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Peer influence on disruptive classroom behavior depends on teachers' instructional practice

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ABSTRACT

This study investigated whether early adolescents' disruptive classroom behavior is predicted by descriptive classroom norms for such behavior (i.e., mean level of classmates' disruptive behaviors). We further examined whether classmates' influence on a student's disruptive behavior varies based on teacher's instructional practice. Participants were 701 adolescents (M = 13.12 years; 48.8% girls) who were followed across six measurement points from Grades 7 through 9. Multilevel analyses showed that subsequent individual disruptive behavior was predicted by earlier levels of disruptive behavior in the classroom. Peer influence on disruptive behavior was lower when students perceived that their teacher's instruction was more supportive and interesting. When students reported that their teacher used more ability differentiation (e.g., ability grouping), peer influence on disruptive behavior was higher.

Classroom disruptions by students include a broad set of rule-breaking behaviors, such as excessive talking during instructions, throwing items around, or walking around in the classroom at inappropriate times (Little, 2005; Wheldall & Merrett, 1988). Such behaviors disrupt academic instruction and are associated with low achievement and subsequent behavioral problems (Blank & Shavit, 2016; Le Blanc, Swisher, Vitaro, & Tremblay, 2007; Loeber et al., 1993). Frequent disruptive behavior in the classroom is also correlated with teacher burnout (Hastings & Bham, 2003).

Several reasons have been identified for the occurrence of disruptive behavior in the classroom. Some authors have focused on students' individual characteristics, such as attention deficits (e.g., Déry, Toupin, Pauzé, & Verlaan, 2004). Others have emphasized teachers' quality of instruction and classroom management (e.g., Clunies-Ross, Little, & Kienhuis, 2008). Yet others have focused on peer influence in the classroom as a cause of disruptive behavior (e.g., Müller & Zurbriggen, 2016; Shin & Ryan, 2014, 2017). For example, students may reinforce each other's disruptive behavior, leading to a general increase in disruptive behavior in the classroom (Dishion & Tipsord, 2011). These processes may be especially pronounced in early- and mid-adolescence, when peers have considerable impact on individual development (Brechwald & Prinstein, 2011). An important question is whether teachers can reduce such negative peer influences in the classroom.

To address this issue, it is crucial to examine how teachers' instructional practices are related to peer influence on disruptive behavior in the classroom. In recent years, much effort has been spent on identifying individual characteristics that increase youth susceptibility to peer influence (Prinstein & Dodge, 2008). However, remarkably little is known about the role of aspects of the learning environment, such as teacher characteristics. An exception is a recent study by Shin and Ryan (2017). They examined friend influence in fifth- and sixth-grade classrooms that were either high or low in emotional support from teachers. Across six months, students were less likely to adopt their classroom friends' disruptive behaviors when emotional support from their teacher (e.g., positive climate, sensitivity) was high. This suggests that teachers can have an effect on peer influence in the classroom by providing an emotionally supportive environment for their students. The first goal of the current study was to replicate Shin and Ryan's (2017) findings on the effects of teacher support on peer influence on disruptive behaviors in the classroom. We focused on student-perceived support from teachers for students' academic needs. In addition, we explored how academically interesting instruction and ability differentiation by teachers, as seen by their students, were associated with peer influence on classroom disruptive behaviors. We expected all three instructional practices (i.e., support, interesting instruction, ability differentiation) to differentially activate adolescents' academic or social goals, and that these practices would in turn be associated with the degree to which classmates influence each other's disruptive behaviors.

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1. Peer influence on disruptive behavior

Various processes may underlie peer influence on disruptive classroom behaviors. One may be adolescents' desire for popularity. Being popular means being visible and having a good reputation; to achieve this goal, adolescents often rely on rule-breaking behaviors (Cillessen & van den Berg, 2012; Jonkmann, Trautwein, & Lüdtke, 2009; Mayeux, Sandstrom, & Cillessen, 2008). When students experience that their disruptive behaviors are reinforced by their classmates, the probability of repeating these behaviors increases. Furthermore, adolescents who observe their classmates disrupting instruction learn how to effectively and efficiently do so (Bandura, 1986).

In addition to social learning processes, the general level of disruptive behavior in a classroom can function as a descriptive group norm that indicates what is "normal" in this class (Cialdini, Kallgren, & Reno, 1990; Henry et al., 2000). In classrooms with high levels of disruptive behaviors, not being disruptive means deviating from the classroom norm, which may lead to negative responses from peers. In line with this reasoning, there is growing evidence that the average level of antisocial behaviors in a classroom affects students' individual development of such behaviors (e.g., Araos, Cea, Fernández, & Valenzuela, 2014; Henry et al., 2000; Kellam, Ling, Merisca, Brown, & Ialongo, 1998; Müller, Hofmann, Fleischli, & Studer, 2016; Thomas, Bierman, & Powers, 2011).

2. Teachers' instructional practice as a moderator of peer influence

Adolescents influence each other at school, yet susceptibility to peer influence differs between adolescents (Prinstein & Dodge, 2008). Certain characteristics, such as being male, impulsive, popular, and unsupervised by parents increase the risk of being negatively influenced by peers (Fallu, Brière, Vitaro, Cantin, & Borge, 2011; Gardner, Dishion, & Connell, 2008; Müller, Hofmann, & Arm, 2017; Selfhout, Branje, & Meeus, 2008). The effect of other factors on peer influence susceptibility are less clear, such as students' academic achievement, school connectedness, and teacher bonding, and results are mixed (Crosnoe, Erickson, & Dornbusch, 2002; Mrug & Windle, 2009). Shin and Ryan's (2017) study on the role of teacher characteristics in peer influence added to this research. Based on their findings they suggested that emotional support from teachers may create classroom peer norms that inhibit disruptive behaviors (see also, Luckner & Pianta, 2011).

