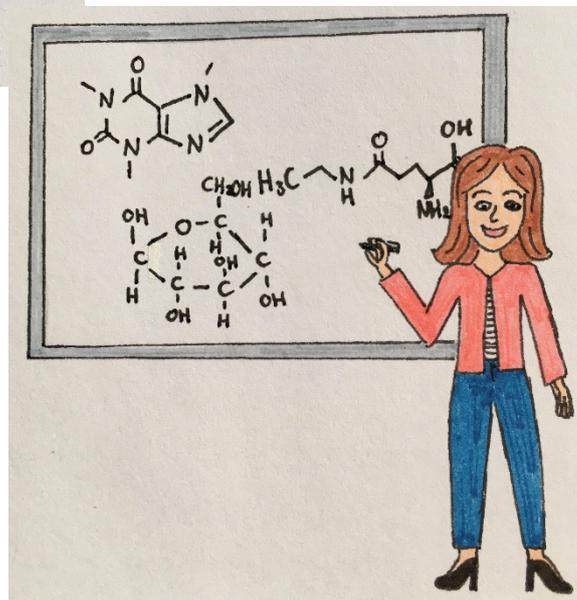
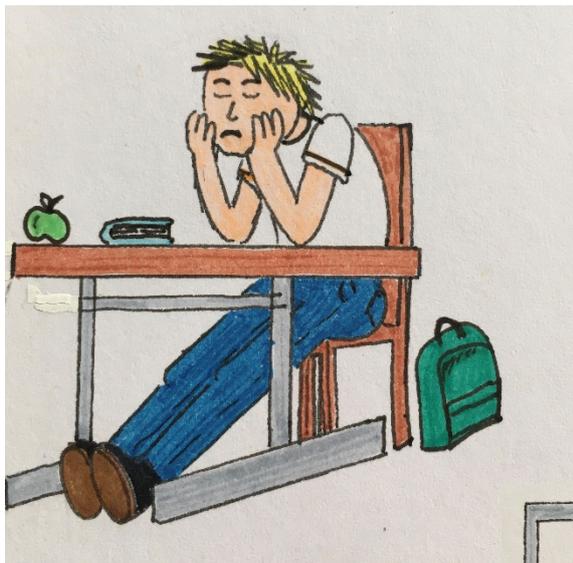


The relation between a teacher's quality of motivation and their autonomy-supporting classroom behaviour.

A Case study in secondary chemistry education.



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Abstract

In order to elucidate a possible connection between teacher's motivational profile and their observed autonomy-supportive behaviour in class, two chemistry teachers and their classes in the same school in secondary education have been studied. Teacher autonomy-supporting or thwarting behaviour was observed in class, teacher self-reported motivation was assessed through Self-Regulation Questionnaires, and semi-structured interviews were conducted with the teacher and their students. Since it is known that competence, autonomy and relatedness supportive teaching leads to more autonomous motivation, the focus of this research is on what the link is between the quality of motivation (the degree of autonomy defines the quality of motivation) and the competence, autonomy and relatedness supportive teaching that teachers show. Observing two teachers and interviewing both the students and the teachers, no definite conclusion could be made on what the link is between the teacher's quality of motivation and competence, autonomy and relatedness supportive teaching. This research does show that the research methods used do support each other. The observations and the interviews with both students and teachers used to measure competence, autonomy and relatedness behaviour do not contradict each other. Regardless of the research method, the same results were shown.

Introduction

Every teacher has experience with those students that lie back in their chairs and do not participate in class. This attitude is not only an annoyance for the teacher who has to deal with the class disturbances, but it is also a bad influence on the students themselves. For many students, this attitude of disengagement results in bad grades. Even worse, it might be leading to dropping out further on in their academic career, because they only have done the minimum to get by (e.g. Anderman, 1994; Gottfried, 2001; Peetsma, 2005; van der Werf, 2008; Wigfield, 2006). Some out-of-class variables, such as social and situational factors, have been identified as improving the motivation of students (Turner, 2006). Teachers also can influence the motivation of students in many ways: with stimuli like awards or bonuses to activate students, with different teaching methods, with a buddy system or with their behaviour.

A very large second-order metastudy has shown that 30% of the variance in students' achievements can be traced more or less directly to the teacher (Hattie, 2003). One of the effects of different teaching styles is the specific influence on the type of motivation that is fostered in the students. For example, Roth (2007) has studied the effect of teaching styles on students' intrinsic motivation, i.e. their inherent enjoyment of classroom activity. Vansteenkiste (2006) has found and described in the self-determination theory that students need motivation and that autonomous motivation is more effective than controlled motivation. Because autonomous motivation is less dependable on the surroundings of the activity, the person will enjoy it because of the activity itself and not because of the circumstances. The amount of autonomous motivation can be indicative of the quality of motivation. The more autonomous the motivation is the higher the quality. If the quality is lower than there is more controlled motivation.

