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# Is comparison the thief of joy? Students' emotions after socially comparing their task grades, influence on their motivation

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## ABSTRACT

This paper examines how emotions elicited when students compare their individual performance with that of others affect their motivation to not give up their effort in their class tasks. Data were gathered from students from two different studies. In Study 1, data was obtained from 77 students to explore the influence of social comparisons on motivation to study and the moderator role of the academic situation of the student. Study 2, on the other hand, used a scenario-based approach to explore how 1653 undergraduate students reacted to different relative positions in terms of task grades. In this second study, two path models were designed to explain the expected effort of the students as a function of students' emotions, and in turn students' emotions as a function of task value in two different scenarios: task grades below or above the average. The results show that fostering social comparisons in academic settings influences students' motivation and that the influence of social emotions related to the success or failure of others depends on the relative position of the student in terms of achievement.

## 1. Introduction

This paper investigates how the relative standing of students in class influences the effect of emotions on students' motivation. Research on students' emotional experiences has demonstrated the important role of emotions regarding learning and achievement (Pekrun et al., 2002). A characteristic of emotions that can potentially affect their influence is their valence (Russell, 1980), that is, "the extent to which an emotion reflects a negative or positive state of mind, which has been variously framed as reflecting either approach or withdrawal, or attraction or aversion, respectively" (Gerber et al., 2008, p. 2130). Thus, academic achievement can be influenced by the positive or negative valence of students' emotions (Pekrun et al., 2002). However, the simplistic conception of positive and negative emotions as being "good" or "bad" does not hold in the context of academic learning and achievement (Pekrun et al., 2002). For example, a positive emotion, such as relaxation, can be detrimental for students' effort (Pekrun & Schutz, 2007). Furthermore, a non-beneficial motivation effect of negative emotions such as boredom has been shown, while a negative emotional experience in the form of frustration can positively influence motivation (Artino, 2009). In the same way, a negative emotion like anxiety can impair students' interest but can also induce motivation to invest effort (Pekrun, 2006).

The ambivalence of the emotions-motivation effect has been attributed to factors such as differences in the measurement of the emotions under study (Shao et al., 2019), the interaction between the student and the specific learning situation (de la Fuente et al., 2020), the activating or deactivating role of the emotions (Pekrun & Linnenbrink-Garcia, 2012) or the direction of the emotions (Hareli

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& Weiner, 2002). From this variety of sources of ambivalence, this paper focuses on the direction of the emotion, that is, whether emotions are self or other-directed. Inasmuch as learning situations can be solo or social, emotions can be self-directed—occurring in solo learning situations—or other-directed—associated to social learning situations— (Wosnitza & Volet, 2005). Thus, other-directed emotions are a consequence of the social setting where educational achievements take place and are derived from the fact that education is a social rather than an individualistic process (Osterman, 2000). The social dimension of educational settings affects attention to the task, monitoring of self-performance, time spent on the task, task persistence in the event of failure and performance level itself (Levine, 1983). Furthermore, the social dimension is particularly patent when grades are presented to students and they compare their individual feedback with that of others (Huguet et al., 2001). Emotions experienced by students as a result of their performance, by and large, are the product of a comparative evaluation. As a consequence, the students' emotional reactions depend on their achievements but are also affected by these comparisons (Hareli & Weiner, 2002).

Prior research has reported predicted relationships between social comparison feedback and performance (McClintock & Van Avermaet, 1975) and between upward social comparison choices and performance (Huguet et al., 2001). However, those studies focus on children in early stages of education and on upward social comparisons. The relationship between the sign of the social comparison (upward vs. downward) has yet to be clearly established, as well as its effect on the motivation of students in higher education settings. This is therefore the focus of the present research that is in line with previous studies that proclaim the subjective nature of grading (Wimshurst et al., 2006). A better understanding of how social comparisons affect the impact of emotions in academic achievements can offer paths to shape grading practices in a way that those emotions experienced can benefit students' motivation. The importance of this topic nowadays lies in the role of students' motivation when designing strategies of teaching and learning in higher education (Gyepi-Garbrah et al., 2022). Thus, our study contributes to the literature in search of "effective feedback" (Poulos & Mahony, 2008), a crucial issue in today's higher education system (Lim et al., 2021), by identifying the social comparison of grades as a variable that affects the impact of feedback.

