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9. DO TEACHER-STUDENT RELATIONSHIPS DETERIORATE OVER TIME?

An Investigation of Within-Year Changes and Links with
Autonomous Motivation in Indonesia

INTRODUCTION

This research on Teacher-Student Relationships (TSR) in education has shown that TSR is an important determinant of classroom environments and suggests that a good TSR is beneficial for student learning and outcomes (Davis, 2003; den Brok, Brekelmans, & Wubbels, 2004; Henderson, Fisher, & Fraser, 2000; Opdenakker, Maulana, & den Brok, 2012). In line with the idea of self-determination theory that self-interest in learning is necessary for productive learning outcomes (Deci & Ryan, 2002), there is evidence that enhanced academic motivational outcomes are positively related to high quality of TSR (den Brok et al., 2004; Opdenakker & Maulana, 2010; Opdenakker et al., 2012; Wubbels & Brekelmans, 2005). TSR of good quality seems to be essential for students' development of positive experiences of their schooling period associated with healthy development, well-being and productive learning outcomes. When support for TSR is inadequate, students do not learn as much as we expect them to learn (Freiberg, 2010).

However, research originated from the western context also suggests that the quality of TSR tends to deteriorate over time (Mainhard, Brekelmans, den Brok & Wubbels, 2011; Maulana, Opdenakker, den Brok, & Bosker, 2012; Maulana et al., 2013; Opdenakker & Maulana, 2010; Opdenakker et al., 2012; Ryan & Patrick, 2001; Skinner & Belmont, 1993). Similarly, studies (in Western and Non-Western contexts) also indicate that the level of student academic motivation tends to decline over time (Corpus, Mc-Clinctic, & Hayenga, 2009; Opdenakker et al., 2012; Maulana, Opdenakker, & Bosker, 2012). These findings suggest the possibility of problematic current classroom environments and its negative consequences for student interest in learning (at least in the western context). However, it remains open for debate if the declining trend in the development of TSR and academic motivation over time is normative and can be considered as a common phenomenon irrespective of the cultural context. Until recently, there was no evidence whether or not the developmental trend in East-Asian countries like Indonesia would resemble the trend in the western context. How TSR develop over time is an important issue in education especially because the generality of the developmental trend over time may provide an answer about how best to improve

the quality of TSR and academic motivation over time. If the general trend would be evident, then interventions to prevent the declining trend could be one (best) way to take. Otherwise, learning from other countries with better TSR profiles and sharing knowledge among different cultural contexts could be an alternative for future references.

The inconclusiveness regarding a universal trend of the development of TSR and academic motivation is partly due to the fact that there is only limited research originated from Non-Western contexts, respectively the East-Asian context. Another reason is that changes in TSR over time are hardly studied in a longitudinal fashion (exeptions are studies of Mainhard et al., 2011; Maulana et al., 2012; Opdenakker & Maulana, 2010; Opdenakker et al., 2012). In addition, links between TSR and academic motivation are hardly studied in a longitudinal way as well. Exeptions are the studies of Maulana et al. (2012), Opdenakker et al. (2012), and Opdenakker and Maulana (2010). Therefore, differences in the effects found in different studies are probably (mainly) attributed to specific moments during the school year because studies do not investigate, e.g. learning environments, on the same point in time. Given that TSR and academic motivation tend to change over time and that changes in both may differ as a function of time, the current knowledge would benefit from a refinement in the measurement of changes and links over time, by applying a more representative to the school year longitudinal design.

The present study was designed to supplement the knowledge base on the change and the longitudinal relation between TSR and academic motivation over time from an Indonesian perspective. Particularly, attention was paid to the development of teacher involvement, structure, and autonomy support as recognized by self-determination theory (Deci & Ryan, 2002) and how differences and changes in the quality of TSR over time affect differences and the changes in the quality of autonomous motivation across the school year.

THEORETICAL FRAMEWORK

Teacher-student Relationships from the Self-determination Theory Perspective

Within the conceptualization of TSR, self-determination theory (SDT) recognizes three elements of teacher behaviors, namely *involvement*, *structure*, and *autonomy* support. The conceptualization of these elements originates from the concept of three basic psychological needs, called *competence* (structure)*, relatedness* (involvement)*, and autonomy*. SDT posits that human beings are active organisms. As active organisms, individuals have a tendency to develop and grow and act therefore to fulfill the three basic needs (Deci & Ryan, 2007). Individuals also have a tendency to integrate their experiences into a coherent sense of self. For the natural human tendency to be able to function effectively, supportive and healthy social environments are essential. Thus, the dialectic between active individuals and their social context is the basis for SDT make predictions about human behavior.

SDT posits that the social context is a key indicator of individuals' development. In the educational context, classroom social climates become central for students' fulfillment of the three basic needs. Research recognizes that teachers could provide students' satisfaction of the three needs through their positive involvement, structure and autonomy support. Teacher involvement refers to the demonstration of sincere concern and the provision of warmth and unconditional regard (Connell & Wellborn, 1991). Teacher structure support involves the provision of optimal challenging tasks, encouragement after failure, praise, and adequate help as well as the communication of clear guidelines and expectations with respect to the task that needs to be accomplished (Reeve, 2002). Teacher autonomy support involves the offering of choice, the minimization of controlling language, and the provision of a meaningful rationale (Deci, Eghrari, Patrick, & Leone, 1994; Reeve & Jang, 2006). Teachers' provision of clear expectations, consistent contingency for behavior, and ample help for students is in line with the term teacher structure, which corresponds to supporting students' need for competence (Skinner, 1991). Relatedness refers to a situation in which students feel related to their teachers and feel that their teachers enjoy being together with them, which corresponds to teacher provision of involvement over student learning (Ainsworth, 1989). In addition, autonomy support involves teacher facilitation to connect school activities and students' own interests (Deci & Ryan, 1985). If these needs are satisfied, students allow optimal function and development. To actualise the inherent potential of these needs they need nurturing from the social environment. If this happens there are positive consequence (e.g., well-being and healthy development), but if not, there are negative consequences. Therefore, SDT emphasises humans' natural growth toward positive motivation, however this is thwarted if their basic needs are not fulfilled.