Combining the outcome of these studies, it could be possible to change the motivation of students when teachers use autonomy-supportive teaching. In primary education, a study is done on the influence of a teacher's quality of motivation (Roth, 2007). In this study, it was found that autonomy supportive teaching can be linked to a teacher's higher quality of motivation. However, this research was never done in secondary education. Therefore, the research question is: "How does a teacher's quality of motivation translate into autonomy-supportive teaching?"

Theory

Before studying to what extent a teacher's high quality of motivation leads to autonomy-supportive teaching, there is a need to establish what is understood with both high quality of motivation and autonomy-supportive teaching.

To start with the latter, autonomy-supportive teaching is based on the Cognitive Evaluation Theory was presented by Deci and Ryan (1985) to make apparent what the factors in social contexts are that produce variability in intrinsic motivation. CET is considered a sub-theory of the self-determination theory (SDT; Deci & Ryan, 1985). CET has three fundamental psychological needs that need to be met in order to enhance intrinsic motivation (or for that matter, internalise extrinsic forms of motivation). These are competence, autonomy and relatedness (CAR; Ryan & Deci, 2000b; Vansteenkiste, 2006). These three dimensions complement each other and affect the general level of students' need for satisfaction (Connell & Wellborn, 1991).

The first dimension is competence; it is the need for structure versus chaos. Structure can be shown in optimal challenges, promoting feedback and freedom from demeaning evaluations (Ryan & Deci, 2000a; Ryan & Deci, 2002). It can be shown in step-by-step directions when answering questions on content to teach the students on their level in a structured way (Stroet, Opdenakker, & Minnaert, 2015). However, competence cannot stand on its own. When there is competence without autonomy, it is useless (Ryan & Deci, 2000a).

The second dimension, autonomy, is about thwarting versus support. Autonomy-supportive teaching is to include students' perspectives and help students to make a meaningful connection between their learning activities and their personal goals. In a controlled environment, assertions of power are used to overcome students' complaints (Stroet et al., 2015).

The third and final dimension is relatedness. This dimension is about involvement versus disaffection; everybody needs to connect and be accepted by others (Baumeister & Leary, 1995). This need can be satisfied with interpersonal relationships or by belonging to a social group (Stroet, 2015).

The next question is, why would anyone want high quality or autonomous motivation, and what does it mean? In short, it is not essential what the quantity of motivation is, what matters is the quality of motivation (Ryan & Deci, 2000b; Vansteenkiste, 2009).

The scale of motivation can be divided into two main categories: autonomous and controlled motivation. Within each category, there are three subcategories. Of the six subcategories, the most extremes are, on the low end, amotivation and, on the high end, intrinsic motivation (see Figure 1). The three subdivisions of controlled motivation are amotivation, external regulation and introjected regulation. Amotivation is the absence of motivation. External regulation means that motivation is driven by external demand or reward. For example, "I do my homework, because every time I hand it in, I get a higher bonus on my test". Introjected regulation means that the motivation is driven by the need to promote the ego of a person, to be the best or to enhance pride. For example, "I do my homework every day because then my teacher will think that I am the best". Autonomous motivation can be subdivided into regulation through identification, integrated regulation and intrinsic motivation. Regulation through identification means that the motivation is regulated by the personal value of the task and relevance. For example, "I do my homework because I want to learn something new". Integrated regulation means that the motivation is regulated by influences that are external but are integrated with a person's deepest values, pleasure and interest; it captivates. For example, "I do my homework because I enjoy doing chemistry".

Finally, there is the ultimate autonomous motivation: intrinsic motivation (Ryan & Deci, 2000a); this is the motivation that is internal and self-sufficient. As a rule, when looking at autonomous and controlled motivation, amotivation is the lowest quality of motivation and intrinsic is the highest quality of motivation. In other words, the more to the left in Figure 1, the lower the quality of motivation (controlled motivation), the more to the right, the higher the quality (autonomous motivation). The reason why to aim for a higher quality of motivation is that if the quality of motivation

is higher, it is less dependable on the circumstances of the activity (Cerasoli et al. 2014). To help students to stay motivated, it helps for them to have a higher quality of motivation.

Based on this theory, Vansteenkiste adapted the self-regulation questionnaire – academic (SRQ-A) (Vansteenkiste, 2009) to determine the quality of motivation easily. The questionnaire consists of sixteen simple questions. The four categories that are included in the questionnaire are external regulation, introjected regulation, identified regulation and intrinsic motivation. The difference between integrated regulation and intrinsic motivation is difficult to separate from each other with a self-reporting questionnaire; that is why integrated regulation is skipped in "The Academic Self-Regulation Scale".