Emotional support can include teacher behaviors aimed at students' general well-being (e.g., comforting a student who is sad), and it can also include support aimed at their academic achievement (e.g., individually encouraging a student who is solving a task). Both types of emotional support may contribute to positive peer norms in the classroom. Beyond providing emotional support, teachers may impact peer influence in other ways. In the following we describe how teachers' instruction may differentially activate students' goals at school and thereby affect peer influence processes. While not being able to empirically test the role of students' goals with our data, this conceptualization serves as a theoretical rationale for why different instructional practices may moderate peer influence on disruptive behaviors.

Individual goals are a central component of students' school motivation. Goals can be conceptualized as internal representations of the desired outcomes that adolescents attempt to accomplish in school (Wentzel, Baker, & Russell, 2012). This conceptualization addresses *what* students want to achieve and not *why* they want to achieve it (Wentzel, 1993). Adolescents can have different *academic goals* (for an overview, see, e.g., Wentzel & Wigfield, 2009). In the present theoretical framework academic goals were of specific importance that relate to the mastery of academic content including, for example, wanting to know more about a specific subject or becoming more proficient in a certain academic domain (Wentzel & Wigfield, 1998). At the same time, students have *social goals* (Boekaerts, 2009; Cillessen, 2011; King & Watkins, 2012; Ryan, Jamison, Shin, & Thompson, 2012; Urdan & Maehr, 1995; Wentzel & Wigfield, 1998). For example, a main social goal of adolescents is to achieve popularity among their peers (e.g., Dijkstra, Cillessen, Lindenberg, & Veenstra, 2010; LaFontana & Cillessen, 2010); early adolescents have reported prioritizing popularity over friendships or empathy for a less fortunate peer (e.g., Dijkstra et al., 2010; LaFontana & Cillessen, 2010).

Bringing together this literature on students' goals and peer influence on disruptive classroom behaviors, it can be expected that academic goals (e.g., trying to solve a mathematical problem) decrease peer influence on disruptive behaviors, as students will focus on academics and not on social issues in the classroom. In contrast, social goals (i.e., wanting to be popular) may increase peer influence, as students will focus on both their classmates' behaviors and their classmates' thoughts about them.

Adolescents usually have both academic and social goals, which compete when students are in school (Brown & Lawrence, 2016; Hofer & Fries, 2016; Wentzel & Wigfield, 1998). Cues in the learning environment may prompt them to be more concerned with some goals than with others (Boekaerts, 2009). In the classroom, the teacher is an important source of cues (Dowson, McInerney, & Nelson, 2006; Hamm & Hoffman, 2016; Urdan & Maehr, 1995; Wentzel & Wigfield, 1998). If a teacher uses an instructional practice that activates students' academic goals rather than their social goals, then peers' influence on disruptive behaviors may be reduced. In this study, in line with the literature we focused on three instructional practices related to school motivation (e.g., Ames, 1992; Wentzel & Wigfield, 2009).

First, we examined students' perceptions of teacher *support* (Wentzel, 2009). We focused specifically on academic support, which may include providing individual help for students with questions, explaining incorrect answers, and taking seriously students' ideas for how to solve a problem. According to our theoretical framework, academic support may keep students focused on their academic goals, whereas diminished support may result in negative attitudes about school work and a shift to peer-related goals in the classroom accompanied by more peer influence.

Second, we examined students' perceptions of whether their teacher's instruction was academically *interesting* (e.g., Schiefele, 2009). Interesting instruction may include using different methods, examples, and pictures for explanations, and making connections to real-life problems. Instruction that is perceived as more interesting can be expected to decrease students' focus on social goals and consequently decrease classmates' influence on disruptive behaviors. If instruction is perceived as less interesting, students' attention may shift to their social goals and peer influence on disruptive behaviors may increase.

Third, we examined the instructional practice of *ability differentiation.* Ability differentiated instruction provides students with different tasks according to their proficiency, or divides the classroom into ability-matched groups with separate tasks (e.g., Lou et al., 1996; Rock, Gregg, Ellis, & Gable, 2008; Steenbergen-Hu, Makel, & Olszewski-Kubilius, 2016). This practice is less clear in terms of which goals it may activate. On the one hand, such instruction could closely match students' ability levels and thus keep them focused on academic goals. On the other hand, if students perceive that teachers have visibly marked where they stand academically compared to their classmates, this could also activate their social goals (Ames, 1992). Students may then compare themselves to each other and define their social status according to their teacher's publicly communicated ability level (Schuncke, 1978). Students who receive the message that they have low academic abilities may instead attempt to gain status via rule-breaking behaviors (Urdan & Maehr, 1995). Furthermore, ability-matched small groups are hard for teachers to monitor, thus they create more room for non-academic interactions. These interactions may be positive (e.g., making new

friends) but can also include deviant talk. Mutual reinforcement of deviant utterances is an important mechanism of negative peer influence and is known to occur most frequently in unsupervised settings (Dishion & Tipsord, 2011; Rorie, Gottfredson, Cross, Wilson, & Connell, 2011). In conclusion, there are good arguments that ability differentiated instruction should reduce peer influence on disruptive behaviors but there are also reasons to expect it may increase peer influence on disruptive behaviors.

3. The current study

In order to investigate the role of teachers' instruction in peer influence processes, we used data from a three-year longitudinal study in Swiss lower secondary schools. We hypothesized that higher mean levels of disruptive behavior in a classroom (i.e., positive descriptive classroom norms for disruptions) are associated with elevated subsequent individual disruptive behavior (Hypothesis 1). Furthermore, we expected that an instructional teaching style that is perceived by students to be academically supportive (Hypothesis 2) and interesting (Hypothesis 3) reduces the effect of descriptive classroom norms on individual disruptive behavior. Given the opposing expectations regarding the role of ability differentiated instruction suggested in the literature, we tested two opposing hypotheses. Hypothesis 4a stated that more ability differentiated instruction as perceived by students *reduces* the effect of descriptive classroom norms on individual disruptive behavior. Hypothesis 4b stated that more ability differentiated instruction *increases* the effect of classroom norms on individual disruptive behavior.

We included students' academic track in the analyses, as it represents the underlying structure of how classrooms are composed in the local school system (see Methods). We also included gender, as there is evidence that peer influence differs for boys and girls (e.g., Allen, Chango, Szwedo, Schad, & Marston, 2012; Berndt & Keefe, 1995). Including track and gender allowed us to further explore whether the effects of instructional practices on peer influence varied between adolescents in lower and higher tracks, and between boys and girls.

