convincing support for recommending private tutoring as a generally effective strategy to improve academic achievement. When opting for private tutoring, parents and students should regularly evaluate whether grades really improve. Public subsidies of private tutoring (Bray, 2009) should be monitored closely. Nonetheless, private tutoring seems to relieve the stress level induced by insufficient achievement in school and might therefore stabilize students’ general well-being as a basis for future academic achievement.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Table S1. Sensitivity analyses I: Global effects of private tutoring attendance in mathematics or German on the respective end-of-year grades (N = 11,358).

Table S2. Sensitivity analyses II: Global effects of private tutoring attendance in mathematics or German on the respective end-of-year grades (N = 11,358).

Table S3. Effects of private tutoring quality and intensity in mathematics on end-of-year grades, satisfaction with school situation and family life (results from one integrated structural equation model, N = 1,722).

Table S4. Effects of private tutoring quality and intensity in German on end-of-year grades, satisfaction with school situation and family life (results from path analyses with manifest mean scores for dimensions of tutoring quality, N = 148).

Table S5. (a) Effects of private tutoring quality and intensity in mathematics on end-of-year grades, satisfaction with school situation and family life – Subsample of below-average performing students (results from multigroup analyses, n = 944). (b) Effects of private tutoring quality and intensity in mathematics on end-of-year grades, satisfaction with school situation and family life – Subsample of average-performing students (results from multigroup analyses, n = 546). (c) Effects of private tutoring quality and intensity in mathematics on end-of-year grades, satisfaction with school situation and family life – Subsample of above-average performing students (results from multigroup analyses, n = 196).

Appendix 1: Items on private tutoring quality in NEPS

To what extent do the following statements apply to your tutoring experience?

Structure

St1. There are no unnecessary interruptions during my tutoring sessions.
St2. My tutor and I discuss what we’re going to do at the beginning of each session.
St3. When the tutoring session is over, we summarize what we’ve done.

**Challenge**
Ch1. I practice new methods for doing my schoolwork or for learning while being tutored.
Ch2. While I’m being tutored, we do exercises to see if I’ve really understood what’s been taught.
Ch3. The exercises we do in tutoring are always different so I have to pay close attention.
Ch4. The exercises we do in tutoring always include tasks that really require me to think.

**Support**
Su1. The tutor explains everything to me until I understand it.
Su2. My tutor communicates the joy of the subject we’re working on.
Su3. When I’ve worked hard in my tutoring session, my tutor praises me.
Su4. Making a mistake in front of my tutor is no big deal.