In the following sections we discuss prior research and develop our conceptual framework.

## 2. Theoretical background

Two streams of literature are particularly relevant in the context of this paper: literature on academic emotions and literature on social comparisons. We discuss both below and propose the questions that lead this research.

### 2.1. Academic emotions

Academic emotions were largely neglected by educational psychology, with the exceptions of a few seminal studies on test anxiety (Brown, 1938; Mandler & Sarason, 1952) and on achievement-related emotions (Weiner, 1972). However, in the first decade of the current century, a new corpus of research started to appear, defending the multiplicity of emotions of students and teachers and their deep effect on variables as important as engagement, performance, personality development, and, in general terms, the health and psychological well-being of students (Pekrun & Schutz, 2007) and the quality of the student experience (Tight, 2013). This realm of research seeks to explain how emotional experiences in the teaching-learning contexts affect the learning processes (de la Fuente et al., 2020). In fact, previous research has demonstrated the inseparability of emotions and motivation in the context of learning (Kim & Pekrun, 2014).

Recently, due to the availability of multiple learning environments, there has been renewed interest in academic emotions (e.g. Deng et al., 2022; Wang et al., 2022) as they are considered factors with potential impact on how students choose between face-to-face learning settings and online environments (Artino, 2009), on the dropout rate of learning environments such as Massive Open Online Courses (Xing et al., 2019) or on students' performance in computer-based collaborative problem-solving activities (Camacho-Morles, Slempe, Oades, Pekrun, & Morrish, 2019). It has also been considered how the emotions of educators, and not only of students, affect the transition to online teaching (Naylor & Nyanjom, 2021).

The term academic emotions was proposed by Pekrun et al. (2002, p. 92) to denote emotions "that are directly linked to academic learning, classroom instruction and achievement". These authors demonstrated that students experience a full range of emotions, which can be triggered by activities (i.e., participation in a task) or outcomes (i.e., derived from the outcome of the task). Furthermore, according to their valence, academic emotions can be positive—pleasant states— or negative—unpleasant states—. In line with the positive psychology approach, the broaden-and-build theory of positive emotions posits that experience of positive emotions broadens an individual's repertory of cognition and activities (Fredrickson, 2001). On the other hand, the processing efficiency theory (Eysenck & Calvo, 1992) explains how negative emotions, such as anxiety, exert an adverse effect on the performance of cognitive tasks (Derakshan et al., 2009). While positive academic emotions play a driving role, negative academic emotions play the opposite role (Zhen et al., 2017). Although there is previous evidence regarding these assertions (i.e. Gao, 2016; Garn et al., 2017; Wang et al., 2022), this simplistic conception does not always hold as positive emotions are sometimes detrimental to essential components of students' self-regulated learning and negative emotions are sometimes beneficial (Pekrun et al., 2002). Thus, for example, in the context of second language acquisition, it has been demonstrated that a negative emotion such as shame negatively influences second language learner motivation, whereas the influence of guilt, also an emotion of negative valence, is positive (Teimouri, 2018).

Academic emotions can also be examined based on their degree of physiological activation, differentiating between activating emotions and deactivating emotions. Both positive and negative emotions vary in their level of activation versus deactivation (Feldman Barrett & Russell, 1998). Thus, physiological activating emotions, such as enjoyment and anger, can be distinguished from deactivating emotions, such as relaxation and boredom (Pekrun & Linnenbrink-Garcia, 2012).

At the same time, and depending on the time frame considered, outcome academic emotions can be prospective—that is, they are future oriented emotions that occur before the outcome—or retrospective—past oriented emotions that appear as a result of feedback of achievement— (Harley et al., 2019; Pekrun, 2006; Putwain et al., 2021). Thus, emotions such as hope and anxiety are related to possible future success and failure while there are retrospective outcome emotions, such as pride and shame, that result from prior success and failure, respectively (Weiner, 1985; Zeidner, 2007). The present study focuses on retrospective outcome academic emotions, that is, emotions that follow academic outcomes. They are triggered when the student recalls how he/she did in a task and implies thinking about a success or failure already experienced (Harley et al., 2019).

