Encouraging intrinsic motivation in the clinical setting: teachers' perspectives from the self-determination theory

C. Orsini[1,2], P. Evans[1], V. Binnie[1], P. Ledezma[3] and F. Fuentes[3]

[1] College of Medical, Veterinary and Life Sciences, University of Glasgow, Glasgow, UK,
[2] Teaching and Learning Centre, FEN, University of Chile, Santiago, Chile,
[3] Dental School, University San Sebastian, Santiago, Chile

Abstract

Introduction: Self-determination theory postulates that the three basic psychological needs of autonomy, competence and relatedness have to be satisfied for students to achieve intrinsic motivation and internalisation of autonomous self-regulation towards academic activities. Consequently, the influence of the clinical teaching environment becomes crucial when satisfying these needs, particularly when promoting or diminishing students' intrinsic motivation. The aim of this study was to describe and understand how clinical teachers encourage intrinsic motivation in undergraduate dental students based on the three basic psychological needs described by the self-determination theory.

Methods: A qualitative case study approach was adopted, and data were collected through semistructured interviews with nine experienced undergraduate clinical teachers of one dental school in Santiago, Chile. Interview transcripts were analysed by two independent reviewers using a general inductive approach.

Findings: Several themes emerged outlining teaching strategies and behaviours. These themes included the control of external motivators; gradual transference of responsibility; identification and encouragement of personal interests; timely and constructive feedback; delivery of a vicarious learning experience; teamwork, team discussion, and presence of a safe environment, amongst others. Overall, teachers stressed the relevance of empowering, supporting and building a horizontal relationship with students.

Conclusions: Our findings regarding dental education expand on the research outcomes from other health professions about how teachers may support students to internalise behaviours. An autonomy-supportive environment may lead students to value and engage in academic activities and eventually foster the use of an autonomy-supportive style to motivate their patients.

Introduction

Over the last decade there has been increasing interest about the role of motivation in the education of health professionals (1–5). It has been suggested that clinical teachers have important influences on students' intrinsic motivation and performance (6–8). A number of studies have found that the internalisation of students' motivation in an intrinsic form is associated with increased interest, commitment, effort, learning and satisfaction with education (9–13). In contrast, a poor quality of learning occurs when students are not willing to learn (12, 14). Clinical undergraduate dental training is based on a series of cumulative experiences and on the interaction between teacher, student and patients. The quality of this interaction, which is guided by the teacher, is a key component in students' motivation and self-regulation to learn (15, 16).

It is suggested that students in higher education, especially in medicine and dentistry, have a predisposition towards learning

and readily engage with their educational environment (1, 17–19). However, these behaviours can be supported or diminished by internal or external factors (19). Teachers' behaviour and teaching style can influence students' motivation (17, 20). Students' own curiosity and interests are potent tools that teachers can use to promote the desire to learn. In contrast, teachers that rely on external factors (rewards or punishment) risk students' internal learning aspirations, thereby compromising the quality of the process (17).

Self-determination theory (SDT) (12, 21) supports the idea of students' innate curiosity and desire to learn. This is achieved by internalising and integrating psychological components to build an integrated and unified sense of the self (17). Despite being one of the most frequently cited motivational theories in psychology, the application of SDT in medical and dental education is uncommon (19). SDT posits three quality types of motivation: amotivation (lack of motivation), extrinsic motivation (driven by external control or demands) and intrinsic motivation (free engagement in an activity for inherent satisfaction). An internalisation process, from external to internal regulation, influences the type of motivation adopted. This process relates to how self-determined an individual's behaviour is and can lead to the internalisation of habits and motives to generate feelings of autonomous self-regulation and value towards academic activities.

The desired types of motivation in students are intrinsic motivation and autonomous forms of self-regulation, which have been associated with deep learning, better performance and well-being when compared with extrinsic motivation and controlled forms of self-regulation (under external control) (10, 12). Therefore, many successes and failures in clinical education could be understood through SDT. In addition, because intrinsic or extrinsic motivation is not permanent characteristics, attention must be paid to environmental influences (22).

SDT claims three basic psychological needs that have to be satisfied to achieve intrinsic motivation and internalisation of autonomous self-regulation: autonomy, competence and relatedness (10, 17, 23).

First, the need for autonomy refers to making decisions by one's own will, based on one's own needs and values (19). For example, students are autonomous and intrinsically motivated when they freely choose to devote time and energy to their studies or to a particular academic activity (17). Second, the need for competence refers to the desire to feel capable of performing a determined task, and it is related to seeking challenges that are optimal for one's abilities (12, 19). In this context, competence is not defined as an attained skill or ability *per se* but rather as a perception of confidence and effectiveness (19). Third, the need for relatedness is described as the need for belongingness or connectedness with significant others as well as with a significant community (10, 24); it means being accepted and valued by people surrounding us.

