Attributions to Academic Achievements in the Transition to Higher Education

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Abstract The perceived causes of success in academic learning play a decisive role in students' goals, behaviours and emotional reactions towards similar situations in the future. The purpose of this study was to identify the perceived causes of academic achievement in the transition to higher education and to relate them to the academic outcomes. The participants, 204 college students, were asked to rate the importance of a list of attributions to their academic outcomes. Those ratings were related to a measure of academic success. The results have revealed that the most important perceived causes of success are internal and controllable. Discriminant analysis permitted the estimation of a significant discriminant function that distinguishes between successful and non-successful students. A one-way ANOVA has revealed significantly higher means of internal and controllable attributions in more successful students. These results suggest the importance of interventions to help students assume control over their success and engage intentionally in more effective learning processes.

Keywords Attributions · Academic success · College students

Attributional theory has been stating that people naturally seek to explain the causes of significant events (Heider 1958; Kelley and Michela 1980; Weiner 1986). Weiner focused on how achieving behaviour as well as expectations, motivations and emotions are influenced by perceived causes of success and failure. According to Weiner (1986), people could attribute their successes or failures to such factors as effort, ability, luck or task difficulty. Those studies and many others reported that causal explanations (e.g., illness, environment conditions, other people's influence) could be categorised along three dimensions: *locus of causality,* establishing the cause as residing within the person (internal) or outside the person (external); *stability*, referring to the difference between perceived causes that do not change over time (stable) and causes that change over time (unstable); and *controllability*, discriminating between those causes that can be controlled (controllable) and those that cannot (uncontrollable) (Weiner 1986). The combination of these three dimensions permits any attributional cause to be classified. Perceived causes of success and failure in academic learning have a major impact on how individuals react. Students' explanations for their successes or failures have shown to have a decisive influence on their future goals, their behaviours and their emotional reactions to future situations (Hareli and Hess 2008; Weiner 2010, 2016). If students believe that their failure is caused by a lack of ability, an internal but uncontrollable and stable cause, it is likely that they will do nothing to change their academic outcomes because they assume they cannot change the situation. However, if students believe their failure is due to a lack of effort, an inadequate use of learning strategies or inadequate time management, they can be more optimistic about the likelihood of success in the future, and are likely to attempt to change their academic outcomes by changing their learning processes, working harder or learning new strategies to do better when faced with similar circumstances (Holschuch et al. 2001; Wolters et al. 2013).

Although previous research revealed that the effect of the attributions on emotions was not linear and might reflect the impact of some mediators, like values or self-perceptions (Dong et al. 2015; Stephanou and Tatsis 2008), there has been

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clear evidence that different perceived causes of outcomes produce different emotional responses in students, and those reactions have a powerful effect on how they will behave and react the next time they face a similar situation. Research based on Weiner's dimensions of attributions (e.g., Hareli and Hess 2008; Tracy and Robins 2006) provides evidence that the attribution of internal but uncontrollable causes of failure leads to feelings of shame or embarrassment, whereas the attribution of failure to an internal but controllable cause generated feelings of guilt. If students feel guilt, they are more likely to seek a solution, increasing motivation to change goals and activate different behaviours to enhance the likelihood of success. When a failure is attributed to a controllable cause, students feel they can control the situation and believe that their academic performance is dependent on their agency. Thus, they can intentionally activate the strategies and self-regulation mechanisms needed to succeed. Otherwise, a student who feels shame is more likely to feel helplessness, lowering expectations of success (Hareli and Hess 2008; Holschuch et al. 2001). In any case, the perception of the attributional causes is believed to be a key factor in academic outcomes.

According to social cognitive theory (Bandura 1986, 1997), beliefs about oneself and one's environment have been seen as an important component of the reciprocal interaction that leads to human functioning. Thus, although attribution thoughts do not imply a direct link to academic performance and success in school and are usually seen as mediated by critical variables, such as perception of value of education, self-efficacy beliefs, academic self-esteem or success expectation (Bandura 1997; Dong et al. 2015; Schunk 2009, 2012; Stephanou and Tatsis 2008), there are adaptive attributions that can be indirectly related to better academic outcomes. Attributions that are internal but controllable, such as amount of effort to success, have been related to an adaptive profile of academic engagement, persistence, use of metacognitive strategies, which are in turn associated with better academic outcomes (Heikkila and Lonka 2006; Linnenbrick and Pintrich 2002; Schunk et al. 2014; Wolters et al. 2013). Considering that self-regulated learning implies a process in which students intentionally activate and sustain behaviours, cognitions, beliefs and affects to attain academic goals (Pintrich 2000, 2004; Zimmerman 2011, 2013), attributions can be seen as playing an important role in self-regulation processes. As Zimmerman (2011, 2013) stated, self-regulation processes could be conceived in terms of three cyclical phases: forethought, performance control and self-reflection. Within this structure, attributions are connected to the self-regulation phase during the forethought phase, as students consider their prior experiences and corresponding attributions in similar previous situations, and in the self-reflection phase, when students self-evaluate and try to explain their achievements in a defensive or adaptive way. Students with an internal attributional orientation, explaining their achievements using internal and controllable causes, such as effort or adequate