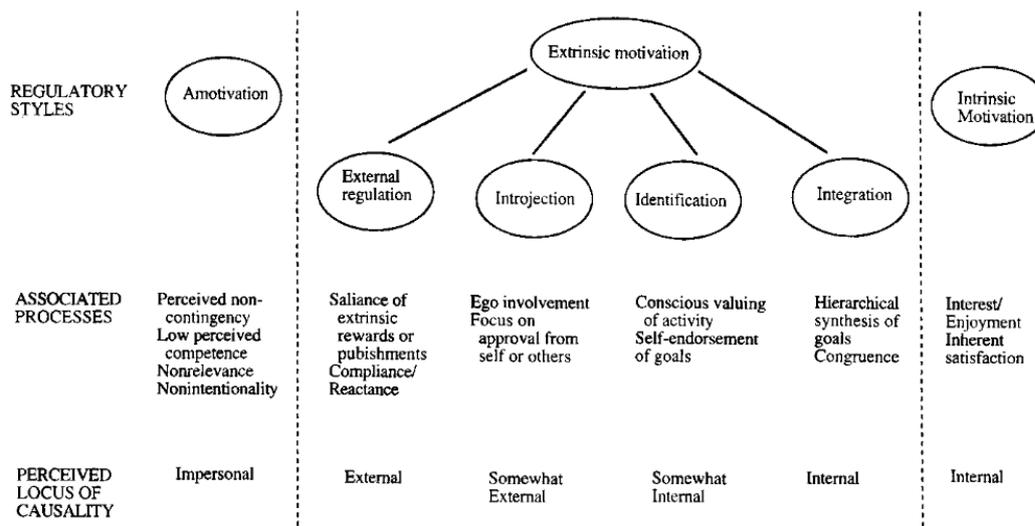


Figure 1: Quality of motivation as described by Ryan and Deci (2000a), the more to the left the lower the quality of motivation which is controlled motivation, the more to the right, the higher the quality of motivation which is more autonomous motivation.

The remark that CAR behaviour leads to a high quality of motivation (it moves to the right in Figure 1) by students is a consequence of the framework of SDT and CET (Roth et al., 2007; Richard M. Ryan & Deci, 2000b; Vansteenkiste et al., n.d.). This happens because CAR behaviour helps the students to integrate the extrinsic motivators. The teacher's high quality of motivation may also lead to CAR behaviour. Roth supports the hypothesis that autonomous motivation in teaching promotes autonomy-supportive teaching (Roth et al., 2007). He mentions three reasons why teacher's higher quality of motivation may lead to CAR behaviour. With one side note, because in Roth's research, he does not look at the relatedness aspect.

The first reason is that autonomously motivated teachers better understand the subjects they teach and have more various ways to teach. Autonomous motivation in a domain involves a deep understanding of the value of this domain (Ryan et al. 1993). Thus, teachers can teach a subject in different ways and also tune their teaching to the level of their students so that they may understand it better. This can be linked to CAR-behaviour, where it is stated that the structure and optimal instruction supports competence.

The second reason is related to the personal experience-based understanding of autonomous motivation and its benefits (Roth et al., 2007). If the teacher has experience with motivational moments, then the teacher may reflect this on the students and be able to help them experience a motivational moment. This may lead to a better understanding of the relevance of the topic and may help students to choose learning activities they find interesting. This can be linked to CAR-behaviour, where it is stated that the meaningful connections between the learning activities and personal goals support autonomy.

The third reason is that a deep understanding of the subject is more important than quick results (Roth et al., 2007). This could take the form of personal learning routes for students and different options to choose from, but what matters is that the quality of learning is high and not focused on the direct result. This can be linked to CAR-behaviour, as it is a mix of competence and autonomy.

In Roth's study, students and teachers got a questionnaire. For teachers assessing autonomous motivation for teaching, feelings of exhaustion, personal accomplishment, and social desirability bias. And for students, the questionnaire was assessing their perceptions of their teacher's autonomy supportive and competence-supportive teaching behaviours, as well as their autonomous motivation for studying the classes taught by that teacher. The analysis of this data led to the outcome that "autonomous motivation for teaching was positively related to students' perceptions of teachers as autonomy supportive and students' autonomous motivation of learning" (Roth et al., 2007). On the other hand "autonomous motivation for teaching was not significantly related to students' perceptions of their teachers as competence supportive" (Roth et al., 2007). What could be seen as a weaker part of Roth's research is that the data they collected are perceptions of students only and not data collected from different points of view. Therefore, this research has a broader setup, combining observations, student interviews and teacher interviews to see if the data obtained from different perspectives agree with each other. Also, the data collected from a different point can shed more light on the what and why of a perceived link.

Taken all this into account, the hypothesis for this study is that a teachers' high quality of motivation leads to competence-, autonomy- and relation supportive teaching.

Method

Participants

Five teachers (four male, one female) from 4 different schools partook in the initial questionnaire (by Vansteenkiste, 2009a). All of them teach students grades 10 till 12. Two teachers (both male) were selected for observation in parallel classes grade 11.

