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University teaching practices and learning-oriented motivation: the mediating effect of basic psychological needs satisfaction

Prácticas docentes universitarias y motivación orientada al aprendizaje: efecto mediador de la satisfacción de las necesidades psicológicas básicas

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ABSTRACT

Several studies recognize the importance of the relationship between academic motivation and learning in the university context, contrasting with the smaller number of studies addressing mediating variables' influence. This research aimed to evaluate the mediating role of Basic Psychological Needs in the relationship between practices performed by university professors perceived by students as motivating and learning-oriented motivation. The study involved 763 students from health and education programs at different Chilean universities. The PROCESS macro for SPSS was used to evaluate the mediating effect. The results indicate that the satisfaction of basic psychological needs partially mediates the effect of teaching practices on the type of learning-oriented motivation. This reinforces the idea of a situated, explicit, and frequent teaching practice with motivational formative actions that strengthen usefulness, importance, and autonomy. The findings show the relevance of these teaching practices to generating learning-oriented motivation and the role of the Satisfaction of Basic Psychological Needs in this relationship.

Keywords: learning, motivation, teacher practices, motivational orientation, basic psychological needs

RESUMEN

Diversos estudios reconocen la importancia de la relación entre la motivación académica y el aprendizaje en el contexto universitario, lo que contrasta con el menor número de trabajos que abordan la influencia de las variables mediadoras. Esta investigación tuvo como objetivo evaluar el rol mediador de las Necesidades Psicológicas Básicas en la relación entre las prácticas realizadas por profesores universitarios percibidas por los estudiantes como motivadoras y la motivación orientada hacia el aprendizaje. En el estudio participaron 763 estudiantes de programas de salud y educación de diferentes universidades chilenas. Para evaluar el efecto mediador se utilizó la macro PROCESS para SPSS. Los resultados indican que la satisfacción de las necesidades psicológicas básicas media parcialmente el efecto de las prácticas docentes sobre el tipo de motivación orientada hacia el aprendizaje, lo que refuerza la idea de realizar una práctica docente situada, explícita y frecuente con acciones formativas motivadoras que fortalezcan la utilidad, la importancia y la autonomía. Estos hallazgos muestran la relevancia de estas prácticas docentes para generar motivación orientada hacia el aprendizaje, así como el papel de la Satisfacción de las Necesidades Psicológicas Básicas en esta relación.

Palabras clave: aprendizaje, motivación, prácticas docentes, orientación motivacional, necesidades psicológicas básicas

INTRODUCTION

Academic motivation is defined as the «process by which goal-directed [academic] activity is prompted and maintained» (Schunk et al., 2015, p. 5). In the past fifty years, research on academic motivation has flourished, allowing for a more in-depth understanding of learning processes. In the university context, academic motivation has been the object of study from different theories. We focus our analysis on two of them: Goal Theory and Self-Determination Theory. The former identifies the motivational orientation towards learning or mastery. As part of its sub-theories, the latter contributes to the notion of satisfaction of basic psychological needs, which would be at the basis of internalizing the motives that lead us to action.

Goal Theory [hereafter, GT] is a family of theories that focus on characterizing the motivational orientation of subjects in the academic domain (Elliot, 2020; Elliot et al., 2018; Harackiewicz et al., 2002; Urdan & Kaplan, 2020). These orientations are determined by the types of goals that individuals set for themselves regarding the academic task (Hulleman et al., 2010). Within this perspective, students tend to engage in academic tasks oriented toward content mastery [Learning or Mastery Goals] or towards execution [Performance or Performance goals] (Urdan & Kaplan, 2020), and two dynamics can be distinguished within each of these orientations or types of goals: approximation and avoidance (Elliot, 2020; Elliot & Friedman, 2017). This crossover gives rise to four basic orientations [mastery approach, mastery avoidance, performance approach, and performance avoidance]. Studies under this theoretical perspective show that different orientations have differential effects on learning outcomes (Barca et al., 2011; Bircan & Sungur, 2016; Hulleman et al., 2010), self-efficacy and critical thinking (Phan, 2009), cognitive and self-regulation strategies (Valle et al., 2006) and epistemic beliefs (Zhou et al., 2019). In all these, mastery goals [Mastery] yield better benefits for the learner, except in cases where only performance is to be assessed, for example, through multiple-choice questions (Senko, 2019).

