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The role of intrinsic motivation for teaching, teachers' care and autonomy support in students' self-determined motivation[1]

Abstract

Using self-determination theory as a framework, this study examined teachers' motivation and behavior as they relate to students' intrinsic motivation. A cross-sectional study with eighth grade students (N = 1,195) and their teachers (N = 48) was conducted by analyzing questionnaires given to participating teachers and students. Multilevel analyses showed that students' individual perceptions of teachers' autonomy support and teachers' care predicted students' intrinsic motivation. Perceived autonomy support by the teacher on class level proved to be another predictor. On the other hand, intrinsic motivation for teaching in addition to teachers' reported autonomy support and care had no impact on students' intrinsic motivation. Implications for pedagogical practice are discussed, with a focus on the importance of autonomy support in a classroom setting.

Keywords

Motivation for teaching; Intrinsic motivation; Teachers' care; Autonomy support

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Zur Rolle von intrinsischer Lehrmotivation, Lehrerfürsorglichkeit und Autonomieunterstützung für die selbstbestimmte Lernmotivation von Schülerinnen und Schülern

Zusammenfassung

Vor dem Hintergrund der Selbstbestimmungstheorie untersuchte diese Studie, in welchem Maß eine intrinsische Lehrmotivation sowie das Lehrerverhalten zur Aufklärung der intrinsischen Motivation von Schülerinnen und Schülern beiträgt. Dazu wurden im Querschnitt Daten von 1.195 Schülerinnen und Schülern der achten Jahrgangsstufe und deren Lehrkräften (N = 48) mittels Fragebögen erhoben. Mehrebenenanalysen zeigten, dass die intrinsische Motivation der Schülerinnen und Schüler von der von ihnen wahrgenommenen Autonomieunterstützung und Fürsorglichkeit der Lehrperson mitbestimmt wird. Die wahrgenommene Autonomieunterstützung auf Klassenebene erwies sich als weiterer Prädiktor. Intrinsische Lehrmotivation, Autonomieunterstützung und Fürsorglichkeit aus Sicht der Lehrkräfte trugen jedoch nicht zur Aufklärung der intrinsischen Motivation von Schülerinnen und Schülern bei. Implikationen für die pädagogische Praxis werden diskutiert, insbesondere die Bedeutung von Autonomieunterstützung im Unterricht.

Schlagworte

Lehrmotivation; Intrinsische Motivation; Lehrerfürsorglichkeit; Autonomieunterstützung

1. Introduction

Interpersonal relationships and students' perceptions of teachers' behavior in the classroom are important determinants for students' motivation and engagement. Therefore, a focus of past educational research has examined teachers' behaviors that might be effective in promoting students' motivation. One theory, which guides much of the research on classroom conditions, is Self-Determination Theory (SDT), proposed by Deci and Ryan (1993, 2000). Based on deCharms Origin-Pawn-Concept (1972), SDT postulates that environmental factors support effective functioning of humans when they are studied with respect to three basic psychological needs: the needs for competence, relatedness, and autonomy (e.g., Ryan & Deci, 2002). *Competence* refers to the experience of being effective in navigating one's own behavior. It guides people to seek challenges that are optimal related to their capacities. Teachers can promote competence experiences when they focus on students' effort and rely on an individual's own abilities and past performance in evaluating students' work (Fischer & Rustemeyer, 2007). *Relatedness* refers to the feeling of connecting to others, being cared for by those others and having a sense of belonging with significant others (Baumeister & Leary, 1995; Bowlby, 1979; Ryan, 1995). The functions of relatedness are considered as important catalysts for engagement, which is a key construct in motivation (Furrer & Skinner,

2003). For the teacher-student relationship, it means providing acceptance, respect, and a feeling of caring. Finally, the experience of *autonomy* occurs when people feel that they have the ability to direct their own behaviors and that they can determine and realize their personal goals, values and interests (Ryan & Deci, 2000). Autonomous individuals feel a sense of control over their choices, and consider their behaviors as an expression of the self, even when their actions are influenced by others (Filak & Sheldon, 2003; Ryan & Deci, 2002). Teachers can nurture this need by using autonomy supportive behaviors. This means that teachers are more attentive and listen carefully to students' contributions, and that they create more opportunities for students to work on their own. Autonomy supportive teachers promote the relevance of schoolwork, and they provide more opportunities for choice, ask more questions about what students want to do and praise signs of improvements. They offer hints when students seem stuck in their work, and they are responsive to questions and communicate a clear acknowledgement of students' perspectives (Assor, Kaplan, & Roth, 2002; Reeve, 2006; Reeve, Bolt, & Cai, 1999). Individuals whose needs are generally supported by such environmental conditions have more positive outcomes concerning their well-being, to which intrinsic motivation is related to (Deci & Ryan, 2002). Research on self-determination theory showed that students benefit especially from autonomous motivation, i.e. intrinsic motivation (Reeve, 2002).

