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# **Achievement Emotions and Achievement Goals in Support of the Convergent, Divergent and Criterion Validity of the Spanish-Cognitive Test Anxiety Scale**

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## **Abstract**

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Based on the control-value theory of achievement emotions and theory of achievement goals, this research provides evidence of convergent, divergent, and criterion validity of the Spanish Cognitive Test Anxiety Scale (S-CTAS). A sample of Argentinean undergraduates responded to several scales administered at three points. At time 1 and 3, the sample responded to scales designed to assess their adoption of mastery and performance goals. At time 2, they responded to the S-CTAS and items assessing their anxiety and shame in class, and their enjoyment, hopelessness, shame, and anxiety experienced in exam. Results demonstrated the convergent and divergent validity of the S-CTAS through correlations with other class and test emotions scales measuring outcome and activity-emotions. Furthermore, the findings verified the criterion validity of the S-CTAS by estimating the predictive influence of achievement goals on cognitive test anxiety and other emotions, and in turn the effects of cognitive test anxiety and these emotions on achievement goals.

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**Keywords:** cognitive test anxiety, achievement emotion, achievement goal, validity, scale

# **Emociones de Logro y Metas en Apoyo de la Validez Convergente, Divergente y Criterio de la Versión en Español de la Escala de Ansiedad Cognitiva frente a los Exámenes**

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## **Resumen**

Basada en la teoría de control –valor de las emociones de logro y en la teoría de las metas de logro, esta investigación provee evidencias de validez convergente, divergente y de criterio para la Spanish Cognitive Test Anxiety Scale (S-CTAS). Una muestra de estudiantes argentino respondió diversas escalas administradas en tres momentos. En el momento 1 y 3 la muestra informó sobre sus metas de maestría o rendimiento. En el momento 2 respondieron la S-CTAS e informaron sobre su ansiedad y vergüenza en clase, y su disfrute, desesperanza, vergüenza y ansiedad experimentadas en exámenes. Los resultados demostraron la validez convergente y divergente de la S-CTAS mediante las correlaciones con otras escalas de emociones en clase y exámenes que miden emociones de resultados y de actividades. Adicionalmente, los resultados verifican la validez de criterio de la S-CTAS, mediante la estimación de la influencia predictiva de las metas de logro sobre la ansiedad cognitiva ante los exámenes y otras emociones, e inversamente, el efecto de la ansiedad cognitiva ante los exámenes y otras emociones sobre las metas de logro.

**Palabras clave:** ansiedad cognitiva ante los exámenes, emociones de logro, metas de logro, validez, escala

**T**est anxiety is an emotional reaction experienced by people in evaluative settings that is accompanied by worries about the possibility of failure or poor performance and possible aversive consequences for self-esteem, social desirability and loss of an expected benefit (Gutiérrez Calvo & Avero, 1995).

Researchers agree that the cognitive component of test anxiety, namely worry, is negatively related to academic achievement (Hembree, 1988; Zeidner, 2007). However, students with high test anxiety have a much broader spectrum of cognitive manifestations than merely worry. Cassady and Johnson (2002) advanced the construct of cognitive test anxiety to more accurately describe the cognitive manifestations of test anxiety. Cognitive test anxiety includes cognitions with the potential to interfere with optimal performance – such as the tendency to worry about poor performance, the experience of task irrelevant thoughts during the test and periods of study, comparisons with other peers during periods of test preparation or performance, and thoughts of escape that interfere with attention during the test taking. To assess this construct, researchers developed and validated the Cognitive Test Anxiety Scale (CTAS, Cassady & Johnson, 2002).

The Spanish Cognitive Test Anxiety Scale (S-CTAS; Furlan, Cassady & Pérez, 2009) is a Spanish adaptation of the Cognitive Test Anxiety Scale (Cassady & Johnson, 2002). The S-CTAS estimates the cognitive manifestations of test anxiety in university students. Previous studies with the S-CTAS have provided evidence of construct validity based on explorations of the factor structure of the S-CTAS thorough exploratory and confirmatory factorial analyses, gender differences, and criterion validity through explorations of the measures ability to predict important outcomes including: (1) academic performance (Furlan et al, 2009), (2) attention self-regulation (Furlan, Kohan Cortada, Piemontesi & Heredia, 2008), (3) dimensions of perfectionism and negative automatic thoughts (Moyano, 2010), (4) academic procrastination and mental symptoms (Furlan, Ferrero & Gallart, 2014) and (5) behavioral manifestations of anxiety, such as avoidance or performance deficits during exams (Furlan, 2013). Additionally, normative values differentiated by gender for Argentine university students (Furlan, Pérez, Moyano & Cassady, 2010) were estimated. The S-CTAS has also been successfully used in studies evaluating

the effectiveness of psychoeducational interventions (Medrano & Moretti, 2013). Nonetheless this proven evidence, additional studies demonstrating the validity of the instrument are required.