Additionally, Self-Determination Theory [hereafter, SDT] (Ryan & Deci, 2020) focuses on the quality of motivation and the types of regulation that underlie and guide a particular type of motivation. Indeed, SDT has contributed to understanding this phenomenon (Deci et al., 2017; Roth, 2019; Vansteenkiste et al., 2006) in different learning settings, including online formats, so present in current education (Chiu, 2022).

Self-Determination Theory postulates that humans naturally tend towards growth and general well-being, driven by the satisfaction of three basic psychological needs: autonomy, competence, and relatedness. Autonomy refers to a person's ability to feel free to act on their own initiative and freely choose what they want

to engage in (Chen et al., 2019), relatedness is associated with having a sense of belonging, bonding, connection, and caring (Liu & Sitoe, 2020; Vansteenkiste et al., 2020), and competence refers to valuing efficacy and feeling capable and effective. However, it is also recognized that social, family, educational, cultural, and other environments can frustrate the satisfaction of these three needs, generating a sense of external control that affects levels of self-determined motivation (Legault, 2017).

In contrast to the educational tradition that linked motivation and learning as influenced by external factors, self-determination theory emphasizes the natural propensity of individuals to grow and achieve psychological integration, allowing the development of autonomous or intrinsic motivation. However, achieving this type of motivation requires certain conditions that support the satisfaction of the three basic psychological needs (Ryan & Deci, 2020).

SDT recognizes types of motivation located on a continuum that considers amotivation, extrinsic motivation, and intrinsic motivation, each composed of different regulatory factors that affect people's behavior and performance in different situations. Amotivation refers to a lack of intentionality, not feeling competent to perform an activity or a lack of energy or interest in performing a task (Howard et al., 2021). Extrinsic motivation refers to behaviors aimed at obtaining rewards, avoiding punishment, shame, guilt, or fear of failure. This type of motivation is externally regulated. On the other hand, intrinsic motivation is characterized by activities or actions performed for interest, enjoyment, and satisfaction in the tasks undertaken (Chen et al., 2019; Ryan & Deci, 2020) and would be at the base of a motivational orientation towards learning.

Different studies under the Self-Determination Theory framework (Cheon et al., 2023; Hosseini et al., 2022; Neufeld, 2021) recognize the importance of the satisfaction of basic psychological needs as a mediating variable and its influence on learning, commitment to academic activities, academic performance, psychological well-being and particularly, on the regulatory styles that affect the type of motivation (Botnaru et al., 2021).

Recent research has shown that teachers meeting basic psychological needs leads to a type of autonomous motivation among students, which significantly impacts their academic performance, engagement, and well-being (Bureau et al., 2022). Additionally, evidence suggests that academic motivation changes when basic psychological needs are met, particularly autonomy, which generates a type of motivation that predicts and positively affects learning, engagement, and effort (Johansen et al., 2023).

Previous studies have indicated that the satisfaction of each of the basic psychological needs has been significantly related to self-determined behaviors and autonomous motivation (Carriedo et al., 2023; Hosseini et al., 2022) whereas the frustration of these needs has effects on certain types of behaviors that are guided

by external factors and, therefore, with high levels of controlled motivation (Ryan & Deci, 2020; Wild et al., 2023). In addition, the specialized literature has shown that they are essential nutrients for effective functioning and psychological health independent of people's culture (Deci & Ryan, 2008).

In this study, the two theoretical perspectives (GT & SDT) allow for the broadening and deepening of the understanding of the academic motivation of university students. Goal Theory emphasizes motivational orientation, either approach or avoidance to Mastery or performance (Elliot, 2020), depending on the goals pursued by students. On the other hand, Self-Determination Theory has shown that the satisfaction of basic psychological needs is related to a type of autonomous motivation that has effects on psychological well-being, academic engagement, and learning (Botnaru et al., 2021; Johansen et al., 2023). Thus, a student's motivational orientation might change depending on whether or not he or she has satisfied basic psychological needs as a function of certain teaching practices.