2. Previous research

A substantial amount of research has explored diverse determinants of students' motivation and revealed, among other things, that autonomy support has an impact on students' intrinsic motivation (e.g., Assor et al., 2002; Black & Deci, 2000; Kunter, 2005; Rakoczy, Klieme, & Pauli, 2008; Reeve et al., 1999; Roth, Assor, Kanat-Maymon, & Kaplan, 2007). Most previous studies have placed an emphasis on autonomy support, paying less attention to social relatedness. It is well known that supportive teacher behaviors towards students are crucial for instructional quality (Weinert, Helmke, & Schneider, 1989). Nie and Lau (2009) found a positive relation between teachers' care – operationalized through teachers' sensitivity to students' needs – and student engagement. This documented the important role of teacher care in supporting student engagement. Goudas and Biddle (1994) demonstrated that perceived individual teachers' care in physics education makes a substantial difference in students' intrinsic motivation. Ryan, Stiller, and Lynch (1994) found that establishing a relationship between teachers and parents can facilitate a higher level of school-related functioning for adolescents. Those studies emphasized that teachers' care is an important aspect for students' motivation.

Because there are various definitions for "care", we define teachers' care as teacher behaviors derived from the need for relatedness which improve or maintain the quality of interpersonal relationships among teachers and students. A pos-

itive interpersonal relationship is possible when teachers create a warm, accepting classroom setting where students feel that they are respected (Reeve & Jang, 2006). This quality was outlined by Chang (2003), who defined a caring teacher as someone who cares about, listens to, likes, respects, and understands his/her students. Apart from this, we can also understand teachers' care as a kind of "social support for students" (Kunter et al., 2008). In a supportive social environment, students experience personal guidance and feel personally valued (Ryan & Powelson, 1991). In such a setting, the teacher insures the necessary time for student questions and problems both inside and outside the classroom. The teacher shows a personal interest in the problems of the students and helps the students with their work.

In the present study, teacher care refers to these described aspects. Furthermore, it was found that children's needs for connectedness (Weiner, 1990), or their sense of belonging in their classrooms (Eccles & Midgley, 1989), can serve as a fundamental motivator for them (Connell & Wellborn, 1991; Deci & Ryan, 1985). A study by Weinert, Helmke, and Schrader (1992) showed that the teacher's ability to adapt to students' needs and their patience with slower learners has positive effects on students' learning motivation. Research in this field also found that students' motivation depends on the quality of the teacher-student relationship (Eccles & Midgley, 1989), as conveyed by constructs such as "pedagogical caring" (Wentzel, 1997) and the role that relatedness plays in students' academic motivation (Furrer & Skinner, 2003). Analyzing conditions for teachers' care is important because it highlights the motivational significance not only of autonomy support but also of teacher-student relationships (Reeve, 2002).

Apart from this, it was found that students' perceptions of teachers' instructional behaviors, as well as teachers' motivational orientation, can influence students' intrinsic motivation and self-determination (Bieg & Mittag, 2009; Fischer & Rustemeyer, 2007). In addition to students' need satisfaction and its important role in students' intrinsic motivation for learning, teachers' motivation should also predict students' motivation. There are different aspects of teachers' motivation in the current literature. In the present study, we examined the aspect of "motivation for teaching" from a teachers' perspective, within the motivational framework of self-determination theory. In that sense, autonomous and intrinsic motivation for teaching refers to teachers' thoughts and feelings concerning their own motivations for engaging in teaching (e.g., "Why do I look for interesting topics?"; Roth et al., 2007). Few studies have focused on the relationship between teachers' motivation for teaching and subsequent students' learning motivation (Müller, Hanfstingl, & Andreitz, 2009; Pelletier, Séguin-Lévesque, & Legault, 2002; Roth et al., 2007). The results of a study by Roth et al. (2007) did find, however, that autonomous motivation for teaching is positively related to students' intrinsic and self-determined motivation. Another key finding of these studies was that autonomous motivation for teaching is also positively associated with autonomy supportive teaching behaviors (Müller et al., 2009; Pelletier et al., 2002; Roth et al., 2007). However, the findings of Roth et al. (2007) were restricted to elementary school, and in the