4. Methods

4.1. Participants

This study was part of the longitudinal research project “Fribourg Study on Peer Influence in Schools” (FRI-PEERS) that included the entire cohort of a small rural region of Switzerland that entered secondary school in Fall 2011. There were four measurement occasions in Grade 7 (T1: September 2011; T2: November/December 2011; T3: February/March 2012; T4: May/June 2012), one in Grade 8 (T5: April/May 2013), and one in Grade 9 (T6: May 2014). Classrooms were newly composed in Grade 7 and students remained in self-contained classrooms for nearly all of their courses (except for, e.g., religion lessons). Each class had one main teacher who taught the majority of lessons for the class. This teacher also had weekly “classroom times” (1 lesson) to work with students on common projects, and they were the contact person for students and parents should any problems arise. In addition to this main teacher, there were teachers who taught specific subjects (e.g., religion). Given that we investigated the role of the main teachers' instructional practice in peer influence, only classrooms in which this same teacher remained in place from Grades 7 through 9 were included in the current study.

Each self-contained classroom belonged to one academic track; the tracks had advanced, general, or basic achievement demands. In addition, there were special education classrooms for students with learning difficulties. Students were assigned to tracks based on four criteria of their academic performance in Grade 6: grades, teacher recommendations, parent recommendations, and their scores on a standardized achievement test.

Based on the requirement to include classrooms with the same main teacher across all three years, the sample for this study consisted of 701 students from 48 classrooms in 8 schools (from a total sample of 864 students, 56 classrooms, and 8 schools). Mean participant age at T1 was 13.12 years ($SD = 0.48$). Thanks to strong support from school authorities, participation rates were consistently high (T1: 97.1% of $n = 691$; T2: 97.4% of $n = 691$; T3: 95.3% of $n = 686$; T4: 96.1% of $n = 684$; T5: 94.4% of $n = 680$; T6: 80.3% of $n = 660$). The sample was representative of the Swiss population as indicated by students' socioeconomic status scores on the International Socioeconomic Index of Occupational Status (ISEI; Ganzeboom & Treiman, 1996) derived from parental occupations. The average ISEI in the sample was 49.56 (SD = 16.16), which corresponds to the national Swiss average of 49.20 (Vellacott, Hollenweger, Nicolet, & Wolter, 2003).

4.2. Measures

4.2.1. Individual disruptive behavior

Individual disruptive behavior was assessed six times (T1-T6) using the *Fribourg Self-Report Scales – School Problem Behavior* (FSP-S; Müller, Begert, Gmünder, & Huber, 2012). Students reported the number of days out of the prior 14 (i.e., 10 school days) they engaged in behaviors such as heckling during lessons, talking back to the teacher, cheating on a test, standing up in the classroom without permission, throwing items around, or engaging in nonacademic activities during lessons (e.g., writing letters to friends). The 8-item scale was originally evaluated by Müller et al. (2012) in a sample of 627 students from Grades 7–9, revealing a one-factor structure and adequate internal consistency ($\alpha = 0.83$; current sample $\alpha = 0.78$). The item scores were combined to a scale mean score for each participant on each measurement occasion.

4.2.2. Descriptive classroom norms for disruptive behavior

This variable was created by calculating the classroom mean of individual disruptive behavior scores on the FSP-S for each measurement point (T1–T6; see also, e.g., Araos et al., 2014). Higher scores indicated more positive descriptive norms for disruptive behavior in the classroom.

4.3. Student-perceived teachers' instructional practice

Adolescents are generally considered a reliable source of information on instructional characteristics, given that they spend a good amount of time in school and encounter many different learning environments (Ditton, 2002; Fraser, 1998; Gruehn, 2000). Furthermore, students' own view of their teachers' instruction provides direct information on how teaching is perceived and interpreted by its recipients. We thus assessed teachers' instructional practice from the student perspective. Participants individually reported on their main teacher's instructional practice; individual ratings were then aggregated at the classroom level to create one estimate per teacher. This aggregation at the classroom level was important to avoid confounding between individual student characteristics and perceptions of the teacher. When students' ratings within a classroom are more homogeneous, the information these ratings provide on their teacher's instructional practice can be considered more reliable (Lüdtke, Trautwein, Kunter, & Baumert, 2007). For all assessments of teachers' instructional practice, we used scales from Ditton and Merz (2000) that have been validated and are frequently used to investigate the quality of schools and teaching in Germany (e.g., Ditton, 2002), as described below. In order to most reliably estimate perceived instruction at one measurement point, we assessed these data in eighth grade (T5). This choice of timing guaranteed that students knew their teachers sufficiently well and T5 represents about the midpoint of students` time in

lower secondary school. Eighth grade is also a time in early adolescents when youth have the necessary cognitive skills to reflect on learning and the quality of instruction.

4.3.1.1. Perceived supportive instruction. Student perception of academically supportive instruction from the main teacher was measured at T5 with the 7-item "Motivating Support and Assistance" scale (Ditton & Merz, 2000). The items addressed whether the teacher helped when someone did not know an answer immediately, praised students, incorporated their ideas into instruction, explained exactly why an answer was not correct, left time for reflection, did not censure students when only a minor thing was incorrect, and did not tell students off in front of the whole class. Items were scored on a 4-point scale (0 = *absolutely not true*, 3 = *absolutely true*), with higher values indicating more supportive instruction. The authors reported $\alpha = 0.74$, which was similar to that found in the current study ($\alpha = 0.73$). To convert this scale to the final variable of perceived teacher's supportive instruction, we aggregated the classroom's mean ratings across the scale. An *ICC 2* of 0.85 indicated satisfying interrater reliability within classrooms (Lüdtke et al., 2007).