Measures

This study employed a mixed-method approach with judgment-sampling. In order to select two chemistry teachers, five chemistry teachers had been asked to fill out the adapted SRQ-A that showed their quality of motivation. The adapted SRQ-A by Vansteenkiste was chosen instead of the questionnaire of Connell and Ryan (1989) because it was a shorter questionnaire. However, it still provides a good overview of the quality of motivation of teachers. The questionnaire (Vansteenkiste & Sierens, n.d.) was adapted for teachers instead of students. The main change in all questions was that 'studying' was substituted with 'teaching chemistry'. The two questions that were further changed were question 14 and 15. The questions were written down for students and the way external factors influence them. Those questions were changed to be used with teachers and the external factors they might experience. For example, "because others (parents, teachers, etc.) oblige me to do so" was changed to "because others (family, friends, colleges, etc.) pressure me to do so. For all changes, see Appendix 1. The teachers were selected based on their relative score on the adapted SRQ-A. The relative score was calculated by dividing the autonomous motivation by controlled motivation. The higher the relative score, the more autonomous motivated the teacher is. This number helps to select the teachers because it shows more evident than just the outcome of the adapted SRQ-A.

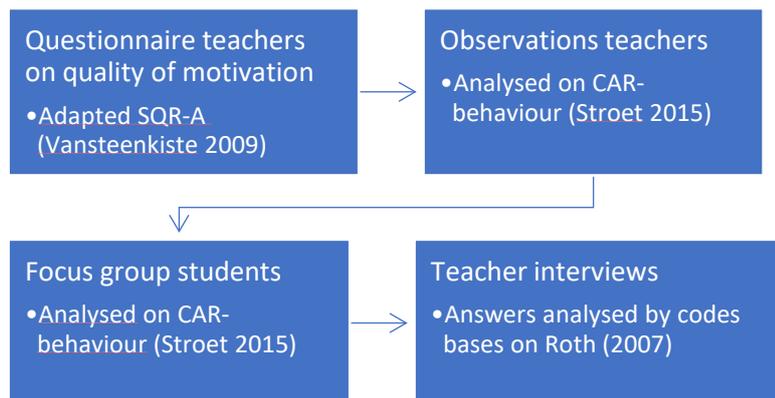


Figure 2: Schematic overview of the data collection.

The schematic overview of collecting the data is shown in Figure 2. Two teachers of the same school were selected based on their relative score of autonomous motivation versus controlled motivation. It was a coincidence that the teachers were from the same school. Both teachers were filmed during one lesson of 50 minutes, and afterwards, the students were asked if three or four would be willing to participate in a focus group of circa ten minutes. Both the lesson recordings and the focus group interviews were transcribed and analysed by using the categories made by Stroet (2015) (see Table 1). Every interaction during the lesson was coded for one of the subcategories (if possible). A mention of one of the main categories in the focus group (or underlying subcategory) was coded as one code. With the observation data and focus group data collected and analysed, the teachers were interviewed to obtain a better view of the mechanism. The data of the teacher interviews were analysed by using a coding system constructed based on the hypothesis, as mentioned above by Roth et al. (2007). The summarised version (see Table 2) is used for representing the data of the teacher interviews the results; the detailed version can be found in Appendix 2.

Table 1: Rating sheet 'Components of need-supportive teaching'. Taken from (Stoet et al. 2015)

Teachers' <u>autonomy support/thwarting</u>	
<p>Choice Creating opportunities for students to work in their own way and incorporating their interests, curiosity, or sense of challenge into the lesson.</p> <p>Fostering relevance Meaningfully connecting the learning activity to a goal that is of personal value to the student(s).</p> <p>Respect Listening and responding to students' feelings, thoughts, perspectives, and complaints.</p>	<p>Control Keeping possession of the learning material, providing solutions before students have time to reflect by themselves, exerting pressure, or disrupting students' natural rhythm by not allowing them to realise their action plans.</p> <p>Forcing meaningless activities Actively attempting to compel students to do things they find boring or meaningless or connecting the learning activity to an extrinsic goal.</p> <p>Disrespect Not allowing differences in opinion, complaints, or negative affect.</p>
Teachers' provision of <u>structure/chaos</u>	
<p>Clarity Clear organisation that includes communicating clear and consistent guidelines and being available when students have questions on task management (coded per lesson).</p> <p>Guidance Being available to answer questions on content (coded per lesson) and providing step-by-step directions when needed, thereby adjusting to the student(s).</p> <p>Encouragement Fostering non-competitive learning structures, fostering views that success in learning activities depends on internal controllable factors rather than inborn talent, and demanding effort.</p> <p>Informational feedback Providing constructive, non-comparative feedback focused on helping students gain control over valued outcomes.</p>	<p>No clarity No clear organisation or not being available when students have questions on task management (coded per lesson).</p> <p>No guidance Not being available to answer questions on content (coded per lesson) and clearly not monitoring or adjusting to students' level of comprehension.</p> <p>Discouragement Fostering competitive learning structures, fostering students' views that success in learning activities depends mostly on inborn talent, not demanding effort, or treating poor performance judgementally.</p> <p>Evaluative feedback Providing comparative feedback focused on evaluating students' performance, or feedback with a controlling locution, e.g.: "Good, you did just as you should".</p>
Teachers' <u>involvement/disaffection</u>	
<p>Affection Showing warmth, demonstrating interest, fostering a sense of connectedness by encouraging empathy and pro-social behaviour, and treating students fairly and as important</p> <p>Attunement Showing understanding of what is of importance for the students. Dedication of resources Being available to all students in class.</p> <p>Dependability Being available to offer support and showing commitment to students' learning.</p>	<p>Disaffection Talking in an unfriendly tone, showing lack of interest, communicating that students do not belong, or treating students unfairly and as unimportant.</p> <p>No attunement Showing no understanding of what is of importance for the students. No dedication of resources Not being available to (all) students, e.g. appearing occupied with other things or walking out of the classroom.</p> <p>No dependability Clearly not being available to offer support and showing no commitment to students' learning.</p>