Academic emotions derived from academic activities and outcomes partly depend on task value (Pekrun, 2006). Eccles (2005) stated that the higher the task value, the higher the learner perception on the relevance of the task to advance in the understanding of that particular domain (Noteborn et al., 2012). Task value involves the perceived relevance of the task, the perceived enjoyment of the task and the perceived costs of engaging in the task (Durik et al., 2006; Harley et al., 2019). Therefore, task value is a subjective variable with potential influence on academic emotions and, subsequently, on the level of motivation of the students (Pekrun et al., 2002). According to the Expectancy-value theories—based upon the early works of theorists such as Peak (1955), Porter and Lawler (1968) and Vroom (1964)— individuals are motivated by the expected results of their actions (Dinibutun, 2012). In the context of learning, task value has been positively related with positive emotions, such as enjoyment, and negatively related to negative emotions, such as boredom (Noteborn et al., 2012; Pekrun et al., 2010). In the specific case of outcome retrospective emotions, task value is also expected to be positively related to positive valence emotions and negatively related to negative valence emotions (Pekrun et al., 2007).

## 2.2. Social comparisons in academic settings

According to the Social Comparison Theory (Festinger, 1954), individuals compare themselves with others in order to evaluate their own levels of skills. The outcome of the comparison can be emotions of a positive or negative nature (Ackerman et al., 2000).

The academic setting is a very common field of research for psychological literature on social comparisons. Thus, for example, Baumel and Berant (2015) analysed the link between attachment styles and manifestation of envy by using a sample of undergraduate students. Lange and Crusius (2015) included university student participants in their research into the relationship between envy and pride. Webster et al. (2003) examined the roles of social comparisons and praise on the experience of pride by using college students as population. The choice of student samples in the context of social comparisons rests on the fact that the circumstances that promote social comparisons are inherent to academic settings. Among these circumstances, the similitude to the target of the comparison and the relevance of the domain under comparison (Smith, 2004) can be highlighted. Thus, social comparisons are more frequent in those that are perceived as similar, as happens with students. On the other hand, social comparisons are more frequent in domains that are relevant to the individuals, as is the case of academic achievements for students.

Research on the field of education has demonstrated that social psychology theorizing on social comparisons holds in academic contexts (Trautwein et al., 2009) because “even when learning alone, students do not act in a social vacuum” (Pekrun & Linnenbrink-Garcia, 2012, p. 263). Social comparisons allow students to have objective criteria at their disposal when evaluating their achievements (Kesici & Erdogan, 2010). Information on what peers have done can inspire students to take responsibility for doing their best to close a perceived gap in performance compared to successful peers (Fritz, 2017). In fact, feedback about peers’ performance helps students to develop study strategies and behavioural engagement, reflecting the existence of a possible social component in individual study strategies (Brown et al., 2019).

The relevance of the social component has been pointed out both in online and offline educational settings (Apps et al., 2019). Furthermore, the influence of others affects the identity of first-year university students (Ding & Curtis, 2021). In contexts that require high social interactions, such as small group work, it has been studied how emotions are related to social engagement (Linnenbrink-García et al., 2011).

Upward and downward social comparisons between students are followed by different students’ reactions in terms of liking of the grade, the course and the instructor, perceptions of the course and the instructor; students’ attributions for performance and emotions evoked by the course (Ackerman & Yang, 2021).

## 2.3. Research questions

In the earliest stages of education, children learn that comparing their academic outcomes with other students who perform better than themselves can help self-improvement (Huguet et al., 2001). Regarding this unwritten rule, and in the context of higher education, the arguments mentioned in Sections 2.1 and 2.2 of this paper lead to the formulation of the following questions.

Research Question 1: Do social comparisons guide students in higher education?

Research Question 2: How do different comparative evaluations affect outcome academic emotions?

Research Question 3: How do outcome academic emotions impact on motivation to study under different relative task grade standings?

## 3. Methods and results

We carried out two studies in order to explore our research questions. Study 1 investigated how social comparisons affect the

motivation of students enrolled in marketing courses. Study 2 examined the effect of comparative evaluations of a different sign.

### 3.1. Study 1

The main goal of Study 1 was to explore whether students compare their task grades and the effect of this possible comparison process on their motivation to study. To achieve this goal, we measured students' reactions after being informed about the grade of their latest task on a marketing course. The study bears some resemblance to a natural experiment (Dunning, 2012) in that, due to the course dynamic itself and without any intervention of our own, students were exposed to different conditions defined by their relative position in terms of task grade.