It is important to get knowledge on potential changes of TSR over time and on links between changes in TSR and changes in student autonomous motivation. In the rather limited literature on changes in teacher behavior and classroom environments, there is a general trend in the western context that TSR tends to change over time (Brekelmans, 1989; Evertson & Veldman, 1981; Flanders, Morrison, & Brode, 1968; Mainhard et al., 2011; Maulana, 2012; Opdenakker & Maulana, 2010; Opdenakker et al., 2011; Ryan & Patrick, 2001; Skinner & Belmont, 1993). In general, there is also evidence that the quality of the classroom environment seems to decline to some degree during the school year (Brekelmans, 1989; Mainhard et al., 2011; Opdenakker et al., 2012). However, another study about changes in teacher dominance and cooperativeness in the Indonesian context indicate a contradictory finding: teacher dominance and cooperativeness tend to increase across the school year (Maulana, 2012). Because longitudinal studies on TSR in different countries and cultures are still scarce, it remains inconclusive if the change in TSR truly depends upon country backgrounds.

Autonomous Motivation

As a theory of motivation, self-determination theory assumes a multidimensional view of the motivational concept by distinguishing the quantity, amount, or intensity of motivation from the quality or type of motivation (Vaansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). Compared to other theories (i.e., expectancy-value theory of Eccles & Wigfield, 2002) which assume that motivation is a unitary construct and suggest that the higher the motivation the better the learning outcomes should be, self-determination theory recognizes that the interplay between motivation and learning outcomes is not straightforward, but it depends upon type of motivation. If the source of motivation is not internally-driven, less favorable learning outcomes are expected (Deci & Ryan, 2002). In addition, self-determination theory links motivation to the learning environment as an important context for motivation, while many other theories focus solely on motivational aspects within the person.

Within self-determination theory, autonomous motivation is considered the most important motivational component leading to productive learning outcomes. Autonomous motivation is theoretically conceptualized as having two subcomponents called identified regulation and intrinsic regulation (Ryan & Deci, 2000). Identified regulation reflects consciousness of valuing the regulation and students accept the action (i.e., studying) as personally important . Intrinsic regulation is considered as the most internally-driven type of motivation in which regulation is fully assimilated to the self. Empirically, these two subcomponents of motivation have been proven to be composites of autonomous motivation (Opdenakker et al., 2012; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). There is a close conceptual connection between academic motivation and academic engagement. Particularly, a low level of academic engagement has been commonly conceptualized and defined as a deficit in academic motivation (Opdenakker & Minnaert, 2011). Thus, motivation is necessary and is central for understanding academic engagement.

There is evidence from the western context that autonomous motivation tends to decrease over time (Bouffard, Marcoux, Vezeou, & Bordeleau., 2003; Corpus et al., 2009; Harter, 1981; Otis, Grouzet, & Pelletier, 2005; Opdenakker et al., 2012). Similarly, research reveals that prevalent declines in the level of mastery goals, which corresponds to autonomous motivation, are visible as young students become older (e.g., Gottfried, Fleming, & Gottfried, 2001; Lepper, Corpus, & Iyengar, 2005; Spinath & Spinath, 2005). Research from the Indonesian context reveals a similar trend indicating that autonomous motivation tends to deteriorate across the school year (Maulana, Opdenakker, & Bosker, 2012).

Teacher-student Relationships and Autonomous Motivation

Some studies also show relations between teacher interpersonal behavior and student motivation. Flanders et al. (1968) found a greater decrease in students' attitudes when students perceived their teachers as less praising and encouraging

compared to other teachers. Ryan and Patrick (2001) found that students who perceived their teacher as more supportive and promoting respect in their classes reported to engage less in disruptive behavior compared to the year before. Skinner and Belmont (1993) indicate that students' behavioral engagement is primarily a function of student perceptions of teacher structure and that students' emotional engagement is influenced by teacher involvement. Consistent with Corpus et al. (2009) and Skinner and Belmont (1993), Opdenakker and Maulana (2010) demonstrated that differences and changes in teacher involvement, structure, and autonomy support are linked with differences and changes in student academic engagement. Maulana et al. (2011) found that teacher dominance and cooperativeness are significant predictors of autonomous motivation of Indonesian students as well. In addition, some studies found that supportive TSR can attenuate the decline in student motivation over the year (Lapointe, Legault, & Batiste, 2005; Wentzel, 2010) because TSR of good quality serve as a protective factor for the decline in students' autonomous motivation (Opdenakker et al., 2012). Overall, research suggests that the better the classroom social climate, the more likely progressive changes in students' interest and learning value are promoted, irrespective of the cultural background (Maulana, 2012).

The Current Study

The present study is one of the first to investigate changes in TSR (based on student perceptions) as measured by teacher involvement, structure, and autonomy support. All these support dimensions are to support the satisfaction of the need for relatedness, competence, autonomy in the context of the first grade of secondary education in Indonesia. The second aim is to explore the role of teaching subject (math versus English), class type (homogeneous high-ability classes versus heterogeneous mixed-ability classes), and student gender in explaining differences and changes in the components of TSR. The last aim is to investigate the relation between changes of TSR and the evolution in autonomous motivation over time.

In this chapter, we focus our exploration on links between changes in TSR and autonomous motivation in the Indonesian context because we want to represent a country within the East-Asian context, geographically and culturally. Additionally, the role of several personal and contextual characteristics is examined. We are aware of the fact that findings from merely one country would provide less clear clue with regard to the generalization purpose across the East-Asian context. Nevertheless, our aim is not to provide a clear-cut understanding about the nature of TSR and academic motivation between the west and the east, but to initiate the discussion regarding potential differences about the psychological constructs mentioned between different east-west cultural backgrounds.