The clinical learning environment can promote these three basic psychological needs and foster intrinsic motivation through an autonomy-supportive teaching style, thus making students feel autonomous, competent and supported by their teachers and peers. This environment is in opposition to traditional controlling teaching styles in which behaviour is usually regulated by punishments and rewards (21), leading to extrinsic motivation or amotivation.

Autonomy-supportive teaching is characterised by providing options and opportunities for self-directed decisions and minimising external pressures (12, 25). Evidence suggests that if teachers support students' autonomy, competence and relatedness, students will thrive in educational settings (21), take responsibility for their learning (1, 20) and interact with their patients in a more autonomy-supportive way (26).

Moreover, very few studies have investigated the role of motivation in dental education, with most of the literature focused on medical and psychology education. In addition, previous research has mostly relied on the students' point of view, and relatively little attention has been paid to the clinical teachers' perspectives, which play a key role in the clinical teaching environment.

Considering the importance that motivation in clinical teaching has over the development of future dentists, the aim of this study was to describe and understand how clinical teachers encourage intrinsic motivation in undergraduate dental students from the SDT perspective. Therefore, this research will focus on how the teaching environment supports the students' needs for autonomy, competence and relatedness. This study is based on a naturalistic qualitative approach using a case study design with semistructured interviews for data collection. This method is exploratory and is particularly useful for a topic that has been hardly investigated (27).

Methods

Context and participants

This study was conducted during April 2014 at one dental school in Santiago, Chile. This dental school has a 6-year discipline-based curriculum that mixes lectures and active, student-centred teaching strategies. Students start their clinical training during the first semester of the fourth year, which lasts until the second semester of the sixth year. The teaching philosophy imparted by the dental school is based on a close, approachable and horizontal relationship between their teachers and students. Within clinical courses, there is a proportion of one teacher to every eight students, which facilitates a close and personalised teaching environment.

Study participants comprised a final sample of nine undergraduate clinical dental teachers. Two inclusion criteria had to be met for eligibility: first, to have 5 or more years of continuous undergraduate clinical teaching experience and, second, to be 'accredited' by their peers and students based on the 360° evaluations from the last 5 years. Following the aforementioned criteria, the dental school's authorities provided an initial list of ten eligible clinical teachers, with the possibility of recruiting more participants if a saturation point was not reached. Selected clinical teachers had a mean teaching experience of 15 years (range 6–40 years) and a mean practitioner experience of 24 years (range 11–44 years). The mean score from the 360° evaluation from the last 5 years was 6.2 (in a scale from 1.0 to 7.0). Selected teachers included a variety of practitioners, seven males and three females, with master's degrees and diplomas in higher education, from different age groups and specialities (general practice, endodontics, periodontics, paediatric dentistry, prosthodontics and maxillofacial radiology) and positions

(Professors and Senior Clinical University Teachers). The inclusion of these groups of interest enhanced the study's representativeness, which has been addressed as an important quality indicator in qualitative research (27–29).

The dental school's research ethics committee reviewed and approved the study protocol in March 2014 (Reference Number: 0038).

Data collection

Data collection and analysis were divided in stages for educational purposes, but in the field, they were conducted as an iterative and simultaneous process.

Clinical teachers were invited to participate voluntarily by email, which included participant's information and the informed consent form. Confidentiality and anonymity were respected for participants, with the possibility of withdrawing at any time without any consequences. Teachers were recruited on a first-come-first-served basis. Each teacher was interviewed once through a videoconference using Skype®. This software was used for practical reasons, mainly because of the distance between the interviewer and the interviewees (UK and Chile). Depending on each teacher's preference, interviews were held at the dental school or at a self-chosen location. All interviews were conducted by one author (C.O.), in the interviewees' native language (Spanish), and lasted between 45 and 60 min. These interviews were voice-recorded for later transcription and analysis. As the authors who conducted and analysed the interviews were bilingual (English and Spanish), the collected data were analysed in Spanish and later translated to English.

Semistructured interviews were selected because of their intimate, flexible and open characteristics along with their ability to generate in-depth data inaccessible with quantitative survey techniques. The semistructured interviews consisted on a predetermined set of open-ended questions derived from the literature and based on topics discussed between the authors; however, the interviewer and participants were free to pursue additional relevant topics as they arose spontaneously. The question guide focused mainly on themes addressing how clinical teachers supported students' needs for autonomy, competence, and relatedness along with concrete examples and experiences.

To test the question guide, a pilot interview was performed with a voluntary clinical teacher that would not be recruited for the study sample. As a result, five questions were reframed, and the order in which they were asked was changed. Representative examples of such questions were 'How do you usually motivate your students towards academic activities in the clinical environment? Could you give an example?', 'In your clinical teaching practice, how do you manage to support students' autonomy? Could you give examples?', and 'Imagine you want your student to perform a new clinical task that s/he has never performed before. How do you teach him/her? Why?'

After completing eight interviews, no new themes emerged, and a saturation point was reached. This was confirmed by conducting a ninth interview; after that, no more interviewees were recruited.