In this research, two studies designed to (a) provide evidence of convergent and divergent validity of the S-CTAS, and (b) verify criterion validity of the S-CTAS on a theoretical model that includes personal achievement goals and other achievement emotions are reported below.

### **Convergent and Divergent Validity of the S-CTAS**

While theories and studies prevail which address single emotions (e.g., test anxiety; Zeidner, 2007), or single functions of emotions (e.g., their impact on cognitive processes; Ashby, Isen, & Turken, 1999), more integrative approaches are largely lacking. The control-value theory of achievement emotions (Pekrun, 2006) offers an integrative framework for analyzing the antecedents and effects of emotions experienced in achievement and academic contexts.

In this theory, achievement emotions are defined as emotions tied directly to achievement activities (e.g., studying or test taking) or achievement outcomes (success and failure). Most emotions pertaining to attending class, studying, and writing tests and exams are seen as achievement emotions, since they relate to activities and outcomes that are typically judged according to competence-based standards of quality (Pekrun & Perry, 2014). Two types of achievement emotions differing in object focus can thus be distinguished: activity emotions pertaining to ongoing achievement-related activities and outcome emotions pertaining to the outcomes of these activities (Pekrun, Goetz, Titz, & Perry, 2002; Pekrun, Elliot, & Maier, 2006, 2009). The latter include prospective, anticipatory emotions (e.g., hope for success, anxiety of failure), as well as retrospective emotions (e.g., pride or shame experienced after feedback of achievement). As with emotions more generally, achievement emotions can be conceptualized in trait or state-like ways. For example, habitual test anxiety as measured by traditional test anxiety scales is commonly regarded as a trait emotion, whereas anxiety experienced an hour before a specific exam would be viewed as a state emotion (Spielberger, Anton, & Bedell, 1976).

According to the S-CTAS, test anxiety is considered to be a specific situational trait that involves concern about potential negative outcomes that could occur before, during, and after an evaluative event. So studies of convergence and divergence should consider distinctions related to different aspects of emotion – such as trait (typically experienced by an individual), situational (attending class, studying, and writing tests and exams) and temporal specificity (prospective, retrospective). Further, according to the Pekrun's (2006) taxonomy of outcome emotions, the prospective and retrospective, positive and negative (valence) emotions can be distinguished. The prospective emotions include hope (positive), anxiety and hopelessness (negative), whereas the retrospective emotions contain shame (negative), pride and relief (positive).

In order to provide evidence of convergent validity, scores of the S-CTAS and scales measuring test-anxiety and other prospective (hopelessness) and retrospective (shame) outcome-emotions aroused by test situations should be correlated. Additional evidence could be achieved by correlating the S-CTAS with scales that assess negative outcome emotions in other relevant academic situations as attending classes (anxiety, shame). Because the situations differ, the size of the relationship between emotions experienced in class and S-CTAS should be lower than the relationship between emotions experience during a testing event and S-CTAS. On the other hand, divergent evidence could be obtained by exploring the relationship between scores on the S-CTAS and activity-related emotions experienced during test taking - such as enjoyment. In this case, due the object and valence change, the size of the relationship between test-enjoyment and S-CTAS should be even smaller and negative.

### **Criterion Validity of the S-CTAS: Achievement Goals, Anxiety and other Achievement Emotions**

The interplay between achievement goals and emotions has been acknowledged since the inception of achievement goal theory (Dweck & Leggett, 1988) and current research on achievement emotions has integrated conceptualizations of achievement goal theory. The model proposed by Pekrun and his colleagues (Elliot & Pekrun, 2007; Pekrun et al., 2006, 2009)

extends Pekrun's (2006, Pekrun & Perry, 2014) control-value theory of emotions by articulating how achievement goals and discrete achievement emotions are reciprocally related (see Linnenbrink & Pintrich, 2002 for the asymmetrical bidirectional model). Specifically, achievement goals facilitate different types of appraisals related to desired and undesired results, and these appraisals contribute to the arousal of different types of emotions (e.g., anxiety, shame, hopelessness, enjoyment). In turn, it is postulated that these same emotions would have retroactive effects on personal achievement goals (Pekrun, 2006) by focusing attention on goals congruent with emotional arousal. However, this hypothesis has not been tested yet been empirically tested (Linnenbrink-Garcia & Barger, 2014).