In Indonesia, there are three categories of secondary school that are generally distinguishable based upon their standard qualification: (1) School of International Standards (highest qualification), (2) Pilot School of International Standards (second highest qualification), and (3) School of National Standards (lowest qualification). The distinction between homogenous (high or low ability group)[i]

and heterogeneous (mixed ability group) classes depends mainly on the school qualification: Some schools offer both homogeneous and heterogeneous classes, while others provide either homogeneous or heterogeneous classes only (Ministry of National Education, 2007). Since the targeted learning objectives failed within the centralized curriculum, there has been a conceptual and practical transformation in the school system into the decentralized curriculum (Mullis et al., 2008). With this transformation, the country hopes for a significant improvement in many educational levels, including the classroom level leading to better student motivation in learning and academic achievement.

Undoubtedly, several contextual and personal characteristics may affect TSR and autonomous motivation. Teaching subject is one of the contextual characteristic that play a role as past studies show that science and mathematics teachers are often perceived less favorable in terms of TSR compared to other school-subject teachers (Levy, den Brok, Wubbels, & Brekelmans, 2003; Maulana et al., 2012). Moreover, class type is another contextual characteristic determining TSR. Often, classroom environments are found to be better in term of quality in high- ability classes than in other types of classes (Opdenakker & Van Damme, 2001; Mills, 1997; Evertson, 1982; Maulana et al., 2012; Boufard & Couture 2003; Lapointe et al., 2005). However, there is also evidence that teacher cooperativeness and students' autonomous motivation declines faster in high-ability compared to mixed-ability classes (Opdenakker et al., 2012). With regard to student gender, studies show that girls tend to have more favorable views compared to boys (Fraser, 2007) and seem to perceive their teachers as more dominant (teacher-centered) and cooperative than boys (Levy et al., 2003; Wubbels & Levy, 1993). Boys stereotypically experience a greater level of conflict, while girls typically experience more interpersonal closeness (Hamre & Pianta, 2001; Saft & Pianta, 2001).

Furthermore, the fact that students experience a new start with important changes in educational environments when they leave primary education and enter secondary education is the main reason to investigate the link between changes in TSR and autonomous motivation in the first grade of secondary education. This schooling period is the first experience for students to deal with multiple subject teachers. Next, it is a period when students experience important changes in biological, psychological and social challenges (Lord, Eccles, & McCarthy, 1994). Although peer orientations become more significant when students become older, it does not necessarily mean that support of teachers do not matter anymore (La Guardia & Patrick, 2008). Therefore, this schooling period offers a fruitful context for studying TSR and autonomous motivation dynamics.

This study contributes to the knowledge base of the (in)stability and importance of classroom environments in several ways. First, we followed students over the school year to document their perceptions about teaching behavior of their teachers associated with teacher involvement, structure, and autonomy support. Second, we gathered students' self-report of autonomous motivation across the school year, which allow us to link TSR and students' autonomous motivation together dynamically. Third, we collected data from Indonesian secondary schools to

complement the knowledge base predominantly originated from a western context. Findings of this study offer empirical evidence to the knowledge base as regards instability and universal characteristics of TSR, effects of TSR on student autonomous motivation, as well as the extent to which findings as regards TSR and autonomous motivation are context specific (Western versus East-Asian). Finally, the application of multilevel growth curve models allowed us to handle the hierarchical structure of our data, paying attention to variability and changes of TSR components as well as relations to academic motivation longitudinally.

METHOD

Participants and Procedures

A total of 504 students from 16 mathematics and English first grade classes of secondary schools participated in the longitudinal survey. The survey was targeted to examine student perceptions of teacher involvement, structure, and autonomy support as well as autonomous motivation in their classes. Of the students, 222 were boys and 282 were girls. Of the classes, 50% was homogeneous (high-ability) classes and 50% was heterogeneous (mixed-ability) classes. In theory, homogeneous classes refer to either high-ability groups (corresponds to international or acceleration classes) or low- ability groups (corresponds to regular low- ability classes). In this study, it refers only to high- ability groups and international classes.

Self-report autonomous motivation of students was measured in five waves (from the first week of the school year to month 10), while student report on teacher involvement, structure, and autonomy support was measured in four waves (from month 1.5 to month 10) across the school year. Prior to conducting the survey, agreement between schools and researchers was established. Students participated on a voluntary basis. Across five waves of measurements, the percentage of missing cases was between 0.9% (fifth wave) and 10% (first wave).

Measures

Teacher-student relationships. To examine TSR, the Indonesian translation of the "Teacher as a Social Context (TASC)" questionnaire was used (Belmont, Skinner, Wellborn, & Connell, 1992; Sierens et al., 2009). The TASC is theoretically consistent with the conceptualization of TSR rooted in self-determination theory. The measure consists of three scales measuring the dimension of TSR: *involvement*, *structure*, and *autonomy support*.

The measure consists of 52 items provided on a 5-point Likert scale ranging from 1 (completely not true) to 5 (completely true, see Appendix for examples of items). For the current study, translation and back-translation of the measure was done by the first author, an English-as-Foreign-Language teacher educator, and an educational psychologist specializing in young adolescent development. Exploratory factor analysis (PCA with varimax rotation) revealed that three factors

could be extracted, which is in line with the original American version of the measure. The three factors could explain about 51% of the variance: the first factor accounted for 29% of the variance, the second factor for 16%, and the third factor for 6%. The internal consistencies of the three TASC scales appear to be good. Analysis of reliabilities of the scales based on one measurement point are: involvement ($\alpha = 0.87$), structure ($\alpha = 0.91$), autonomy support ($\alpha = 0.71$).

Autonomous motivation. A measure of (subject-related) autonomous motivation was based on the questionnaire of motivational dimensions (Vansteenkiste et al., 2004), which was originally developed based on the academic self-regulation scale (Ryan & Connell, 1989). The autonomous motivation scale examines students' internal reasons for studying (math and English), which consists of two subscales called Identified regulation (4 items) and Intrinsic regulation (4 items). Examples of items are (identified regulation: "I study math/English because it is personally important to me") and (intrinsic regulation: "I study math/English because I find it interesting"). The reliability of autonomous motivation based on one measurement point appears to be good ($\alpha = 0.90$).