Although many factors can favor the development of motivation or the satisfaction of basic psychological needs, teachers are relevant actors. Through them and their practices, motives for learning (Valenzuela et al., 2021) and the conditions for satisfying the needs for relatedness, autonomy, and competence (Ryan & Deci, 2020) can be favored. In this context, *teaching practice* is defined as a set of visible actions carried out by academics to improve students' learning experience (Osorio Pérez & Moreno Martínez, 2023). It constitutes a system of activities wherein various factors interact simultaneously in a culturally defined context, such as the learning space. Among these practices, some are oriented explicitly toward generating motivation in students. To qualify them as «motivational», there must be a theoretical basis for assuming that they have such an effect and, ideally, empirical evidence of this effect. In this sense, motivation theories help us identify teaching practices with motivational potential.

The literature agrees that motivation can be regulated internally or externally. In the latter case, through rewards or punishments (Guay, 2021). Similarly, we know that intrinsic motivation arises from a process of internalization of motives and self-determination, predominantly mediated by experiences of autonomy (Ryan & Deci, 2020), and that although both types of motivation affect learning, they contribute differently. Thus, to understand why students develop an internal or external motivational orientation toward learning (Cf. Bieg et al., 2017), it is important to observe the dynamic of rewards and punishments and the promotion of self-determination (autonomy).

For its part, it is known that the feeling of self-efficacy is a determinant for the choice of goals, and we have evidence that it plays a crucial role in the development of goal orientation (see mastery goal in Babenko & Oswald, 2019). So, self-efficacy seen from the perspective of teaching practices, can be translated into experiences

of cognitive challenge or challenge, where the teacher implicitly expresses his or her beliefs that the student can successfully solve the task. Added to this is the value of the task as an explanatory variable. This last dimension includes the task's perceived utility, importance, cost, and interest.

Additionally, two other factors can be identified that act as a necessary but hardly sufficient condition for learning motivation: emotional support practices and classroom climate. The former, refers to those teaching practices of emotional support and containment to the student, individually. The latter are those that are carried out collectively and are expressed as the creation of an adequate and safe classroom climate for learning. Recent reports linked to online teaching show that students identify these emotional support factors as crucial in their desire to learn (Frenk et al., 2010; Miranda Ossandón et al., 2023; Schenke et al., 2018).

In this line, our team examined the effect of nine types of teaching practices with motivational potential on the motivational orientation toward learning in a university context (Valenzuela et al., 2024). It should be noted that these practices arise from the analysis of the reports developed by the teachers and students themselves, and the theoretical frameworks of reference on motivation support their definition. These nine practices (Valenzuela et al., 2022) are centered on rewards, punishments, autonomy, challenge, utility, self-efficacy, importance, emotional support, and a safe classroom environment.

Analyses performed through Bayesian multiple regression showed that the motivational practices that most affect learning-oriented motivation focus on the *importance* of what is to be learned and on student *autonomy*. In some cases, motivational practices focused on showing the *utility* of the content addressed. This last type of practice has been observed to be relevant in health students. Although it is a variable that is located in the margins of the significance of the explanatory model (BFinclusion= 1.45; P(excl|data) = .489), we have decided not to exclude it because, in some types of students, this kind of motivational practice may be relevant (Valenzuela et al., 2024).

Some research examines the satisfaction of these basic psychological needs as a mediator (Babenko & Oswald, 2019). However, we did not find any research that explicitly observes it as a mediator of the motivational effect of teaching practices on motivational orientation towards learning (mastery). Therefore, in a sample of undergraduates, this study analyses the mediating effect of the satisfaction of basic psychological needs on the relationship between these three motivational practices (utility, importance, and autonomy) and learning-oriented motivation.

According to the above, we seek to test four hypotheses derived from the theoretical review that account for the directionality of the variables: exogenous (motivational teaching practices), exogenous mediating (basic psychological needs),

and endogenous (learning-oriented motivation), considering the paths of simple mediation analysis.