strategy use, are more motivated to engage in self-regulated learning (Schunk 2008). In contrast, students with an external attributional orientation, dissociating themselves from causes of failure, are more likely to use cognitive strategies such as self-handicapping to protect their self-worth, which, in turn, can lead to an increased likelihood of failure (Martin et al. 2001).

The connection between perceived causes of success and academic success has been empirically shown, with data supporting theories that claim that effort attributions motivate achievement (McClure et al. 2011). More specifically, students' tendency to explain achievements using internal and controllable attributions could contribute to promoting positive achievement outcomes (Stewart et al. 2011). Also, research suggested that students who attribute their worst marks to external causes tended to have a *Do Just Enough* motivation orientation and that this kind of attribution related to lower marks (McClure et al. 2011).

This association of a certain attributional style to academic performance, as reported in several studies (Dollinger 2000; Heikkila and Lonka 2006; Kirkpatrick et al. 2008; Linnenbrick and Pintrich 2002; McClure et al. 2011; McMillan 2015; Perry et al. 2005; Schunk et al. 2014), suggests the importance of encouraging controllable and internal attributions, such as effort and strategy, in place of uncontrollable causes, such as ability or luck, to enhance positive academic outcomes. Some authors analysed the impact of conducting a treatment intervention, known as attributional retraining, to reduce the likelihood of failure or procrastination in students or enhance their academic success (e.g., Brownlow and Reasinger 2000; Chodkiewicza and Boyle 2014; Haynes et al. 2009; Robertson 2000; Stewart et al. 2011). Nevertheless, the effectiveness of attributional retraining to assist students who are entering college could be dependent upon attribution combinations. Perry et al. (2008) defined different groups of students, accordingly to the kind of dominant attributions to failure and suggest that attributional retraining would be more useful for those students (within a cluster named effort-reliant) that emphasise one controllable attribution (low effort) and de-emphasise three uncontrollable ones (low ability, test difficulty and poor teaching).

Ramirez et al. (2002) also reported that an intervention conducted to change teacher's attributions contributed to their pupils' use of a more adaptive attributional style as well as an increase in GPA.

Purpose of the Study

The purpose of the present study is to identify the most important perceived causes of academic achievement in the transition to higher education and to relate those attributional beliefs to the academic outcomes of freshmen college students at the end of their first semester. Previous research has

emphasised the relationship between different dimensions of attributions that are more closely related to behavioural change to enhance academic outcomes and to the prediction of academic achievement. In some studies (e.g., Holschuch et al. 2001; Miranda et al. 2012), the results suggest that the controllable causes, as attribution to effort, is a strong associate to academic achievement, even when controlling for social class (McMillan 2015) or ethnicity (McClure et al. 2011). Other studies (e.g., Brownlow and Reasinger 2000; McMillan 2015) reveal that the dimension of locus of causality also contributes to academic performance.

Furthermore, the association between internal and controllable attributions and psychological processes, such as effort, mastery-orientation or self-regulation of learning (Heikkila and Lonka 2006; Linnenbrick and Pintrich 2002; Schunk 2009, 2012; Zimmerman 2011, 2013), also suggests the relationship of these attributions with better academic outcomes. Identifying the attributions related to success can contribute to helping students cope successfully with the transition to higher education and designing intervention programs that enhance adaptive attributions.

With this study, we aim to explore the perceived importance of different causal explanations of success and their relations to the marks obtained by college students in the first semester of their first college year. We also attempt to identify the causal attributions that differentiate students from those whose marks decreased during the transition to college. We also analysed differences in causal attributions for success in groups defined by different levels of academic success.

