



## BRIEF ORIGINAL

# Implications of motivation differences in preclinical-clinical transition of dental students: A one-year follow-up study



Cesar Orsini<sup>a,d,\*</sup>, Vivian I. Binnie<sup>b</sup>, Fernando Fuentes<sup>c</sup>, Priscilla Ledezma<sup>c</sup>, Oscar Jerez<sup>d</sup>

<sup>a</sup> Medical School, University of Glasgow, Glasgow, UK

<sup>b</sup> Dental School, University of Glasgow, Glasgow, UK

<sup>c</sup> Dental School, University San Sebastian, Santiago, Chile

<sup>d</sup> Teaching and Learning Centre, Faculty of Economics and Business, University of Chile, Santiago, Chile

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### KEYWORDS

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### Abstract

**Background:** Patient contact and clinical-based learning have been suggested as positive determinants of student motivation. However, few studies have been conducted on how this impacts dental student motivation. Based on the self-determination theory, this study aims to explore differences in the quality of motivation of dental student transition from preclinical (no previous patient contact) to clinical courses.

**Methods:** A longitudinal study was conducted with 95 Chilean students who completed the Academic Motivation Scale in two iterations over a one-year period.

**Results:** Paired *t*-test showed a significant increase in relative autonomous motivation as well as in amotivation.

**Discussions:** This suggests that while clinical contact supports student self-determination, an abrupt transition might be associated with maladjustment, which could lead to feelings of inadequacy and anxiety. Future research could usefully explore if early and gradual clinical experiences enhance student adaptation to the clinical context, thus increasing relative autonomous motivation and decreasing amotivation in the time.

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\* Corresponding author.

E-mail address: [cesar.orsini@gmail.com](mailto:cesar.orsini@gmail.com) (C. Orsini).

**PALABRAS CLAVE**

Motivación;  
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Chile

## Implicaciones de diferencias motivacionales en la transición preclínico-clínica de estudiantes de odontología: un estudio longitudinal de un año

**Resumen**

*Antecedentes:* El contacto con pacientes y la enseñanza clínica han sido señalados como determinantes positivos de la motivación de estudiantes. Sin embargo, es limitada la evidencia sobre cómo estas variables impactan en la motivación en estudiantes de odontología. Basándonos en la teoría de la autodeterminación, el objetivo de este estudio fue explorar las diferencias motivacionales en la transición preclínica (sin previo contacto con pacientes) a la clínica en estudiantes de odontología.

*Métodos:* Se realizó un estudio longitudinal en el cual 95 estudiantes chilenos respondieron en 2 ocasiones la Escala de motivación educativa en un período de un año.

*Resultados:* La prueba t de muestras pareadas mostró, al mismo tiempo, un aumento significativo de motivación autónoma relativa y de amotivación.

*Discusiones:* Esto sugiere que, mientras el contacto clínico beneficia la autodeterminación de los estudiantes, una transición abrupta puede llevar a estados de inadaptación y ansiedad. Se sugiere que futuras investigaciones exploren si la experiencia clínica temprana beneficiaría la adaptación de estudiantes, aumentando así la motivación autónoma relativa y disminuyendo la amotivación en el tiempo.

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**Introduction**

Recent research in dental education has suggested a strong association between self-determined forms of motivation and positive outcomes, such as higher self-concept, positive emotions, and deep study motives,<sup>1</sup> with similar findings reported in medical education.<sup>2</sup> However, few studies have explored which determinants impact students' quality of motivation.

These studies have been conducted following the principles of the self-determination theory of motivation (SDT).<sup>3</sup> SDT focuses on quality types of motivation and makes a distinction, from the least to the most self-determined types, between (1) amotivation i.e., lacking the intention to act, (2) controlled motivation (CM) i.e., originating from external sources and aimed at doing something because it leads to a separable outcome, and (3) autonomous motivation (AM) i.e., originating within the individual and engaging in activities because they are interesting, valuable or enjoyable. As reasons for engaging in activities become more self-determined, outcomes become increasingly positive. For a comprehensive review of self-determined motivation in health professions education, we refer the reader to the work of Ten Cate et al.<sup>4</sup>

It has been suggested that supporting students' autonomous forms of motivation might lead to positive educational outcomes, which in turn may encourage students to use a more autonomy-supportive style when relating to patients, and therefore support patients' autonomous motivation towards their healthcare.<sup>4</sup> However, little attention has been paid in dental education to which variables are likely to influence students to engage in academic activities out of autonomous motivation.