After each encounter, the interviewer completed field notes with observational and reflective information and stored them in a field journal. All interviews were transcribed verbatim, and

prior to the analysis of the transcribed interviews, participants were asked to voluntarily check and validate the transcript information and were given the opportunity to add forgotten data. All interviewees agreed to participate in the member checking process (27, 29).

Data analysis

A thematic analysis was conducted based on inductive logic (themes emerged from the data) using Nvivo® 10 software (QSR International, Doncaster, Australia). Every step of the analytical process and self-reflections was registered in an analytical journal, which detailed problems and solutions, coding rationale, ideas, meanings and memos. To add dependency or qualitative reliability to the results, two independent authors analysed and coded the data, finding only minor discrepancies amongst their coding criteria. To enhance the trustworthiness of our results, whenever the authors could not agree, a third researcher would be invited to mediate the discussion until a consensus was reached.

To identify the units of analysis (actions and behaviours of teachers when supporting students' needs of autonomy, competence, and relatedness), a 'free flowing' segment analysis was conducted, implying that the length of each segment did not have to be equivalent but rather determined by its meaning and importance (27).

The coding process aimed to identify relevant concepts, experiences and examples. It was divided into two phases. The first phase, an open coding stage, was based on constant comparison, resulting in descriptions and the grouping of segments into different categories. These were mainly labelled by *in vitro* codes (as concepts from the literature) and, to a lesser extent, by *in vivo* codes (using the informant's words). Multiple cycles of coding were performed by the authors, in which they self-reflected and also clarified, refined and renamed categories.

The second phase was a central coding stage, which aimed to combine and relate different categories amongst each other and to group them in themes and subthemes. To describe key elements within each theme, a selection of original quotes, verbatim excerpts, and/or examples were drawn directly from the transcripts. The final phase was an interpretative stage in which authors reflected about the descriptions of the different categories and themes, their meanings to participants, and the relations amongst them. After two discussion meetings between the authors, cross-check agreement was reached on the emergent information.

Overall, the findings were triangulated (27) through the semistructured interviews, a comparison with the results of the initial literature review, observation and field notes from the interviewer, and authors' discussions concerning the analysed data. The collection and analysis of data from multiple positions within the studied sample allowed the researchers to gain deeper and multiperspective insights into the studied phenomenon (30, 31).

Findings

Several themes emerged on how clinical dental teachers support the fulfilment of each of the three basic psychological needs in

students to foster their intrinsic motivation towards academic activities. Therefore, our analysis of findings was organised following a framework based on teachers' encouragement of students' needs for autonomy, competence and relatedness. The findings are presented in Tables 1–3, which outline themes and subthemes that emerged, main findings, and relevant quotes.

Encouraging students' autonomy

Teachers' strategies to foster students' need for autonomy were mainly centred on five themes: controlling and managing external motivators, refocusing uninteresting activities, transferring responsibility, identifying and encouraging personal interests, and supporting proactivity and giving choice (Table 1).

First, teachers acknowledged that for students, external motivators played an important role and, therefore, focused their efforts to controlling and managing these external forces by redirecting them and transforming them into internal forces. Second, teachers expressed awareness that not every single activity pleased all students, so an attempt was made to refocus uninteresting tasks, making students value them as solutions to real-life problems. Therefore, students realised that all clinical actions were important and would be relevant in their future as general dental practitioners. This refocusing was partly achieved by applying creativity in their teaching sessions and including newly available technologies. Third, students were given responsibility for their learning process. As they were dealing with patients, this transference of responsibility was aimed as a gradual independence from the teacher's clinical interventions, and it was made through a critical and personalised observation of each student's progress. As this is a very personal process in which each student has his or her own time and pace, not everyone was given the same responsibility at the same time. The final aim is that students accept responsibility for their patients' care and that teachers gradually act more like observers, only checking certain points throughout the treatment. Fourth, the teachers believed that students should be encouraged to follow their personal interests within the boundaries of general dentistry. Teachers encouraged them to find and deepen these interests, and as they completed the basic training requirements, they were encouraged to increase the level of difficulty of their actions and procedures. Finally, a proactive and freedom of thought learning strategy was conducted. Teachers expressed their concern with controlling and coercive teaching strategies and, therefore, tried to overcome this by encouraging students' reasoning. They acted as facilitators giving choice so that the student finally felt ownership of the final decision. To promote autonomy, teachers claimed that students had to be active participants in the learning process and encouraged them to think, do research, decide and act.

Encouraging students' competence

To fulfil students' needs for feeling competent, capable of learning the course content and performing different clinical actions, teachers expressed four main strategies: giving timely and constructive feedback, providing a vicarious learning experience, providing appropriate clinical challenges and valuing students' clinical practice (Table 2).

