International Journal of Educational Research Open 6 (2024) 100331

Contents lists available at ScienceDirect

International Journal of Educational Research Open

journal homepage: www.elsevier.com/locate/ijedro

What need-supportive and need-thwarting teaching behaviors do university teachers use in their honors classes? An observational study

Tineke Kingma [a,b,*], Anneke Smits [b], Debbie Jaarsma [a,1], Joke Voogt [c]

[a] Department Wenckebach Institute, University Medical Centre Groningen, Hanzeplein 1, GZ, Groningen 9713, the Netherlands
[b] Department of Movement and Education, Windesheim University of Applied Sciences, Campus 2-4, CA, Zwolle 8017, the Netherlands
[c] Department of Child Development and Education, University of Amsterdam, Nieuwe Achtergracht 127, WS, Amsterdam 1018, the Netherlands

ARTICLE INFO

Keywords:
Teaching behaviors
Self-determination theory
Observation tool
Instructional patterns
Video-observations
Honors education

ABSTRACT

Teacher classroom behavior is an important factor in student learning and motivation. Past research within higher education has primarily concentrated on identifying teaching behaviors that teachers and students deem important in honors classrooms. Yet, what specific teaching behaviors either support or thwart the needs of students in real-world honors classrooms is currently not clear. This study, which utilizes video observation, sheds light on teaching behaviors that either support or thwart students' needs, as viewed through the lens of self-determination theory, within the context of Dutch honors education. We developed an observation tool to analyze video recordings of 12 lessons from four different teachers, and identified the types of behaviors making up the various dimensions of need-supportive and need-thwarting behaviors. We found nine types of behaviors that had not previously been identified in observational studies. Structure-providing behaviors were the most common need-supportive behavior, while need-thwarting behaviors always occurred alongside need-supportive behaviors. The observation tool introduced here can be used for further study of teaching behaviors in honors education practice. These results also make an important contribution to teachers' further professionalization and instructional practices.

1. Introduction

Teaching behavior in the classroom is critical for student learning (Schneider & Preckel, 2017). Teaching behavior involves instruction, connecting with students, and responding to their interests and needs (Muijs & Reynolds, 2017; OECD, 2020). Teachers can motivate or demotivate their students during the learning process through their teaching behavior. Although we know a great deal about the effectiveness of particular forms of instruction, such as giving lectures, small-group discussions, brainstorming, or asking questions (Brewer & Burgess, 2005), much less information is available about actual teaching behavior in higher education practice. Previous empirical studies looking at teaching behavior, primarily conducted in secondary schools (Aelterman et al., 2019; Hornstra et al., 2021; Stroet et al., 2013) and to a limited extent in higher education (Gucciardi et al., 2020; Vermote et al., 2020), have usually emphasized self-report methods. Observational studies are a vital addition to these studies because of their high ecological validity (Haerens et al., 2013; Van Doren et al., 2023). They provide the opportunity to capture information about real-life examples of behaviors in different combinations and stages in actual classroom situations, rather than perceived information (Haerens et al., 2013; Van Doren et al., 2023). In addition, these concrete observations of teacher behaviors can help train honors teachers in higher education for their role (Gaudin & Chalies, 2015; Haerens et al., 2013; Lemke, 2007; Van Doren et al., 2023).

Through their teaching behavior, teachers support or hinder the satisfaction of their students' basic psychological needs: autonomy, competence, and relatedness (e.g., Ryan & Deci, 2017). *Autonomy* is the feeling of control over one's own actions, experiences, thoughts, and behavior (e.g., Deci & Ryan, 2000; Haerens et al., 2013; Ryan & Deci, 2017). *Competence* is defined as feeling confident about one's abilities to achieve the desired goals (e.g., Haerens et al., 2013; Ryan & Deci, 2017), and *relatedness* is experiencing a sense of belonging and respect (e.g., Deci & Ryan, 2000; Haerens et al., 2013; Ryan & Deci, 2017). Meeting these basic needs is a necessary condition for intrinsic motivation (Deci & Ryan, 2000), which contributes to deep learning, continuing growth,

* Corresponding author at: Department Wenckebach Institute, University Medical Centre Groningen, Hanzeplein 1, GZ, Groningen 9713, the Netherlands.
E-mail address: t.kingma@umcg.nl (T. Kingma).
[1] Present address: Faculty of Veterinary Medicine, Utrecht University, Yalelaan 7, CL, Utrecht 3584, The Netherlands.

https://doi.org/10.1016/j.ijedro.2024.100331
Received 19 June 2023; Received in revised form 17 January 2024; Accepted 24 January 2024
Available online 13 February 2024

well-being, and better performance (Deci & Ryan, 2000; Orsini et al., 2015). Teacher behavior plays an important role in the satisfaction of the students' basic needs in education.

Previous research has shown that teachers simultaneously exhibit various need-supportive and need-thwarting teaching behaviors in their lessons (Aelterman et al., 2019; Van den Berghe et al., 2013). The blend of teaching behaviors students encounter influences their motivation and performance (Deci & Ryan, 2000). To date, only a small number of observational studies on need-supportive and need-thwarting teaching behaviors have been conducted in secondary schools and secondary vocational institutions, and not in higher education (Cents-Boonstra et al., 2020; De Meyer et al., 2014; Haerens et al., 2013; Jang et al., 2010; Jiang et al., 2019; Reeve et al., 2004; Van den Berghe et al., 2013, 2016).

This study was conducted in a 4-year bachelor's degree program at a Dutch institute of higher professional education (University of Applied Sciences). The program in question is an honors program that selects students based on a motivation letter and an intake interview. The program aims to create an educational environment where teachers nurture students' intrinsic motivation through need-supportive teaching behaviors. This study aims to shed light on the need-supportive and need-thwarting teaching behaviors of teachers in honors education. Honors education is designed to educate students who are intrinsically motivated, inquisitive, have a profound desire for knowledge (Wolfensberger & Offringa, 2012), and are eager to tackle challenges (Scager et al., 2014). Students appreciate teachers more who are demanding, challenging, and inspiring (Wolfensberger & Offringa, 2012). Empirical studies on teaching behaviors in honors education are scarce (Scager et al., 2014; Wolfensberger, 2012). We are not aware of any observational studies in the classroom of honors education. Therefore, we developed an observation tool for analyzing videos of actual lessons in honors education. Our research question was as follows: What need-supportive and need-thwarting teaching behaviors do university teachers in honors education demonstrate during their classes?

2. Theoretical background

We used self-determination theory (SDT) to identify relevant teaching behaviors in honors education. When students experience more need-supportive teaching behavior from their teachers in class, their intrinsic motivation increases, and so does their engagement, self-regulation, learning, performance, well-being, and self-confidence (Deci & Ryan, 1985, 1987, 2000; Jang et al., 2010; Niemiec & Ryan, 2009; Reeve, 2009; Reeve & Jang, 2006; Ryan & Deci, 2017; Vansteenkiste et al., 2012). In contrast, as students experience more need-thwarting teaching behavior from their teachers in class, their intrinsic motivation decreases (Ryan & Deci, 2020), and their learning becomes more routine (Assor et al., 2005; Deci & Ryan, 1987, 2000; Niemiec & Ryan, 2009; Reeve & Tseng, 2011; Soenens et al., 2012; Van den Berghe et al., 2013). SDT proposes several types of motivation (Deci & Ryan, 1985, 2000) that can be placed along a continuum from high (intrinsic motivation, integrated and identified regulation) to low (introjected, external regulation, and amotivation). The level of motivation depends primarily on how students experience and evaluate the satisfaction of their needs for autonomy, competence, and relatedness (Deci & Ryan, 2000).

2.1. Dimensions of need-supportive teaching behavior

Teachers who exhibit need-supportive teaching behaviors support their students' intrinsic motivation (Skinner & Belmont, 1993). They appreciate the students' perspective (Reeve, 2009; Ryan & Deci, 2020). They engage in autonomy support (supporting the need for autonomy), providing structure (supporting the need for competence), and teacher involvement (supporting the need for relatedness). Table 1 shows an overview of the basic needs and need-supportive teaching behaviors. In order to support autonomy, teachers try to understand, acknowledge and respond to their student's individual interests, perspectives, preferences and initiatives (Niemiec & Ryan, 2009; Reeve, 2009; Ryan et al., 2023). For example, they do so by soliciting students' input regarding their interests and lesson contents (Cents-Boonstra et al., 2020), by providing students with options in assignments, or providing tasks that align with their goals or interests (Assor et al., 2002; Patall et al., 2010), and by using inviting, non-controlling language (Jiang et al., 2019; Reeve, 2009) such as "You might consider …". However, when teachers give choices in irrelevant and uninteresting tasks (Assor et al., 2002) or by using verbs like "you must" or "have to" choose (Sarrazin et al., 2006), choices can also feel like pressure (Ryan et al., 2023), and become need-thwarting.