4.3.1.2. Perceived interesting instruction. To assess the level of interesting instruction of the main teacher as perceived by students, participants completed Ditton and Merz's (2000) 7-item "Interestingness" scale at T5. This scale assesses teaching techniques, such as using interesting and diversified tasks, linking instructional material to real-life issues and explaining why it is important to learn this material, and incorporating demonstrations and examples. The scale is scored on a 4-point scale (0 = *absolutely not true*, 3 = *absolutely true*), with higher values indicating more interesting instruction. Ditton and Merz (2000) reported an internal consistency of $\alpha = 0.85$; the exact same value was found for the current dataset. Individual student scale means were aggregated at the classroom level to indicate the main teacher's level of perceived interesting instruction (*ICC 2* = 0.85).

4.3.1.3. Perceived ability differentiated instruction. Using the 3-item "Differentiation" scale by Ditton and Merz (2000), at T5 students rated whether their main teacher gave students different tasks according to their skills, put together working groups that were defined by students' abilities, and gave more difficult tasks to better students. By assessing students' perception of how teachers handled academic ability differences, the scale assessed a specific part of the broader concept of instructional differentiation (which also includes differentiation in terms of students' culture, interests, and gender; see, e.g., Tomlinson & Strickland, 2005). Higher scores indicated more perceived ability differentiated instruction (0 = *absolutely not true*, 3 = *absolutely true*). Ditton and Merz (2000) reported an internal consistency of $\alpha = 0.84$, which was similar to the current dataset ($\alpha = 0.81$). Individual scale means were aggregated and interrater reliability was adequate (*ICC 2* = 0.89).

4.3.2. Academic track

Each classroom was assigned to one track. For ease of interpretation of the three-way interactions that included the variable "Track" (see "Statistical analyses"), the four academic tracks were dichotomized into low (general, basic, special education; coded as 0) and high (advanced; coded as 1).

4.3.3. Gender

Participants self-identified as girls (coded as 0) or boys (coded as 1).

4.4. Procedure

Students and parents were informed about the study by the university and the local education government. They received a letter explaining that participation was voluntary, that anonymity would be assured at all times, and that students' self-reports would not be given to anyone outside the research team. The paper-and-pencil questionnaires were completed in the classroom; mobile screens were placed on students' desks to assure the independence of their answers. Trained research assistants collected the data and followed a detailed manual. Participants never provided their names but were assigned a numeric code; data were combined across waves using these codes.

4.5. Statistical analyses

In our statistical analyses certain specifics of the data had to be considered. The study took place in a school system typical for many European countries, and was characterized by self-contained, tracked classrooms with stable classroom compositions. It has been argued that investigating self-contained classrooms avoids the possibility of misinterpreting peer selection as socialization effects because classmates are not self-selected by students (e.g., Araos et al., 2014; Busching & Krahé, 2015; Juvonen & Galvàn, 2008). However, students in tracked school systems are not randomly assigned to classrooms; instead, institutional selection that is based on achievement criteria exists. As a consequence, students within a track (and classrooms of this track) may be more similar to each other than to students from other tracks. Therefore, we controlled for track and accounted for similarity between students in classrooms by using multilevel analyses (Raudenbush & Bryk, 2002).

We tested our hypotheses with multilevel models for change (Level 1: points in time; Level 2: students; Level 3: classrooms) that were used to predict subsequent individual disruptive behavior (Singer & Willett, 2003). In all models the variable "time in weeks since T1" was included as a predictor indicating individual disruptive behavior development across time. Analyses were run in MLwiN version 2.22 (Rasbash, Charlton, Browne, Healy, & Cameron, 2009).

We first tested whether descriptive classroom norms predicted individual disruptive behavior at a later time point (Hypothesis 1). To avoid reciprocal causation, lagged models were used (Singer & Willett, 2003), meaning that individual behavior at T2–T6 was predicted from descriptive classroom norms at T1–T5 (controlling for time in weeks since T1). To best separate classroom norm effects from individual effects, individual disruptive behavior at T1 was also controlled for in all models (see also Kindermann, 2016). This procedure made it possible to adequately assess longitudinal associations between variables, but effects cannot be interpreted as causal.

To analyze whether the effect of descriptive norms depended on perceived teachers' instructional practice (Hypotheses 2–4), moderation was tested. Using the same lagged multilevel models, teacher variables (measured only at T5 and thus kept constant from T1–T6) were included as moderators of the effect of descriptive norms (T1–T5) on individual disruptive behavior (T2–T6). Three-way interaction terms were included to explore if the moderating effect of perceived teachers' instructional practice on classmates' influence differed by academic track and gender. Finally, the dependent variable (individual disruptive behavior) varied across time and across individuals. The predictor descriptive classroom norms changed across time and between classrooms. Perceived teachers' instruction and track did not vary over time but between classrooms. Gender differed between individuals.

Given the non-random selection to tracked classrooms described above, we performed additional sensitivity analyses. We expected that non-random selection is greatest in special education classrooms for students with learning disabilities. Assignment to special education in Switzerland is typically associated with additional assessments and an extensive process of institutional decision making. Students in these classes exhibit particularly low levels of achievement and are more likely to come from families with lower socioeconomic status than students from regular tracks (this was the case in our study; average ISEI was 39.19 in special education classrooms compared to 50.06 in

Table 1
Descriptive statistics.

	M	SD	Range	%
Individual disruptive behavior (T1–T6)	1.57	1.61	0–10	–
Descriptive classroom norms (T1–T6)	1.43	0.57	0.17–4.84	–
Supportive instruction (T5)	1.94	0.29	1.12–2.45	–
Interesting instruction (T5)	1.80	0.31	0.76–2.32	–
Ability differentiated instruction (T5)	0.91	0.47	0.17–2.22	–
Male gender (*reference female*)				51.80
Low track (*reference high track*)				66.60

the rest of the sample; $t = 9.95$, $p < .01$). To test whether our main results remained stable when excluding special education classrooms thus provides information on the reliability of our findings.

5. Results

The descriptive statistics in Table 1 indicate that the frequencies of individual disruptive classroom behaviors (mean of T1–T6) were generally low. Individual behavior and descriptive classroom norms were nearly equal, as descriptive norms were created from the classroom aggregates of this variable. For instructional practices, the means for interesting and supportive instruction were above the scale mid-point of 1.5. Students perceived ability differentiated instruction to be less prevalent, with a value below the scale mid-point. Gender was nearly equally distributed. About two-thirds of the participants attended a lower track.