study of Pelletier et al. (2002), students' levels of motivation were assessed only through measures of teachers' perceptions. Research by Pelletier and Vallerand (1996) did find a direct link between students' perceptions of intrinsic motivation and teacher behavior, but this study did not include a measurement of teachers' motivation to teach. In conclusion, there are only a small number of studies that examined the association between teachers' and adolescent students' motivation using students' and teachers' self-reports (e.g., Müller et al., 2009). Therefore, the main focus of the present study was on how students' intrinsic motivation is related to teachers' intrinsic motivation for teaching and teachers' supportive behaviors in the classroom.

3. Research questions

Our major focus was to analyze to what extent teachers' intrinsic motivation for teaching and related teachers' behavior in class – autonomy support and teachers' care – can predict students' intrinsic motivation and self-determination. We used teachers' self-reported behaviors, as well as students' reports of teachers' behavior, to answer the following research questions: (1) Can students' intrinsic motivation and self-determination be predicted by students' perceptions of teachers' autonomy support and care? (2) Can students' intrinsic motivation and self-determination be predicted by teachers' self-reports about their perceived autonomy support and care? (3) Can the prediction of students' intrinsic motivation and self-determination be improved when students' perceptions of teachers' autonomy support and care on the class level are taken into account? And, (4) how much of the variance in students' intrinsic motivation and self-determination is associated with differences in teachers' intrinsic motivation for teaching?

4. Method

4.1 Participants

Participants were 1,195 (51% girls) seventh and eighth grade students in Germany. Students age ranged from 11 to 17 years (M = 13.37, SD = 0.91). Participation was voluntary and required parental consent. Students were recruited from 48 classrooms in different schools in the vicinity of Stuttgart, Germany.

4.2 Procedure

Questionnaires were administered to students and teachers. Students' questionnaires assess individual characteristics of students' motivation and their perception

of teachers' autonomy support and care. Data were obtained in Physics, Biology, and German language classes by research assistants in one session when the teachers were not present in the classroom. Students were instructed orally and in written form to think about the class subject and the particular classroom teacher as they completed the survey. At the same time, teachers completed a questionnaire in their faculty room, assessing their motivation for teaching and their perceived level of autonomy support and care related to this particular group of students. On average, teachers and students took 40 minutes to complete the questionnaires.

4.3 Measures

Demographic variables. Participants were asked to report their age, gender, and native language. Apart from these three demographic variables, the survey was anonymous.

Motivational Self-regulation Questionnaire for Adolescents (MoS-A, Bieg & Mittag, 2005). This questionnaire is a modified version of the *Self-Regulation Questionnaire – Academic*, by Ryan and Connell (1989), and assesses the extent to which students feel autonomous vs. controlled in performing different kinds of learning tasks. The students were asked for reasons to do their homework, to cooperate with the teacher and class in a course, and to learn in the class. Students responded on a 4-point scale, ranging from 0 (*not at all true*) to 3 (*very true*). The reasons for engaging in school work reflect four different types of motivation: external, introjected, identified, and intrinsic motivation. For the analysis we used the subscale *intrinsic motivation* as an indicator of the most autonomous form of motivation. It assesses the extent a student behaves out of fun (e.g., "I cooperate in this course because it is fun."). Cronbach's alpha for this scale was .86.

Students' Perception of Autonomy Support (Röder & Kleine, 2007). This five-item scale is designed to measure the perceived level of autonomy support for students during lessons (e.g., "We often decide in this course the way we work on topics, such as with a book, group discussion, teacher lecture, etc."). Students rated their perceptions on a 4-point scale ranging from 0 (*not at all true*) to 3 (*very true*). The internal consistency of the scale was $\alpha = .74$.

Students' Perception of Teachers' Care (Saldern & Littig, 1987, shortened version). This scale consists of five items measuring students' perceived level of teachers' care (e.g., "Our teacher takes care for the problems of the students."). Students answered each item on a 4-point scale ranging from 0 (*not at all true*) to 3 (*very true*). Cronbach's alpha was .80.