Table 1
Basic needs and dimensions of need-supportive and need-thwarting teaching behaviors.

Basic needs	Dimensions	
	Need-supportive teaching behavior	Need-thwarting teaching behavior
Autonomy	Autonomy support	Control
Competence	Providing structure	Creating chaos
Relatedness	Teacher involvement	Cold teaching

By providing structure before and during class, teachers support students in their need for competence (Haerens et al., 2013). For example, they do so by being clear about what they expect from their students (Sierens et l., 2009; Vansteenkiste et al., 2012). They also offer challenging tasks (Niemiec & Ryan, 2009; Reeve, 2009; Reeve et al., 2004) such as an open or complex assignment, give feedback (Mouratidis et al., 2008), and explain why particular knowledge is of use or relevant (Assor et al., 2002; Ingram, 2012; Reeve & Jang, 2006; Skinner & Belmont, 1993). When teachers help students in recognizing the long-term relevance of their learning students are likely to be more engaged in learning activities and, as a result, perform better in demonstrating their competence (Vansteenkiste et al., 2006). However, students become frustrated when they feel overchallenged by complex tasks or expectations that are too high (Scager et al, 2014). Thus, structure, not to be confused with control, provides helpful informational support through clarity of goals and guidelines (Aelterman et al., 2019). With the help, guidance, and feedback students need, they can make progress and feel competent. Good structure scaffolds learning when students encounter challenges, combined with positive guidance and feedback to grow and help when obstacles are encountered (Ryan et al., 2023). It is a challenge for teachers to find the right balance between supporting autonomy and providing structure (Vansteenkiste et al., 2012) to meet the diverse needs, interests and abilities of students Scager et al. (2017).

Teachers who show that they are involved with their students meet their students' need for relatedness and a sense of belonging. Students can experience a sense of belonging by, for example, feeling socially comfortable in classroom interactions, academically respected and heard, and feeling interpersonally connected to their peers and the teacher (Brekelmans et al., 2000; Ingram, 2012). Involved teachers display an open attitude and a personal interest in and concern for their students (Ryan & Deci, 2017). The student's needs for relatedness calls for teachers to know their students' concerns (e.g., Niemiec & Ryan, 2009). It also necessitates fostering positive academic connections between students, for instance during collaboration on a project (Ingram, 2012). It is important for teachers to be aware of the influence that their facilitation of positive peer interactions has on their students' sense of social belonging (Ingram, 2012). Fulfilling the need for relatedness contributes to student engagement and well-being (Ryan & Deci, 2000).

2.2. Dimensions of need-thwarting teaching behavior

Teachers who demonstrate need-thwarting teaching behavior may hinder their students' intrinsic motivation (Bartholomew et al., 2011; Van den Berghe et al., 2013). They are less responsive to students' perspectives (Soenens et al., 2012) and more distant (Aelterman et al., 2019; Brekelmans et al., 2000). Teachers can thwart students' basic needs by being controlling and pressuring students to behave, by creating a chaotic environment without information and guidance, and by having cold interactions with their students that lead to feelings of loneliness and alienation (Deci & Ryan, 2000; Haerens et al., 2013; Ryan et al., 2023; Van den Berghe et al., 2016). Table 1 provides an overview of need- thwarting teaching behaviors.

Through both direct and indirect control, teachers may thwart their students' need for autonomy (Assor et al., 2005; De Meyer et al., 2014; Haerens et al., 2015; Reeve, 2009; Van den Berghe et al., 2013; Vansteenkiste et al., 2005). Controlling teachers take the lead and steer their students' thoughts, feelings, and actions in a particular direction (Assor et al., 2002). For example, they may use commanding language (Assor et al., 2005) such as "You have to meet all the criteria." They may push students towards a single correct answer (Sarrazin et al., 2006) or may not allow any criticism (Assor et al., 2002). Controlling teacher behavior may indirectly induce feelings of guilt, shame, or fear (Soenens et al., 2012) for example through a statement such as: "If you are not able to pass this simple test, you are not fit for this profession."

Teachers who create a chaotic learning environment may thwart satisfaction of their students' need for competence (Ryan & Deci, 2017). They do so through unclear lesson objectives and by giving too few rules or too little information about what they expect from their students (Reeve, 2009; Van den Berghe et al., 2013). They also adopt a laissez-faire approach (Aelterman et al., 2019).

Finally, by being unfriendly, impatient, and distant towards their students, teachers may hinder satisfaction of their students' need for relatedness (Ryan & Deci, 2017; Van den Berghe et al., 2013). They do so, for example, by ignoring or excluding students (Skinner & Belmont, 1993).

2.3. Observable teaching behaviors

Studies of teaching behaviors from the perspective of self-determination theory have previously been carried out in primary and secondary schools, with a focus on student perceptions of teaching behavior (Stroet et al., 2013) and self-reports from both students and teachers (Aelterman et al., 2019; Hornstra et al., 2021). Self-reports have also been obtained from teachers in higher education (Vermote et al., 2020). Using a vignette-based self-report questionnaire, this study focused on how teachers perceived their motivating and demotivating teaching styles (i.e., autonomy support, structure, control, and chaos) and the possible antecedents of their style (i.e., motivation and mindset). They aimed to gain insight into how these teaching practices are interrelated and form a cyclical structure within higher education.

In earlier research, need-supportive and need-thwarting teaching behaviors were viewed as opposites (Jang et al., 2010). Later studies have shown that teachers combine both need-supportive and need-thwarting teaching behaviors in their lessons (Aelterman et al., 2019; Vermote et al., 2020). However, these studies of teaching behavior have provided little insight into concrete teaching behavior in class. Observational studies of teaching behavior have mainly been conducted in a laboratory setting (e.g., Deci et al., 1994; Reeve & Jang, 2006). Only a limited number of observational studies have been conducted in authentic teaching situations, often in secondary schools and secondary vocational institutions (Cents-Boonstra et al., 2020; De Meyer et al., 2014; Haerens et al., 2013; Jang et al., 2010; Jiang et al., 2019; Van den Berghe et al., 2013, 2016). In this study, we complement the existing experimental and self-report studies by conducting video observations in authentic honors education teaching settings.

3. Methods

3.1. Research design

We conducted an observational, descriptive study, with observations based on video recordings. Video recordings render teaching behaviors visible (Haerens et al., 2013; Hennink et al., 2010; Noordegraaf & Wester, 2018), have high ecological validity (Haerens et al., 2013), and enable further review of the data (Klette & Blikstad-Balas, 2018). It is possible to precisely describe teaching behavior in authentic educational practice through video observation (Haerens et al., 2013; Van Doren et al., 2023).

3.2. Context, sample, and procedure

The 25 teachers and 250 students of this honors program form a close-knit community. Each class has 3 h of lessons in the morning or afternoon, and students work independently or in groups for the rest of the day on lesson-related assignments. This structure ensures that focus on the day's lesson topic is maintained.

Teachers were informed about the study's purpose in a team meeting, after which the specific information was sent by email. Four teachers expressed their willingness to participate. In individual agreements, it was then decided which three lessons and which classes would be filmed. We opted for several lessons per teacher to obtain as varied a picture as possible of different teachers' need-supportive and need-thwarting teaching behaviors. We also decided to record lessons in different classes and weeks to minimize random factors (e.g., the time of day or unexpected situations; Cents-Boonstra et al., 2020). These 12 lessons formed a convenience sample (Marshall, 1996). The first author informed students about the study during class, 1 week before the first recording. All participating teachers and students took part voluntarily and signed an informed consent form. Confidentiality was guaranteed for teachers and students.

The observed teachers had 6 to 25 years of higher education teaching experience and 2 to 10 years of honors teaching experience. They taught first or second-year students in the course units on Organizational Behavior, Project Management, Global Challenges, and Statistics, focusing on knowledge, understanding, and application. The sizes of the observed classes ranged from 16 to 20 students.

3.3. Data collection

Data were collected between October 2019 and January 2020. A video camera with robotic support (SWIVL) was set up at the back of the class and followed the teacher's movements. This setup meant the teacher was always in the frame, while students were filmed mainly from behind. The teachers wore a transmitting microphone around their neck, including during the coaching discussions with smaller groups of students. The use of the SWIVL camera meant that no adjustments to the classroom setup were required. The study was approved by the ethics committee of the University of Amsterdam under the number 2019-CDE-11252.