The research questions addressed in this paper are as follows:

1. What are the perceptions of students regarding the importance of various causes of academic success?
2. How do different causal attributions relate to one another? Is it possible to identify underlying variables that explain the pattern of correlations within the set of causal attributions?
3. Which causal attributions differentiate students whose marks (measured by arithmetic mean of the five mandatory courses of first semester) in the end of first semester increased as compared to marks at entrance (measured by college entrance score) from those whose marks decreased in the same period?
4. Are there differences in attributions for academic success in students with different levels of academic success?

Method

Procedures

This study was conducted in two steps.

Preliminary Study A face-to-face survey with open questions was administered to a sample of freshmen college students with full-time status. Students were asked to indicate which factors they thought were the key for academic success in the transition to higher education. The data were anonymous, and the students' confidentiality was guaranteed. A content analysis of the answers and the attributions to success/failure referred in literature (Lebedina-Manzoni 2004; Schunk 2008; Weiner 1986) led to the following list of possible attributions of success: persistence, hard work, self-regulation of learning, attendance to all classes, luck, resilience, good note-taking in class, help from colleagues, family support, determination to reach goals, university resources, intelligence, family resources, motivation to study a subject, favourable environment, anxiety, reflexivity (versus impulsivity), commitment to academic goals, focus (task-oriented), belief in own skills, teachers and well-being at the university.

Main Study The resulting list of possible attributions was presented to a different sample of college students, with full-time status, after the autumn semester. Students were asked to rate the importance of each attribution to good academic outcomes using a numerical scale from not important at all to very important, where the points of the scale were considered equidistant, thus maintaining the interval properties of the scale (Moreira 2009). According to Matell and Jacoby (1972), the number of points in the scale has no significant impact on the quality of results. In this study, we used a numerical scale from 1 to 5. Cronbach's alpha of this scale is .74.

Participants

In the preliminary study, 184 freshmen students (110 female and 74 male, aged 19 to 22 years old), of the University of Lisbon (public university), answered the survey.

In the main study, the participants were other 204 college students of the same public university (University of Lisbon) in the middle of their first year of college. All students were Caucasian (100 %); additionally, 92 participants (45.1 %) were male, and 112 (54.9 %) were female. Their age ranged from 18 to 22 (M: 18.71; median: 18; SD: .92).

Measures

Attributions of Academic Outcomes

The list of attributions of academic outcomes referred in main study section was rated by the participants using a numerical scale from 1 (not important at all to academic outcomes) to 5 (very important to good academic outcomes).

Success in the Transition to College

Success in the transition to college was assessed by computing the difference between students' college entrance score and the marks (measured by arithmetic mean of the five mandatory courses of first semester) they achieved after the examinations of the autumn semester. Students were considered to have been successful at transition from high school when their marks after the examinations increased (on a 20-point scale from 1, the minimum mark possible, to 20, the maximum mark possible and corresponding to excellence in academic achievement) relative to their college entrance score. For example, a student with college entrance score of 14 was considered successful in the transition if, at the end of the autumn semester, his or her marks (measured by arithmetic mean of the five mandatory courses) were higher than 14. If his or her marks at the end of the autumn semester were lower than 14, he or she was considered unsuccessful.

Levels of Academic Success in College

To better explore the concept of academic success in college (and trying to minimise the likelihood of errors due to chance), we defined a second criterion of success, not dependent on the differences between students' college entrance score and the marks obtained in the autumn semester. This criterion was only dependent on the final marks of the autumn semester on the five mandatory courses. It permitted to differentiate between 4 levels of success: 1 – fail (arithmetic mean of the five mandatory courses lower or equal to 9.4), 2 – lower achievement (arithmetic mean of the five mandatory courses higher or equal to 9.5 and lower or equal to 13.4), 3 – good achievement (arithmetic mean of the five mandatory courses higher or equal to 14 and lower or equal to 16.4) and 4 – excellent achievement (arithmetic mean of the five mandatory courses higher or equal to 16.5). These boundaries are not arbitrary: Portuguese grading system ranges from 0 to 20, with a correspondent qualitative interpretation of each range of grades from fail to excellence.

Results

The participants stated that hard work is the most important factor for success ($M = 3.62$), followed by determination ($M = 3.55$) and persistence ($M = 3.5$) and, which are all internal and controllable attributions. Self-regulation of learning ($M = 3.49$) and commitment to academic goals ($M = 3.4$), were also rated as very important. The lowest scores of importance were attributed to external causes, such as luck ($M = 2.27$), family resources ($M = 2.69$) and help from colleagues ($M = 2.76$), all out of a maximum of 5.00 (Table 1).