1. The three teaching practices students perceive as motivating (importance, utility, and autonomy) directly and significantly affect the type of learning-oriented motivation (path c).
2. The three teaching practices students perceive as motivating directly and significantly affect the satisfaction of basic psychological needs (path a).
3. The satisfaction of basic psychological needs directly and significantly affects learning-oriented motivation (path b).
4. Satisfaction of basic psychological needs mediates the effect between the teaching practices of utility, importance, and autonomy perceived as motivating by students on motivational orientation towards learning (path c').

METHOD

Participants

Although all professions are important and contribute to society in a specific way, there are those whose practice has a more significant social impact. As such, we focus on undergraduates in health and education programs. Moreover, the number of professionals in these areas is also an aspect to consider. Currently, 28.5% of the total enrollment of university students in Chile is associated with the areas of health (19.4%) or education (9.1%) (Mifuturo.cl, 2023).

In the present study, 763 Chilean university students of both sexes (79% women) from different universities in the country participated in the Health (n=398) and Education (n=365) areas. The research used a combination of convenience and simple random sampling. The first case corresponds to the selection of the areas of Education and Health because the careers of these faculties have a high social impact. Simple random sampling was used to take the sample (within the respective careers).

The Health area included careers were Medicine, Nursing, Kinesiology, Occupational Therapy, Psychology, Chemistry and Pharmacy, Medical Bioengineering, Nutrition, Dentistry, Obstetrics, and Speech Therapy. The education area considered careers in preschool, elementary, and secondary pedagogy in different specialties: Mathematics, Language, Religion/Philosophy, English, History, Science, and Physical Education. The average age of the participants was 20.9 years (SD= 3.39), concentrated in the 18 to 24 years age group (91.1% of the sample).

Instruments

Basic psychological needs were assessed through the Basic Psychological Needs Satisfaction and Frustration Scale by Chen et al. (2015), adapted to Spanish by Del Valle et al., (2018). This instrument is composed of 24 items grouped into the three dimensions that measure the levels of satisfaction and frustration of each of the basic psychological needs proposed by the self-determination theory; autonomy, competence, and relatedness. The scale was validated in a sample of Chilean university students presenting adequate psychometric properties, CFI = .92; TLI = .90; RMSEA = .05 [.042, .058] and a SRMR = .05 (Del Valle et al., 2018). The items were answered on a 5-degree Likert scale ranging from (1) «strongly disagree» to (5) «Strongly agree». In this study, the subscale of satisfaction of basic psychological needs (α = .90) was used, composed of 12 items measuring autonomy (e.g., «I feel I have the freedom and possibility to choose the things I take on»), competence (e.g., «I feel I can do things well») and the dimension, relatedness that measures the relationship with others and sense of belonging (e.g., «I feel I matter to the people who matter to me»).

The Mastery Goal subscale of the Achievement Goal Scale (Elliot & Church, 1997) was used to assess motivational orientation. The scale evidenced in this study adequate psychometric properties $Chi^2(7) = 23$; p = .001; CFI = .987; TLI = .973; SMRS = .019; RMSEA = .057 [.03, .08] and a Cronbach's alpha of α = .80. The applied subscale is derived from the 2x2 model of personal achievement goals and seeks to assess the degree of agreement with questions using a 5-grade Likert scale ranging from (1) «strongly disagree» to (5) «strongly agree» and measuring approximation-mastery (e.g., «my goal is to learn as much as I can»).

To assess the motivational potential of teaching practices, the scale of motivating teaching practices was used (Valenzuela et al., 2024). This scale evaluates the motivational potential of nine teaching practices based on the frequency of the practice (PF) and the motivational effect attributed to the practice (MEP). The frequency was measured through the question: How often do your teachers carry out the following practices... (0=never - 5=always) and the perceived motivational effect through the item: The following teacher practices make me want to learn in my career (0=Strongly disagree 5=Strongly agree). The motivational potential variable of the teaching practices was constructed from these two variables, which corresponds to the square root of the product between frequency and the motivational effect attributed to each type of practice (MP= PF*MEP).