Patient-related factors such as extent of patient responsibility and clinical contact, have been reported to increase students' perceptions of autonomy and relatedness, and

motivation for learning.<sup>5</sup> This is especially relevant to dental education, where students start treating patients (under tutor supervision) in early years. Traditionally, the transition from preclinical to clinical-based learning has occurred during the third or fourth year, and benefits from this transition have been shown for students' communication skills, self-awareness and socialization.<sup>6</sup> Additionally, previous research in dental education has supported an even earlier and more gradual transition,<sup>7</sup> mainly because of the feelings of inadequacy, fear, and anxiety that an abrupt transition may cause at the same time.<sup>8</sup> This has grown in importance in light of recent findings from a cross-sectional study suggesting that third and fourth year dental students, despite reporting a more autonomous than controlled motivation profile, were at the same time reporting higher amotivation scores than other years of study.<sup>1</sup>

A question that rises from this is how clinical contact impacts students' motivation. Therefore, the aim of this study is to explore the differences in students' quality of motivation to engage in academic activities in the transition from preclinical to clinical courses. To the extent of our knowledge, this is the first study to undertake a longitudinal analysis on this topic and thus provides an important opportunity to advance the understanding of motivation and its determinants in dental education.

**Methods**

We conducted a longitudinal panel design study<sup>9</sup> at the Dental School of the University San Sebastian in Santiago, Chile. The dental school has a six-year discipline-based undergraduate curriculum, where the first two years comprise basic sciences, progressing to a preclinical third year, and finally to clinical-based fourth, fifth and sixth years.

**Table 1** Preclinical – clinical RAM and amotivation means (standard deviations), and *t*-test differences with 95% BCa bootstrap confidence intervals.

| Sample | Pre clinical RAM mean (SD)         | Clinical RAM mean (SD)         | Pearson’s correlation | Mean difference | 95% difference BCa CI | <i>t</i> | <i>p</i> -value | Effect size (Cohen’s <i>d</i> ) |
|--------|------------------------------------|--------------------------------|-----------------------|-----------------|-----------------------|----------|-----------------|---------------------------------|
| Total  | –1.64 (11.10)                      | 1.26 (14.50)                   | .699                  | –2.90           | [–4.88, –0.80]        | –2.71    | 0.008           | –0.22                           |
| Sample | Pre clinical amotivation mean (SD) | Clinical amotivation mean (SD) | Pearson’s correlation | Mean difference | 95% difference BCa CI | <i>t</i> | <i>p</i> -value | Effect size (Cohen’s <i>d</i> ) |
| Total  | 6.22 (4.86)                        | 7.49 (5.33)                    | .554                  | –1.27           | [–2.25, –0.32]        | –2.57    | 0.010           | –0.25                           |

Note: 95% bias corrected and accelerated confidence intervals based on 1000 bootstrap samples. RAM, relative autonomous motivation.

Students were invited to participate voluntarily in two iterations: at the end of the first semester of the third year (no prior patient contact) and one year after, on the fourth year, where they had experienced a full semester of clinical-based learning. An ad-hoc power analysis (alpha level of 0.05, power of 0.80 and effect size of 0.3) resulted in a total sample size of 71 students; nevertheless we invited the entire 2014 third-year and 2015 fourth-year cohorts, in order to have a representative sample and to account for possible non-responses and attrition.

Data were collected on demographics and students’ quality of motivation for attending university. The latter was measured through the Academic Motivation scale (AMS),<sup>10</sup> which is a self-reported instrument composed by 28 items, where students rate how closely a list of reasons for studying at university reflects their own motivation. We used a Chilean-Spanish version, which had been previously validated with a dental student sample (Cronbach’s alpha 0.77).<sup>1</sup>