3.4. Data analysis

3.4.1. Unit of analysis

Previous observational studies of teaching behaviors frequently opted for the time-sampling method, in which observations were made at 5-minute time intervals (Cents-Boonstra et al., 2020; Haerens et al., 2013; Van den Berghe et al., 2013) or during a single specific lesson phase, for example, the beginning of the lesson (Van den Berghe et al., 2016). The disadvantage of this approach is that the interactions between the teacher and students become fragmented.

To avoid fragmentation, we opted for instructional patterns as the meaningful unit of analysis in this study, as this gave us a better

understanding of the relationship between teaching behaviors and the method of instruction. We used Brekelmans et al. (2000), Holt et al. (2006), and Kember (1997) as a starting point for describing some general information about the three main groups of instructional patterns in order to delineate the roles of students and teachers in the classroom context. These groups of instructional patterns are teacher-centered patterns, teacher-student interactive patterns, and student-centered patterns.

Through carefully watching the videos, we found the features of the five instructional patterns we used for the analysis (see Table 2). We distinguished the different instructional patterns by when a teacher switched to a distinctively different form of instruction. For example, the teacher might begin by giving an explanation, and then switch to a group assignment. In order to distinguish the instructional patterns that were operating, the first two authors examined one recorded lesson for each teacher, and identified types of instructional patterns. Table 2 below gives an overview of the features of the instructional patterns we found in the video recordings.

Each instructional pattern was established by the beginning of a different pattern, a break, or the beginning or end of a lesson. We found that each instructional pattern lasted 10 to 15 min on average before a transition occurred. Teachers alternated between the different instructional patterns several times in their lessons and made sure to use all three groups of instructional patterns. The video data were analyzed using ATLAS.ti software (Friese, 2019). In the next phase of the coding, each teaching behavior code could be assigned a maximum of one time within a single instructional pattern.

3.4.2. *Developing the observation schedule*

To develop the observation schedule, we built on existing SDT observation schedules from educational sectors outside higher education (Haerens et al., 2013; Jiang et al., 2019; Morgan, 2006; Van den Berghe et al., 2013). We supplemented them with descriptions of teaching behavior from experimental, self-report, and lab studies from various educational contexts (Aelterman et al., 2019; Gucciardi et al., 2020; Reeve, 2009; Scager et al., 2014; Stroet et al., 2013). Working with existing (validated) SDT observation schedules made it possible to compare teaching behaviors found in other contexts (Klette & Blikstad-Balas, 2018). This initially resulted in a long list of descriptions of need-supportive and need-thwarting teaching behaviors, some of which overlapped. Table 3 shows the final observation schedule for the types of need-supportive teaching behaviors, and Table 4 shows the types of need-thwarting teaching behaviors.

Table 2
Features of instructional patterns.

Instructional patterns	Features of instructional patterns
Teacher-centered	
Instruction and explanation of theory	The teacher explains the concepts. The teacher asks questions to check comprehension. The teacher elaborates on the students' answers. The students' input is brief and confined to comprehension. The teacher initiates and manages the discussion in class.
Teacher-student interactive	
Dialogue with the class	The teacher encourages students to ask questions and share experiences. The teacher elicits and stimulates different students' input and opinions. Students provide a lot of their own input. A mutual, learning-oriented dialogue takes place. The initiative for interaction sometimes rests with the teacher and sometimes with the students.
Student presentations	Student groups present the results of their group work. The teacher gives feedback and invites the class to ask questions or add something. The teacher manages the discussion in class.
Student-centered	
Group coaching	Students work together on their project in desk groups. The teacher coaches the groups on their project's progress in various rounds. The teacher sits down with each group while coaching. Students share the progress of their project work with the teacher and can say what they want to discuss. The teacher gives feedback on the points made by the students. The initiative for what is discussed rests with the students.
Independent work	Students work on a task individually, in pairs, or in groups. The teacher walks around, offering help and answering questions from students where necessary.

After recoding the first video per the modified observation schedule, the first author coded the behaviors from a recorded lesson by a different teacher. The second author then independently coded 20 % of the instructional patterns already coded by the first author. The authors then discussed the teaching behaviors codes where they did not agree. Together, they decided whether a code for a teaching behavior and the corresponding description were correct, should be modified or removed, or whether a new, inductive code was required. After agreement was reached, the first author adjusted the observation schedule, reviewed the previously coded lesson recordings, and recoded the first and second lesson recordings using the modified schedule. This process was repeated for the first lesson recording for the remaining teachers. After four coding sessions across four different recordings, the observation schedule was finalized, and the first author coded the behaviors from the remaining eight recordings using the definitive observation schedule.

Table 3 shows the definitive observation schedule for the types of need-supportive teaching behavior, with a description of the behavior and an example. The observation schedule consists of six existing and six new, inductively generated codes for providing structure (S2, S3, S5, S7, S8, S11), five existing and one new code for teacher involvement (I4), and eight existing codes for autonomy support. We had to adapt existing codes and descriptions to the honors education context. Based on the video recordings, addressing students by their first name (I1) was identified as a teacher-involvement behavior. Other studies have identified it as a type of structure-providing behavior (e.g., Gucciardi et al., 2020; Haerens et al., 2013). The note to the table indicates whether a code is deductive or inductive and what the deductive sources are.

Table 4 shows the definitive observation schedule for the types of need-thwarting teaching behavior, with a description of the behavior and an example. The observation schedule consists of five existing, one new inductively generated control code (C5), and two existing and one inductively generated cold teaching behavior code (col3). No teaching behaviors that created chaos were found in the video recordings. The note to the table indicates whether a code is deductive or inductive and what the deductive sources are.

4. Results

The results of the study are described in Sections 4.1 and 4.2. Section 4.1 discusses the frequency of occurrence of the different dimensions of need-supportive and need-thwarting behavior. Section 4.2 describes the types of autonomy support, structure providing, teacher involvement, control, and cold teaching behaviors observed in the video recordings.

Table 3
Observation schedule for types of need-supportive teaching behaviors.