#### 3.1.1. Study 1 methodology

We collected survey data from undergraduate students taking marketing and marketing research courses at a School of Economics of a European public university. Participation was anonymous and voluntary.

We informed participants about a task grade and distributed the survey electronically via an online survey tool to 77 undergraduate students. The average age of students was 19.89 (SD = 1.36), almost equally distributed by gender (53.2% were female).

The survey asked students about the degree to which they compared their assignment score with that of their peers. The item for the social comparison of the task grades was based on the situational envy scale proposed by Wallace et al. (2017): "When checking my assignment score, I thought some colleagues achieved better results than I did". Responses ranged from 1 "strongly disagree" to 5 "strongly agree". The motivation to increase their effort in the next marketing task was measured on a five-point scale (1 "very low motivation" to 5 "very high motivation"). Finally, the questionnaire included demographics and registered information about the outcome referred to in the study and the average mark achieved so far by the student in his/her degree.

#### 3.1.2. Study 1 results

To examine our first research question, we considered the effect of social comparisons between students and the motivation to study. We additionally considered the effect of the latest assignment score as well as the possible moderation effect of student average mark on social comparisons. We ran a moderation analysis based on model 1 of PROCESS v3.3 estimated with the software IBM SPSS Statistics 24 (Hayes, 2012) with 10,000 bootstraps and 95% confidence level. The results are summarized in Table 1. Regarding the single predictors, there is a positive and significant effect of the task grade on motivation ( $b = 0.34$ ,  $t(72) = 6.88$ ,  $p < 0.001$ ). Moreover, social comparisons have a significant and positive effect on motivation to study. Thus, for every 1 unit increase in social comparison, we obtain a 0.92 increase in student motivation ( $b = 0.92$ ,  $t(72) = 1.91$ ,  $p = 0.05$ ). The average degree mark achieved for the student has a non-significant effect on motivation to study. However, we observed that there is a tendency of the average degree mark to moderate the effect of social comparisons on motivation ( $b = -0.14$ ,  $t(72) = -1.90$ ,  $p = 0.06$ ). Fig. 1 reflects this moderator effect. The overall regression model is significant ( $F = 5.70$ ,  $p < 0.001$ ,  $R^2 = 0.46$ ).

### 3.2. Study 2

Study 2 had two goals. First, we used a scenario-based approach that allowed us to examine how students react to situations that differ in the position of their task grades in comparison with those of their peers. Second, in Study 2 we analysed how differences in the relative position of the student in terms of their task grades affect their motivation to study according to the framework defined by the task value-achievement emotions relationship.

#### 3.2.1. Study 2 methodology

Undergraduate students at a medium sized university in Europe participated in the study. Participants were recruited by other students who volunteered in return for partial fulfilment of a Marketing and a Tourism Marketing course of a Business Administration degree. The participants were emailed a link to complete an online questionnaire. The instructions of the questionnaire guaranteed the confidentiality of the responses and participation in the study was voluntary to decrease social desirability bias (Michaelis & Eysenck, 1971; Zeng et al., 2021).

In total, 1671 students completed the survey. Eighteen surveys were eliminated from the analysis because: (a) they reported a high level of suspicion ( $n = 1$ ); (b) they did not specify the numerical code that identified the student that acted as recruiter ( $n = 17$ ).

The questionnaire consisted of two parts: one question where students had to set their time of study budgeting followed by the

**Table 1**

Linear Regression for motivation to study (dependent variable), social comparisons, outcome and average degree grade.

Model	Coefficient	T	p
Constant	-0.06347	-0.0319	0.9747
Social comparisons	0.9214	1.9134	0.0597
Average degree grade	0.2446	0.7694	0.4442
Social comparisons × average degree graded	-0.1435	-1.9068	0.0605
Task grade	0.3420	6.8819	0.0000

$F(4,72) = 15.7029$ ,  $p < 0.001$ ,  $R^2 = 0.4659$ .