A principal component analysis of these causal attributions and an analysis of the scree plot of the eigenvalues revealed that only four factors should be kept, explaining 51.5 % of all variability of the results (Table 2). The rotated (varimax algorithm) factor solution is presented in Table 3.

The analysis of factor loadings in the matrix rotated orthogonally in accordance with the varimax criterion revealed a factor structure in which the first component is defined mainly by loadings over .60 of Resilience, Persistence, Hard work, Self-regulation of work and Determination, all internal and controllable causes, suggesting stability and the agency of the students. The second component is defined by factor loadings higher than .60 of Resources of the Faculty, Environment, Teachers, Well-being at the university, Family support and Family resources, all external but stable attributions. The third and fourth components are defined, respectively by internal and by external causes. Nevertheless, unlikely component 1 and 2, these causes can be considered uncontrolable and/or unstable.

Discriminant analysis, a multivariate statistical method, was performed to determine which causal attributions differentiate between students whose marks increased (considered success) and those whose marks decreased (considered fail) in the transition to college. The analysis permitted the estimation of a significant discriminant function ($\Lambda = .30$, χ^2 (22) = 226.68, $p = .001$) that distinguishes between those students who were successful in the transition to college and

Table 1 Perceived importance of different causes to academic outcomes ($N = 204$)

Causes	Mean (SD)	Causes	Mean (SD)
Hard work	3.62 (0.73)	Family support	3.00 (0.84)
Determination	3.55 (0.70)	Reflexivity (vs impulsivity)	3.00 (0.70)
Persistence	3.50 (0.78)	Intelligence	2.98 (0.63)
Self-regulation of learning	3.49 (0.70)	Teachers	2.97 (0.72)
Commitment to academic goals	3.40 (0.60)	Anxiety	2.95 (0.72)
Believe in own skills	3.27 (0.71)	Resources of the Faculty	2.85 (0.76)
Motivation for subjects	3.19 (0.75)	Well-being at University	2.80 (0.71)
Take good notes in classes	3.18 (0.73)	Environment	2.79 (0.73)
Resilience	3.17 (0.87)	Help from colleagues	2.76 (0.77)
Focus (task-oriented)	3.10 (0.60)	Family resources	2.69 (0.88)
Attendance to classes	3.02 (0.77)	Luck	2.27 (0.81)

Table 2 Total variance explained

Component	Eigenvalue	% of Variance	Cumulative %
1	4.91	22.30	22.30
2	3.69	16.79	30.09
3	1.51	6.89	45.98
4	1.21	5.52	51.5

those who were not. Table 4 shows the structure matrix table. Highest discriminant loadings refer to Resilience (.60), Persistence (.34), Hard work (.27) and Attendance to classes (.26), all of which are internal attributions and controllable. By contrast, important negative loadings refer to external and uncontrollable attributions like Environment (−.36), Family support (−.23) and Family resources (−.22).

This function clearly discriminated between the two groups and correctly classified 195 (95.6 %) of the cases.

These results suggested that perceived causes of academic success were significantly related to performance.

To better explore the concept of academic success in the transition to higher education, a one-way ANOVA was performed to analyse mean differences between groups defined

Table 3 Rotated component matrix

	Components			
	1	2	3	4
Take good notes in classes	.39	-.32	.17	.40
Resources of the faculty	-.26	**.68**	-.14	-.03
Resilience	**.69**	-.42	.09	.14
Commitment to academic goals	.07	-.26	**.64**	.08
Environment	-.33	**.54**	.03	.10
Teachers	-.04	**.69**	.12	.04
Well-being at university	-.14	**.63**	.09	.22
Persistence	**.81**	-.20	.10	.04
Hard work	**.80**	-.13	.17	-.12
Self-regulation	**.79**	-.05	.06	-.25
Luck	-.22	.16	-.09	**.61**
Help from colleagues	-.11	.34	.20	**.67**
Family support	.10	**.71**	.09	.40
Determination	**.77**	.04	.23	-.07
Intelligence	.00	.19	.14	.33
Family resources	.07	**.61**	.08	.47
Attendance to classes	.43	.08	.49	-.05
Motivation for subject	-.04	-.17	.45	.34
Anxiety	.08	.27	**.64**	.05
Reflexivity vs impulsivity	.19	.10	**.74**	-.14
Focus	.28	.12	.46	.11
Believe in own skills	.05	.05	**.51**	.18