First, teachers expressed being very careful when providing feedback. They planned to do it as soon as the student finished the clinical procedure, highlighting the 'good things' and discussing what could be improved for next time, and as a dialogue and a coparticipative instance where students were encouraged to self-reflect on what they had done. Likewise, tutors agreed that for a student to feel competent, it was crucial to provide a vicarious learning experience, especially when procedures were being performed on a patient for the first time. The modelling of skills and knowledge by teachers should always be present. An autonomy-supportive teaching style does not mean that students are left by themselves treating patients; teachers always provide structured guidance to facilitate students' clinical work. However, students are guided to conduct treatments that are at an appropriate level for their competencies, neither too easy nor too difficult. Teachers claimed that presenting students with tasks that are too easy may not represent an interesting challenge and can undermine students' motivation. However, if challenges that are too difficult are presented, they can also undermine students' feelings of competence. When treatments become more difficult than expected, the coparticipation of teachers, involving students as participant observers, can overcome a potential sense of incompetence. Teachers constantly cared about giving positive reinforcement and valuing students' clinical work; this validation enhanced student's feelings of competence and made them feel more involved and important in the clinical environment.

Encouraging students' relatedness

Finally, clinical teachers encouraged students' relatedness mostly by making them feel connected to the clinical environment and to fellow students and teachers (Table 3). These intentions were condensed in six themes: accepting criticism, acting as a behavioural role model, getting to know students and letting them know you, promoting teamwork and team discussion, providing a safe environment, and showing empathy and assertiveness.

Teachers argued the importance of students being heard and given the possibility to criticise teaching and learning activities. Moreover, teachers were open to discussion and to the introduction of eventually reasonable changes that can suit students' needs. Second, teachers agreed that they have to act as behavioural role models, teaching with happiness and enthusiasm and modelling the soft skills that students should exhibit. Teachers acknowledged that their attitudes influence students' behaviour to the extent that students might actually tend to replicate what they see in the teachers. Third, to support the connection with and amongst students, it was essential that teachers get to know their students, show interest in them, let students know them, and share their academic and professional experience. Teachers should care to know their students' backgrounds and generate instances for knowing each other. Teachers might share how, in the past, they overcame similar difficulties that students are having at present. Furthermore, working in small clinical groups provides a personalised learning experience that facilitates these interactions. Fourth, to foster a sense of belongingness to the group, tutors claimed that it was imperative to stimulate teamwork, team discussion, and interaction between

TABLE 1. Themes and subthemes emerged, along with their main findings and relevant quotes for the needs of autonomy

Supporting students' autonomy

Themes and subthemes		Main findings	Relevant quotes
1. Control and manage external motivators		External forces are important, and how teachers manage and control them is crucial	'When I see a student that is not motivated to study a certain topic or to perform certain activity, I tell them that they have an image to maintain and a responsibility towards the safeness of their patients, otherwise they can lose their confidence' (Int4)
		Rewards are offered with caution as they can externalise a regulation that was previously internal.	'Besides from the mark there are many other kinds of useful rewards, usually I invite them to our social campaigns and they have the opportunity to experience real professional life situations' (Int3)
		Teachers focus external forces towards to what patients expect and to the relevance that present actions and behaviours will transcend and affect students' future professional lives	
2. Refocus uninteresting activities	2.1 Real-life problems	Teachers make students face and solve real-life problems	'Initially and basically I motivate them through problems arising directly from the professional context' (Int3)
	2.2 Teaching with creativity	Adapt the teaching to the needs and the context of the students	'Students do not learn the same way I did... creativity and new technologies are important' (Int9)
	2.3 Give value to uninteresting tasks	Each clinical action of students' training will be relevant in their future general dental practice	'I tell them that our graduates are expected to succeed in these actions...' (Int8)
3. Transference of responsibility	3.1 Critical observation of progress	Teachers carefully assess and observe each student's progress	'Autonomy is a very individual process, with personal times and pace' (Int9)
	3.2 Give responsibility	Make students responsible of their patients and of the solution to their dental problems	'With their patients they are the dentists, I like to empower them and make them feel responsible' (Int6)
	3.3 Gradual independence	As the year goes by teachers tend to let students more on their own and only check certain points throughout the treatment	'As they progress, we give them more independence from us, to the point that in their last patients in the 5th year we practically leave them alone' (Int4)
4. Identify and encourage personal interests	4.1 Develop personal interests	Teachers care to identify and encourage students to find their personal interests	'One of the things I consider important is for me and also for themselves to identify their objectives an interests within our profession' (Int7)
	4.2 Deepen in personal interests	Within the context of general dentistry, students should be free to reach beyond in their areas of interests	'...Here we set the floor, but the ceiling is set by them...' (Int9)
5. Support proactivity and give choice	5.1 Active participation	An active involvement of each and every student during the sessions will foster an autonomous learning	'The more active the student is, the more he will understand and own the process' (Int7)
	5.2 Encourage freedom of thought	Teachers tend to guide students in their reasoning, so finally they feel that it is their choice and decision	'I never give them the answer right away, I know the answer is hidden somewhere and I try to lead them towards it' (Int3)