Perceived Autonomy in Teaching (PAT, Mittag, Backes, Bieg, & Runge, 2010). This modified and adapted measure is based on Ryan and Connell (1989) and Roth et al. (2007) for autonomous motivation for teaching. The questionnaire contains four scales representing four types of motivation: external, introjected, identified, and intrinsic motivation for teaching. The questionnaire asks teachers to report their reasons for engaging in different school-related activities, e.g., "I'm looking

for interesting topics, because…" or "When I devote time to individual talks with students, I do so because…". For each situation there were four responses, representing the different types of motivation. Teachers indicated the extent to which they agreed with each response on a 4-point scale ranging from 0 (*not at all true*) to 3 (*very true*). Items were mixed across the motivation types. In this study we used the subscale *intrinsic motivation* with five items as an indicator of the most autonomous form of motivation. On the intrinsic motivation scale, a teacher acts because e.g., "I'm looking for interesting topics, because then teaching is more fun for me.", "I'm looking for new forms of teaching, because then teaching is more fun for me.", or "When I invest effort in my work as a teacher, I do so because then work is more fun for me." Cronbach's alpha for this subscale was .83.

Teachers' Care (Clausen, 2002, modified version) was measured with a five-item scale. It assesses the extent to which the teacher shows caring and appreciating behaviors toward students. Care mainly refers to students' personal interests and problems, e.g., "There is always enough time in class for personal and social matters". Responses were given on a 4-point scale ranging from 0 (*not at all true*) to 3 (*very true*). Cronbach's alpha was .70.

Teachers' Autonomy Support (Röder & Kleine, 2007). This scale asks for teachers' classroom behaviors, which support the students' need for autonomy or choice. The scale consists of six items e.g., "Students can often decide in my class if they want to work alone or in groups." Responses were given on a 4-point scale ranging from 0 (*not at all true*) to 3 (*very true*). Cronbach's alpha for the scale was .73.

The items of the corresponding scales, Autonomy Support and Teachers' Care, are presented in the Appendix.

4.4 Statistical analysis

Data were collected on a set of students (individuals) nested within classes. These hierarchically structured data were analyzed using multilevel analyses. Hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002) allows for the simultaneous estimation of effects of predictors from different levels. So student-level and class-level parameters were estimated simultaneously. All analyses were conducted using the program HLM, version 6.06 (Raudenbush, Bryk, Cheong, & Congdon, 2004). At the individual level, students' ratings of their teachers' behavior were included as predictors. Aggregated means of students' ratings for each class, as well as teachers' ratings, were used as predictors at the group level. Coefficients at the group level described the association of the aggregated predictors and teachers' ratings with the dependent variable controlling for individual associations.

Missing values. The data set contained missing responses to some of the items (6.4% missing values). Because mean substitution of missing values or list-wise and pair-wise deletion may bias the results (Schafer & Graham, 2002), multiple imputation (MI) of missing data is more appropriate to derive unbiased test sta-

tistics. For this reason, five imputed data sets were created using the NORM 2.03 program (Schafer, 1999) and were merged in HLM 6.06.

5. Results

The major focus of this study was: (1) to investigate if students' intrinsic motivation can be explained by students' perceptions of teachers' behavior on the individual level; (2) to examine if teachers' reports about their autonomy support and care make a contribution to explain students' intrinsic motivation; (3) to examine if students' intrinsic motivation can be explained by students' perceptions of teachers' behavior on class level; and (4) whether teachers with more intrinsic motivation for teaching have students with more intrinsic motivation for learning. Table 1 presents means and standard deviations of students' reports as well as the correlations among students' variables. On the average, students' perceived autonomy support was rated lower than students' perceived teachers' care. The correlations presented in Table 1 provide an estimate of the associations of perceived autonomy support and perceived teachers' care with students' intrinsic motivation.

Table 1: Means, standard deviations and correlations among students' variables

Students' reports	*M*	*SD*	1	2
1. Intrinsic motivation	1.43	0.84	-	
2. Perceived autonomy support	0.91	0.61	.33**	-
3. Perceived teachers' care	1.82	0.69	.40**	.46**

Note. Scales ranged from 0–3.
** $p < .01$.