Code	Description	Example
	Types of autonomy support	
A1 Encourages diverse responses [d, a, 4]	Encourages students to provide diverse responses and makes suggestions that require them to engage in higher level thinking [a, 4]	"What strategies could you have if you have any risk? So not necessarily the rain, but what else can you do?"
A2 Encourages asking questions [d, a, 5]	Encourages students to ask questions or seek clarification [5]	"Let's start with a very basic thing: do you have questions yourself about the budget?"
A3 Fosters interest in learning [d, 6]	Promotes students' feelings of enjoyment, sense of challenge, and curiosity during engagement in an activity [6]	"Actually, this is interesting because what you are defining is what we discussed in lesson one about world news: define how you would take a look at the world. No question. So your cultural identity … "
A4 Expresses high expectations [d, a, 7]	Expresses trust to students that they can do it, expresses high expectations	"No doubt you are very eager to know how we'll do this one."
A5 Fosters value of student's contribution [d, a, 6]	Reflects on the meaning and value of the student's approach to the next step in the student's project while leaving the student's options open [a, 6]	"Everything that you do extra now is sort of helpful for your project. But it also adds to the workload that you feel each week right now. So if you feel that you are busy, then I think you can find an explanation here in your own schedule."
A6 Offers choices to the students [d, 1]	Creates meaningful choices and options for students to take the initiative during learning activities Provides choices in the order of exercises, chooses tasks students perceive as interesting and important	"You can choose the option of making a micro-documentary … or it could be a micro-fiction story … or some of you could go for a micro-animation. I don't know."
A7 Offers students the opportunity to bring in their own experiences [d, a, 1]	Offers students the opportunity to bring in their own experiences and/or problems, to practice independently, to experiment, to exercise, and to solve problems on their own, without interfering [a, 1]	"Now, let's talk about exam preparation. You all did one exam already. How did you prepare for the previous research exam? … Any other approaches?"
A8 Uses non-controlling language [d, 6]	Uses communications that minimize pressure and conveys a sense of choice and flexibility with the use of "can," "could," or "may" [6]	"I can't really give you a real number. So I would say about scope and quality, I would expect, for example, five indicators. So not only for the final product. You want to keep track of if we are moving in the right direction."
	Types of structure provided	
S1 Gives an overview of the lesson [d, 1]	Gives an overview of the content and structure of the lesson and how the different assignments fit into the whole lesson [2]	"I will explain some theory today. The new theory will be about issues and risk: risk analysis and risk management. However, the largest part of this lecture will be to discuss the draft work you have handed in."
S2 Asks questions to check understanding [i]	Asks coaching/learning-focused questions to provide a short answer in order to check if students know and/or understand what has been discussed and explained	"If we are doing a test, there are typically four steps. What are the four steps of significance testing?"
S3 Asks for attention [i]	Focuses on getting the students' attention	"Can I have your attention again?"
S4 Offers help during exercises [d, 1]	Supports students in their tasks or exercises when working independently [2]	" … So, what you see here [showing on the student's laptop] is that Catholics have the highest mean, Protestants have the middle mean, and mixed has the lowest mean."
S5 Provides an explanation [i]	Gives an explanation, examples, explains the how	"So, if we wanted to look at this graphically, this would be the null hypothesis. The data distributions of the three groups are all around the same mean."
S6 Provides clear expectations [d, a, 1]	Establishes clear expectations, instructions, and requirements for how to fulfil a task or what steps to take	"For each plot that you make, apply the appropriate options. So I want to be able to read it. It has to have a label, and it has to get a number, it has to be referenced in the text … "
S7 Provides feedback on where to go next [i]	Gives feedback focused on the process of learning to show the gap between the present and the future Orients feedback on where to go next (feed-forward)	"… in this example, you should add subtasks… Because now it breaks down into too many different activities that don't have much to do with each other …. So, in your case, the quickest way to have a correct Work Breakdown Structure is to have four levels: results, tasks, some of your tasks have subtasks, and then come to the activities. In your overview, sub-tasks and activities are somewhat mingled."
S8 Provides own opinion to elaborate on concepts [i]	Refers to own judgement or belief (regarding central concepts)	"I'll tell you something about it, so that you are aware of it because sometimes people still use it. However, if you ask me, you are better off not using it."
S9 Provides a rationale [d, a, 1]	Offers a rationale for tasks or exercises Explains the why Explains and clarifies future professional meaning [2]	"And I think it is good to include the workshops because I feel that the guide and the closing event in itself with the current expectations is not a full semester of five credits in the project. So I think you need an additional line of action."
S10 Offers positive feedback [d, 1]	Shows appreciation for students' efforts, persistence, opinions, improvement, or performance without further explanation or information	"Okay, so that makes sense."
S11 Shows a video [i]	Shows a video to illustrate the discussed subject	"What I would like to do is to show you a short YouTube about what we call observation inference, or you could say interpretation."

(*continued on next page*)

Table 3 (*continued*)

Code	Description	Example
S12 Uses students' work as example [d, a, 1]	Uses students' work as an illustration	"Another group in another class has sort of changed their topic into awareness about food sustainability. And I asked them to reach out to you."
	Types of teacher involvement	
I1 Addresses students by their first name [d, 1]	Addresses students by their first name	"Thory, you had a question?"
I2 Shows enthusiasm and eagerness [d, a, 1]	Shows passion for the subject or the student's contribution	"We're just seeing noise and action, so that is okay."
I3 Shows respectful listening [d, a, 1]	Shows respectful listening behavior and is responsive to student input/criticism/ questions	"No, so that is a good question."
I4 Shares personal experiences [i]	Shares personal experiences to illustrate or explain the topic of the lesson or as an introduction	"And this is a funny anecdote. I started to save energy last year with my daughter. And I became like my grandma: turn off the light, turn off the water, don't shower every day. … So we started a hard campaign … We saved a lot of energy. And I got a letter from the energy company. And they wanted to come to check if I had manipulated the energy use. So it is not like: well done... No, you woman."
I5 Shows empathic behavior [d, a, 1]	Asks how students are doing and shows interest in students' feelings Shows care and concern for the students Makes contact with the group Takes the student's perspective into account [a, 1]	"My worry is a bit that you only have …. you have so many activities already right now in this semester."
I6 Uses humor [d, a, 3]	Shares a joke or instance of relativization with the students	"I want to get rid of the exam altogether…. But not next week."

Note. [d] deductive code
[i] inductive code
[a] adjusted code. Numbers refer to empirical studies. Descriptions without a letter or a number were defined by the authors. [1] Haerens et al. (2013). [2] Van den Berghe et al. (2013). [3] Morgan (2006). [4] Aelterman et al. (2019). [5] Gucciardi et al. (2020). [6] Jiang et al. (2019). [7] Scager et al. (2014).

4.1. Dimensions of need-supportive and need-thwarting teaching behaviors

Table 5 presents how often the dimensions of need-supportive and need-thwarting teaching behaviors were observed, given as their percentage of the total number of coded teaching behaviors.

The table shows that the within the need-supportive dimensions of teaching behavior, providing structure occurred twice as often as teacher involvement and autonomy support. In addition, the dimensions of need-thwarting teaching behavior (control and cold teaching) accounted for 11 % of the observed teaching behaviors.

Fig. 1 gives an overview of the occurrence of the different dimensions of need-supportive and need-thwarting behavior during the different instructional patterns. The figure shows the occurrence of the five instructional patterns on the left side and the occurrence of the use of each dimension of need-supportive and need-thwarting behavior across each instructional pattern on the right side.

The comparatively most frequent use of the three dimensions of need-supportive behaviors (autonomy support, providing structure, and teacher involvement) was in teacher-student interactive instructional pattern of dialogue with the class and in the student-centered pattern of group coaching. The comparatively most frequent use of the two dimensions of need-thwarting behaviors (control and cold teaching) was in instruction and explanation of theory (teacher-centered) and independent work (student-centered).

Table 4
Observation schedule for types of need-thwarting teaching behaviors.

Code	Description	Example
	Types of control	
C1 Uses controlling language [d, 3]	Uses words like "should," "have to," "must," or "got to," and "need to" to direct students' behavior [a, 3]	"…You have to use the dataset …"
C2 Displays impatience [d, a, 1]	Does not give students enough time to answer or answers the question themself	"Other things you would like to share? Because otherwise, I would like to suggest that you have your break here, and then we'll do the last part."
C3 Does not accept criticism [d, a, 1]	Does not accept criticism or the student's perspective	"Teacher says 'Be interactive.'" [The student makes a critical remark. Teacher has no reaction and immediately turns to the screen.]
C4 Suppresses students using guilt [d, a, 1]	Suppresses students by inducing feelings of guilt, anxiety, and shame [2]	[Student asked a question. Teacher gestures: take a moment to think.]
C5 Stresses efforts needed to pass the exam [i]	Stresses which efforts are needed in order to pass the exam	"And I ask you this because I would like you to be able to mention them or explain them during the exam."
C6 Uses extrinsic motivation sources [d, a, 3]	Uses extrinsic sources of motivation such as incentives, consequences, directives, and deadlines	"I will walk you shortly through assignment C. The first thing about assignment C is that the deadline in the course manual is the day before we have the last lecture."
	Types of cold teaching	
Col1 Does not pay much attention to the students [d, 1]	Does not react to group struggles, shows a lack of care, and concern for students	[Students share a personal example in their group work. The teacher stands by the group, does not react, and walks away.]
Col2 Is distracted by activities [d, 1]	Checks the phone or walks out of the classroom to talk with a student or colleague	[Teacher only looks at their cell phone and does not see what is happening in class.]
Col3 Offers irrelevant feedback [i]	Offers no or irrelevant feedback	[The student asks a question. The teacher doesn't answer the question but makes a remark irrelevant to the question.] "… the pronunciation is not good."

Note. [d] deductive code
[i] inductive code
[a] adjusted code. Numbers refer to empirical studies. Descriptions without a letter or a number were defined by the authors.
[1] Van den Berghe et al. (2013). [2] Aelterman et al. (2019). [3] Jiang et al. (2019)

Table 5
Dimensions represented in teaching behaviors.