TABLE 2. *Themes and subthemes emerged, along with their main findings and relevant quotes for the needs of competence*

Supporting students' competence

Themes and subthemes		Main findings	Relevant quotes
1. Give Timely and constructive Feedback	1.1 Positive feedback	Teachers establish a dialogue, saying the good things and what should be improved, focusing on the task rather than on the person	'I try to give feedback as a conversation, telling the good things and how to overcome the bad ones, and right after they have finished' (Int8)
	1.2 Promote self-reflection	Students should be aware of what they are doing and why they are doing it. Self-reflection is seeing as crucial for improvement	'It is important that feedback is a co-participative instance supporting self-assessment' (Int3)
2. Provide a vicarious learning experience		Teachers 'show how' and provide the students a 'learning by observing' experience prior to doing things for the first time	'The clinical teacher must be someone who can model the skills to the students' (Int3)
		Teachers provide a structured guidance to facilitate students' clinical work	'Their first clinical action is made by me, they observe, then I ask them to take my hand and we remove the caries lesion together... it is 100% modelling' (Int4)
3. Provide appropriate clinical challenges		Teachers take care that students are faced with appropriate challenges, nor to easy nor to difficult for them	'Students must advance following a progressive clinical path, they must not skip steps otherwise they might fall...' (Int4)
		Letting them face challenges that are too difficult can undermine their motivation and frustrate them. When faced, co-participation of the teacher is crucial	'If they face challenges that are not up to their skills they probably will feel incompetent and loose enthusiasm...' (Int4)
4. Value students' clinical practice		Teachers are concerned about giving positive reinforcement and validating students' good clinical work	'Making them feel competent is acknowledging and recognising that they have the skills and competencies we demand from them' (Int3)
		Recognising the importance and significance of their work makes students more involved in the clinical environment and enhances their feeling of competence in subsequent actions	'Giving them positive reinforcement when something is well done is essential, they feel valued by the teacher and feel that their clinical work is in fact important' (Int6)

TABLE 3. Themes and subthemes emerged, along with their main findings and relevant quotes for the needs of relatedness

Supporting students' relatedness

Themes and subthemes		Main findings	Relevant quotes
1. Accept criticism		Teachers listen and accept criticism and give students the opportunity to be heard	'I have no problem with criticism, in fact in many sessions I ask them for feedback... we discus if something should be changed' (Int9)
		Teachers are willing to change and/or modify activities or actions when reasonable criticism arises, and when not, they always justify their decisions	'When students tell you something, such as a suggestion or criticise certain things, you have to do something to let them know you have listened... change things or justify them' (Int3)
2. Behavioural role model		A happy and enthusiastic teaching attitude is essential, a positive leadership	'The message conveyed by the teacher must not come from rhetoric but from the attitude' (Int3)
		Teachers should model to their students the soft skills expected from them	'Teachers' attitudes influence students to such degree that students "want to be like them"...' (Int1)
3. Get to know your students and let them know you	3.1 Interest in students	Teachers are interested in knowing each of their students, their backgrounds and generate instances for knowing each other	'There is a constant interaction between my students and me, I try to know the person that is in front of me' (Int8)
	3.2 Share professional experience	Teachers share their academic and professional lives and how they have overcome difficult situations	'I give them practical examples and tell them things that have happened to me since I was a student' (Int7)
	3.3 Work in small groups	Working with groups of no more than 8 students provides to opportunity to know students and personalise the teaching	'Interacting with students is easier and more beneficial when working with small groups, it provides a much more personal tutoring' (Int2)
4. Promote teamwork and team discussion		Teachers encourage students to help each other and to learn from each other	'Cooperation and collaboration is always valued, when someone is without patient I tell them to assist and help a fellow student' (Int3)
		Students should be prepared to establish professional relationships with peers and with the entire healthcare team	'They can be friends or not, but they must be able to establish professional relationships' (Int8)
		Teachers encourage collaboration and group discussion	'At the end of each clinical session we have short groups meetings and discuss how things went'(Int5)
5. Provide a safe environment		Teachers build a horizontal relationship with the group, so students can be honest and rely on them	'I always make sure that they are not afraid or ashamed in asking me something if they do not know it' (Int1)
		Teachers work on being always available in the clinical setting, as a mobile unit	'The dental clinical teacher should always be in movement and available for students' (Int3)
		Teachers ensure a relaxed and non-threatening environment, avoiding distressful situations	'They understand that I do not know everything and I do not expect them to do so either' (Int4)
6. Empathy and assertiveness		Teachers act considering the emotional state of students	'I do not see them just as students, I see them as persons that are also subjected to the occurrence of events that can take them out of their emotional balance' (Int8)
		Teachers consider important to say things in a way that students' feelings, thoughts and actions are respected	'He was afraid of using the high speed hand piece when removing the amalgam, I said that it was perfectly normal, I told him to hold my hand... we did it together' (Int4)

students and other healthcare professionals. It is important that students help each other and also learn from each other with the aim of preparing them to build positive professional relationships in the future. Fifth, teachers claimed that for students to feel connected to the clinical group, a safe environment must be provided in which students feel neither threatened nor distressed and are entitled to be honest and able to rely and trust their teachers. Teachers cared to build a horizontal relationship, highlighting the importance of making themselves available and creating the opportunity for students to ask and relate to them. Finally, teachers expressed the relevance of considering the students' emotional states, showing empathy, being assertive in their commentaries and making sure that the students' feelings, thoughts and actions are respected.