Time, teaching subject, class type, and student gender. Time was coded in accordance with the survey intervals (in months) as follows: 0 (baseline), 1.5 months, 4 months, 7 months and 10 months. Class type was divided into two categories, with "0" referring to homogeneous classes (also referred as high- ability classes) and "1" referring to heterogeneous classes (also referred as mixed- ability classes). Teaching subject and student gender were included in the analyses as dummy variables with "0" for mathematics and "1" for EFL, and "0" for boys and "1" for girls respectively.

Analytic Strategy

Due to the hierarchical structure of the data (i.e., time nested within students, students nested within classes), multilevel growth curve modeling (with MLwiN, Goldstein, 2003; Rasbash, Charlton, Browne, Healy, & Cameron, 2005) was applied to investigate changes in TSR and links with autonomous motivation. Models with three levels were included: measurement occasion at level 1, student at level 2, and class at level 3. Attention was paid to the general development (teacher involvement, structure, autonomy support) and the deviation to this development at class and student level. In addition, changes of autonomous motivation of classes were explored and were linked (longitudinally) with that of TSR across the school year. Modeling strategy was done in a number of steps, ranging from estimating empty models (model with no predictors) to full models (model with predictors and control variables). The modeling was applied separately for each of the measures. Significant results of 95% confidence intervals and higher were focused on, but in some instances, a *p* value of < 0.10 was also included to increase the statistical power given a relatively small number of classes included in the study.

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RESULTS

Changes in Teacher-student Relationships over Time

Results of multilevel growth curve modeling reveal small differences between classes (1%-2%) and relatively large differences between students with regard to TSR components (22% - 24%, see Table 1). All components of TSR appear to be (roughly) equally unstable over time. This suggests that considerable changes in teacher involvement, structure, and autonomy support across the school year are visible.

Table 1. Distribution of the total variance over the class, student and occasion level (percentages)

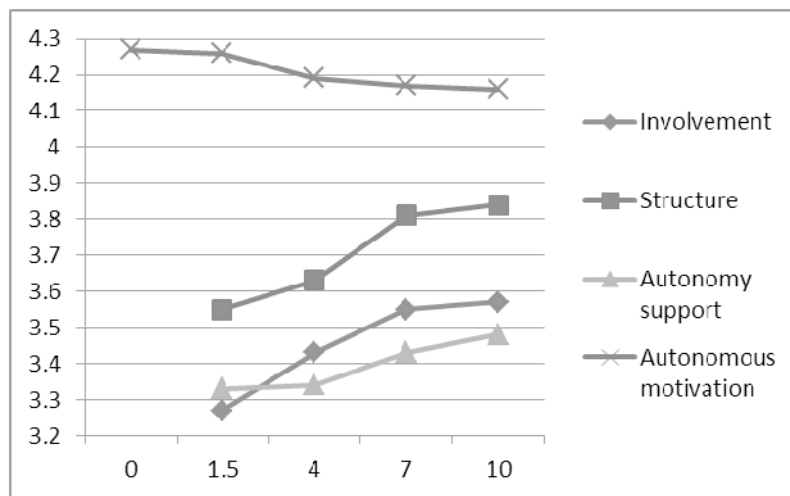| Levels	Involvement (N = 1903)	Structure (N = 1904)	Autonomy (N = 1903)	Autonomous motivation (N = 2378)
Class	2.2%	2%	1%	5%
Student	23.7%	21.7%	22.4%	23%
Occasion	74.1%	76.3%	76.6%	72%

Figure 1. Development of teacher involvement, structure, autonomy support and student autonomous motivation over time (raw scores)

Inspection of the mean trajectories of the raw scores of the TSR components shows a general increase in the quality of TSR over time (see Figure 1). Results from multilevel growth curve modeling confirm this finding and suggest that the

change in teacher involvement is best-represented by a linear and quadratic term, while the change in teacher structure and autonomy support are best-represented by linear terms (see Table 2, Model 1). Additional analyses reveal that although the level of all components of TSR increases over time, the magnitude of the increase seems to differ to some extent between classes and between students within classes. With regard to differences between classes associated with the linear effect of time, it was estimated that the 95% interval contains negative as well as positive time effects. Recalculating the interval limits for a period of 10 months (corresponding to a regular school year in Indonesia), the interval of the linear effect of time ranges for teacher involvement between -0.60 and 2.21 and, for structure between -0.30 and 1.08, and for autonomy support between -0.30 and 0.70.

Furthermore, results reveal that differences (and changes) in the components of TSR could be explained by class type (see Table 2, Model 2). For autonomy support, only the main effect of class type is significant ($p < 0.10$), indicating that the general level of teachers' autonomy support in heterogeneous classes is lower than in homogeneous classes. For involvement and structure, however, not only the main effects of class type are significant ($ps < 0.01$), but the interaction effects between time (linear) and class type are significant as well ($ps < 0.05$, see Figure 2). Taking together all the effects of time, class type and the interaction effect between time and class type, the results indicate that, in general, structure and teacher involvement is lower in heterogeneous classes compared to homogeneous classes. This is, in particular the case at the beginning of the school year. However, teacher involvement increases at a much faster rate in heterogeneous classes compared to homogeneous classes resulting in the end at a higher level of teacher involvement in heterogeneous classes compared to homogeneous classes. This trend is, even more pronounced, visible as regards structure. Furthermore, a small effect of student gender on autonomy support was found (significant at 10% level) suggesting that girls experience a little bit more autonomy support than boys. No differences in TSR components associated with teaching subject are evident. To summarize, we found evidence that the general quality of TSR in heterogeneous classes seems to be less favorable at the beginning of the school year compared to that in homogeneous classes. However, the quality as regards teacher involvement and structure increases at the much faster rate in homogeneous classes compared to the quality of these TSR components in homogeneous classes resulting in an equal to even better quality of the learning environment as regards these TSR components in heterogeneous classes compared to homogeneous classes.