Table 4 Discriminant analysis (N = 204; Success (n = 100); Fail (n = 104))

	Function at group centroids
Success	2.47
Fail	-.91
Attributional causes	**Structure matrix**
Hard work	.27
Self-regulation of learning	.17
Determination	.22
Persistence	**.34**
Commitment to academic goals	.22
Resources of the Faculty	-.19
Take good notes in classes	.13
Believe in own skills	.09
Motivation for subjects	.07
Attendance to classes	.26
Focus (task-oriented)	.09
Resilience	**.60**
Family support	-.23
Reflexivity (vs impulsivity)	.13
Anxiety	.06
Teachers	-.19
Intelligence	-.03
Well-being at University	-.20
Environment	**-.36**
Help from colleagues	-.15
Family resources	-.22
Luck	-.16
Eigenvalue	2.27

*bold. Absolute correlation (>.30) between each variable and the discriminant function

by the four levels of academic success presented in method section. Results are shown in Table 5.

There are significant differences ($p < .01$) in attributions of groups defined by levels of success (fail, lower achievement, good achievement and excellent achievement) in internal and controllable attributions. Students with excellent and/or good achievement consider (more than the students with lower achievement), in mean, that their success is dependent on internal causes that they can control, like working hard, acting with determination and persistence, adopting strategies of self-regulation of learning, taking good notes in classes, attending classes and coping with difficulties with resilience. In contrast, students with lower achievement levels have higher means (than the students with higher levels of academic success) in external and uncontrollable attributions like environment variables, well-being at university, teachers, family support or resources, faculty resources and even luck. In the intermediate levels of success (poor vs good according to the criterion

Table 5 One-way ANOVA. Attributions by levels of academic success (N = 204)

Attributions	F (3200)	p
Hard work	**34.83****	.001
Determination	**18.37****	.001
Persistence	**41.48****	.001
Self-regulation of learning	**41.41****	.001
Commitment to academic goals	1.86	.14
Believe in own skills	1.66	.18
Motivation for subjects	.21	.89
Take good notes in classes	**10.97****	.001
Resilience	**86.23****	.001
Focus (task-oriented)	1.0	.39
Attendance to classes	**4.18****	.01
Family support	**4.65****	.001
Reflexivity (vs impulsivity)	2.38	.07
Intelligence	2.07	.10
Teachers	**9.9****	.001
Anxiety	.89	.45
Resources of the Faculty	**33.55****	.001
Well being at University	**10.12****	.001
Environment	**15.55****	.001
Help from colleagues	**5.79****	.001
Family resources	**3.8****	.01
Luck	**9.63****	.001

Bold **$p < .01$

presented above), students that get poor academic success have significant higher mean in resources of the faculty, an external attribution and lower mean in resilience, an internal attribution. Table 6 presents means of different groups, identifying significant mean differences, revealed by Scheffé post-hoc tests.

Discussion

The results of this study showed that, on average, students attribute academic success predominantly to internal and controllable causes, with higher means for hard work, determination, persistence, self-regulation and commitment to achieving goals. These attributions are adaptive, focusing mainly on agency and control of one's own outcomes. At the lower extreme are external and uncontrollable attributions, such as luck, family resources and help from colleagues. Interestingly, students' academic success was rarely attributed to intelligence or intellectual capabilities, which are internal, stable but uncontrollable attributions, suggesting that students see their academic achievement as relying on factors over which they can exert control (hard work, determination, persistence or self-regulation of learning processes). Moreover,

those students who believe that skills can be learnt, can adopt functional learning objectives, and the connection between the intentional study of learning and motivation strategies and an improvement in academic success has been empirically established (e.g., Tuckman 2003; Tuckman and Kennedy 2011; Weiner 2010). Being aware of the importance of effort for success, students may seek to learn in a proactive way and would likely try to enhance their self-regulation of learning processes. This type of attribution, believing in control over one's academic performance as well as accepting commitment and persistence (hard work) as contributing to success, is ultimately related to such concepts as academic buoyancy (the 5 C's) and academic resilience (Martin and Marsh 2006, 2008, 2009) and affects how students deal with underachievement or poor performance.

The results of this study also suggested that some attributions can be used to distinguish between those students who were successful in the transition to college and those who were not. The use of internal and controllable attributions (vs. the use of external and uncontrollable attributions) permitted to discriminate the students who succeed in the transition to college from those who failed. Helping students to be aware of their attribution patterns and their emotional and behavioural consequences should be an important goal of educational psychologists. Considering that transition moments are sensitive periods when students are at increased risk and are faced with challenges and pressures, this period might be one in which students can benefit most from interventions (Schoon and Bynner 2003). These interventions can help students attribute failure and success to causes within one's own control and to engage in more effective learning processes that will contribute to their personal development.