There were significant positive correlations between intrinsic motivation and perceived autonomy support ($r = .33$) and between intrinsic motivation and perceived teachers' care ($r = .40$). Perceived teachers' care also correlated positively with perceived autonomy support ($r = .46$). Table 2 presents correlations between the aggregated class means of students' reports and the individual teacher scores, as well as the intercorrelations between the teacher variables. The pattern of correlations indicates that the results only partially supported the assumptions.

Table 2: Means, standard deviations and correlations between class reports and teachers' reports

Variable	*M*	*SD*	1	2	3	4	5
Students' reports							
1. Intrinsic motivation/class	1.45	0.35	-				
2. Perceived autonomy/class	0.93	0.27	.63**	-			
3. Perceived teachers' care/class	1.83	0.32	.58**	.55**	-		
Teachers' reports							
4. Intrinsic motivation	2.38	0.53	.05	.10	-.12	-	
5. Autonomy support	1.17	0.52	.11	.07	.15	.29*	-
6. Teachers' care	2.09	0.48	.33*	.48**	.38**	.24	.26

Note. Scales ranged from 0–3. The scores of variables 1 through 3 are group means of the students' reports of one teacher. Variables 4 through 6 show teachers' self-reports.
* $p < .05$. ** $p < .01$.

As expected, students' intrinsic motivation was positively correlated with perceived autonomy support (r = .63) and perceived teachers' care (r = .58) on the group means level. However, contrary to our expectations, significant correlations on the class level were neither found between students' intrinsic motivation and teachers' intrinsic motivation for teaching nor between students' intrinsic motivation and teachers' self-reported autonomy support. Significant correlations between students' group means and teacher ratings were only found for students' intrinsic motivation and teachers' self-reported care (r = .33), for students' perceived autonomy support and teachers' self-reported care (r = .48), and between students' perceived teachers' care and teachers' self-reported care (r = .38). Among the teachers' variables significant positive correlations were observed only between intrinsic motivation for teaching and teachers' autonomy support (r = .29).

Related to the hierarchical structure of the data, the multivariate relations between students' intrinsic motivation and teachers' intrinsic motivation and behavior were further analyzed using multilevel linear modeling. Intrinsic motivation as the most autonomous form of motivation served as the dependent variable in the model. Teachers' intrinsic motivation for teaching, teachers' autonomy support and teachers' care were included as predictors on the group level (with between-group variation only), whereas students' perceptions of autonomy supportive teaching and teachers' care were used as predictors on the individual level (with both between- and within-group variation). In addition, students' perceptions were used as aggregated scores on the group level. A necessary precondition for the formation of aggregated values on the group level is an agreement in the ratings among the students who form the group (Cohen, Doveh, & Eick, 2001, p. 297). The reliability of the aggregated individual ratings in multilevel analyses is determined by intra-class correlations, ICC (1) and ICC (2). To use aggregated class scores as indicators in multilevel analyses there should be sufficient rater reliability within each class (Lüdtke, Trautwein, Kunter, & Baumert, 2006, p. 86). Calculation of intra-class correlation (ICC (1)) showed that students' perceived autonomy support (15%) and

students' perceived teachers' care (17%) varied systematically between the classes, indicating that a substantial proportion of the total variance is due to the variance between the classes. By means of a Spearman-Brown-Formula, it is possible to quantify the reliability of the aggregated individual data (ICC (2)) (see Lüdtke et al., 2006, p. 87). ICC (2) showed values for perceived autonomy support (.81) and perceived teachers' care (.83) which were greater than the critical value of .70.

To use multilevel analyses it is also necessary that, in addition to individual differences, there are also meaningful differences among the classes on the dependent variable. To test this assumption, the proportion of the total variance for the group level was determined by calculating the intra-class correlation of the null model. First, a one-way-ANOVA with random effects was performed to test class differences concerning the dependent variable. The results of this analysis showed a significant between-group variance of intrinsic motivation averaging 13%, indicating that there were differences between the classes and multilevel analyses could be performed. Teachers' behavior and motivation, as well as aggregated students' scores, were used as predictors for students' intrinsic motivation on the second level.[2] Models were tested for fit using restricted maximum likelihood estimation.

Table 3: Hierarchical Linear Modeling to predict intrinsic motivation

	Model	
	β	*SE*
Individual level		
Teachers' care	0.39***	0.04
Autonomy support	0.17***	0.04
Group level		
Autonomy support/class	0.43*	0.19
Teachers' care/class	-0.02	0.16
Intrinsic motivation/teacher	0.03	0.08
Autonomy support/teacher	0.01	0.08
Teachers' care/teacher	-0.02	0.10
Explained variance		
Individual level	.192	
Group level	.442	

Note. β = standardized regression coefficient; *SE* = standard error.
* $p < .05$. *** $p < .001$.