Table 2. Results of multilevel models of the development of Involvement, Structure, and Autonomy support over time

Variable	Model 1						Model 2					
	Involvement (N = 1903)		Structure (N = 1904)		Autonomy (N = 1903)		Involvement (N = 1903)		Structure (N = 1904)		Autonomy (N = 1903)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Fixed effect												
Intercept	3.169434*	.082773	3.5090***	.0708	3.2908***	.0522	3.3386***	.1086	3.7229***	.0869	3.3534***	.0849
Time	.0810**	.0266	.0357***	.0100	.0185*	.0077	.0657*	.0294	.0043	.0131	.0103	.0130
Time^2	-.0041º	.0022					-.0041º	.0022				
Time^3												
Subject							-.0231	.0889	-.0734	.0909	-.0173	.0957
Time x Subject							-.0055	.0147	.0027	.0137	.0010	.0150
Class type							-.2797**	.0890	-.4210***	.0910	-.1637º	.0957
Time x Class type							.0360*	.0147	.0585***	.0138	.0160	.0150
Gender							-.0294	.0489	.0549	.0581	.0478º	.0289
Time x Gender							.0002	.0074	.0015	.0088		
Random effect												
Level 3 variance (class)												
Intercept	.0813	.0387	.0671	.0283	.0367	.0154	.0813	.0389	.0200	.0117	.0298	.0129
Intercept x Time	-.0197	.0118	-.0087	.0038	-.0055	.0022	-.0218	.0123	-.0024	.0016	-.0049	.0020
Time	.0050	.0040	.0013	.0005	.0008	.0003	.0054	.0041	.0004	.0002	.0007	.0003
Intercept x Time^2	.0012	.0009					.0016	.0009				

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Table 2. (Continued)

Variable	Model 1						Model 2					
	Involvement (N=1903)		Structure (N=1904)		Autonomy (N=1903)		Involvement (N=1903)		Structure (N=1904)		Autonomy (N=1903)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Time x	-.0003	.0003					-.0004	.0003				
Time^2	.0000	.0000					.0000	.0000				
Level 2 variance (student)												
Intercept	.1646	.0694	.0000	.0000	.0159	.0158	.1675	.0696	.0000	.0000	.0155	.0158
Intercept x Time	-.0996	.0297	.0000	.0000	.0039	.0020	-.1010	.0298	.0000	.0000	.0038	.0020
Time	.0771	.0147	.0000	.0000	.0000	.0003	.0776	.0147	.0000	.0000	.0000	.0003
Intercept x Time^2	.0089	.0024					.0090	.0024				
Time x Time^2	-.0067	.0012					-.0067	.0012				
Time^2	.0005	.0001					.0005	.0001				
Level 1 variance (occasion)												
Residual	.1991	.0131	.3602	.0117	.1733	.0080	.1990	.0131	.3592	.0117	.1731	.0080
Deviance	3291.34		3508.78		2498.52		3282.06		3488.51		2486.28	

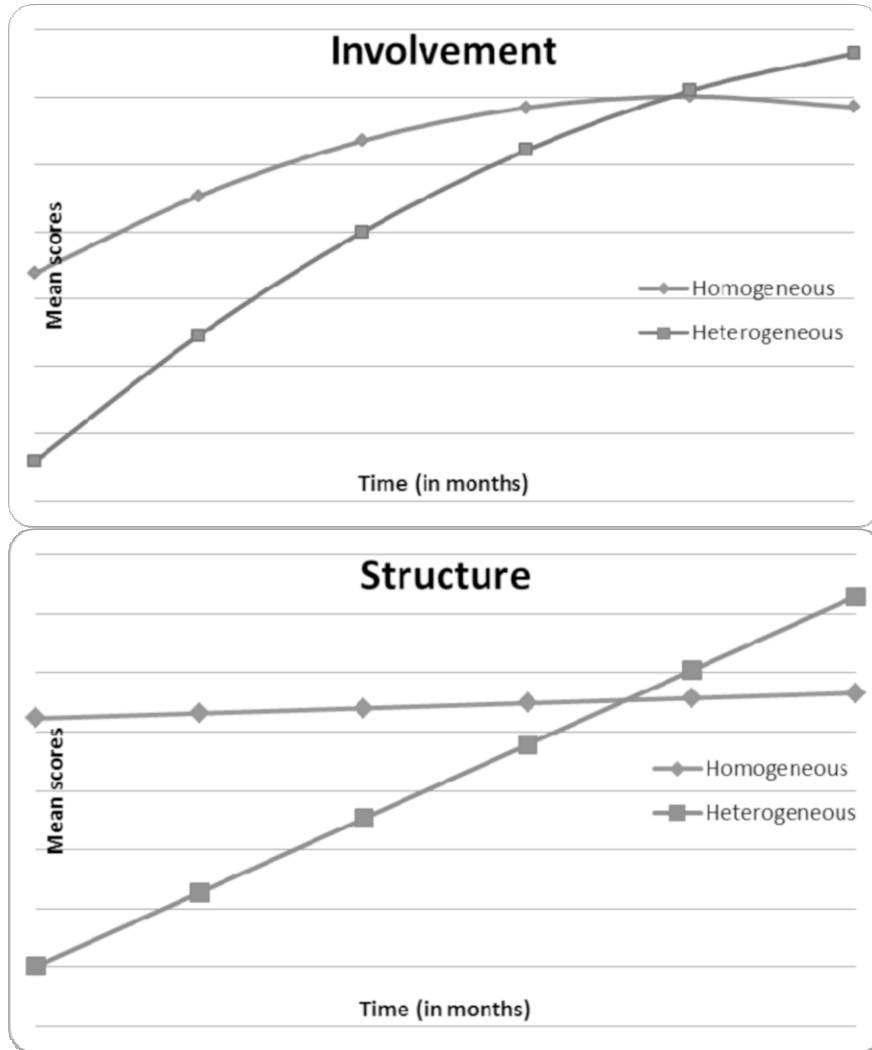*Note.* $^{o}p<.10$, $*p<.05$, $**p<.01$, $***p<.001$

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Figure 2. Developmental trajectories of teacher involvement and structure support based on class type (based on best-fitted multilevel growth curve model)

Longitudinal Relations between Teacher-student Relationships and Autonomous Motivation

Results reveal that differences between classes (5%), between students within classes (23%), as well as across measurements occasions (72%) regarding autonomous motivation are evident (see Table 1). There is an indication that student autonomous motivation changes over time.