There are some limitations to consider when interpreting the results of the present study, particularly because they are based on a convenience sample (not a randomly assigned sample), and there was no control for a number of well-known achievement predictors, such as student background characteristics, self-efficacy beliefs, achievement goals or learning environment variables. Another limitation of the present study is related to the criterion of success, which was somewhat simplistic. Considering success to be an improvement of the entrance mean is arbitrary but sought to address the need to quantify and measure it. Although, to minimise the likelihood of errors due to chance, we defined a second criterion of success that permitted to define different levels of academic success, based on the arithmetic mean of the marks obtained by all the students in the five mandatory courses of the autumn semester. Despite this effort of diversification of measures of academic success, we consider that, in future research, the criteria of success can be improved. Nevertheless, the results are very promising as they suggest the importance of a psychological variable – attributions to success – that can be a target of intervention activities,

Table 6 ANOVA: Mean of attributions by level of academic success

	Level of academic success		Good (n = 92)	Excellent (n = 12)	Mean Differences (p < .01)
	Fail (n = 32)	Poor (n = 68)			
Take good notes in classes	2.84	2.99	3.35	3.92	Excellent > Fail
					Excellent > Poor
Resources of the faculty	3.34	3.24	2.51	1.92	Good and Excellent <Poor and Fail
Resilience	2.19	2.72	3.70	4.33	Fail < Poor < Good < Excellent
Commitment to academic goals	3.28	3.31	3.48	3.58	No significant differences
Environment	3.22	2.91	2.70	1.75	Fail > Good and Excellent
					Good > Excellent
Teachers	3.28	3.07	2.90	2.08	Excellent < Fail, Poor and Good
Wellbeing in university	3.25	2.84	2.71	2.08	Fail >Good and Excellent
					Poor > Excellent
Persistence	2.47	3.47	3.80	4.17	Fail < Poor, Good and Excellent
					Poor < Excellent
Hardwork	2.72	3.63	3.82	4.42	Fail < Poor, Good and Excellent
Self-regulation	2.50	3.57	3.74	3.67	Fail < Poor, Good and Excellent
Luck	2.81	2.19	2.25	1.50	Excellent < Fail
Help from colleagues	3.16	2.87	2.60	2.42	Fail > Good
Family suport	3.16	3.15	2.93	2.25	Excellent < Fail and Poor
Determination	2.84	3.56	3.75	3.92	Fail < Poor, Good and Excellent
Intelligence	3.16	3.04	2.87	2.92	No significant differences
Family resources	2.91	2.79	2.62	2.00	*No significant differences at p < .01
Attendance to classes	2.69	2.93	3.16	3.33	**No significant differences at p < .01
Motivation for subject	3.28	3.16	3.17	3.17	No significant differences
Anxiety	2.88	2.91	3.03	2.75	No significant differences
Reflexivity vs impulsivity	3.06	2.84	3.04	3.33	No significant differences
Focus	3.09	3.00	3.16	3.17	No significant differences
Believe in own skills	3.34	3.13	3.37	3.17	No significant differences

*Excellent < Fail (significant at p < .05)

**Good > Fail (significant at p < .05)

contributing to enhancing self-regulatory processes in students coping with the transition to higher education. In this sensitive period when students are faced with new challenges, strategies that facilitate the development of an explanation of academic performance within the control of the student, can be rehearsed and related to the activation of behaviours that enhance the likelihood of academic success.

Therefore, despite its limitations, this study provides a valuable contribution to the research on the attributions to success and failure, especially by using a two-step procedure, in a sensitive period of transition, and revealing the importance of a variable that can be the focus of an educational intervention in the context of a real-world academic setting.

Additional research on this topic is required. It will be interesting to analyse differences in how students attribute success or failure after an attributional retraining, considering the potential impact of the intervention in academic success, in longitudinal studies or follow-up contacts. It will also be interesting to compare cohort effects. Are these results related to the participants being members of Generation Y or millennials, valuing hard work and being motivated by success and achievement? Would the results be the same if participants were older, belonging to Generation X? Are there mediating factors, such as self-efficacy, results expectancy or even self-esteem? Further research can focus on these topics.

Compliance with Ethical Standards

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