Note: Components are coded per teacher-student interaction, unless indicated otherwise.

Table 2: Coding system teacher interviews based on the hypotheses extracted from Roth (2007) that are explained in the theory.

Insight on the value of the subjects leads to an explicit link between the subject and the real world.
Knowledge of the teacher leads to more autonomy for students.
The teacher supports students with CAR-behaviour.
The teacher is explicitly interested in extrinsic motivation
The teacher is interested in more in-depth learning as a result.

Results

The results of the teachers' SRQ-A are presented in Figure 2. It shows the results of the four categories of the SRQ-A for the five teachers. The goal of this SRQ-A was to distinguish between the high and low quality of motivation. 'Motivation is regulated by pleasure' and 'regulation through identification' are the two indicators of high quality of motivation, also called autonomous motivation. 'Introjected regulation' and 'externally regulated' are the two indicators of low quality of motivation, also called controlled motivation. Teacher D has a relatively high score on all categories, whereas teacher A, for example, only scores high in the categories for autonomous motivation. Teacher B has a high score on controlled motivation without the extra high score on autonomous motivation, as was the case with teacher D.

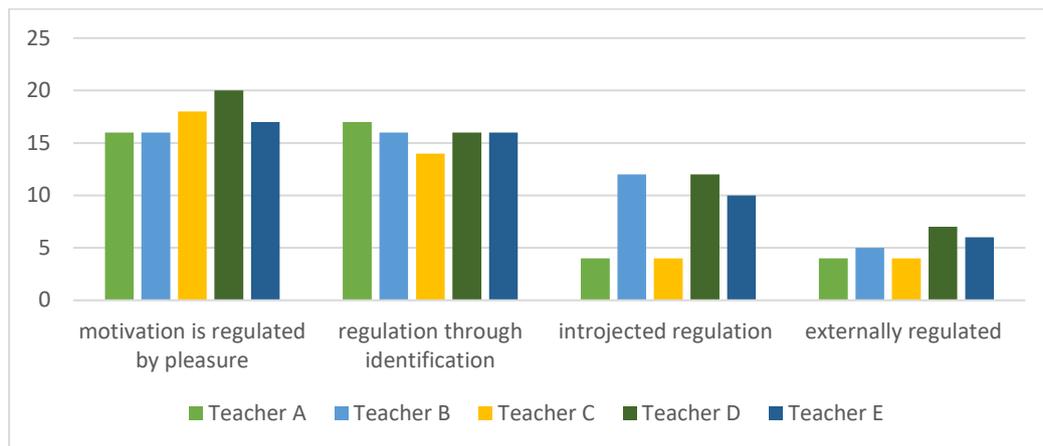


Figure 3: Outcome of the questionnaire of Vansteenkiste (2009). Each teacher's score was gathered in four categories of quality in motivation.

In order to compare the outcomes, the motivation index was calculated. If the index is above one, autonomous motivation is higher than controlled motivation. If the index is lower than one, this is the other way around. Figure 4 shows all motivation indexes of the five teachers. Teacher A and teacher C both have a higher index; the others have a lower index. All have a score above one that indicates that for all teachers, the score of autonomous motivation was higher than controlled motivation. Of the five teachers who partook on the questionnaire teacher A and teacher B were selected for the observations and interviews because they were the two with the highest and lowest motivation index.

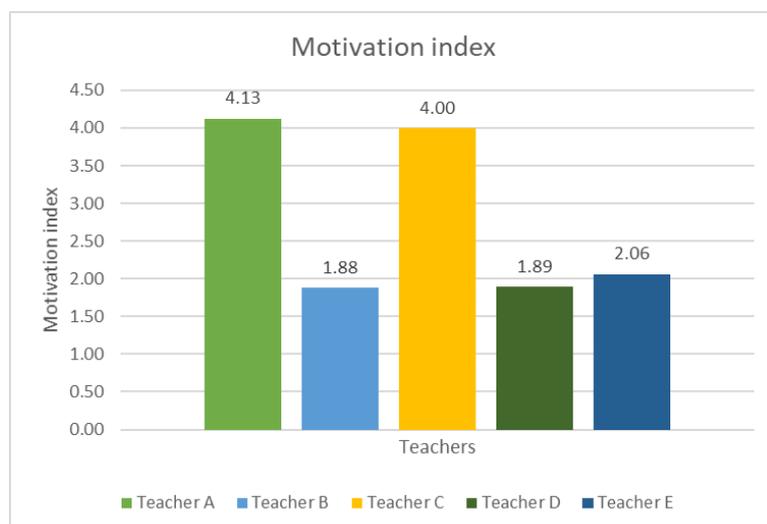


Figure 4: Motivation index of the teachers. The higher the index, the more autonomous motivated the teacher is.