Table 3 shows the results of the multilevel analyses. According to the data, students were more intrinsically motivated when they perceived more teachers' care and more autonomy support. Overall, 19% of the variance at the individual level was explained by autonomy support and teachers' care. At the group level, we ex-

2 Additional analyses with age, gender and school subjects as further predictors showed that these variables did not make a significant contribution to predict intrinsic motivation.

amined whether differences in students' intrinsic motivation could be explained by teachers' self-reported autonomy support and care, the aggregated students' scores of autonomy support and teachers' care and by teachers' intrinsic motivation for teaching. As shown in Table 3, teachers' self-reported autonomy support and care, as well as their intrinsic motivation for teaching, were not significant predictors for students' intrinsic motivation in this model. However, the prediction of the aggregated students' scores for autonomy support on students' intrinsic motivation was statistically significant, suggesting that the higher the classes rated their teacher as being autonomy-supportive the more likely it was that the students were intrinsically motivated. No significant prediction of aggregated students' scores of teachers' care on students' intrinsic motivation was found. Overall, group predictors explained 44% of the variance at the group level.

6. Discussion

The main purpose of the present investigation was to examine the association of teachers' motivation and their classroom behaviors with students' motivation from both teachers' and students' perspectives. Our first question was to determine if students' intrinsic motivation and self-determination could be predicted by students' perceptions of teachers' autonomy and care. The correlations between the variables in the present study (see Table 1) are consistent with previous research findings (e.g., Assor et al., 2002; Roth et al., 2007). Students' intrinsic motivation was positively related to students' perceived autonomy support and students' perceived teachers' care. This result also supports the assumption that the quality of the interpersonal relationship between teachers and students plays an important role for students' intrinsic motivation (Furrer & Skinner, 2003), and it is also in line with the assumption of SDT that the promotion of autonomy and social relatedness is important for intrinsic motivation (Deci & Ryan, 2002).

Regarding teachers' perceptions of their autonomy support and care for students, only the correlation between teachers' reported level of care and a higher level of students' intrinsic motivation reached significance (see Table 2). No relation was found between teachers' reported autonomy support and students' intrinsic motivation. Among the corresponding teacher and student scales, the only significant correlation was found on teachers' care. A similar correlation of teachers' care between teachers and students is also reported by Kunter et al. (2008).

Overall, the direct comparison of teacher and student ratings shows that they do not correspond very closely. One possible interpretation for these findings might be related to discrepancies in human perception processes. Both students and teachers are actors and observers in the classroom, and it is possible that each of them overstated the stability of the others' behavior while downplaying their own contributions and, as a consequence, caused biased ratings (see Kunter & Baumert, 2006, p. 233). The ratings of teachers and students tend to have dif-

ferent influences. While students' ratings are influenced by the perceived teacher popularity or grading practice (Aleamoni, 1999; Greenwald, 1997 cited in Kunter & Baumert, 2006, p. 233), teachers' ratings are more influenced by self-descriptions and, therefore, possibly biased by teaching ideals or self-serving strategies (Wubbels, Brekelmans, & Hooymayers, 1992). So it is possible that, although students and teachers are answering the same or similar items, they could differ in their interpretations of the individual items (Clausen, 2002). Another reason for the lack of correspondence could be the response options from "not true" to "very true". A response format ranging from "never" to "very often" might be more appropriate for eighth grade students to rate their teachers' classroom behaviors.

In examining the association between teachers' intrinsic motivation for teaching and their reports of autonomy-supportive teaching, the results of the present study are consistent with previous research findings by Pelletier et al. (2002), who also reported positive correlations between these teacher variables. However, in contrast to the findings of Roth et al. (2007), no positive correlations between teachers' intrinsic motivation for teaching and students' perceived autonomy support and students' intrinsic motivation could be observed in the present study. One possible explanation of those unexpected results could be that teachers' intrinsic motivation to teach is not necessarily reflected in classroom behavior and students are not able to recognize teachers' personal motivational dispositions (Kunter et al., 2008).