Changes in student autonomous motivation are best-illustrated by a (small negative) linear term, suggesting that the level of autonomous motivation decreases systematically a little bit across the school year (see Table 3, Model 1, Figure 1). In addition, differences between classes and between students within classes regarding the linear trend are visible. Inspection of the linear time effect on differences between classes shows that, assuming Normality, the 95% confidence interval consists of negative and positive time effects. The estimate of the interval limit across the school year ranges between -0.42 and 0.14. This suggests rather moderate between classes differences over time.

Furthermore, differences and changes in autonomous motivation could be explained by class type (Table 3, Model 1). Results show that both main effect of class type ($p < 0.10$) and interaction effect between time and class type ($p < 0.01$) are significant, indicating that the level of autonomous motivation is slightly higher in heterogeneous classes compared to homogeneous classes, and that the decrease of autonomous motivation is steeper in homogeneous classes compared to heterogeneous classes. In fact, the autonomous motivation of students in heterogeneous classes remains rather stable across the school year, while a (small) declining trend is evident in homogeneous classes.

Finally, results reveal that differences in autonomous motivation are linked with differences in the TSR components. Teacher involvement, structure, and autonomy support could significantly predict student autonomous motivation ($ps < 0.001$, see Table 3, Model 2-4). Teacher involvement explains about 6% of the variance, structure support about 7%, and autonomy support about 6%. Together, differences in the TSR components explain about 7% of the variance in autonomous motivation. All components of TSR have significant unique effects on student autonomous motivation, although the joint effect of the three components overwhelms the unique effects of each of them. Interestingly, results also show that positive effects of teacher involvement and structure support on autonomous motivation seem to be stronger for students in homogeneous classes compared to students in heterogeneous classes, although its effect for students in heterogeneous classes remain important as well (see Table 3, Model 2-3). The positive effects of teacher autonomy support, on the other hand, appear to be equally important for students in homogeneous and heterogeneous classes.

Table 3. Results of multilevel models of the development of autonomous motivation over time and effects of TSIR variables

Variable	Model 1 Motivation with control variables		Model 2 Motivation with Involvement and control variables		Model 3 Motivation with Structure and control variables		Model 4 Motivation with Autonomy and control variables		Model 5 Motivation with Involvement, Structure, Autonomy, control variables (Full model)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Fixed effect										
Intercept	4.2558***	.0616	3.4496***	.1665	3.2481***	.1710	3.3060***	.1807	2.8898***	.2061
Time	-.0264**	.0087	-.0195°	.0103	-.0181°	.0103	-.0202	.0129	-.0205	.0128
Time^2										
Subject taught	-.0241	.0602	.0291	.0699	.0427	.0726	.0331	.0708	.0379	.0706
Time x Subject taught	.0004	.0084	-.0066	.0095	-.0077	.0095	-.0076	.0132	-.0072	.0130
Class type	.1123°	.0604	.7160***	.1885	.6773***	.1977	.5239*	.2202	.8124***	.2475
Time x Class type	.0230**	.0085	.0047	.0097	-.0024	.0098	.0048	.0132	.0005	.0132
Student gender	-.0153	.0518	-.0645	.0712	-.0909	.0718	-.0973	.0720	-.0859	.0718
Time x Student gender	-.0001	.0074	.0078	.0097	.0089	.0097	.0103	.0096	.0088	.0096
Involvement			.2118***	.0433					.1009*	.0490
Structure					.2496***	.0413			.1358*	.0553
Autonomy							.2612***	.0486	.1242*	.0609
Class type x Involvement			-.1290*	.0529					-.0938	.0597
Class type x Structure					-.0955°	.0517			-.0427	.0685
Class type x Autonomy							-.0731	.0630	-.0066	.0777
Random effect										
Level 3 variance (class)										
Intercept	.0040	.0051	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Intercept x Time	.0009	.0005	.0000	.0000	.0000	.0000	.0000	.0000	.0000	.0000
Time	.0000	.0001	.0000	.0000	.0000	.0000	.00003	.00002	.0003	.0001

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Table 3. (Continued)

Variable	Model 1 Motivation with control variables		Model 2 Motivation with Involvement and control variables		Model 3 Motivation with Structure and control variables		Model 4 Motivation with Autonomy and control variables		Model 5 Motivation with Involvement, Structure, Autonomy, control variables (Full model)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Level 2 variance (student)										
Intercept	.1595	.0219	.2585	.0404	.2720	.0411	.2768	.0413	.2708	.0410
Intercept x Time	-.0090	.0026	-.0204	.0051	-.0224	.0021	-.0229	.0051	-.0230	.0051
Time	.0020	.0004	.0035	.0008	.0035	.0008	.0034	.0008	.0034	.0008
Level 1 variance (Occasion)										
Residual			.2839	.0134	.2822	.0134	.2786	.0132	.2788	.0133
Deviance	4633.81		3642.15		3616.52		3591.11			

Note. $^{o} p<.10$, $^{*}p<.05$, $^{**}p<.01$, $^{***}p<.001$

CONCLUSIONS AND DISCUSSION

Teacher-student relationships are important determinants of the classroom environment. Self-determination theory recognizes that supportive and healthy relationships are considered as productive environment characteristics, while problematic relationships are detrimental to student well-being, growth, and learning outcomes. The present research is one of the first studies focusing on differences and changes in TSR and on relations between changes and differences in TSR and autonomous motivation, taking into account the role of teaching subject, class type, and student gender in the context of first-grade secondary schools in Indonesia.