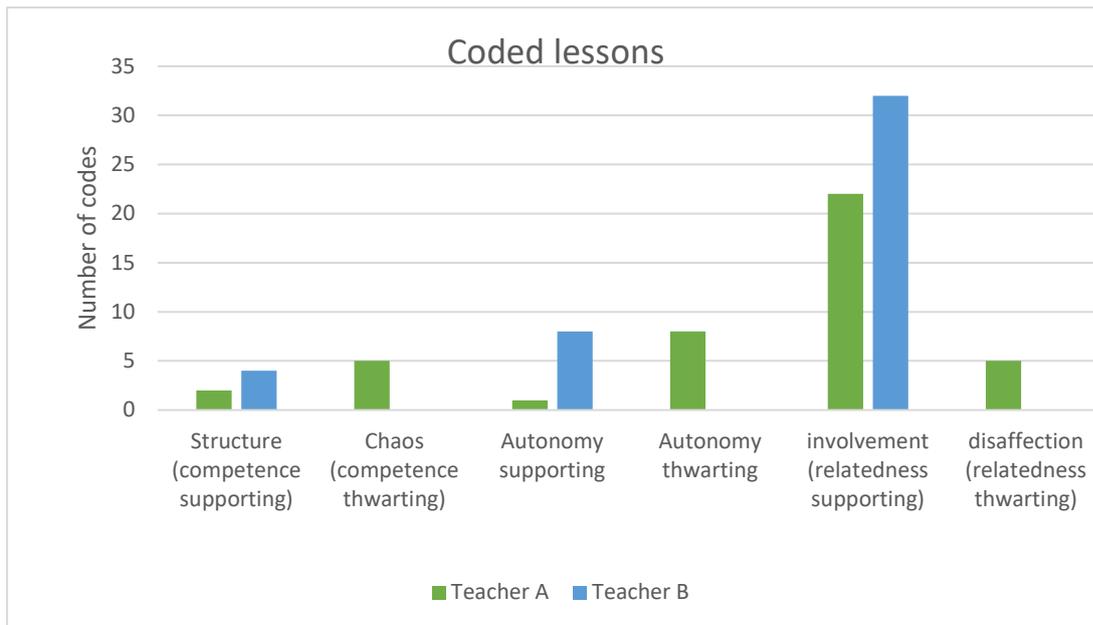


Figure 5: Results CAR-behaviour in the classroom. They are coded with 'Components of need-supportive teaching' (Stroet, 2015). Teacher A has codes in every category; teacher B only has codes in the supportive categories.

Figure 4 shows the coded observations from lessons from teacher A and teacher B. The observations of the behaviour of the teachers were categorised based on the coding scheme of Stroet (2015). Teacher A has both CAR-supportive and CAR-thwarting codes. Teacher B only has codes in the CAR-supportive categories. The highest number of codes is in the 'relatedness supporting' category, whereas 'relatedness thwarting' has the lowest number of codes compared to the relatedness supporting. It is the only category where teacher A scores higher in the supporting category than in the thwarting category. Competence has the lowest score in total; in this category, teacher A has the smallest difference between thwarting and supporting.