Discussion

The present study was designed to describe the strategies used by clinical dental teachers to encourage students' intrinsic motivation towards academic activities from the SDT perspective. Specifically, the study described how teachers support students' basic psychological needs for feeling autonomous, competent and related in the clinical teaching environment.

Prior studies have highlighted the importance of an autonomy-supportive teaching style in the education for the health professions to internalise students' behaviours (18, 19, 23). Motivation has been studied in the education of several health professions (19, 23, 32–34), but to a lesser extent in dentistry (6). Moreover, the aforementioned studies mostly addressed students' voices, not considering the teachers' perspectives. This study expands the context in which academic motivation has been studied and focuses on teachers' perspectives, leading towards future research in the field.

Our qualitative research provides a variety of teaching strategies and behaviours that are transferable to different dental education contexts. The autonomy-supportive teaching styles of the interviewed dental educators were mainly focused on empowering, supporting and encouraging students to understand that their present learning and actions will have an impact on their future professional lives. This is closely related to adult learning principles (35) and to the basis of SDT (19), both of which stress the importance of self-concept and problem-centred focus and that adults are generally internally motivated.

The empowerment of students aims at supporting their innate intrinsic motivation; it is manifested as a gradual autonomous process in which students take responsibility for their clinical learning cycle, are active participants and are given the possibility, within the school's curriculum, to pursue different activities that reflect their personal interests. Dental and medical students have manifested their appreciation when teachers give them time and space to take ownership of their learning (6, 23). Nevertheless, teachers advise that this independence is given at a gradual pace, involving critical observation of each student's progress and always considering the implications for patient safety. However, our findings reveal that teachers, in certain occasions, rely on well-intended external motivators. However, these external forces are mostly managed to promote behaviours that are enacted because they are considered valu-

able or important by the student themselves; these types of 'somewhat internal' external behaviours are described by SDT as the most autonomous forms of external regulation (23, 36). Whilst directives and motivators become less externally controlled, students' performances are enhanced (33).

Our findings emphasise the importance of teachers providing appropriate challenges, valuing students' work, supporting clinical activities by a 'learning-by-observing instance' and giving timely and constructive feedback. Providing optimal challenges would make students feel secure by perceiving that the levels of demands are matching their competency levels (1), and the co-participation of the tutor when activities become too difficult would enhance students' feelings of competence by avoiding frustration. When teachers value students' work, students feel important and that their role in clinical practice is being taken seriously, boosting their competence levels (6). Combining an autonomy-supportive teaching style with a vicarious learning experience, which provides students with the possibility of observing other people perform successfully and being guided, can raise their beliefs of being capable of performing similar tasks and bring about the best learning outcomes of clinical sessions (37, 38). As explained by the social cognitive theory of learning (39), teachers modelling desired skills increase learners' perceptions of self-efficacy. Our findings are also consistent with those of previous research suggesting the relevance of performance-oriented feedback (6, 17, 24). When feedback is oriented to the task, presented as suggestions more than directives, with the opportunity for students to reflect-on-action and in-action, it supports the integration of new into existing experience and knowledge, thus promoting lifelong learning skills (37, 40, 41).

The findings observed in this study mirror those of previous research that have examined the positive effects on motivation and on the mastery of the subject matter when providing a learning environment that fosters collaboration, connections and a sense of belongingness (5, 9, 19, 23). As proposed by the situated learning theory (42), learning is fostered by participation, and it occurs not only individually but in collaboration with others. The strategies of dental teachers to support the establishment of connections between them and student and between students themselves suggest that teachers should carefully consider how they interact with students, model soft skills and stress the importance of providing a safe environment, which allows students to work as a team amongst themselves and with their teacher. Teamwork and team discussion eventually prepare students for a future successful integration with an interdisciplinary work environment.

Some of the issues emerging from these findings relate specifically to the informal curriculum. In addition to a formal curriculum, which represents what is stated, an informal curriculum represents the social interactions between students, teachers, clinical environments, other students, personal interests and goals. These informal interactions can support or diminish the needs of autonomy, competence and relatedness, which may have a positive or negative impact on learners' motivation, performance, and well-being (41, 43). The teachers' teaching style and training and the pressures placed on them are also factors to be considered by dental schools (44). As it has been suggested (45), a teacher who works under controlling forces is

more likely to teach in a controlling style rather than in an autonomy-supportive style.