Table 2 presents the correlations between all study variables. There was a significant correlation between the average individual disruptive behavior across T2–T6 and descriptive classroom norms across T1–T5, showing that students were somewhat similar to their classmates in terms of disruptive behaviors. Gender was significantly related to individual disruptive behavior with a small effect size, indicating that boys scored higher than girls. The association between gender and descriptive classroom norms suggested that boys were more likely to be in classrooms with more disruptive behaviors. Teachers' instructional practices (supportive, interesting, and ability differentiated instruction) were related to disruptive classroom behaviors, with small effect sizes. The three teacher variables were correlated with each other; the largest association was between interesting and supportive instruction. There was no significant association between individual disruptive behavior and track, but there was a significant correlation between descriptive norms and track, indicating that lower track classrooms had more disruptive behavior than higher track classrooms. Interestingly, students from lower tracks reported more supportive and interesting instruction than students from the high track.

Table 2
Pearson correlations between all variables.

	1	2	3	4	5	6
1. Individual disruptive behavior (T2–T6)	–					
2. Descriptive classroom norms (T1–T5)	0.27**	–				
3. Supportive instruction (T5)	−0.01	0.01	–			
4. Interesting instruction (T5)	−0.07**	−0.15**	0.80**			
5. Ability differentiated instruction (T5)	−0.06**	−0.12**	0.21**	0.28**		
6. Male gender (*reference female*)	0.12**	0.05**	−0.03	−0.03	0.08**	–
7. Low track (*reference high track*)	0.02	0.10**	0.14*	0.04**	0.00	0.00

* $p < .05$.
** $p < .01$.

5.1. Descriptive norms and perceived supportive instruction

Next, we tested our expectations regarding the effects of descriptive norms on disruptive behaviors and the moderating role of teachers' instructional practices. We first consider the models for supportive instruction (Table 3). Hypothesis 1 stated that more positive descriptive norms for disruptive classroom behaviors would predict more individual disruptive behavior at a later time point. Model 1 supported this expectation and showed a significantly positive effect of descriptive norms ($B = 0.153$; $SE = 0.055$; $p < .01$) on future individual disruptive behavior, controlling for time in weeks since T1, individual disruptive behavior at T1, gender, track, and teachers' interesting instruction. That is, for each one-unit increase in descriptive norms there was an individual increase in disruptive behavior of 0.153 units. The significantly positive effect of time since T1 indicated an increase in disruptive behavior over time. Boys reported more disruptive behavior than girls. No difference was found between students attending the lower and high tracks. The amount of teachers' supportive instruction as perceived by students did not significantly explain individual disruptive behavior development as a main effect.

However, when considering supportive instruction as a moderator in Model 2, we found a significant interaction between supportive instruction and descriptive norms in favor of Hypothesis 2. When teachers' instruction was perceived as more supportive, descriptive norms had a smaller effect on individual disruptive behavior development. Further exploratory analyses in Model 3 (testing three-way interactions between gender, supportive instruction, and descriptive norms) showed that this effect did not differ by gender. Model 4 yielded a significant three-way interaction between track, supportive instruction, and descriptive norms. The interaction indicated that the peer-influence-reducing effect of more supportive instruction was stronger for students in a lower track than for students in the high track. The variance components indicated that, after controlling for all main effects in Model 1, there was still significant variation in disruptive behavior at levels 1 and 2.

5.2. Descriptive norms and perceived interesting instruction

Model 1 in Table 4 indicated that descriptive classroom norms significantly predicted individual disruptive behavior when including the effect of interesting instruction. More interesting instruction did not predict disruptive behavior development as a main effect. The sign of the coefficients for the effects of time, individual disruptive behavior at T1, gender, and track did not change compared to the previous analyses. In Model 2, we tested Hypothesis 3 that the effect of descriptive norms on individual disruptive behavior would be lower when the teacher was perceived as using more interesting instruction. The significant and negative interaction effect of interesting instruction and descriptive norms supported this hypothesis. The three-way interaction between gender, interesting instruction, and descriptive norms in Model 3 showed that the protective effect of interesting instruction on peer influence did not differ between boys and girls. The significant three-way interaction between track, interesting instruction, and descriptive norms indicated that the decrease in classmates' influence due to supportive instruction was stronger in the lower tracks than in the high track.

5.3. Descriptive norms and perceived differentiated instruction

In Model 1 (see Table 5), descriptive classroom norms again significantly predicted later individual disruptive behavior. Boys reported more disruptive behavior than girls, and disruptive behavior increased over time. No main effects of track or ability differentiated instruction were found. Regarding the moderator effect of perceived instructional practice, more perceived ability differentiated instruction significantly enhanced the effect of descriptive classroom norms on individual

Table 3
Multilevel models for change predicting future individual disruptive behavior from descriptive classroom norms, teachers' supportive instruction, gender, and academic track (T1–T6).

	Model 1 Main effects *B (SE)*	Model 2 Two-way-interaction *B (SE)*	Model 3 Three-way-interaction with gender *B (SE)*	Model 4 Three-way-interaction with track *B (SE)*
Intercept	0.361 (0.302)	−0.994 (0.565)	−0.111 (0.804)	1.058 (0.994)
Time in weeks since T1	0.005** (0.000)	0.005** (0.000)	0.005** (0.000)	0.005* (0.000)
Individual disruptive behavior T1	0.557** (0.033)	0.553** (0.033)	0.551** (0.033)	0.548** (0.033)
Descriptive norms	0.153** (0.055)	1.193** (0.379)	0.436 (0.560)	1.964** (0.474)
Male gender (*reference female*)	0.219** (0.082)	0.210* (0.082)	−1.410 (1.106)	0.270** (0.082)
Low track (*reference high track*)	−0.052 (0.094)	−0.023 (0.090)	−0.030 (0.091)	−3.042* (1.203)
Supportive instruction	−0.022 (0.149)	0.703* (0.284)	0.300 (0.407)	1.201** (0.347)
Descriptive norms × supportive instruction	–	−0.526** (0.192)	−0.173 (0.283)	−0.919** (0.243)
Male gender × supportive instruction	–	–	0.750 (0.562)	–
Male gender × descriptive norms	–	–	1.346 (0.750)	–
Male gender × supportive instruction × descr. norms	–	–	−0.632 (0.381)	–
Low track × supportive instruction	–	–	–	1.508* (0.602)
Low track × descriptive norms	–	–	–	2.171** (0.799)
Low track × supportive instruction × descr. norms	–	–	–	−1.087** (0.401)
Variance components				
Level 1: Time (within subject)	1.162** (0.034)	1.161** (0.034)	1.159** (0.034)	1.158** (0.034)
Level 2: Student (between subjects)	0.799** (0.061)	0.799** (0.061)	0.795** (0.061)	0.801** (0.059)
Level 3: Classroom (between classrooms)	0.011 (0.018)	0.003 (0.016)	0.006 (0.017)	0.000 (0.000)