In order to take the hierarchically structure of the data into account and to get more detailed information about the interrelationship between students' intrinsic motivation and teachers' behavior, data were further analyzed using multilevel modeling, which allows for a deeper examination of the functioning of the psychological needs (Deci & Ryan, 2002). The results of our analyses indicate that both teachers' care and autonomy support as perceived by the students on the individual level are important factors for students' intrinsic motivation. Students show more optimal functioning and higher intrinsic motivation and self-determination in a context where their basic psychological needs are satisfied (Deci & Ryan, 2002). The more the students perceive that they are treated with respect and that the teacher is personally interested and involved with them, the more likely it is that they will feel socially embedded and intrinsically motivated (e.g., Eccles & Midgley, 1989). Besides the quality of the student-teacher relationship, autonomy supportive behavior is another important requirement for students' intrinsic motivation and self-determination. Students benefit when teachers support their autonomy and allow them to make choices in the classroom (e.g., Reeve, 2002). Therefore, the primary task of the teacher is to show care and respect for students and to support autonomy by providing choice and clarifying the relevance of schoolwork (e.g., Assor et al., 2002; Reeve, 2006). This result, on the individual level, confirms the importance of perceived teachers' behaviors for individual students (Brok, Brekelmans, & Wubbels, 2006). Overall, the findings of the present study indicate that students' perceptions on an individual level are crucial for their motivation.

Another important aspect in educational research concerns the shared perceptions of students on the group level. Therefore, we studied in a second step the perceptions of teachers' behaviors as a group observation. The aggregated class means of students' perceived autonomy support and teachers' care were included in the multilevel analyses. The results indicate that the collective perception of autonomy support by class is an additional predictive factor for students' intrinsic motivation and self-determination. In other words, the more the members of a class perceive their teacher as being autonomy-supportive, the more intrinsically motivated they feel. However, in contrast to the results on the individual level, no significant prediction of students' shared perception of teachers' care on their intrinsic motivation could be observed in the present study. This finding is in line with the assumption that teachers show a unique behavior towards the class as a whole, but that this can differ from their behaviors toward individual students within that same class (Brok et al., 2006). Another finding on the second level was that teachers' reports of autonomy support and care do not predict students' intrinsic motivation. This is not an unusual research finding. Several other studies have shown that students' perceptions of teachers' behaviors are better predictors for students' motivation than teachers' self-reported behaviors (e.g., Dickhäuser & Stiensmeier-Pelster, 2003; Rakoczy, 2006; Rakoczy et al., 2008). Teachers have difficulties reporting the quality of their own classroom instruction, because they want to serve teaching ideals (e.g., Kunter & Baumert, 2006). They are likely to rate how they want to teach and not necessarily the way they really teach in classroom. Previous research has shown that student reports are generally a very good source of information for documenting interactions in the classroom, and that students are able to differentiate between various instructional settings (Clausen, 2002; Kunter et al., 2008).

A very interesting topic in educational research is whether teachers' motivation for teaching has a direct effect on students' motivation for learning. The present study provides no evidence for such an effect. Teachers' intrinsic motivation for teaching was not a significant predictor for students' intrinsic motivation. This finding supports the results of Müller et al. (2009), who also did not find a direct link between teachers' autonomous motivation for teaching and students' motivation. However, this finding is in contrast to the study of Roth et al. (2007), who found a positive relation between teachers' autonomous motivation for teaching and students' self-determined motivation. Therefore, the question remains as to what classroom factors tend to impact students' intrinsic motivation. According to the results of this study, this factor seems to be related more to the behavior of the teacher than his or her motivation to teach. What appears to be more important for students is how their teacher behaves and teaches in the classroom. Is there a structure in the instruction? Do the students have opportunities to choose if they will work in groups or on their own? Are the classroom themes relevant for students? Another important aspect is the individual characteristics of the teacher as a person. Is the teacher likeable? Does the teacher have a good rapport with the students? So, in terms of classroom effectiveness, it might be more crucial that the teacher is a good motivator and enthusiastic about teaching (Kunter et al., 2008)