Before turning to our proposed model relating achievement goals and emotions in order to test the criterion validity of the S-CTAS, it is important to note that some empirical investigations have examined the relation between goals and affect (see Huang, 2011; Linnenbrink-Garcia & Barger, 2014; Linnenbrink-Garcia & Pintrich, 2002 for a more detailed review of the literature).

On one hand, mastery-based goals focus on the activity itself and the implications of ongoing experience with the activity for intrapersonal development. There is strong empirical support suggesting that mastery-approach goals relate positively to enjoyment (Daniels et al., 2008, 2009; King, McInerney, & Watkins, 2012; Pekrun et al., 2006, 2009; Sánchez-Rosas, 2015 a, b; Sánchez-Rosas & Pérez, 2015; Sapio, 2010) and negatively to boredom (Daniels et al., 2008, 2009; King et al., 2012; Pekrun et al., 2006, 2009; Sánchez-Rosas, 2015 b). Several studies found a negative relation between mastery-approach and anxiety (Bandalos et al., 2003; Daniels et al., 2008, 2009; Shih, 2005, 2008). However, there were no significant relations in an equivalent number of studies (Bong, 2009; Linnenbrink, 2005; Pekrun et al., 2009; Putwain & Symes, 2012; Sideridis, 2007). Somewhat surprisingly, there was a positive relationship between mastery-approach goals and anxiety in two studies (Gaudreau, 2012; Koul, Roy, Kaewkuekool, & Ploisawashay, 2009).

Mastery-avoidance goals are presumed to focus on negative activity engagement. Thus Pekrun et al. (2006, 2009) posited that these goals would be a positive predictor of boredom and anger (Shih, 2008) and perhaps a

negative predictor of enjoyment. However, mastery-avoidance goals were associated with several negative emotions, such as anxiety (Bong, 2009; Putwain & Symes, 2012; Sideridis, 2008) and sadness (Sideridis, 2008). On the other hand, performance-based goals focus on normative outcomes in either prospective or retrospective ways.

Performance-approach goals are presumed to focus prospective attention on the possibility of attaining positive normative outcomes, and retrospective attention on the positive value of the normative outcome attained. These goals would be a positive predictor of prospective and retrospective emotions like hope and pride (King et al., 2012; Pekrun et al., 2009). Negative emotions, on the other hand, relate less consistently to performance-approach goals. Several studies have suggested that performance-approach goals are related to test anxiety (Bandalos et al., 2003; Bong, 2009; Daniels et al., 2008, 2009; Gaudreau, 2012; King et al., 2012; Koul et al., 2009; Linnenbrink, 2005; Sánchez-Rosas, 2015b). However, a small number found just the opposite (Duchesne & Rattelle, 2010; Shih, 2005), and even more have found no relation at all (Pekrun et al., 2006, 2009; Putwain & Symes, 2012; Shih, 2008; Sideridis, 2007). In addition, performance-approach goals relate positively to hopelessness and shame (King et al., 2012; Pekrun et al., 2006; Sánchez-Rosas, 2015a, b; Sánchez-Rosas & Pérez, 2015).

Finally, performance-avoidance goals are presumed to focus prospective attention on the possibility of negative normative outcomes, and retrospective attention on the negative value of the normative outcome attained. Thus these goals are a positive predictor of anxiety (Bong, 2009; Duchesne & Rattelle, 2010; Pekrun et al., 2006; 2009; Putwain & Symes, 2012; Shih, 2008; Sideridis, 2007), hopelessness (Pekrun et al., 2006), and shame (Pekrun et al., 2009; Sánchez-Rosas, 2015a, b; Sánchez-Rosas & Pérez, 2015).