Based on the inspection of the amount of variation between classes regardless of time effect, we found rather small differences between classes with regard to TSR components. Another study in the Netherlands indicated rather large between classes differences, suggesting that the teacher in some classes seem to have the power to counter the downwards evolution of the quality of TSR (Opdenakker & Maulana, 2010). Rather small between classes differences found in our study could mean that teachers in general displayed more or less the same level of interpersonal behavior in their classes. However, this could also mean that there is not enough variation in our 16-classes sample. Replicating the study with more classes involved in the sample would clarify this inconclusive line of reasoning.

More importantly, we found that all the components of TSR changed over time. Some components of TSR (structure and autonomy support) changed in a linear way, while the change of another component (teacher involvement) could be described best as a combination of a linear and a quadratic trend. Contradictory to findings in the western context investigating TSR from the interpersonal perspective (Brekelmans, 1989; Mainhard et al., 2011; Opdenakker et al., 2012) and from the SDT perspective (Opdenakker & Maulana, 2010), we found that all components of TSR showed an increasing trend. Teacher structure and autonomy support showed a systematic increase across the school year, while the increase in teacher involvement was slightly decelerated towards the end of the school year. Compared to teacher structure and autonomy support, the largest between-class differences associated with the linear effect of time were visible for teacher involvement. Our finding is in line with research of Maulana (2012) who found that the level of teacher dominance and cooperativeness (from the interpersonal perspective) in the Indonesian secondary schools increased across the school year. Our findings suggest that instability in TSR might be a universal phenomenon, irrespective of the cultural context. However, findings of this study also suggest that a deteriorating trend in the quality of TSR is not normative, and thus cannot be considered as inevitable. Perhaps, this has some connection with cultural values associated with TSR

Among other possible reasons, respect for authority and power distance index might play a role in explaining this opposite developmental trend (Ho, Holmes, & Cooper, 2004; Hofstede, 1991). In a collectivist country like Indonesia, teacher authority is a privilege and students respect the authority as a part of society.

Respecting the teacher as an authority figure also implies a clear high power distance between the teacher and students. In addition, the teacher is commonly seen as a role model, the knower and the source of knowledge which students highly respect and appreciate. It seems logical to argue that if students hold these values about their teachers, there will be a reflection of them in their perceptions. Another observation study in the same country showed that, compared to Dutch teachers, the level of Indonesian teacher interpersonal involvement is lower. Future research should clarify how cultural values play a role in shaping student perceptions about their teacher behavior.

Furthermore, although past studies documented significant effects of teaching subject on TSR (Levy et al., 2003; Maulana et al., 2012), these were not confirmed in our study as we did not find significant effects of teaching subject on teacher involvement, structure, and autonomy support. Also, whereas prior studies showed that student gender is an important determinant of TSR (Fraser, 2007; Levy et al., 2003; Opdenakker et al., 2012; Wubbels & Levy, 1993), this was only partially confirmed in our study as the effect of student gender was only evident on teacher autonomy support and only within the 10% confidence interval. Although this finding should be interpreted with care, there seems to be an indication that female students perceived their teachers to display somewhat higher level of autonomy support than male students. Assuming that student perceptions, to some extent, reflect the real behavior of teachers in the classroom, perhaps this difference in perception between female and male students has some connection with culturally-related gender role differences (Marcus, Gross, & Seefeldt, 1991; Timm, 1999). Often, female students in Indonesia are assumed to be more obedient and comply with classroom rules and tasks (i.e., doing homework consistently), while male students are often assumed to be more disruptive and not studying and working on tasks as much as expected. If this assumption plays a role, then it is not surprising that teachers give more autonomy support to female students, but they emphasize more controlling strategy to male students. Classroom observation research would be beneficial to confirm this hypothesis.

Compared to effects of teaching subject and student gender, the effects of class type on the three components of TSR appeared to be most pronounced. We found evidence that students in heterogeneous classes perceived the quality of their teachers' involvement, structure, and autonomy support in general and in particular at the beginning of the school year lower than their peers in homogeneous classes. To some degree, this finding implies that the quality of teaching (in terms of interpersonal behavior as perceived by students) of teachers teaching in high-ability classes is better at least at the start of the school year than that of teachers teaching in mixed- ability classes. This finding is not surprising given that the current school system of secondary school in Indonesia allows a differentiation with regard to school quality.

Since the implementation of a decentralized school curriculum in line with the implementation of district autonomy in Indonesia, every district has "competed" to improve education in all levels, especially secondary education. Until currently, the quality of schools has been examined, to a great extent, by their qualification

standards (Ministry of National Education, 2007). Consequently, every school within the district has been striving to achieve the highest qualification as possible. Among other ways of improving school standards, the district has taken an action called teacher-rolling: attracting the best teachers for best schools and transferring less qualified teachers to lower qualified schools. This action is probably effective to increase the number of schools with high qualification standards in districts, but what happens with schools and teachers with lower qualifications standards? What can one effectively do to help the country to improve the quality of schools with mixed-ability and low-ability classes? Perhaps, attracting the best teachers for lower qualified schools should also be an alternative. Otherwise, the current strategy would merely enable that good schools become better and bad schools remain, or get worse. Nevertheless, we also found that better changes over time (stronger increase) of teacher involvement and structure are evident in heterogeneous (mixed-ability classes) compared to homogeneous (high-ability classes). Knowing that the quality of TSR in homogeneous classes is, in general and in particular at the beginning of the school year, better than in heterogeneous classes, but that a stronger increase of teacher involvement and structure over time is visible in heterogeneous classes compared to homogeneous classes, this suggest that the connection between TSR, class type, and time is complex requiring more investigation in future research.