Dimension of need-supportive and need-thwarting teaching behavior	Percentage of the total number of coded teaching behaviors ($N = 1509$)
Autonomy support ($n = 312$)	21
Providing structure ($n = 699$)	46
Teacher involvement ($n = 339$)	22
Control ($n = 103$)	7
Cold teaching ($n = 56$)	4

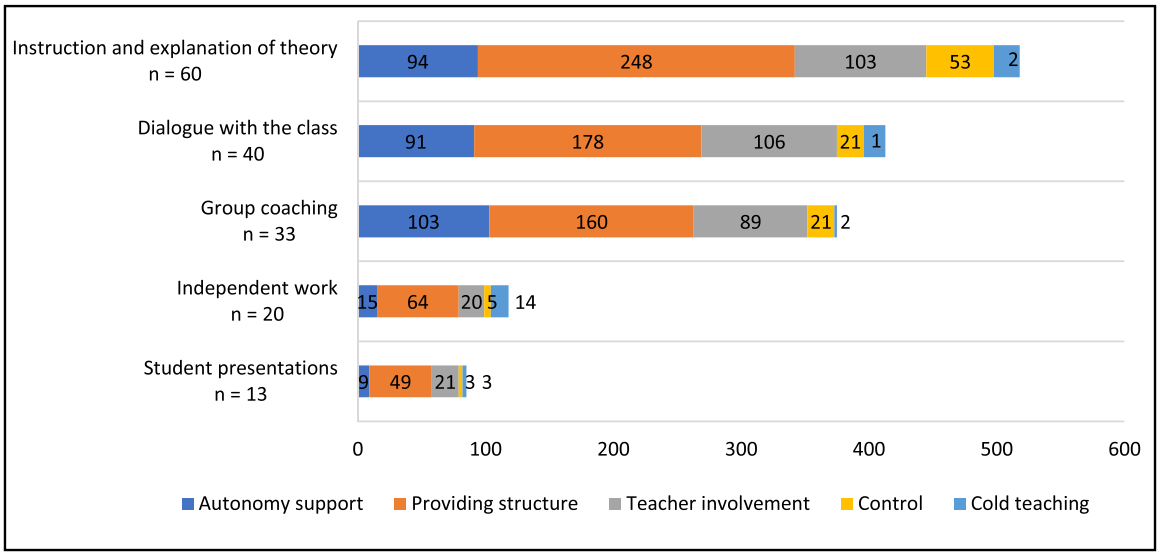

Fig. 1. Occurrence of the use of the dimensions of need-supportive and need-thwarting teaching behavior during each type of instructional pattern ($N = 166$).

The teacher-centered pattern of instruction and explanation of theory ($n = 60$) was the most often used instructional pattern, followed by dialogue with the class (teacher-student interactive; $n = 40$) and group coaching (student-centered; $n = 33$). Teachers demonstrated all the dimensions of need-supportive and need-thwarting teaching behaviors during all five instructional patterns, albeit in different ratios.

Structure-providing behaviors were the main behaviors exhibited during all instructional patterns. Teachers showed comparatively the most autonomy support during the student-centered group coaching pattern. Moreover, the teacher-student interactive patterns (dialogue with the class and student presentations) and the student-centered group coaching pattern showed comparatively the most teacher involvement. Concerning need-thwarting teaching behavior, teachers exhibited control mainly during the teacher-centered pattern of instruction and explanation of theory. They exhibited cold teaching mainly during the student-centered independent work pattern.

4.2. Types of need-supportive and need-thwarting teaching behaviors

The teachers displayed eight types of autonomy-supportive behaviors (see Fig. 2). A particular code could be assigned only once per instructional pattern. Autonomy support mainly aimed at promoting students' input, because promote students' input seems a more natural collocation. They did this by *encouraging students to ask questions* (during 40 % of the 166 observed instructional patterns) and by *encouraging diverse responses* (36 %). In addition, teachers provided autonomy support by *fostering interest in learning* (28 %), for example, by pointing out articles for students to do further reading themselves or websites where they could follow current developments relating to the profession.

The teachers displayed 12 types of structure-providing behavior (see Fig. 3). A particular code could be assigned only once per instructional pattern. They did so mainly through two new, inductively generated codes: *providing an explanation* (in 92 % of the instructional patterns) and *asking questions to check understanding* (72 %). In addition, teachers offered structure through *positive feedback* (64 %) in the form of "good" or "okay," but without further explanation. These three structure-providing behaviors often occurred together. When the lesson topic related to applying and demonstrating professional skills, they relatively often exhibited other teaching behaviors. Among these were *providing a rationale* (43 %) as to why the skill in question was crucial for developing one's professional conduct or giving *feedback on where to go next* (a new code; 23 %) or *providing clear expectations* (40 %).

The teachers displayed six types of teacher involvement behaviors (see Fig. 4). A particular code could be assigned only once per instructional pattern. The video recordings showed that teachers displayed this behavior primarily through *respectful listening* (in 74 % of the instructional patterns). The other types of teacher involvement behaviors were shown less often. For *empathic behavior* (40 %), teachers asked the students how they were. Teacher involvement was also shown by *addressing students by their first name* (36 %) and through the new, inductively

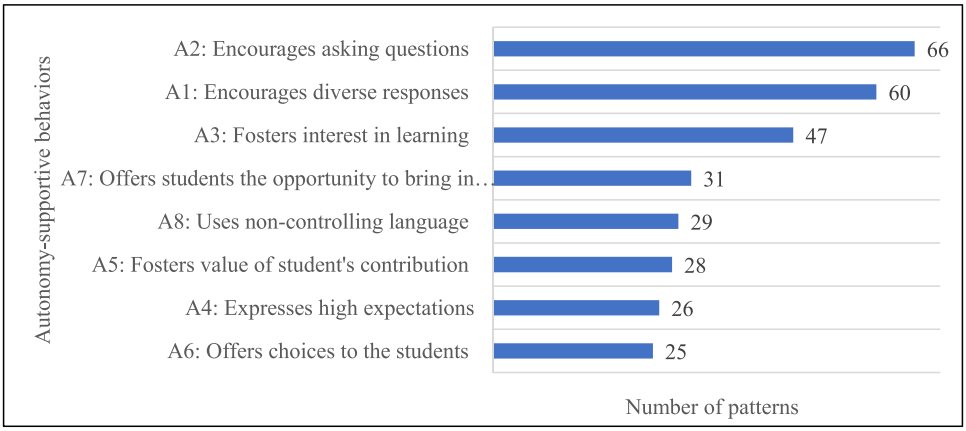

Fig. 2. Types of autonomy-supportive behaviors and number of instructional patterns in which they occurred ($N = 166$).

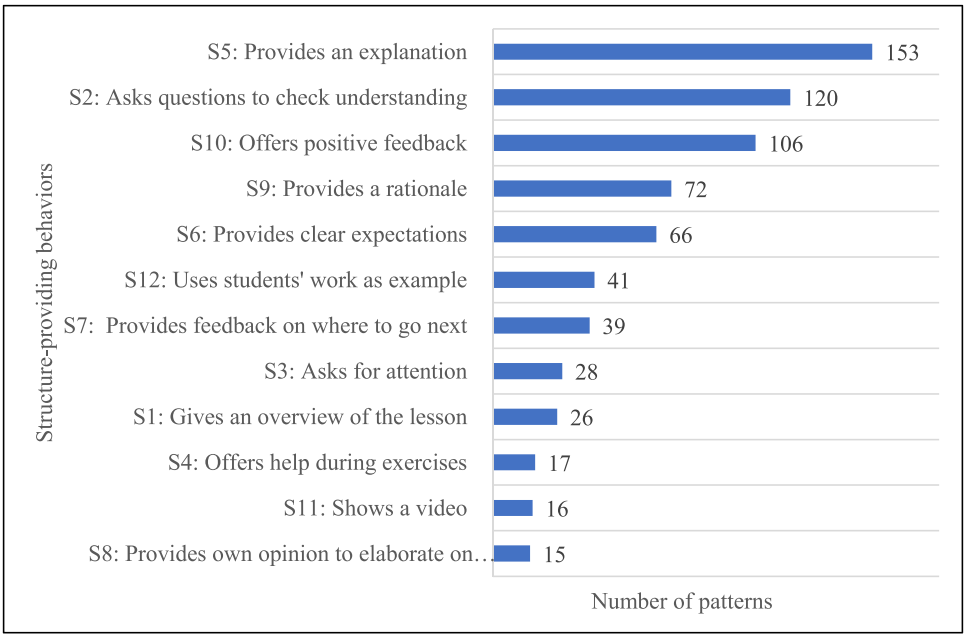

Fig. 3. Types of structure-providing behaviors and number of instructional patterns in which they occurred ($N = 166$).