Despite the emergent relevant findings and the robust methods applied in this study, a number of limitations need to be considered. First, even though our methods consisted of the triangulation of data collection and analysis from multiple positions to gain a deeper understanding of the studied phenomenon (30, 31), these findings do come from a small sample of selected clinical dental teachers from a single Chilean dental school and are not intended to be generalised. Its potential transference to other settings in education for health professions is to be judged by the readers. Second, even though the principles of anonymity and confidentiality were respected, some teachers could have eventually given socially desirable answers. However, as the issues discussed were not considered sensitive, socially desirable answers might have been relatively unlikely. Third, the interviewees manifested genuine answers derived from their experience, and even though this might be considered a strength for the study's credibility, it also represents a limitation, as these teachers have not been trained as experts in academic motivation. Finally, it was not possible to triangulate our data collection methods with students' opinions and performance or with non-participant observation to investigate what teachers actually do and how their actions and attitudes impact the clinical teaching environment.

Further research is recommended in different dental schools and different cultures. More broadly, there is abundant room for further progress in determining how autonomy-supportive teaching is actually perceived by students, exploring its relevance towards formal and informal curriculum and assessing its educational impact. Therefore, more research on this topic is needed to better understand and support the implementation of teaching and learning strategies based on SDT in dental education. Further research might also consider investigating the extent to which clinical dental teachers' own motivations and the fulfilment of their basic psychological needs influence the adoption of an autonomous or controlling teaching style.

Conclusions

Our study contributes additional evidence on how dental teachers may aid students to internalise their behaviour towards academic activities based on the SDT principles of fulfilling their needs of autonomy, competence and relatedness. Teachers adopting an autonomy-supportive style aim at maintaining students' innate motivation to learn, providing gradual empowerment, and acknowledging teachers' skills, knowledge and behavioural modelling responsibilities. In addition, teachers aim to build a safe clinical environment in which students feel supported and able to establish connections with others, so that in the long term, students can develop themselves as reflective lifelong learners.

Health professions' faculty staff who are unfamiliar with the SDT principles (23) may unintentionally teach through a controlling, pressuring and coercive style. Providing a clinical environment that supports students' needs of autonomy, competence and relatedness may lead students to become more intrinsically motivated and to value academic activities, thus having an extensive influence on dental education and eventu-

ally fostering the use of an autonomy-supportive style to motivate their patients.

References

1 Bengtsson M, Ohlsson B. The nursing and medical students motivation to attain knowledge. Nurse Educ Today 2010: 30: 150–156.

2 Sobral DT. What kind of motivation drives medical students' learning quests? Med Educ 2004: 38: 950–957.

3 Misch DA. Andragogy and medical education: are medical students internally motivated to learn? Adv Health Sci Educ Theory Pract 2002: 7: 153–160.

4 Tanaka M, Mizuno K, Fukuda S, Tajima S, Watanabe Y. Personality traits associated with intrinsic academic motivation in medical students. Med Educ 2009: 43: 384–387.

5 Kusurkar RA, Croiset G, Ten Cate TJ. Twelve tips to stimulate intrinsic motivation in students through autonomy-supportive classroom teaching derived from self-determination theory. Med Teach 2011: 33: 978–982.

6 Davies B, Leung A, Dunne S. So how do you see our teaching? Some observations received from past and present students at the Maurice Wohl Dental Centre. Eur J Dent Educ 2012: 16: 138–143.

7 Jahangiri L, McAndrew M, Muzaffar A, Mucciolo TW. Characteristics of effective clinical teachers identified by dental students: a qualitative study. Eur J Dent Educ 2013: 17: 10–18.

8 Spencer J. ABC of learning and. teaching in medicine - Learning and teaching in the clinical environment. Br Med J 2003: 326: 591–594.

9 Beachboard MR, Beachboard JC, Li W, Adkison SR. Cohorts and relatedness: self-determination theory as an explanation of how learning communities affect educational outcomes. Res High Educ 2011: 52: 853–874.

10 Ryan RM, Deci EL. Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. Am Psychol 2000: 55: 68.

11 Vallerand RJ, Blssonnette R. Intrinsic, extrinsic, and amotivational styles as predictors of behavior: a prospective study. J Pers 1992: 60: 599–620.

12 Ryan RM, Deci EL. Intrinsic and extrinsic motivations: classic definitions and new directions. Contemp Educ Psychol 2000: 25: 54–67.

13 Vansteenkiste M, Lens W, Deci EL. Intrinsic versus extrinsic goal contents in self-determination theory: another look at the quality of academic motivation. Educ Psychol 2006: 41: 19–31.

14 Miserandino M. Children who do well in school: individual differences in perceived competence and autonomy in above-average children. J Educ Psychol 1996: 88: 203.