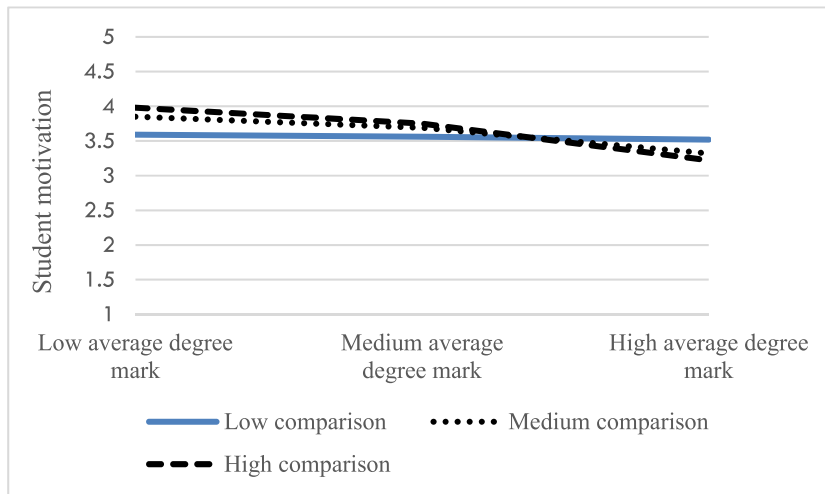


Fig. 1. Average degree grade moderates the effect of social comparisons on the motivation of students.

measure of the probability of experiencing six outcome retrospective emotions, a measure of task value and demographics.

The concept of budget setting is common in studies in the field of consumption (i.e., Jia et al., 2020). To apply this concept in the context of studying, we used a scenario approach by presenting participants the following situation:

You have 4 h a week to study two courses, named as Course A and Course B. You received information about the outcome of the latest academic task of these two courses, as well as the average grade of all the students in each course, resulting that: Course A (your grade is below the class average)/Course B (your grade is above the class average).

After reading the scenario, the participants were asked to set their “study hours’ budget” by deciding how many, of a total of 4 h a week, they wanted to spend on preparing the next academic task of each course. One item served as the key dependent measure: What should my “time of study” budget be? Responses ranged from “0 h Course A (grade below the average), 4 h Course B (grade above the average)” to “4 h Course A (grade below the average), 0 h Course B (grade above the average)”.

After responding on the “time of study” budgeting, students reported their probability of experiencing outcome retrospective emotions. Particularly, following Pekrun (2006), six outcome retrospective emotions were considered, three of positive valence (joy, pride, gratitude) and three of negative valence (sadness, shame and anger). In terms of arousal, they are all activating emotions, with the exception of sadness, which is a negative or unpleasant deactivating emotion, according to the achievement emotion taxonomy of Pekrun et al. (2007). Students were asked to think about the likelihood of experiencing each of these six emotions in response to the task grade of Course A and Course B. For the assessment and measurement of the emotions, a 5-point scale was used from 1 = It is very unlikely that I would feel this emotion to 5 = It is very likely that I would feel this emotion.

Additionally, participants responded to a six-item task value measure on five-point Likert scales proposed by Pintrich (1991): 1 = completely disagree and 7 = completely agree. A confirmatory factor analysis using EQS 6.2 for Windows was carried out to test the reliability and validity of the task value measurement (results shown in Table 2).

### 3.2.2. Study 2 results

Two path models were designed to derive two models able to explain time of study (TS) in terms of outcome retrospective emotions, and in turn outcome retrospective emotions in terms of task value (TV) in the two different scenarios under study: when the student receives a task grade below or above the average. The path models were analysed by means of EQS 6.2. The results are shown in Table 3. To test data fitting properties, fit statistics were computed showing that the models fit the data well.

Additionally, data fitting was tested by comparing three alternative models (Kashada & AllaEddinGhaydi, 2020): the default model, the saturated model and the independent model. The results of these comparisons for scenarios A and B confirmed the satisfactory fit of

Table 2  
Task value measurement scale-validation.

CONCEPT	Standardized parameters	Robust t value	Composite reliability
<b>TASK VALUE (TV)</b>			0,817
TV1	0.670	28.186	
TV2	0.545	20.085	
TV3	0.783	34.298	
TV4	0.613	26.066	
TV5	0.754	31.948	
TV6	0.534	18.498	

S-B  $\chi^2$  (9) = 180,4946 (p < 0.000) SRMR = 0.052 GFI = 0.950 AGFI = 0.884 R-NFI = 0.917 R-CFI = 0.921.