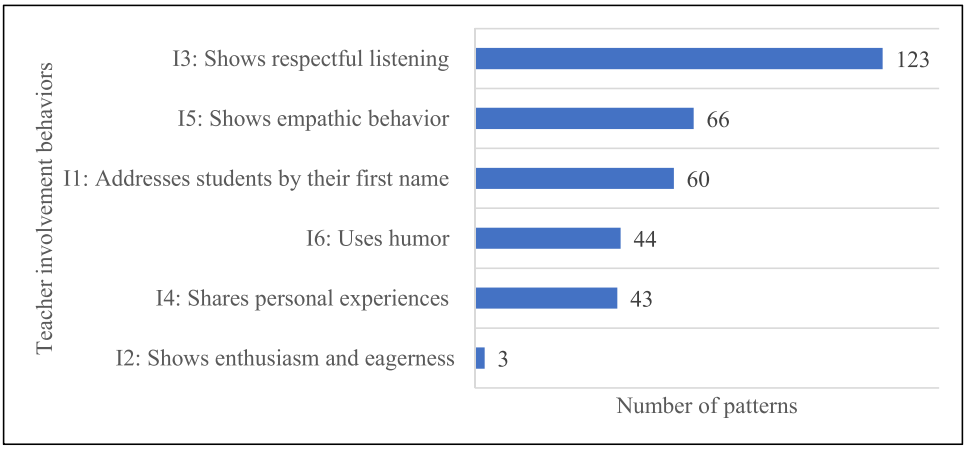

Fig. 4. Types of teacher involvement behaviors and number of instructional patterns in which they occurred ($N = 166$).

generated code-*sharing personal experiences* (26 %).

The teachers displayed six types of control behaviors and three types of cold teaching behaviors, albeit to a limited extent (see Fig. 5). A particular code could be assigned only once per instructional pattern. Cold teaching behavior was mainly demonstrated by *not paying much attention to the students* (in 28 % of the instructional patterns). The

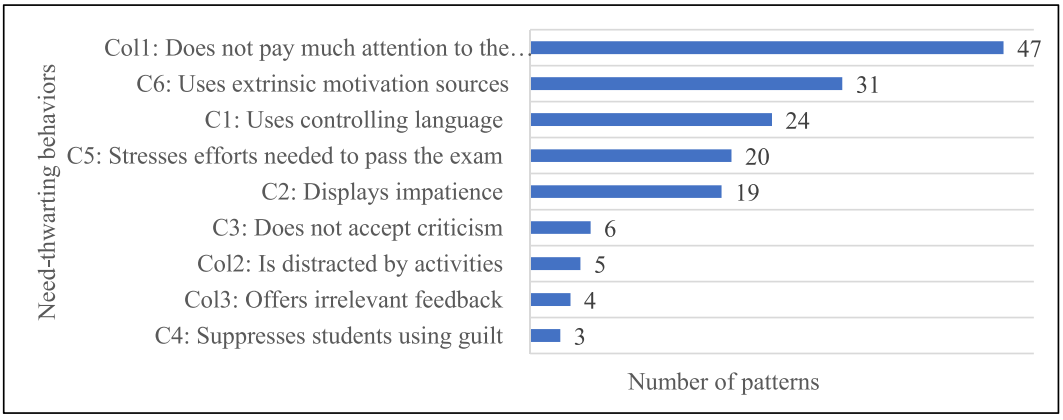

Fig. 5. Types of need-thwarting behaviors and number of instructional patterns in which they occurred ($N = 166$).

behavior in the video recordings showed that teachers did not always notice that a student had raised their hand, for example, because they were looking at the information on the board. Teachers mainly showed direct control behaviors by *using extrinsic motivation sources* (in 19 % of instructional patterns), *using controlling language* (14 %), through *stressing efforts needed to pass the exam* (new code; 12 %), and through *impatience* (11 %). The new cold teaching behavior code *offers irrelevant feedback* (2 %) was barely seen.

5. Conclusion and discussion

The research question for this study was as follows: What need-supportive and need-thwarting teaching behaviors do university teachers in honors education demonstrate during their classes? We gained insight into these behaviors by using the observation tool.

5.1. Need-supportive and need-thwarting teaching behaviors

The critical finding concerning the need-supportive teaching behaviors is that teachers were twice as likely to exhibit structure-providing behaviors as autonomy support and teacher involvement. Given the presence of a much larger arsenal of structure-providing behaviors compared to those seen in secondary and secondary vocational education, we can conclude that these honors education teachers differed in their focus on supporting their students' need for competence. Teachers in honors education supported the need for autonomy and relatedness equally, in contrast to previous studies in secondary schools and secondary vocational institutions, where proportionally less autonomy support and more teacher involvement were shown (Cents-Boonstra et al., 2020; Van den Berghe et al., 2013). One explanation may be that the teachers in this study worked with a mix of instructional patterns that focused on students' input and direction regarding their learning process. It is not known how need-supportive and need-thwarting teaching behavior are related to instructional patterns in secondary and secondary vocational education, as our study is the first to use instructional patterns as the unit of analysis.

As in previous studies (Van den Berghe et al., 2013), we saw in our study that the teachers were much more likely to show need-supportive teaching behavior than need-thwarting teaching behavior. Need-thwarting teaching behaviors occurred to a limited extent, and only in combination with one or more need-supportive behaviors. An explanation for the limited use of control approaches, in particular, could be found in the wide range of structure-providing behaviors that might render control unnecessary. Cold teaching by *not paying much attention to the students* was especially common in independent work, which seems logical, as students were working by themselves.

In this study, we identified some other teacher behaviors that were not found in previous observational studies in other types of education (secondary schools/secondary vocational schools). Based on the observations we made using the observation tool, we also noticed that the relationships between the different dimensions of honors education teaching behaviors differed from those in other types of education. The present study is, therefore, an addition to existing studies.

5.2. Constructing the observation tool

One outcome of this study was the development of a valuable tool to observe need-supportive and need-thwarting teaching behaviors in honors education. For such a tool to have content validity, it must be based on tools from previous observational studies, supplemented by findings from experimental, self-report, and lab studies (Patton, 2015). The tool's reliability was supported by an intensive inter-coder process in which codes were deleted, tightened, and supplemented for the honors education context. This resulted in tightening 26 existing codes and identifying nine new codes for teaching behaviors in honors education.

The supplementary and tightened codes for honors education mainly show broadening of the arsenal of structure-providing behaviors that teachers exhibit compared to previous observation tools. Two structure-providing behaviors not described in previous studies (in secondary schools and secondary vocational institutions) are noteworthy: *providing an explanation* and *asking questions to check understanding.* This may have been because some studies in secondary schools and secondary vocational institutions have continued to work with the existing validated list developed by Haerens et al. (2013) or Van den Berghe et al. (2013). The number of structure-providing codes was also limited in a secondary school study by Jiang et al. (2019), in which a new, validated observation schedule was developed. We made our observations in a completely different context, adding new structure-providing codes where necessary.

Another salient feature was the further breakdown of feedback that teachers in this study provided both *positive feedback* and *feedback on where to go next* (feed-forward). However, this feature was not reported in previous observational studies of teaching behaviors. Observational studies in secondary schools and secondary vocational institutions only distinguished positive feedback (praise) in the form of compliments and confirmations (Haerens et al., 2013; Jiang et al., 2019; Morgan, 2006; Van den Berghe et al., 2013), and constructive and non-constructive feedback as extremes on a bipolar scale (Jang et al., 2010). This might be caused by a change within higher education from a test culture to a feed-forward culture to prepare students for learning how to deal with the increasing complexity of the labor market (Sluijsmans & Segers, 2018). Feed-forward provides students with information about how they performed a task and how they can improve further (Hattie & Timperley, 2007), rather than whether or not the task has been accomplished.

The other new codes for structure-providing behavior involved different ways of explaining concepts. The video recordings were made with first- and second-year students at the end of semester 1, when they were still in their program's initial phase. A cognitive basis is often laid in the early years of a program. Structure-providing behaviors support the need for competence. This might explain why teachers exhibited many (different) structure-providing behaviors in the observed lessons.

The teaching behaviors aimed at autonomy support and teacher involvement were also seen in observational studies in secondary schools (Haerens et al., 2013; Reeve et al., 2004; Van den Berghe et al., 2013, 2016) and secondary vocational institutions (Cents-Boonstra et al., 2020). The only newly generated code for teacher involvement was *shares personal experiences* in the lesson. On the other hand, previous self-report studies in secondary schools (Aelterman et al., 2019; Vansteenkiste et al., 2012) and higher education (Vermote et al., 2020) often did not include teacher involvement.