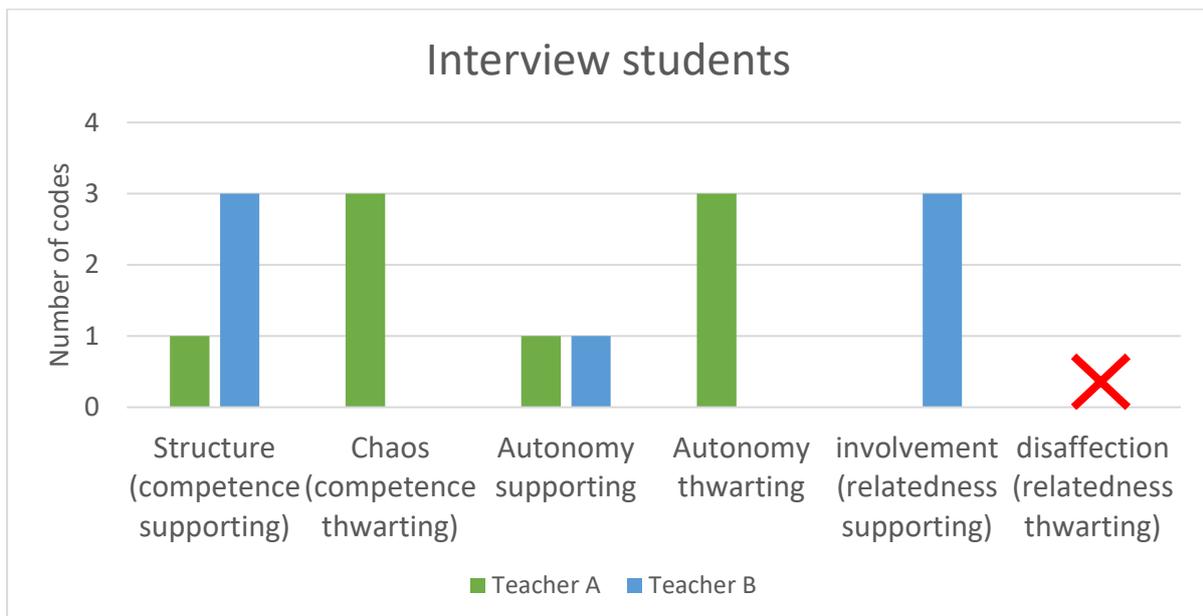


Figure 6: Results of students interviews on their teachers, coded with the main categories of 'Components of need-supportive teaching' (Stroet, 2015). None was coded in the Disaffection category. Teacher A has both supportive and hindrance codes. Whereas teacher B only has codes in the supportive categories.

Figure 5 shows the results of the interviews with the focus group with the students. Compared to the lessons (Figure 4), a similar pattern is seen. The students of teacher A identify autonomy-supportive and autonomy thwarting behaviour, most of the comments were on the autonomy thwarting behaviour. The students of teacher B identify only autonomy-supportive behaviour. The students did not mention relatedness thwarting.

The outcome of the classroom observations and the students focus group interview with the students do not contradict each other. With both methods, teacher A and teacher B both show the autonomy-supportive side, but only teacher A shows the autonomy thwarting side.

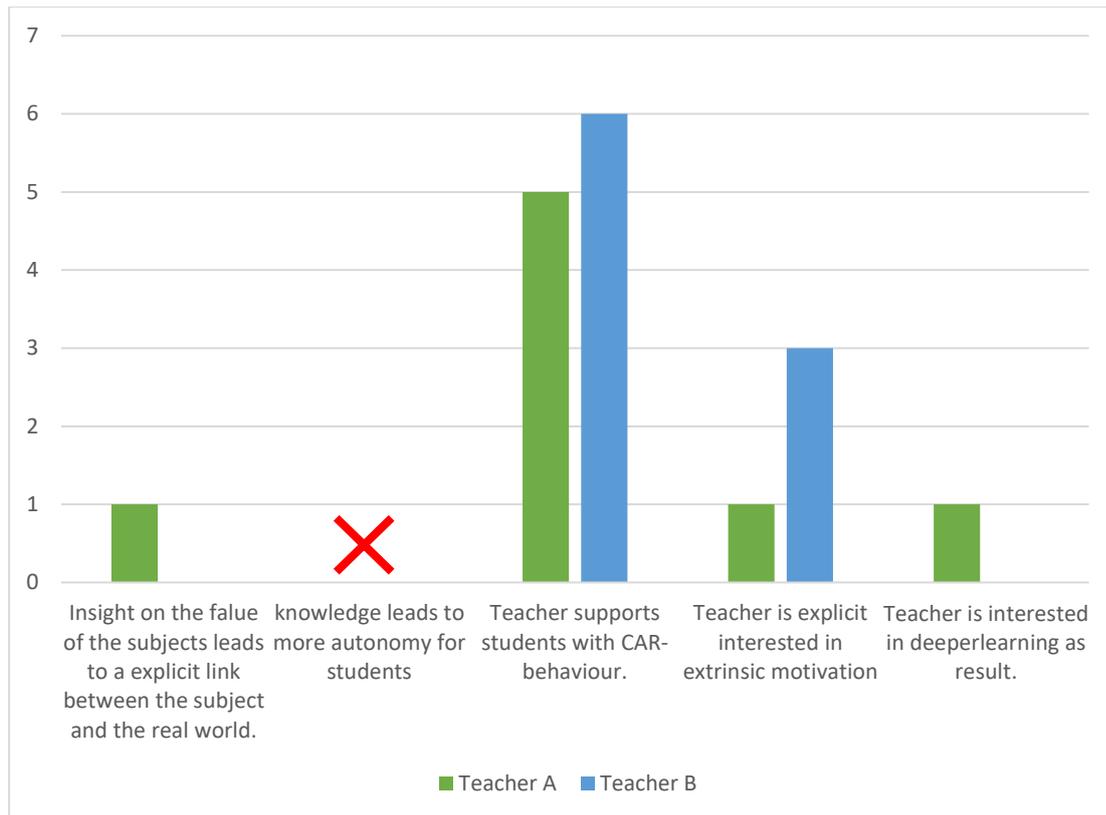


Figure 7: codes of the teacher interviews coded with a coding scheme based on the mechanisms Roth (2007) (see Table 2) implies. The codes are grouped in this figure; the raw data can be found in Appendix 3.