**Table 3**  
Path model-task grade below and above the average.

Relationship	Path model-task grade below the average		Path model-task grade above the average	
	Beta	t-Value	Beta	t-Value
TV-joy	-0.066	-2.588	+0.237	+8.786
TV-pride	-0.037	-1.479	+0.231	+8.559
TV-gratitude	-0.043	-1.692	+0.258	+9.655
TV-sadness	+0.140	+5.277	-0.110	-4.221
TV-shame	+0.104	+4.214	-0.074	-2.762
TV-anger	+0.049	+1.859	-0.132	-4.972
Joy-TS	-0.081	-2.130	-0.025	-0.756
Pride-TS	-0.006	-0.149	+0.071	+2.113
Gratitude-TS	-0.084	-2.240	-0.051	-1.610
Sadness-TS	-0.047	-1.494	+0.027	+0.739
Shame-TS	-0.046	-1.428	-0.002	-0.046
Anger-TS	+0.035	+1.098	+0.155	+3.814

the models.

The impact of task value is negatively significant on positive outcome retrospective emotions, with the exception of pride where there is a non-significant effect. Furthermore, the impact of task value is positively significant on negative outcome retrospective emotions when the task score of the student is below the average. Meanwhile, the impact of task value is positively significant on positive outcome retrospective emotions and negatively significant on negative outcome retrospective emotions when the task score of the student is above the average.

Results show that, under a scenario of a task grade below the average, no outcome retrospective emotion favours putting more effort into the next task of the course. However, there are two emotions, joy and gratitude that, when felt in a situation where the task grade of the student is below the average, have a negative effect on the disposition of the student to spend more time on that course. In a situation where the task grade is above the average, there is also a negative significant effect of joy on the time budget spent on the course but, additionally, there is a positive significant effect of the emotions pride and anger.

#### 4. Discussion

In two studies we explore the role of social comparisons between students in higher education settings. In Study 1, we demonstrate that students who upwardly compare their task grades of a course with those of their peers show a superior level of motivation to improve the effort they devote to subsequent task courses. These effects tend to increase as the average grade of the students decreases. Furthermore, Study 2 tests how upward vs. downward comparisons between students differently affect the impact of task value on outcome academic emotions. Thus, unfavourable social comparisons lead task value to positively influence negative emotions and deter positive emotions (with the exception of pride that seems not to be affected by task value in the case of students with a relatively worse position within the class). Favourable social comparisons lead to a positive effect of task value on positive emotions and a negative effect on negative emotions. We also provide evidence that the effect of outcome academic emotions on motivation to study differs when the emotions are triggered by upward vs. downward social comparisons. In both scenarios, joy felt as a result of feedback on a task diminishes students' motivation. This deterrent effect on motivation is also caused by gratitude in a hypothetical scenario of downward social comparisons. However, in a scenario of upward social comparisons, pride and anger can significantly improve motivation to study.

We contribute to two streams of literature: the literature of social comparisons in academic settings and that of academic emotions. We extend prior research on social comparisons of schools to higher education settings. Prior studies have demonstrated that children freely choose to engage in comparative evaluation even when the result can threaten their self-evaluation (Blanton et al., 1999; Huguet et al., 2001). Our results suggest that students in higher education are also willing to sacrifice their self-evaluation in the present in favour of the possibility of improving their performance in the future. This result is particularly relevant in light of the principals of the self-evaluation maintenance model (Tesser et al., 1988). According to this model, students would not be motivated to compare themselves with better students when the result of this comparison can threaten their self-evaluation. However, our results are in line with the findings of Huguet et al. (2001) and show that in higher education settings students are willing to engage in upward comparisons even when they constitute an element of self-threat. Our data do not allow us to rule out a "reflected glory" effect—or an increase in self-evaluation through assimilation with others better than themselves—(Trautwein et al., 2009). However, arguably, the reason that seems to be behind these upward social comparisons is the value that students place on the information about others' good performance. Achievements of other students seem attainable and set a reasonable goal for those students whose performance is worse. This argument is supported by recent research on a fixed view vs. a malleable view of academic performance (Ackerman & Gross, 2020). In a way, the good results of some students could be interpreted as a sign of malleability of performance. This reasoning is in line with the expectancy-value approach by Eccles and Wigfield (2002) in the sense that other's good performance can positively affect students' expectancies of success.