The practices evaluated are related to the aspects that the literature recognizes as factors that influence motivation: rewards, punishments, utility, importance, self-efficacy, emotional support, classroom climate, and the development of autonomy. Each of these dimensions was measured using items that show prototypical

practices of each of these dimensions (Cf. Valenzuela et al., 2022). The scale, thus constructed, shows good levels of fit $Chi^2(13) = 52.7$, $p < .001$; CFI = .981; TLI = .970; SRMR = .031; RMSEA = .06 [.04, .08] and reliability $\alpha = .80$; $\omega = .86$.

Based on this scale and considering those significant aspects in explaining the motivational orientation to learning (Valenzuela et al., 2024), this study will use only the motivational potential of practices oriented towards utility, importance, and autonomy.

Procedure

The study was conducted according to the ethical principles defined for research involving human subjects, ratified by the Scientific Research Ethics Committee of the sponsoring institution. All instruments were administered online with prior permission from the corresponding university authorities. The participation of the students was voluntary and ratified by signing the informed consent form, which indicates that all responses will be strictly confidential and used only for academic purposes.

Data Analysis

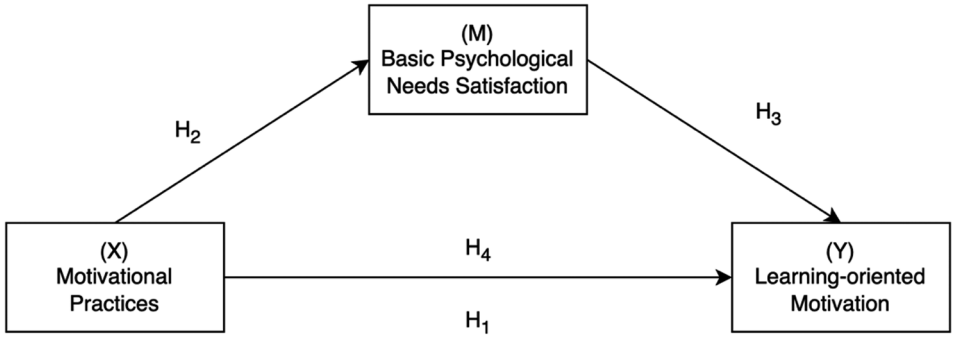
Cronbach's alpha coefficient was used to evaluate the internal consistency of the scales used in the research, using as criteria an $\alpha = .70$ to consider acceptable reliability (Taber, 2018).

The study considered teachers' practice an exogenous variable that students perceive as motivating; in this case, the practice was focused on utility, importance, and autonomy. It also considered the satisfaction of basic psychological needs an endogenous mediating variable. Finally, learning-oriented motivation is an endogenous variable.

Three simple mediation analyses assessed the effect of Basic Psychological Need Satisfaction (BPNS) on the relationship between teaching practices students perceive as motivating (importance, utility, and autonomy) and learning-oriented motivation. The mediation analysis procedure used the bootstrapping procedure with 5000 repetitions.

To verify the mediating effect of BPNS, 95% confidence intervals were estimated. The indirect effect is assumed to be significant ($p < .05$) if the confidence intervals of the indirect effect do not pass through zero (Shrout & Bolger, 2002). The PROCESS macro for SPSS (Preacher et al., 2007) was used to perform the analyses.

Figure 1
Hypothetic model



RESULTS

Correlation analysis

Previous analyses identified that of the nine teaching practices with motivational potential, only three were identified by students as having a significant motivational effect on motivational orientation towards learning: utility, importance, and autonomy. The analyses conducted in this study show that these practices correlate significantly with a motivational orientation toward learning and a positive and significant correlation with Basic Psychological Needs Satisfaction.

Table 1
Correlation matrix

		1	2	3	4
1	Learning-oriented motivation	—			
2	Utility-oriented motivational practices	.332***	—		
3	Importance-oriented motivational practices	.415***	.679***	—	
4	Autonomy-oriented motivational practices	.350***	.461***	.495***	—
5	Basic Psychological Needs Satisfaction	.502***	.313***	.371***	.411***

Note. *** p < .001.