The interviews with the teachers were performed in order to get an impression of possible mechanisms based on the hypotheses proposed by Roth (2007). The actual coding scheme is more detailed than the overview seen in Figure 6, which presents binned data; the raw data can be found in Appendix 3. As we can see in Figure 6, the category "Teacher supports students with CAR-behaviour" has the highest score for both teachers. Consequently, both teachers do employ behaviour that can be characterised as CAR supporting. However, they do not mention that they know *from literature* that they need to give autonomy-supportive behaviour. Distinct is the finding that teacher B mentions that he uses or is interested in extrinsic motivators a few times, however, he only shows CAR supportive behaviour in the observations and interviews with students.

Conclusion

The research question "How does a teacher's quality of motivation translate into autonomy-supportive teaching?" with the hypothesis that "a teachers' high quality of motivation leads to competence-, autonomy- and relatedness supportive teaching" cannot totally be supported by this research. The teacher with high quality of motivation did not show a lot of CAR behaviour.

The contribution of this research is that the observations and the interviews with both students and teachers used to measure competence, autonomy and relatedness behaviour do not contradict each other. Regardless of the research method, the same results were shown.

Discussion

Limitations

An explanation as to why the connection between high quality of motivation and CAR behaviour is not as predicted could be because the adapted SRQ-A is a reflective and self-reporting instrument. With self-reporting, the view of the participant on their functioning plays a significant role; it is never totally reliable. To avoid this, interviews or observations could be used to avoid self-projection imaging.

Bias

As soon as the answers to the questionnaires came back, the data was anonymised and only shortly looked at to choose to observe teacher A and teacher B. At this time it was known what the quality of motivation was for either teacher. There was a long time between choosing the participants for the observations and the observations themselves. As a result of this time gap, the bias that the researcher knows which quality of motivation belonged to which teacher was circumvented.

The aim of the study

This study aimed to get an inside look into the mechanisms between the quality of motivation of the teacher and the CAR supportive behaviour. If a definite link could be found between them, teachers with high quality of motivation would have an easier job to inspire a more autonomous motivation in their students.

Further research

Further research could be done on this subject. There are three suggestions. Firstly, to use another way to measure the teachers' quality of motivation, e.g., use their General Causality Orientation as a measure. Secondly, to scale up the research to a larger number of participants and have both teachers and students fill out SRQ-A. Thirdly, to use teachers from a variety of school subjects to make sure that the outcome is not dependable on the school subject.

Thanks to ...

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Appendices

Appendix 1

Originele vraag	Aangepaste vraag
Vraag 14: ...anderen (ouders, vrienden, leerkrachten, ... me hiertoe verplichten).	anderen (familie, vrienden, collega's, ...) druk op mij uitoefenen om dit werk te doen.
Vraag 15: ...anderen (ouders, vrienden, leerkrachten, ...) me hiertoe verplichten.	anderen (familie, vrienden, collega's, ...) mij dit werk opleggen.

Appendix 2

Underneath stands the coding scheme based on Roth (2007), used for the teacher interviews.

- Inzicht in de waarde van het vak leidt tot een expliciete link tussen lesstof en het dagelijks leven/leefwereld van de leerlingen.
- Didactische kennis leidt tot meer autonomie voor de leerlingen
- Vakkennis leidt tot meer autonomie voor de leerlingen
- Geeft de leerlingen bewust autonomie (op basis van een motivatietheorie/ervaring)
- Geeft de leerlingen bewust competentie (op basis van een motivatietheorie/ervaring)
- Geeft de leerlingen bewust relatie (op basis van een motivatietheorie/ervaring)
- Expliciet geïnteresseerd in cijfers van leerlingen als resultaat
- Expliciet geïnteresseerd in dieper leren van leerlingen als resultaat
- Noemt expliciet extrinsieke motivatoren

Appendix 3

Raw data from the teacher interviews; the colours show which questions were put together.

	Teacher A	Teacher B
Inzicht in de waarde van het vak leidt tot een expliciete link tussen lesstof en het dagelijks leven/leefwereld van de leerlingen	1	
Didactische kennis leidt tot meer autonomie voor de leerlingen		
Vakkennis leidt tot meer autonomie voor de leerlingen		
Geeft de lln bewust autonomie (op basis van een motivatietheorie/ervaring)	2	3
Geeft de lln bewust competentie (op basis van een motivatietheorie/ervaring)	2	2
Geeft de lln bewust relatie (op basis van een motivatietheorie/ervaring)	1	1
Expliciet geïnteresseerd in cijfers van leerlingen als resultaat	1	1
Expliciet geïnteresseerd in dieper leren van leerlingen als resultaat	1	
Noemt expliciet extrinsieke motivatoren		2