Moreover, we found that the level of academic motivation of students decreased in a (small) linear fashion across the school year, which is consistent with the general trend found in western countries (e.g., Corpus, Mc-Clinctic & Hayenga, 2009; Harter, 1981; Otis, Grouzet, & Pelletier, 2005; Opdenakker et al., 2012). While the trend in TSR between Indonesia and western countries is different, the trend of academic motivation is more or less similar to other countries. This might indicate that the relationship between TSR and student outcomes is weaker in Indonesia compared to western countries. Indeed, when comparing our results to that of the Dutch finding (Opdenakker & Maulana, 2010), we found that teacher involvement, structure, and autonomy support together explain merely 7% of the variance in autonomous motivation (cf. 23% in the Dutch context). Taken together our finding and other (western) research, there seems to be a common phenomenon that secondary school students experience motivational "problems", regardless the cultural context. If this phenomenon is inevitable and can be seen as a normative process in the period of adolescence, it would be promising that further research is directed toward the exploration of the magnitude of the decrease over time, taking into account the cultural context. Based on research conducted in Dutch and Indonesian contexts, Opdenakker et al. (2012) and Maulana (2012) discovered that the decrease in TSR in Indonesian classes is smaller than in Dutch classes. These studies suggest that changes in motivation over time are probably more "problematic" in the western than in the East-Asian (Indonesia) context. Interestingly, the level of autonomous motivation is higher for students in heterogeneous (mixed-ability) classes compared to homogeneous (high-ability) classes. In addition, students in homogeneous (high-ability) classes reported a steeper decrease of autonomous motivation than their peers in

heterogeneous (mixed-ability) classes. Our findings imply that what is happening in homogeneous classes over time appears to be less favorable in terms of the motivational dynamic compared to heterogeneous classes. Perhaps, this has some connection with the finding that a more favorable development of TSR is evident in heterogeneous classes compared to homogeneous classes.

Finally, based on the analysis of longitudinal relations between TSR and autonomous motivation, we found evidence that teacher involvement, structure, and autonomy do matter for student autonomous motivation. The fact that the level of the TSR components increased over time seems to play a role as protective factors for autonomous motivation to decline over time. Thus, our findings confirm the idea of self-determination theory (Deci & Ryan, 2002) with regard to the importance of the teacher in satisfying students' basic psychological needs of feeling related, competent, and autonomously supported for student academic motivation. When students continuously feel connected with their teachers, believe that they are competent, and experience a substantial support of autonomy from their teachers, these seem to promote their self-interest in learning. This suggests that the progressive maintenance of TSR over time is very likely to facilitate the process of internalization over learning, which in turn promotes students' self-determined learning motivation (Maulana et al., 2012, 2013; Opdenakker et al., 2012; Ryan & Deci, 2000; Skinner & Belmont, 1993).

In addition, we found some evidence that positive effects of TSR components on autonomous motivation are not similar in magnitude depending on class ability grouping. Students in homogeneous (high- ability) classes seemed to benefit more from teacher involvement and structure support than their peers in heterogeneous (mixed-ability) classes as far as autonomous motivation is concerned. This finding is in line with research of Maulana et al. (2012) who discovered a stronger effect of teacher dominance and cooperativeness on autonomous motivation for students in homogeneous classes compared to heterogeneous classes. Knowing that students in homogeneous (high-ability) classes have a more problematic academic motivation dynamic in terms of the level and the change over time and that the effects of teacher involvement and structure support for their autonomous motivation were stronger compared to the autonomous motivation of students of heterogeneous (mixed-ability) classes, this implies that efforts for improving the quality of TSR in this particular class type would be beneficial. We argue that an optimal level of TSR is needed until its maximum benefit for student autonomous motivation is reached. To what extent the ceiling effect of TSR could be determined, is certainly a challenge for future research. However, the effort for improvement should not be targeted to solely homogeneous (high-ability) classes. Heterogeneous (mixed-ability) classes need adequate attention as well. As one may expect that what works in particular classes may not work in other classes, a more proper implementation of adaptive teaching adjusted for the class type would be one way leading to better motivational (and academic achievement) outcomes (Van de Grift, 2007).

To conclude, we provide evidence from the Indonesian context that the general deteriorating trend in TSR found in the western context may not be a universal, normative, phenomenon. The level of TSR does change regardless of the cultural

context, but the direction of the change over time seems to differ depending on the cultural context. It is tempting for future research to investigate various cultural values that may play a role in explaining differences and changes in TSR and academic motivation. Our research as regards TSR in different cultural contexts (Western versus East-Asian/Indonesian) is still in the beginning phase. Although our findings may be generalizable to other East-Asian countries sharing a similar culture with Indonesia, we will need (much) more research to confirm as to whether clear differences in TSR between the western and the eastern (i.e., other Asian countries) context are significantly distinguishable. With this article, we encourage other researchers for further international discussion and contribution to shed light on this inconclusive research knowledge.

NOTE

[i]   Theoretically, homogeneous classes refers to either high ability groups (also corresponds to international or acceleration classes) or low ability groups (also corresponds to regular classes). However, in our sample it refers only to high ability groups and international classes of a second qualification school.

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APPENDIX

Examples of Items of Student Report of Teacher as Social Context in Terms of Teacher Involvement, Structure, and Autonomy Support

Items	1 Completely not true	2	3	4	5 Completely true
1. My teacher likes me.					
2. My teacher really cares about me.					
3. My teacher doesn't seem to enjoy having me in her class.					
4. My teacher knows a lot about me.					
5. My teacher knows me well.					
Cut for copyright reason					
48. My teacher talks about how I can use the things we learn in school.					
49. My teacher encourages me to find out how schoolwork could be useful to me.					
50. My teacher doesn't explain why what I do in school is important to me.					

51. My teacher doesn't explain why we have to learn certain things in school.
52. My teacher never talks about how I can use the things we learn in school.

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