Mediation analysis

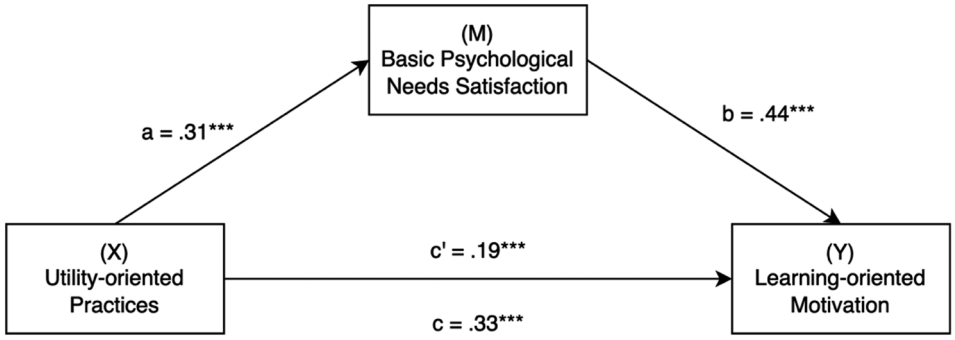
Figures 2, 3, and 4 show the simple mediation models, including the Basic Psychological Needs Satisfaction, mediating the relationship between the three practices perceived by the students as motivating and learning-oriented motivation.

Mediation analysis 1 (utility-oriented practices): According to the standardized coefficients, it was observed for the case of utility-oriented teaching practice that there is a significant overall effect on learning-oriented motivation ($r = .33$, $p < .001$; path c) and also a significant effect on satisfaction of basic psychological needs ($r = .31$, $p < .001$; path a). In addition, a significant effect of basic psychological needs satisfaction on learning-oriented motivation is observed ($r = .44$, $p < .001$; path b).

This first mediation model shows a significant indirect effect (standardized) of utility teaching practices perceived by students as motivating on learning-oriented motivation (B = .14), as the confidence intervals do not pass through zero [.09, .19]. However, a significant direct effect remains when controlling for the effects of basic psychological needs satisfaction ($r = .19$, $p < .001$; path c'), indicating partial mediation. For this teaching practice, the proposed mediation model explains 29% of the variance.

Figure 2

Model of mediation 1 (Utility-oriented practices)

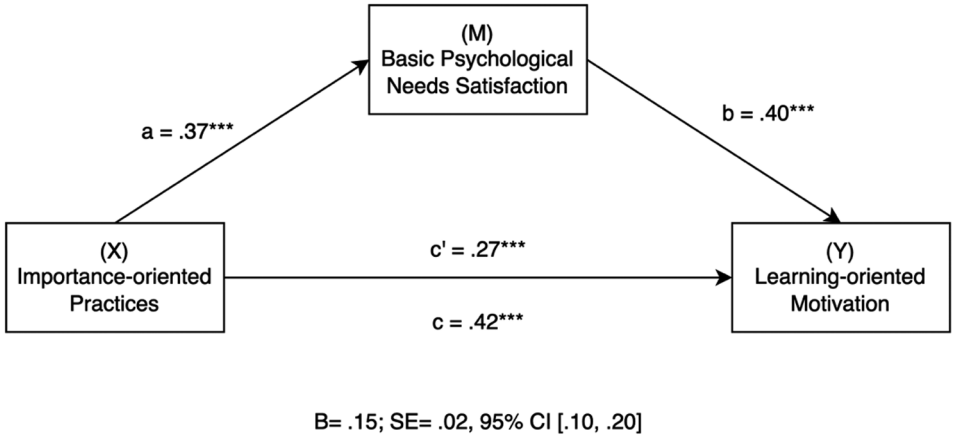


Mediation analysis 2 (importance-oriented practice): For this case, it was observed that importance-oriented teaching practice has a significant overall effect on learning-oriented motivation (r = .42, p < .001; path c) and also a significant effect on satisfaction of basic psychological needs (r = .37, p < .001; path a). In addition, basic psychological needs satisfaction significantly affects learning-oriented motivation (r = .40, p < .001; path b).