In addition to the literature on social comparisons in academic settings, our research also contributes to the literature on academic emotions. Much of the prior literature focuses on the relationship of task value with performance via emotional experience during the

engagement in course-related activities (Camacho-Morles et al., 2019; Noteborn et al., 2012). We extend this literature by specifically examining outcome retrospective emotions and the way in which comparative evaluation affects the task value-emotion-motivation relationship. In particular, in Study 2 we provide evidence that the functions of outcome academic emotions depend on the relative performance of the student and not just on the task grade itself. Thus, joy derived from a task grade does not foster the desire to put more effort into future tasks, independently of the relative position of the student in terms of task grade. However, pride and anger act as motivators only in a context of favourable social comparisons on a marketing task. Interestingly, pride and anger are control-dependent emotions (Pekrun et al., 2007). While pride is caused by attributions to one's own actions, anger is judged to be caused by other people (Weiner, 1985). Previous research highlighted the relevance of attribution when analysing students' emotional responses to the presentation of grades (Ackerman & Yang, 2021). In this paper, attribution is also revealed as a key factor to examine how students' emotions influence their motivation to study. This result extends previous findings on the effect of different types of motivation (Bailey & Phillips, 2016).

#### 4.1. Conclusions

Student exposure to their peers' and their own grades results in a process in which the student self-evaluates in comparison to others (social comparisons). Specifically, this research studies comparisons between students after the publication of grades and offers practical implications for positively influencing student motivation and performance.

Thus, a first conclusion drawn is that encouraging social comparisons can have a motivational effect, especially among students with a lower academic position. This issue is relevant, since these students do not have the stimulus of good results and, in addition, they are the ones most likely to fail and drop out. Offering a broad spectrum of grades increases the chance of students with lower class standings to find a point of comparison that can be seen as an attainable goal and, consequently, can augment their interest in putting more effort into their course tasks. In this way, contrary to what could be logically thought, smoothing differences in task grades is not a good practice in terms of student motivation.

Secondly, this research demonstrates the importance of the management of outcome retrospective emotions resulting from social comparisons. Joy is not desirable for students' motivation. According to our study, both for students with a task grade above or below the average, joy does not awaken the desire to put more effort into the course. In fact, a look at the cocktail of outcome retrospective emotions that seems to affect motivation to study, reveals that the worst situation, whatever the relative position of the student, is an emotional reaction in terms of joy. Our results indicate that joy leads to conformism both for students with a bad relative positioning and for students with a good relative positioning. On the contrary, pride and anger push students with a good task grade to become even better, reflecting the motivational force of nonconformism. So, for instructors who are willing to motivate their students, our research suggests that it may be better to promote nonconformism with task grades than compliance with achievements, even when nonconformism will eventually be followed by the dreaded grade complaints. In this context, grade complaints should be seen as opportunities to open channels of communication with students, to transform the possible nonconformism of the students with the grading criteria into nonconformism with their own effort. This result is in line with previous research that emphasizes the importance of giving students the opportunity to express their emotions in assessment (Crossman, 2007).

Thirdly, our results show that task value is a double-edged sword in terms of its impact on students' outcome academic emotions. Improving the students' perception of task value can push or deter positive or negative emotions depending on the relative position of the student in terms of achievement. Our research shows that reinforcing the value of future tasks could buffer the effect of task grades on negative emotions for students with a current unfavourable comparative evaluation, while strengthening its effect on positive emotions for students with a current good relative position in terms of task grades.

Finally, our results indicate that the relative position of the student in terms of his or her grade is a very relevant aspect in terms of influencing his or her motivation and academic results. In this sense, in the publication of grades it is interesting to incorporate personalized messages to students that take into account not only the grade itself, but also their position in relation to the rest of the grades of the group.

#### 4.2. Limitations and future research

This research suffers from methodological limitations related to potential unobserved variables and sample bias. Additionally, in Study 2, outcome retrospective emotions were measured with one-item scales. An alternative of great interest would be to consider the measurement scales of the Achievement Emotions Questionnaire (Pekrun et al., 2005), emotion scales specifically designed for a higher education context (White, 2013) and also measures of a neuropsychological nature. Moreover, we are assuming that outcome retrospective emotions are momentary occurrences (Pekrun et al., 2007). Further research is needed on whether they are momentary emotions (punctual states) or recurring emotions (habitual traits).

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## Data availability

Data will be made available on request.

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