A new control behavior, i.e., *stresses efforts needed to pass the exam,* was added to the need-thwarting behaviors. We did not find this code in secondary school and secondary vocational studies. This may have been because the recording occurred at the end of the semester. Previous studies have also identified teaching behaviors that contributed to chaos (Cents-Boonstra et al., 2020; Van den Berghe et al., 2013). However, we did not encounter this type of teaching behavior in the present study. Perhaps the broad arsenal of structure-providing behaviors prevented chaos from occurring.

5.3. Analytical lens

Previous observational studies frequently opted for the time-sampling method with observations at 5-minute time intervals (Cents-Boonstra et al., 2020; Haerens et al., 2013; Van den Berghe et al., 2013) or during a single specific lesson phase (e.g., the beginning of the lesson; Van den Berghe et al., 2016). These studies did not link their observations to specific types of instruction. Observational studies of whole lessons are also scarce (Lemke, 2007). In our study, we observed whole lessons and used instructional patterns as the unit of analysis within those lessons. This approach can avoid the fragmentation that

characterizes other observational studies. Our approach sheds light on the combinations of need-supportive and need-thwarting teaching behaviors within the authentic, meaningful context for these behaviors (i.e., specific types of instruction as part of whole lessons). Identifying a behavior within recognizable instructional patterns allows teachers to gain better insight into it. We recommend that subsequent observational studies analyze teaching behaviors in instructional patterns within whole lessons to do justice to the richness of the instructional context.

5.4. Strengths and limitations

A strength of this study is that it has produced an observation tool to shed light on need-supportive and need-thwarting teaching behaviors in honors education. A further strength is the choice to use instructional patterns as the unit of analysis. The tool we developed offers concrete elaborations of teacher behavior in honors education and can therefore be used as a point of reference in the professional development of honors education teachers regarding need-supportive and need-thwarting teaching behavior. This can be viewed as an extension of the emphasis on knowledge dissemination in training, and the potential for a more student-centered or learner-oriented approach to teaching.

The number of observations and their situation within a specific higher education context, i.e., honors education, is a limitation of this study. The four teachers who were observed each taught three lessons at the end of the first semester to relatively homogeneous groups of first- and second-year honors students at a single institute. The lessons were on subjects with a cognitive orientation, focusing on knowledge and application. Therefore, it is impossible to generalize the results to all higher education programs. However, the results do suggest directions for follow-up studies in other higher education contexts. Follow-up research with the observation scheme that was developed could be conducted with different groups of higher education students, during different semesters or academic years, and in lessons with different types of higher education learning objectives (such as forming judgments, communication, and learning to learn). This would allow broader conclusions to be drawn about the specific teaching behaviors of teachers in higher education and the typical relationships between the various need-supportive and need-thwarting dimensions. The observation tool and analysis based on instructional patterns could be used for this purpose, and, where necessary, expanded.

5.5. Concluding remarks

In this study, we presented qualitative research on need-supportive and need-thwarting teaching behaviors. Although there is a vast body of knowledge based on self-reports about teaching behavior in different teaching fields, observational studies in higher education based on video recordings are scarce. This study is an important addition to the self-report studies and the observation tool that we developed can help to train honors and higher education teachers for their role.

Funding

This work was supported by the Netherlands Initiative for Education Research (NRO) [NRO project number 405-15-602].

CRediT authorship contribution statement

Tineke Kingma: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Validation, Writing – original draft, Writing – review & editing. **Anneke Smits:** Conceptualization, Formal analysis, Methodology, Validation, Writing – review & editing. **Debbie Jaarsma:** Conceptualization, Methodology, Supervision, Writing – review & editing. **Joke Voogt:** Conceptualization, Methodology, Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

Aelterman, N., Vansteenkiste, M., Haerens, L., Soenens, B., Fontaine, J. R. J., & Reeve, J. (2019). Toward an integrative and fine-grained insight in motivating and demotivating teaching styles: The merits of a circumplex approach. *Journal of Educational Psychology, 111*(3), 497–521. https://doi.org/10.1037/edu0000293

Assor, A., Kaplan, H., Kanat-Maymon, Y., & Roth, G. (2005). Directly controlling teacher behaviors as predictors of poor motivation and engagement in girls and boys: The role of anger and anxiety. *Learning and Instruction, 15*(5), 397–413. https://doi.org/10.1016/j.learninstruc.2005.07.008

Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good, but relevance is excellent: Autonomy-enhancing and suppressing teacher behaviors predicting students' engagement in schoolwork. *British Journal of Educational Psychology, 72*(2), 261–278. https://doi.org/10.1348/000709902158883

Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin, 37*(11), 1459–1473. https://doi.org/10.1177/0146167211413125

Brekelmans, M., Sleegers, P., & Fraser, B. (2000). Teaching for active learning. In P. R. J. Simons, J. L. Van der Linden, & & T. Duffy (Eds.), *New learning* (pp. 227–242). Kluwer Academic Publishers.

Brewer, E. W., & Burgess, D. N. (2005). Professor's role in motivating students to attend class. *Journal of STEM Teacher Education, 42*(3). Article 3 https://ir.library.illinoisstate.edu/jste/vol42/iss3/3/.

Cents-Boonstra, M., Lichtwarck-Aschoff, A., Denessen, E., Aelterman, N., & Haerens, L. (2020). Fostering student engagement with motivating teaching: An observation study of teacher and student behaviors. *Research Papers in Education, 36*(6), 754–779. https://doi.org/10.1080/02671522.2020.1767184

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. R. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality, 62*(1), 119–142. https://doi.org/10.1111/j.1467-6494.1994.tb00797.x

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Springer. https://doi.org/10.1007/978-1-4899-2271-7

Deci, E. L., & Ryan, R. M. (1987). The support of autonomy and the control of behavior. *Journal of Personality & Social Psychology, 53*(6), 1024–1037. https://doi.org/10.1037/0022-3514.53.6.1024

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01

De Meyer, J., Tallir, I. B., Soenens, B., Vansteenkiste, M., Aelterman, N., van den Berghe, L., Speleers, L., & Haerens, L. (2014). Does observed controlling teaching behavior relate to students' motivation in physical education? *Journal of Educational Psychology, 106*(2), 541–554. https://doi.org/10.1037/a0034399

Friese, S. (2019). *Qualitative data analysis with ATLAS.ti* (3rd ed.). SAGE.

Gaudin, C., & Chalies, S. (2015). Video viewing in teacher education and professional development: A literature review. *Educational Research Review, 16*, 41–67. https://doi.org/10.1016/j.edurev.2015.06.001

Gucciardi, D. F., Weixian, J. C., Gibson, W., Ntoumanis, N., & Ng, L. (2020). Motivational climate in the classroom: Factorial and convergent validity evidence of the need-supportive behaviors scale with health science students. *European Journal of Psychological Assessment, 36*(2), 324–335. https://doi.org/10.1027/1015-5759/a000524

Haerens, L., Aelterman, N., van den Berghe, L., de Meyer, J., Soenens, B., & Vansteenkiste, M. (2013). Observing physical education teachers' need-supportive interactions in classroom settings. *Journal of Sport & Exercise Psychology, 35*(1), 3–17. https://doi.org/10.1123/jsep.35.1.3

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise, 16*, 26–36. https://doi.org/10.1016/j.psychsport.2014.08.013

Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research, 77*(1), 81–112. https://doi.org/10.3102/003465430298487

Hennink, M., Hutter, I., & Bailey, A. (2010). *Qualitative research methods*. SAGE.

Holt, L. C., Kysilka, M., & Kysilka, M. L. (2006). *Instructional patterns: Strategies for maximizing student learning*. SAGE.

Hornstra, L., Stroet, K., & Weijers, D. (2021). Profiles of teachers' need-support: How do autonomy support, structure, and involvement cohere and predict motivation and learning outcomes? *Teaching and Teacher Education, 99*, Article 103257. https://doi.org/10.1016/j.tate.2020.103257

Ingram, D. (2012). *College students' sense of belonging: Dimensions and correlates* [Doctoral thesis, Stanford University]. https://purl.stanford.edu/rd771tq2209.

Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology, 102*(3), 588–600. https://doi.org/10.1037/a0019682

Jiang, J., Vauras, M., Volet, S., Salo, A. E., & Kajamies, A. (2019). Autonomy-supportive and controlling teaching in the classroom: A video-based case study. *Education Sciences, 9*(3), 229. https://doi.org/10.3390/educsci9030229

Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction, 7*(3), 255–275. https://doi.org/10.1016/S0959-4752(96)00028-X

Klette, K., & Blikstad-Balas, M. (2018). Observation manuals as lenses to classroom teaching: Pitfalls and possibilities. *European Educational Research Journal, 17*(1), 129–146. https://doi.org/10.1177/1474904117703228

Lemke, J. (2007). Video epistemology in-and-outside the box: Traversing attentional spaces. In R. Goldman, R. Pea, B. Barron, & S. J. Denny (Eds.), *Video research in the learning sciences* (pp. 39–51). Routledge.