The second mediation model shows a significant indirect effect of this practice on learning-oriented motivation (B = .15, p < .001), as the confidence intervals do not pass through zero [.10, .20]. However, a significant direct effect remains when controlling for the effects of satisfaction of basic psychological needs (r = .27, p < .001; path c'), indicating partial mediation. The proposed mediation model explains 31 % of the variance for this teaching practice.

Figure 3

Model of mediation 2 (Importance-oriented practices)



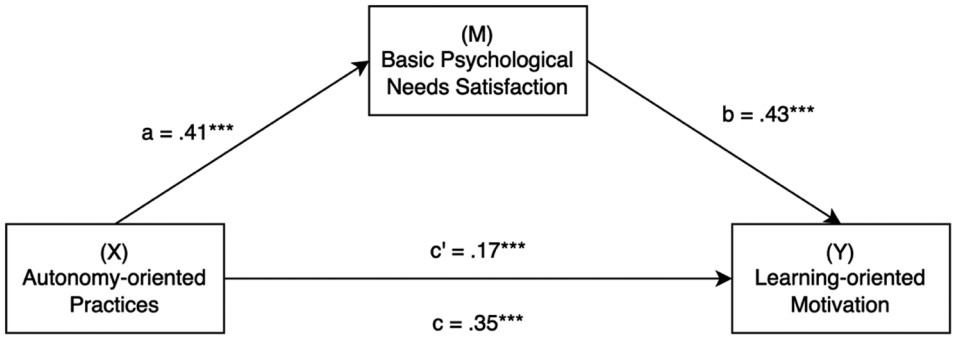
Mediation analysis 3 (autonomy-oriented practices): For the case of autonomy-enhancing teaching practice, the standardized coefficients show that there is a significant overall effect on learning-oriented motivation (r= .34, p < .001; path c) and also a significant effect on satisfaction of basic psychological needs (r= .41, p < .001; path a). Basic psychological needs satisfaction also significantly affects learning-oriented motivation (r = .43, p < .001; path b).

This mediation model shows a significant indirect effect of autonomy-enhancing teaching practice on learning-oriented motivation (B = .18, p < .001), as

the confidence intervals do not pass through zero [.13, .22]. However, a significant direct effect remains when controlling for the effects of basic psychological needs satisfaction (r = .17; p < .001; path c'), indicating partial mediation. The proposed model explains 28 % of the variance.

Figure 4

Model of mediation 3 (Autonomy-oriented practices)



The analyses show the mediating effect of the satisfaction of basic psychological needs (BPNS) on the relationship between teaching practices (oriented on utility, importance, and autonomy) and learning-oriented motivation.

As Table 2 shows, in all the proposed mediation models (1, 2, and 3), the correlation between the different teaching practices (utility, importance, and autonomy) and learning-oriented motivation is greater than the β (X, Y, M) estimator, which quantifies the proportion of the variance explained once the effect of the mediating variable (in this case basic psychological needs) is included, which shows a partial mediating effect that explains a significant percentage of the variance.

Table 2
Effects of basic psychological needs satisfaction as a mediator in the 3 models evaluated

Mediation Analysis	TP – BPNS X→M. (a)	BPNS – LOM M→Y. (b)	TP –LOM X→Y (c)	β(X,Y,M) (c')	% Mediating Effect of BPNS
Model 1 (Utility-oriented practices)	.31	.44	.33	.13	28.57
Model 2 (Importance-oriented practices)	.37	.40	.42	.15	31.33
Model 3 (Autonomy-oriented practices)	.41	.43	.35	.18	27.63

Note. BPNS= Basic Psychological Needs Satisfaction; LOM: Learning-oriented Motivation; TP: Teachers motivational practices (oriented to utility, importance, and autonomy).

The indirect effect is explained by the presence of a mediating variable, in this case, basic psychological needs, which indicates that the practices implemented by teachers can increase learning-oriented motivation on the condition that the three basic psychological needs of competence, relatedness, and autonomy, proposed by the Self-Determination Theory, are satisfied.