and not only intrinsically motivated to teach. Thus, teachers' intrinsic motivation for teaching is only one possible factor that can affect students' perceptions, but teachers' classroom behavior also includes a lot of different factors that are difficult to examine out of the context of all of the other factors. A further possible explanation of why the results of this study vary somewhat with past research could relate to the age of the students. While students in the study of Roth et al. (2007) were all from elementary school, students in the present study and the study by Müller et al. (2009) were from secondary schools and adolescent learners. In elementary schools, there is often only one teacher with whom students interact throughout a typical day. However, in secondary schools there is often one teacher per subject, and the influence of a single teacher is less clear since the quantity of time students spend with a single teacher is much less. Nevertheless, it might be possible that a single teacher's motivation could have an impact on students' motivation if the teacher spends much time in the class interacting with individual students or if they have significant contacts with students outside the classroom in school-related activities. However, in general, the quantity of time teachers spend with students in Germany, as in many other countries, tends to be much less as students move through to the higher grade levels. As a possible consequence, the motivation of a single teacher is less likely to be important for students' motivation in general.

Another reason for the failure to replicate the findings of Roth et al. (2007) could relate to a documented decrease of learning motivation in general, from primary to secondary school (e.g., Fend, 1997; Helmke, 1997; Pekrun, 1993). In secondary schools the influence of the peers tends to increase dramatically while the influence of school in general and the teachers and the subjects in particular tend to become less important. At the same time, the fit between students' needs and school conditions that are likely to meet those needs is getting worse, particularly because the dynamics of teacher-student relationships have changed. In secondary schools, it is a more common perception that many, but not all, of the teachers tend to focus more on their content than on students' needs. Therefore, students' needs for autonomy and social relatedness (concerning school matters) are being less supported and this may lead to a decrease of intrinsic motivation (e.g., Eccles & Midgley, 1989; Lewalter & Schreyer, 2000).

Overall, the results of the present study indicate that students' individual perceptions of both teachers' care and autonomy support contribute to the prediction of students' intrinsic motivation. This is in line with other previous research findings (e.g., Eder, 1996; Satow & Schwarzer, 2003). However, students' collective perceptions on the classroom level can also make a contribution to predict students' intrinsic motivation. However, this was only the case for autonomy support but not for teachers' care. Apparently students' motivation particularly depends on their individual perception of care and autonomy support and on their collective perception of autonomy support. There are several implications of this study for future researchers to consider. Former studies from deCharms (1972) and Eder (1996) have shown that teachers could have an influence on the social climate of their classes and this, in turn, may have an impact on students' motivation. In or-

der to have positive outcomes in school it is important to support students' basic needs. This is possible through student centered teaching, informative individual feedback, and autonomy supportive and person centered behaviors (e.g., Fournés, 1994). Such topics should be more closely examined in teacher education programs and staff development training programs for teachers (e.g., Bieg & Mittag, 2010). Recent research has shown that in-service training, combined with the use of student workbooks for enrichment, can promote intrinsic motivation and self-determination in secondary school (Mittag, Bieg, Hiller, Metz, & Melenk, 2009). However, the question about the relationship between teachers' motivation for teaching and students' motivation for learning is still open and must be further examined. The present study fails to replicate the findings of Roth et al. (2007) who observed a positive relation between teachers' autonomous motivation for teaching and students' intrinsic motivation. Further, additional quantitative and qualitative research is needed to clarify this question.

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Appendix

Items for instructional behavior as rated by teachers and students

Teachers' self-reports	Students' ratings
Autonomy	
Students can often decide between various topics in my course.	We can often decide between various topics in this course.
Students can often decide in my class if they want to work alone or in groups.	We can often decide in class if we want to work alone or in groups.
Students can often decide in my class the way they work on a topic, such as with a book, video, group discussion, teacher lecture, etc.	We often decide in this course the way we work on topics, such as with a book, video, group discussion, teacher lecture, etc.
Students can often decide in my class when and how long they work on a certain task.	We can often decide in class when and how long we work on a task.
Students can often choose between different/various difficult tasks in my class.	We can often choose between different/various tasks in this course.
In my class, students can often determine where they want to work on a task, such as in the classroom, another room, or outside the school.	
Teachers' Care	
If a student has a personal question, I respond to it in class.	Our teacher tries to fulfill our wishes as far as possible.
I discuss topics with students who missed the class discussion.	Our teacher takes care of the problems of the students.
My personal relationship to my students is more important than rapidly teaching topics.	Our teacher feels up to talk with us mostly, if there is something we do not like.
There is always enough time in class for personal and social matters.	If we want to discuss something with our teacher, he will have time for us.
I help every student who has got difficulties with his/her work.	Our teacher helps us like a friend.