Marshall, M. N. (1996). Sampling for qualitative research. *Family Practice, 13*(6), 522–526. https://doi.org/10.1093/fampra/13.6.522

Morgan, G. P. (2006). *Coaching behaviors and players' motivation in elite youth football*. Loughborough University Repository [Doctoral thesis, Loughborough University] https://repository.lboro.ac.uk/articles/thesis/Coaching_behaviors_and_players_motivation_in_elite_youth_football/9605030.

Mouratidis, A., Vansteenkiste, M., Lens, W., & Sideridis, G. (2008). The motivating role of positive feedback in sport and physical education: Evidence for a motivational model. *Journal of Sport & Exercise Psychology, 30*(2), 240–268. https://doi.org/10.1123/jsep.30.2.240

Muijs, D., & Reynolds, D. (2017). *Effective teaching: Evidence and practice* (4th ed.). Sage.

Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education, 7*(2), 133–144. https://doi.org/10.1177/1477878509104318

Noordegraaf, M., & Wester, F. (2018). Video-observatie nader bekeken [Video observation in more detail] (Editorial). *Kwalon, 23*(2), 3–5. https://doi.org/10.5117/2018.023.002.001

OECD. (2020). Teacher behaviour and student learning. *PISA 2018 results (Volume III): What school life means for students' lives*. OECD Publishing. https://doi.org/10.1787/db2e5b3b-en

Orsini, C., Evans, P., & Jerez, O. (2015). How to encourage intrinsic motivation in the clinical teaching environment? A systematic review from the self-determination theory. *Journal of Educational Evaluation for Health Professions, 12*, 1–10. https://doi.org/10.3352/jeehp.2015.12.8

Patall, E. A., Cooper, H., & Wynn, S. R. (2010). The effectiveness and relative importance of choice in the classroom. *Journal of Educational Psychology, 102*(4), 896–915. https://doi.org/10.1037/a0019545

Patton, M. Q. (2015). *Qualitative research & evaluation methods: Integrating theory and practice* (4th ed.). SAGE.

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159–175. https://doi.org/10.1080/00461520903028990

Reeve, J., & Jang, H. (2006). What teachers say and do to support students' autonomy during a learning activity. *Journal of Educational Psychology, 98*(1), 209–218. https://doi.org/10.1037/0022-0663.98.1.209

Reeve, J., Jang, H., Carrell, D., Jeon, S., & Barch, J. (2004). Enhancing students' engagement by increasing teachers' autonomy support. *Motivation and Emotion, 28*(2), 147–169. https://doi.org/10.1023/b:moem.0000032312.95499.6f

Reeve, J., & Tseng, C. M. (2011). Agency as a fourth aspect of students' engagement during learning activities. *Contemporary Educational Psychology, 36*(4), 257–267. https://doi.org/10.1016/j.cedpsych.2011.05.002

Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. The Guilford Press.

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *The American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology, 61*, Article 101860. https://doi.org/10.1016/j.cedpsych.2020.101860

Ryan, R. M., Reeve, J., Kaplan, H., Matos, L., & Cheon, S. H (2023). Education as flourishing: Self-determination theory in schools as they are and as they might be. In R. M. Ryan (Ed.), *The Oxford handbook of self-determination theory* (pp. 591–618). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780197600047.013.60.

Sarrazin, P. G., Tessier, D. P., Pelletier, L. G., Trouilloud, D. O., & Chanal, J. P. (2006). The effects of teachers' expectations about students' motivation on teachers' autonomy-supportive and controlling behaviors. *International Journal of Sport and Exercise Psychology, 4*(3), 283–301. https://doi.org/10.1080/1612197X.2006.9671799

Scager, K., Akkerman, S. F., Pilot, A., & Wubbels, T. (2014). Challenging high-ability students. *Studies in Higher Education, 39*(4), 659–679. https://doi.org/10.1080/03075079.2012.743117

Scager, K., Akkerman, S. F., Pilot, A., & Wubbels, T. (2017). Teacher dilemmas in challenging students in higher education. *Teaching in Higher Education, 22*(3), 318–335. https://doi.org/10.1080/13562517.2016.1248392

Schneider, M., & Preckel, F. (2017). Variables associated with achievement in higher education: A systematic review of meta-analyses. *Psychological Bulletin, 143*(6), 565–600. https://doi.org/10.1037/bul0000098

Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. J. R. C. (2009). The synergistic relationship of perceived autonomy support and structure in the prediction of self-regulated learning. *British Journal of Educational Psychology, 79*(1), 57–68. https://doi.org/10.1348/000709908X304398

Skinner, E. A., & Belmont, M. J. (1993). Motivation in the classroom: Reciprocal effects of teacher behavior and student engagement across the school year. *Journal of Educational Psychology, 85*(4), 571–581. https://doi.org/10.1037/0022-0663.85.4.571

Sluijsmans, D., & Segers, M. (Eds.). (2018). *Toetsrevolutie. Naar een feedbackcultuur in het hoger onderwijs [Assessment revolution. Towards a feedback culture in higher education]*. Phronese.

Soenens, B., Sierens, E., Vansteenkiste, M., Dochy, F., & Goossens, L. (2012). Psychologically controlling teaching: Examining outcomes, antecedents, and mediators. *Journal of Educational Psychology, 104*(1), 108–120. https://doi.org/10.1037/a0025742

Stroet, K., Opdenakker, M. C., & Minnaert, A. (2013). Effects of need supportive teaching on early adolescents' motivation and engagement: A review of the literature. *Educational Research Review, 9*, 65–87. https://doi.org/10.1016/j.edurev.2012.11.003

Van den Berghe, L., Cardon, G., Tallir, I., Kirk, D., & Haerens, L. (2016). Dynamics of need-supportive and need-thwarting teaching behavior: The bidirectional relationship with student engagement and disengagement in the beginning of a lesson. *Physical Education and Sport Pedagogy, 21*(6), 653–670. https://doi.org/10.1080/17408989.2015.1115008

Van den Berghe, L., Soenens, B., Vansteenkiste, M., Aelterman, N., Cardon, G., Tallir, I. B., & Haerens, L. (2013). Observed need-supportive and need-thwarting teaching behavior in physical education: Do teachers' motivational orientations matter? *Psychology of Sport & Exercise, 14*(5), 650–661. https://doi.org/10.1016/j.psychsport.2013.04.006

Van Doren, N., De Cocker, K., Flamant, N., Compernolle, S., Vanderlinde, R., & Haerens, L. (2023). Observing physical education teachers' need-supportive and need-thwarting styles using a circumplex approach: How does it relate to student outcomes? *Physical Education and Sport Pedagogy*, 1–25. https://doi.org/10.1080/17408989.2023.2230256

Vansteenkiste, M., Lens, W., & Deci, E. L. (2006). Intrinsic versus extrinsic goal contents in self-determination theory: Another look at the quality of academic motivation. *Educational Psychologist, 41*(1), 19–31. https://doi.org/10.1207/s15326985ep4101_4

Vansteenkiste, M., Sierens, E., Goossens, Soenens, B., Dochy, F., Mouratidis, A., Aelterman, N., Haerens, L., & Beyers, W (2012). Identifying configurations of perceived teacher autonomy support and structure: Associations with self-regulated learning, motivation and problem behavior. *Learning and Instruction, 22*(6), 431–439. https://doi.org/10.1016/j.learninstruc.2012.04.002

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development, 76*(2), 483–501. https://doi.org/10.1111/j.1467-8624.2005.00858.x

Vermote, B., Aelterman, N., Beyers, W., Aper, L., Buysschaert, F., & Vansteenkiste, M. (2020). The role of teachers' motivation and mindsets in predicting a (de)motivating teaching style in higher education: A circumplex approach. *Motivation and Emotion, 44*(2), 270–294. https://doi.org/10.1007/s11031-020-09827-5

Wolfensberger, M. V. C. (2012). *Teaching for excellence: Honors pedagogies revealed*. Waxmann Verlag.

Wolfensberger, M. V. C., & Offringa, G. J. (2012). Qualities honours students look for in faculty and courses, Revisited. *Journal of the National Collegiate Honors Council, 13*(2), 171–182. https://digitalcommons.unl.edu/nchcjournal/361/.