DISCUSSION AND CONCLUSIONS

This research aimed to evaluate the mediating effect of the BPNS on the relationship between three types of motivational teaching practices and the motivational orientation towards learning in university students.

The study set out to test four hypotheses. Regarding the first one, the results show a direct and significant relationship between three teaching practices with motivational potential on learning-oriented motivation. These teaching practices, which emphasize the importance and utility of the content and promote student autonomy, encourage students to engage authentically in the learning process.

The results also show that these three teaching practices, perceived by students as motivating, directly and significantly affect the satisfaction of basic psychological needs (hypothesis 2). From SDT, several studies have shown that basic psychological needs are considered essential for effective functioning and psychological health (Deci & Ryan, 2008). As a mediating variable, they influence both performance, learning, academic activities, and the regulation styles of different types of motivation (Botnaru et al., 2021; Cheon et al., 2023).

In turn, like Janke (2022), this study corroborates that the satisfaction of basic psychological needs directly and significantly affects motivational orientation towards learning (hypothesis 3). Thus, students will be more motivated to learn to the extent that teachers provide conditions that promote autonomy and stimulate meaningful relationships and a sense of belonging, strengthening their academic competence.

Chilean university context, there is evidence that shows that satisfying the basic psychological needs of students in general, or specifically supporting the development of autonomy, increases academic satisfaction and well-being associated with learning activities, as well as the intention to remain and not drop out of higher education (Barrientos et al., 2021; Vergara-Morales & Del Valle, 2021). On the other hand, there is evidence that in this context, when university professors have satisfied their basic psychological needs, they are more interested in promoting their students' willingness to study (Abello et al., 2022), which directly impacts academic motivation and learning.

These results align with previous studies (Cf. Johansen et al., 2023), which recognize that the types of practices used by university teachers directly affects the type of motivation, effort, and engagement students develop in their learning.

Finally, the results show a partial mediation of BPNS in the relationship between motivational teaching practices (utility, importance, and autonomy) and motivational orientation toward learning (hypothesis 4). This finding is relevant because it shows that the mediating variable does not explain all the variability in motivational orientation toward learning. This finding emphasizes the importance of situated, explicit, and frequent teaching practices that favor formative motivational actions oriented toward utility, importance, and autonomy.

The results of this study imply important challenges. Firstly, given that a practice's motivational potential requires a motivational character for the student, teachers need to know their students to adjust their motivational efforts to the students' reality and context.

A second challenge for teachers is to have an adequate understanding of the autonomy construct from Self-Determination Theory to avoid meaningless practices (e.g., planning unsupervised activities), believing that this creates a space for autonomy. Instead, it is about generating experiences so that the student can, in a self-determined way, carry out activities committed to his or her learning process.

In short, activities, or practices should be encouraged that allow students to develop regulatory styles based on personal goals without seeking rewards or avoiding punishment. Evidence shows that frustration with basic psychological needs is related to a lack of academic engagement and a type of controlled motivation (Howard et al., 2021; Johansen et al., 2023).

One limitation of this study lies in how the motivational potential of teaching practices was assessed. Indeed, for this study, we chose to evaluate the motivational potential from the students' perception. Although this is an indirect measure, it is logical to think that the motivational potential of practice will be more effective, the more meaningful it is for the student. Considering the difficulties of an experimental design in regular classrooms, this design was the most appropriate to simultaneously contrast the different types of practices and their effect on motivational orientation towards learning. The design of experiments with each of these practices was not possible. The challenge remains to implement experimental designs to confirm the individual effect of the three motivational practices identified in this study as significant in their effect on this specific type of motivational orientation.

On the other hand, the results invite us to plan future studies that point in at least two directions. The first is to investigate the understanding of the concept of autonomy in the learning process by the different actors (teachers, students, managers). The second is to critically analyze the real possibility that the university system has today of fostering the satisfaction of basic psychological needs in a mass-education context such as the current one.

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DATA AVAILABILITY STATEMENT

The data supporting this study's findings are available from the corresponding author, [JV], upon a reasonable request.

CONFLICT OF INTEREST

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

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