15 Ramani S, Leinster S. AMEE, Guide no. 34: teaching in the clinical environment. Med Teach 2008: 30: 347–364.

16 McMillan W. Making the most of teaching at the chairside. Eur J Dent Educ 2011: 15: 63–68.

17 Ryan RM, Niemiec CP. Autonomy, competence, and relatedness in the classroom: applying self-determination theory to educational practice. Theory Res Educ 2009: 7: 133–144.

18 Williams GC, Deci EL. The importance of supporting autonomy in medical education. Ann Intern Med 1998: 129: 303–308.

19 Ten Cate TJ, Kusurkar RA, Williams GC. How self-determination theory can assist our understanding of the teaching and learning processes in medical education. AMEE guide No. 59. Med Teach 2011: 33: 961–973.

20 Brewer EW, Burgess DN. Professor's role in motivating students to attend class. J Ind Teach Educ 2005: 42: 23–47.

21 Reeve J, Deci EL, Ryan RM. Self-determination theory applied to educational settings. Handb self-determination Res, 2. Rochester NY: The University of Rochester Press, 2002:183–204.

22 Deci EL. Intrinsic motivation. New York and London: Plenum Press, 1975.

23 Williams GC, Saizow RB, Ryan RM. The importance of self-determination theory for medical education. Acad Med 1999: 74: 992–995.

24 Levesque C, Zuehlke AN, Stanek LR, Ryan RM. Autonomy and competence in German and American university students: a comparative study based on self-determination theory. J Educ Psychol 2004: 96: 68–84.

25 Deci EL, Ryan RM. The "what" and "why" of goal pursuits: human needs and the self-determination of behavior. Psychol Inq 2000: 11: 227–268.

26 Laine C, Davidoff F. Patient-centered medicine: a professional evolution. JAMA 1996: 275: 152–156.

27 Creswell JW. Research design: qualitative, quantitative, and mixed method approaches. In: Knight V, ed. Thousand oaks calif. London: Sage Publications, 2003: 183–214.

28 Tashakkori A, Teddlie C. Quality of inferences in mixed methods research: calling for an integrative framework. Adv mix methods res. London: Sage Publications, 2008: 101–19.

29 Tashakkori A, Teddlie C. Integrating qualitative and quantitative approaches to research. SAGE handb appl soc res methods. London: Sage Publications, 2009:283–317.

30 Lingard L, Kennedy TJ. Qualitative research methods in medical education. Oxford: Wiley Online Library, 2010.

31 Pope C, Ziebland S, Mays N. Analysing qualitative data in health care: assessing quality in qualitative research. BMJ 2000: 320: 114–116.

32 Kaufman A, Dodge T. Student perceptions and motivation in the classroom: exploring relatedness and value. Soc Psychol Educ 2009: 12: 101–112.

33 Boggiano AK, Flink C, Shields A, Seelbach A, Barrett M. Use of techniques promoting students self-determination - effects on students analytic problem-solving skills. Motiv Emot 1993: 17: 319–336.

34 Sheldon KM, Bettencourt BA. Psychological need-satisfaction and subjective well-being within social groups. Br J Soc Psychol 2002: 41: 25–38.

35 Knowles MS. The modern practice of adult education: Andragogy vs. pedagogy business. New York: A. Press, 1970: 400.

36 Vallerand RJ, Pelletier LG, Blais MR, Briere NM, Senecal C, Vallieres EF. On the assessment of intrinsic, extrinsic, and amotivation in education: evidence on the concurrent and construct validity of the academic motivation scale. Educ Psychol Meas 1993: 53: 159–172.

37 Reeve J, Deci EL, Ryan RM. Self-determination theory A dialectical framework for understanding sociocultural influences on student. Big theor revisit. Charlotte, NC: Information Age Publishing, 2004: 4:31.

38 Bandura A. Self-efficacy: the exercise of control. New York: Macmillan, 1997.

39 Bandura A. Social foundations of thought and action. Englewood Cliffs, NJ: Prentice Hall, 1986.

40 Schön DA. The reflective practitioner: how professionals think in action. New York: Basic books, 1983.

41 Kaufman DM, Mann KV. Teaching and learning in medical education: how theory can inform practice. Underst med educ evidence, theory pract. Oxford: John Wiley & Sons, Ltd, 2010: 16–36.

42 Lave J, Wenger E. Situated learning: legitimate peripheral participation. Cambridge: Cambridge University press, 1991.

43 Hafferty FW, Franks R. The hidden curriculum, ethics teaching, and the structure of medical education. Acad Med 1994: 69: 861–871.

44 Ryan RM, Brown KW. In: Legislating competence: high-stakes testing policies and their relations with psychological theories and research. Handbook of competence and motivation. New York: The Guilford Press, 2005.

45 Deci EL, Ryan RM. The paradox of achievement: the harder you push, the worse it gets. San Diego, CA: Academic Press, 2002.