* $p < .05$.
** $p < .01$.

disruptive behavior (Model 2). This result was in line with Hypothesis 4b that more perceived ability differentiated instruction is related to an increase in peer influence on disruptive behaviors (contradicting Hypothesis 4a, which expected the opposite effect). There were no three-way interactions for ability differentiated instruction and descriptive norms and gender (Model 3) or track (Model 4).

In order to test the reliability of our findings, sensitivity analyses that excluded special education classrooms were conducted ($n = 662$). Results indicated no relevant change in the effects. That is to say, with regard to the effects of descriptive classroom norms, the moderating role of perceived instructional practice, and the three-way interactions with academic track and gender, all effect sizes retained the same direction and significance (results tables are available upon request).

6. Discussion

Adolescents' disruptive behaviors in school are influenced by both peer and teacher characteristics. In this study we examined how these two factors interact. We expected that descriptive classroom norms would predict students' subsequent disruptive behaviors and that this effect would be moderated by perceived teachers' instructional practices.

6.1. Effects of descriptive classroom norms on individual disruptive behaviors

Descriptive classroom norms that favored disruptive behaviors were longitudinally associated with higher future individual levels of such

Table 4
Multilevel models for change predicting future individual disruptive behavior from descriptive classroom norms, teachers' interesting instruction, gender, and academic track (T1–T6).

	Model 1 Main effects *B (SE)*	Model 2 Two-way-interaction *B (SE)*	Model 3 Three-way-interaction with gender *B (SE)*	Model 4 Three-way-interaction with track *B (SE)*
Intercept	0.513 (0.283)	−0.639 (0.495)	0.350 (0.717)	0.880 (0.763)
Time in weeks since T1	0.005** (0.000)	0.005** (0.000)	0.005** (0.000)	0.005** (0.000)
Individual disruptive behavior T1	0.556** (0.033)	0.552** (0.033)	0.551** (0.033)	0.547** (0.033)
Descriptive norms	0.150** (0.055)	0.949** (0.297)	0.404 (0.448)	1.729** (0.400)
Male gender (*reference female*)	0.219** (0.082)	0.212** (0.082)	−1.658 (0.986)	0.209* (0.082)
Low track (*reference high track*)	−0.047 (0.093)	−0.051 (0.087)	−0.051 (0.088)	−2.799** (1.077)
Interesting instruction	−0.059 (0.142)	0.567* (0.267)	0.075 (0.389)	1.268** (0.419)
Descriptive norms × interesting instruction	–	−0.433** (0.163)	−0.170 (0.246)	−0.883** (0.225)
Male gender × interesting instruction	–	–	0.937 (0.534)	–
Male gender × descriptive norms	–	–	0.988 (0.596)	–
Male gender × interesting instruction × descr. norms	–	–	−0.481 (0.327)	–
Low track × interesting instruction	–	–	–	1.489** (0.571)
Low track × descriptive norms	–	–	–	1.981** (0.665)
Low track × interesting instruction × descr. norms	–	–	–	−1.082** (0.352)
Variance components				
Level 1: Time (within subject)	1.162** (0.034)	1.162** (0.034)	1.160** (0.034)	1.158** (0.034)
Level 2: Student (between subjects)	0.799** (0.061)	0.799** (0.061)	0.794** (0.061)	0.797** (0.059)
Level 3: Classroom (between classrooms)	0.012 (0.018)	0.000 (0.015)	0.003 (0.016)	0.000 (0.000)

* $p < .05$.
** $p < .01$.

Table 5
Multilevel models for change predicting future individual disruptive behavior from descriptive classroom norms, teachers' ability differentiated instruction, gender, and academic track (T1–T6).

	Model 1 Main effects *B (SE)*	Model 2 Two-way-interaction *B (SE)*	Model 3 Three-way-interaction with gender *B (SE)*	Model 4 Three-way-interaction with track *B (SE)*
Intercept	0.517** (0.139)	0.977** (0.197)	1.132** (0.272)	1.068** (0.325)
Time in weeks since T1	0.005** (0.000)	0.005** (0.000)	0.005** (0.000)	0.005** (0.000)
Individual disruptive behavior T1	0.556** (0.033)	0.555** (0.033)	0.555** (0.033)	0.557** (0.033)
Descriptive norms	0.148** (0.055)	−0.170 (0.108)	−0.266 (0.159)	−0.339 (0.202)
Male gender(*reference female*)	0.228** (0.082)	0.226** (0.082)	−0.070 (0.353)	0.232** (0.082)
Low track (*reference high track*)	−0.049 (0.092)	−0.047 (0.097)	−0.049 (0.097)	−0.080 (0.395)
Ability differentiated instruction	−0.125 (0.092)	−0.555** (0.161)	−0.650** (0.247)	−0.498* (0.242)
Descriptive norms × differentiated instruction	–	0.303** (0.092)	0.356* (0.152)	0.374** (0.144)
Male gender × differentiated instruction	–	–	0.182 (0.317)	–
Male gender × descriptive norms	–	–	0.183 (0.209)	–
Male gender × diff. instruction × descr. norms	–	–	−0.102 (0.190)	–
Low track × differentiated instruction	–	–	–	−0.190 (0.327)
Low track × descriptive norms	–	–	–	0.217 (0.238)
Low track × diff. instruction × descr. norms	–	–	–	−0.081 (0.190)
Variance components				
Level 1: Time (within subject)	1.162** (0.034)	1.155** (0.034)	1.154** (0.034)	1.155** (0.034)
Level 2: Student (between subjects)	0.798** (0.061)	0.799** (0.061)	0.798** (0.061)	0.797** (0.061)
Level 3: Classroom (between classrooms)	0.010 (0.018)	0.018 (0.019)	0.018 (0.020)	0.011 (0.018)