Evidence of criterion validity for the S-CTAS could be achieved through a path analysis estimating the predictive influence of personal achievement goals (at Time 1) on the cognitive test anxiety and other emotions (hopelessness, shame, enjoyment) (at Time 2), and in turn the effects of cognitive test anxiety and these emotions on personal achievement goals (at Time 3).

Next, two studies designed to (a) provide evidence of convergent and divergent validity of the S-CTAS, and (b) verify criterion validity of the S-CTAS on a theoretical model that includes personal achievement goals and other achievement emotions are reported below.

## Method

### Participants

The sample was self-selected because the guest people decided whether or not to participate in the study (Sterba & Foster, 2008). One hundred fifty two (91 % female;  $M = 22.88$  years,  $SD = 6.05$ ) Argentinean undergraduates of Psychology, Languages, Social Sciences and Law (81%), Chemistry, Economy, Math and Engineering (19%) studying at the National University of Córdoba participated in the study. Distribution by gender represents the habitual distribution in the departments sampled.

### Measures

**Cognitive test anxiety.** The Spanish cognitive test anxiety scale (S-CTAS, Furlan, et al 2009) was applied to assess the level of cognitive test anxiety experienced during evaluative events. Responses to the S-CTAS ranged on a four-point Likert-type scale from 1 (*not at all typical of me*) to 4 (*very typical of me*). A sample item include: “Mind goes blank when pressured for answer on test”.

**Achievement goals** (A-AGQ-R, Sánchez-Rosas, 2015a). The Argentinean Achievement Goal Questionnaire – Revised assesses the  $2 \times 2$  achievement goal framework. Participants answered twelve items expressing the degree of agreement with each item on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). Here, dimensionality and internal consistency were tested and optimal results were obtained. At Time 1 and 3, subscales and internal consistencies were: mastery-approach (e.g., My aim is to completely master the material presented in this class,  $\alpha = .67$  and  $.77$ ), mastery-avoidance

(e.g., My aim is to avoid learning less than I possibly could,  $\alpha = .76$  and  $.74$ ), performance-approach (e.g., My aim is to perform well relative to other students,  $\alpha = .89$  and  $.95$ ) and performance-avoidance (e.g., My aim is to avoid doing worse than other students,  $\alpha = .88$  and  $.93$ ). As mastery-approach and avoidance and performance-approach and avoidance were moderate to highly correlated, it was decided to create two new variables (i.e, mastery goals and performance goals) from the sum of both scales to create a more parsimonious measure of the constructs of interest.

**Achievement emotions.** This study employed six scales of Achievement Emotions Questionnaire-Argentine (AEQ-AR, Sánchez-Rosas, 2015b). For all the scales, one dimensionality and internal consistency were tested and acceptable results were obtained. Participants were asked to rate their emotional experiences of class anxiety (e.g., Thinking about class makes me feel uneasy, twelve items), class shame (e.g., When I say anything in class I feel like I am making a fool of myself, eleven items), test enjoyment (e.g., For me the test is a challenge that is enjoyable, ten items), test hopelessness (e.g., I feel so resigned about the exam that I can't start doing anything, twelve items), test shame (e.g., I am ashamed of my poor preparation, ten items), test anxiety (e.g., I get so nervous I can't wait for the exam to be over, twelve items) using five point Likert scale from 1 (*never*) to 5 (*always*).

The total scores of each scale were calculated by adding the values provided to each item and then divided by the number of items in the corresponding scale. In this way, the average values per variable were obtained, they go from 1 to 5 for all scales, in exception of cognitive test anxiety that adopts values from 1 to 4.

**Academic performance.** The achievement motivation and emotion literatures have demonstrated the critical importance that performance attainment has in the interrelations between achievement goals and achievement emotion (Pekrun et al., 2009). In the present research, cumulative Grade Point Average was obtained which is considered an accurate measure of university student performance (Cassady, 2001).

## **Procedure**

Participants were contacted via e-mail and social networking sites, and all agreed to voluntarily complete the protocols administered through the online survey system LimeSurvey (Pérez, 2007). The protocols were administered at three points separated by two weeks during the first semester in an academic year. At Time 1, participants reported their cumulative Grade Point Average and completed the Argentinian Achievement Goals Questionnaire. At Time 2, participants responded to the Cognitive test anxiety scale and the class anxiety, class shame, test enjoyment, test hopelessness, test shame, test anxiety scales. At Time 3, participants were asked to complete the Argentinian Achievement Goals Questionnaire. Protocols were elaborated with consent added to the set of selected scales for this study. Participants provided informed consent prior to participation.