We used the variables of amotivation and a single score to measure AM over CM. The latter is known as relative autonomous motivation and provided a general estimate of students’ degree of autonomous motivation.<sup>2</sup> This was calculated by combining, weighting, and adding the respective AMS-items that form AM and CM, so as to compute a Relative Autonomous Motivation index (RAM). A positive RAM suggested an autonomous or self-determined profile, which is considered the ‘good’ type of motivation,<sup>3</sup> whereas a negative RAM indicated a controlled or non self-determined profile. Previous research has reported reliable scores for amotivation, CM and AM (Cronbach’s alpha 0.83, 0.74, and 0.75, respectively), and the successful use of RAM to combine the measures of CM and AM.<sup>2</sup>

After checking for normal distribution of differences between scores, the SPSS® software version 20.0 was used to computed descriptive statistics, reliability, and paired *t*-tests with BCa Bootstrap confidence intervals and effect sizes, in order to test for differences in RAM and Amotivation in the preclinical-clinical transition. The study had ethics clearance (0039 2015-03-08/03) through the Dental School’s Ethics Committee.

## Results

A total of 95 students (74.2% response rate) agreed to participate, with an average age of 22.7 years (SD = 2.19) at the first iteration. There were 57 (60%) females and 38 (40%) males, which represented the normal gender distribution within the dental school.

The mean Cronbach alpha values of the AMS were 0.81 and 0.80 at the first and second iteration, respectively. This was consistent with the results from previous research.<sup>1</sup>

Table 1 presents the results obtained from the paired *t*-test amongst the preclinical and clinical transition for RAM and amotivation. A negative mean score for RAM was reported in the preclinical year, suggesting a controlled motivation profile. By contrast, these students reported a positive mean RAM score in the first clinical year, suggesting a change towards an autonomous motivation profile. This difference was significant (*p* = 0.008), with a small effect size (Cohen’s *d* = –0.22). In other words, the transition to the first clinical year accounted for a 22% of the variance in RAM. Interestingly, when comparing amotivation scores, there was a significant increase from preclinical to clinical courses (*p* = 0.010), with a small effect size (Cohen’s *d* = –0.25).

## Discussion and conclusions

Our results show positive and significant differences on RAM when transitioning from a preclinical to a clinical environment. These results further support those from previous research,<sup>11</sup> which argue that motivation is a dynamic state that may change as moving from preclinical to clinical contexts. Additionally, these findings might be explained by the enhanced perception of autonomy and relatedness associated with the clinical learning cycle, both of which SDT suggests need to be satisfied in order to enhance autonomous motivation.<sup>3</sup>

Amotivation results were in agreement with those obtained in a recent study,<sup>1</sup> where dental students in their first clinical year showed, at the same time, an autonomous

over a controlled motivation profile as well as reporting a significant increase in amotivation.

These results might seem contradictory at first, but SDT postulates that amotivation is neither an autonomous nor a controlled form of motivation; it is the lack of it.<sup>3</sup> Therefore, a possible explanation for the increase in RAM and amotivation at the same time, might be that, despite reporting an autonomous motivation profile, students were uncertain where to put their efforts because of unsubstantiated feelings or inadequacy to the clinical context.<sup>12</sup> In other words, students were self-determined when engaging in activities in this new, challenging and exciting clinical environment, but at the same time an abrupt transition might be making them not to know what to expect and therefore to feel maladjusted and experience anxiety, uncertainty and lack of confidence.<sup>8</sup> Moreover, previous research in health professions education has correlated amotivation with negative emotions and behaviours.<sup>1</sup>

These findings have important implications for supporting early and gradual clinical contact experiences, as these have been previously associated with improvement and quicker development of interpersonal and clinical skills, better understanding of basic sciences, improvement of confidence, and the alleviation of feelings of inadequacy, uncertainty and anxiety.<sup>6,8,13</sup>

Our findings may be somewhat limited by the educationally important but still small effect sizes, and are not to be generalized as they come from one sample in one dental school. Additionally, it was not possible to assess the effect of other variables, such as teachers' autonomy-support and perceived competence and relatedness, which might contribute to explain larger variance in the results.

Future research should consider additional variables, a longer follow-up period design and the inclusion of early and gradual clinical experiences, so to explore if students' adaptation to the clinical context would lead to an increase in RAM and a decrease in amotivation.

This is the first study to provide evidence on the relevance of the preclinical-clinical transition for students' self-determination, and it may very well serve as a good starting point for more studies on determinants of motivation in dental education.

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## Conflict of interest

The authors of this article declare no conflict of interest.

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