* $p < .05$.
** $p < .01$.

behaviors for students in early- to mid-adolescence. This finding is in line with other research showing that higher classroom levels of antisocial behaviors predict increased individual antisocial student behaviors in the future (Henry et al., 2000; Kellam et al., 1998; Müller et al., 2016; Thomas et al., 2011). One explanation is that rule-breaking behaviors can be an effective means for adolescents to become valued by peers and gain popularity among classmates (Jonkmann et al., 2009; Mayeux et al., 2008). The higher the level of classmates' disruptive behavior, the more acceptable it may be to exhibit such behaviors. In a context of highly disruptive classmates, students who refrain from disruptive behaviors may be considered deviant from the classroom norm (Cialdini et al., 1990; Henry et al., 2000). Further, observing disruptive behaviors among classmates provides social learning opportunities for how to successfully perform such behaviors (Bandura, 1986; Dishion & Tipsord, 2011).

6.2. Moderating effects of perceived teachers' instructional practice

We also examined whether the prevalence of three types of student-perceived teacher instructional styles moderated the effect of descriptive classroom norms on individual disruptive behavior. First, we tested the moderating effect of perceived academically *supportive instruction* on the association between descriptive classroom norms and individual disruptive behavior. In line with our expectation, students who experienced more support from their teachers were less influenced by descriptive classroom norms. A mechanism underlying this result may be that academically supportive instruction keeps students focused on academic goals, which decreases peer influence. In contrast, when teachers are perceived as less supportive, students may become frustrated, stop following academic instruction, and instead attend to the social aspects of classroom life, a focus that may enhance peer influence on disruptive behavior.

However, conclusions regarding the role of students' social goals in the classroom should be made cautiously. In their review, Urdan and Maehr (1995, 226) pointed out that "because there are a variety of social goals, and because the effects of these goals on school-related cognitions, affect, and behavior depend on several factors, it is not possible to define generally the effect of pursuing social goals." It is thus important to stress that our assumptions refer specifically to peer influence on disruptive behavior and social goals related to adolescents' popularity concerns (and not necessarily to all other possible social goals; see Urdan & Maehr, 1995). Furthermore, although our assumptions regarding academic and social goals are a useful theoretical framework for this study, we did not have direct data on student goals. It is thus possible that other processes also underlie our findings. For example, a plausible alternative interpretation for the role of teacher support in peer influence may be Shin and Ryan's (2017) suggestion that teacher support creates classroom peer norms that inhibit disruptive behaviors. In regard of these open questions, future studies should test more explicitly which factors mediate the association between teachers' instruction and peer influence processes.

Our results clearly replicate Shin and Ryan's (2017) finding that in classrooms with more *teacher support* there is less negative peer influence on disruptive behaviors. This replication is important given that the two studies investigated similar questions and developmental stages but also differed in the following ways. Conceptually broader than the scale we used, Shin and Ryan's (2017) operationalization of teacher support (based on the Classroom Assessment Scoring System; Pianta & Hamre, 2009) additionally included emotional support not necessarily related to academics (e.g., comforting a student who had problems with peers). Furthermore, the two studies used different assessments (aggregated student reports vs. observation), statistical analyses (lagged multi-level vs. stochastic actor-based models), peer groups (all classmates vs. friends), and time frames (three school years vs. six months).

A second finding is that when students perceived a teacher's lessons as more *interesting*, descriptive classroom norms had a diminished effect. In our theoretical framework, a mechanism underlying this result may be that perceived interesting instruction keeps students focused on academic goals, which decreases peer influence. In contrast, less interesting instruction may activate adolescents' social goals and increase classmates' influence on disruptive behaviors (see also, McFarland, 2001). The high correlation between perceived teachers' support and interesting instruction ($r = 0.80$) may be due to the fact that some aspects of interesting instruction, such as linking instructional material to real-life issues, require teachers to take on the perspectives of their students. However, other aspects of interesting instruction, such as the use of different methods and adequate examples, suggest that in addition to a generally positive attitude toward students' needs, teacher effects on peer influence processes are related to teachers' didactical expertise.

Third, students' perception of more *ability differentiated instruction* was related to a greater effect of descriptive classroom norms on

disruptive behaviors. One possible explanation is that publicly indicating students' ability levels is a cue for social comparison processes that activate students' popularity concerns. Less supervised ability-based working groups may provide room for students to focus on social issues and allow negative peer influence processes to occur. Our results partly correspond with those from other studies on teachers' use of class groupings (e.g., Gest & Rodkin, 2011; McFarland, 2001). Gest and Rodkin (2011), for example, found an association between teachers' tendency to group students with differing skill levels and less collective approval of prosocial behavior among students.

However, it should be acknowledged that opposite findings would also be plausible. Students might also have stayed academically focused when given tasks that fit their individual levels of academic proficiency, leading to decreased peer influence. One reason why the role of differentiated instruction in peer influence on disruptive behaviors remains difficult to determine is that the very practice of teaching may be decisive for ongoing peer influence processes. For instance, creating homogeneous groups of low-ability students (with low academic orientation; Knigge & Hannover, 2011) and giving them group work without further accommodations may indeed risk a shift in students' attention from academic to social goals. However, if criteria for successful cooperative learning are established first, such as teaching appropriate cooperation skills, interdependence between group members, and individual accountability for group work, then the focus of a student group may remain on academics (see also, Sutherland, Wehby, & Gunter, 2000). More detailed information on the practice of ability differentiated instruction is needed to shed further light on the processes underlying our results.

It should also be noted that student reports of ability differentiated instruction, as used in this study, have limitations. When ability differentiated instruction is conducted well, it may not necessarily be perceived by all students (in contrast to, e.g., supportive and interesting instruction), as teachers avoid publicly communicating students' ability levels in order to reduce social comparison (Gruehn, 2000). It may thus be that our measurement method tended to detect the more negative aspects of ability differentiated instruction (such as stressing different proficiencies in front of the class). Despite these open questions, the findings indicate that ability-differentiated instruction, if used in a suboptimal way, may risk increasing unintended peer influence on disruptive behaviors.

6.3. Differential effects across tracks and gender

In addition to testing our hypotheses, we explored whether the effects of student-perceived teacher instruction on peer influence would differ by academic track and gender. We found that the peer-influence-reducing effect of interesting and supportive instruction was stronger for students in lower tracks. This is plausible, given that students in lower tracks usually have lower levels of academic motivation than those in a high track (Knigge & Hannover, 2011). Thus, interesting and supportive instruction by the teacher may be especially important for students in lower tracks, to keep the focus on academics and avoid an attention shift to social goals. Our findings suggest teachers in low tracks were successful in this regard: Correlations indicated that students from low tracks perceived teacher instruction as more supportive and interesting than students from the high track.

We found no evidence that the effect of perceived teachers' instruction on peer influence differed by gender. However, as research on differential peer processes in boys and girls currently still holds many open questions (e.g., relating to the role that the behavioral domain considered plays; see Müller et al., 2017), there is clearly a need for more research into this topic.

6.4. Implications

Our results support the suggestion that teachers' behavior influences social interactional processes between students, a phenomenon sometimes referred to as teachers' “invisible hand” (for overviews, see, e.g., Farmer, McAuliffe Lines, & Hamm, 2011; Hamm & Hoffman, 2016; Hughes, 2012). Regarding the influence of teachers on the classroom peer ecology, Rodkin and Gest (2011) differentiated between two aspects of teaching. In the first aspect, teachers intentionally aim to impact peer relationships within the class, for example by changing the seating positions of students to enhance the social acceptance of rejected children (e.g., Van den Berg, Segers, & Cillessen, 2012). The current study relates more to the second aspect, namely teachers' general instructional practice, which Rodkin and Gest (2011) expected to also influence the peer ecology. In this regard many studies have focused on the effects of different teaching styles on students' social relationships and status in the classroom (see overview by Hamm & Hoffman, 2016). The present results, in line with those of Shin and Ryan (2017), additionally suggest that teachers' use of good general instructional practice is associated with less negative peer influence in classrooms. Teachers' efforts to use high-quality instruction thus may foster more than students' academic achievements; the core task of providing supportive and interesting instruction may also help teachers avoid difficult-to-manage peer influence dynamics. Further research is needed to better understand both the processes underlying the associations observed here and the ways in which these findings may be used in school practice.

6.5. Limitations and future directions

This study combined peer influence and learning environment research to contribute to our knowledge on the interplay between peer and teacher characteristics in predicting disruptive behavior development. Our analyses were based on a three-year longitudinal dataset that included six assessments. This study design allowed for systematic investigation into peer and teacher effects on adolescents' development beyond the immediate school year. Sensitivity analyses that tested the reliability of results when excluding students from the special education track supported our findings.

Despite these strengths, limitations exist. First, data on disruptive behaviors relied on student self-report. Although allowing participants to give honest answers by guaranteeing absolute anonymity (we did not ask for participants' names and mobile screens were used), our analyses would have benefited from additional assessments from, for example, the teachers' perspective.

A second limitation is that perceived teachers' instructional practice was measured only in Grade 8, which forced us to assume relative stability across Grades 7 through 9. Some studies suggest that teachers' beliefs about effective instruction (Stipek, Givving, Salmon, & MacGyvers, 2001) and students' evaluations of teachers' instructional practice tend to be relatively stable over time (e.g., Marsh & Hovecar, 1991; Nelson, Hall, & Christ, 2016; Seidel & Prenzel, 2006). However, these studies provided limited information on the stability of students' ratings of the teaching characteristics we investigated here across three years in lower secondary school. For example, they partly provided information on other age groups, other time periods between measurements, and other instructional aspects. It is possible that the physical, cognitive and social changes of early adolescence and increased experience with teachers over time influence instructional practice and students` ratings of them. It will thus be important to replicate our findings using repeated measurements of teachers` instructional practice.

Generally, we consider it as strength to have assessed teacher characteristics from the student perspective, as this allowed us to receive information directly from those who interpret the teachers' instruction (see also, Dowson et al., 2006). In terms of ability differentiated instruction, however, it would be beneficial to assess this variable in greater detail and include classroom observations by external experts (see above). Future studies should also investigate

additional aspects of teacher competence, such as classroom management. Teachers' abilities to manage student discipline in classrooms are important predictors of students' levels of disruptive behavior (Marzano, Marzano, & Pickering, 2003). Furthermore, effective classroom management can be expected to play a similar role as supportive and interesting instruction in guiding student attention from social to academic goals. Classroom management may thus also closely relate to peer influence processes in classrooms.

Finally, in addition to investigating the main teacher's role, it may be instructive to consider information on the role of subject-specific teachers who spend less time with students. Because they are likely less familiar with their students than the main teacher, they may have greater difficulty adapting their instruction to varying ability levels and supporting students individually. The moderating effect of subject-specific teachers' instructional practice on peer influence may thus be even more pronounced than what we found for main teachers.

In conclusion, this study showed that research on adolescent disruptive classroom behaviors should not solely focus on peer influence or on teachers' instructional style. Instead, both peer and teacher contexts appear to interact in predicting disruptive behavior development. More such associations between teacher, peer, and individual characteristics may be expected; after reviewing the literature concerning teacher influence on the classroom peer ecology, Hamm and Hoffman (2016, p. 222) concluded that "researchers have only begun to scratch the surface of possible ways in which teachers influence not only students' learning of academic content but also their relationships with one another."

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