## **Data Analysis**

A correlational-explicative, with repeated measures design was developed (Montero & León, 2007). To provide evidence of convergent and divergent validity bivariate correlations were used.

In addition to bivariate correlation procedures, path analysis techniques were used to explore the relationship among the variables of interest. Path analysis is a statistical method used to evaluate the fit of causal models and to identify the direct and indirect contribution made by a set of independent variables to explain the variability of the dependent variables (Pérez, Medrano, & Sánchez Rosas, 2014). A path analysis (maximum-likelihood estimation) was carried out in order to evaluate the reciprocal influences between achievement goals and test anxiety. Suggestions of Pérez et al. (2014) detailing how to appropriately interpret the fit indexes, direct, indirect effects, and significant path coefficients were followed. Model fit was assessed using the following indices (Hu & Bentler, 1995): chi-square degree of freedom ratio ( $\chi^2/df$ ), comparative fit index (CFI), goodness fit

index (GFI), incremental fit index (IFI), and root-mean square error of approximation (RMSEA). The following criteria were used to evaluate the adequacy of model fit:  $\chi^2/df \leq 2.0$  (Hair, Anderson, Tatham, & Black, 1995),  $CFI \geq .90$ ,  $GFI \geq .90$ ,  $IFI \geq .90$ , and  $RMSEA \leq .08$  (Browne & Cudeck, 1993).

The IBM SPSS Amos 19 (Arbuckle, 2010) program was used to conduct the statistical analysis according to proposed objectives.

## **Results**

Prior to the central analysis, an initial exploration of all items was conducted to evaluate missing values, univariate and multivariate atypical cases, and normal univariate distributions. Any missing values were found. Then, univariate and multivariate atypical cases were determined by calculating the standard z score for each variable (z scores > 3.29 were considered atypical) and the Mahalanobis distance measure (considering  $p < .001$  an atypical case). Any cases identified using these methods were discarded. Across variables, the values for asymmetry and kurtosis were between -2 and +2, which are considered acceptable in order to prove normal univariate distribution (George & Mallery, 2010). Finally, the items were averaged within each scale to create indices of all variables.

### **Convergent and divergent validity of the S-CTAS**

Table 1 shows the means, standard deviations and correlations between the variables evaluated in this study.

Table 1.

*Descriptive statistics and bivariate correlations*

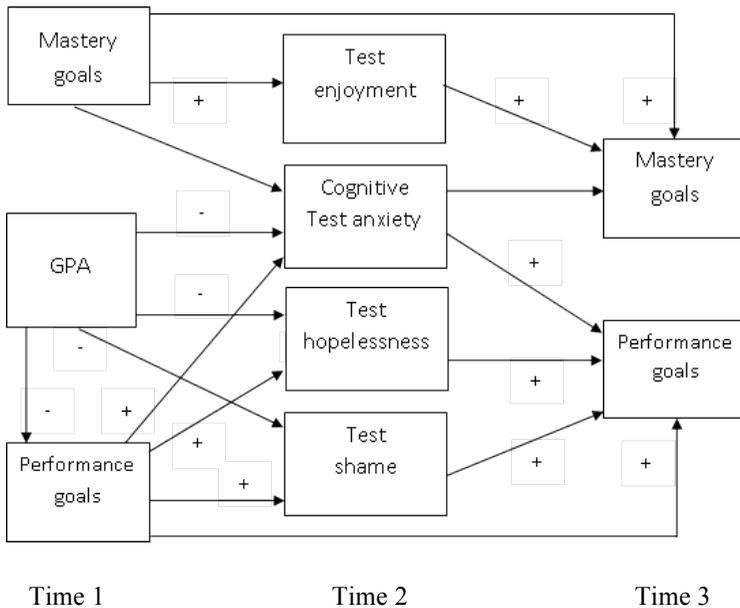
	1	2	3	4	5	6	7	8	9	10	11	12
1. cta	.91											
2. tax	.74**	.92										
3. cax	.54**	.52**	.89									
4. thl	.73**	.68**	.45**	.95								
5. tsh	.75**	.69**	.63**	.74**	.93							
6. csh	.45**	.50**	.65**	.42**	.63**	.90						
7. tjo	-.31**	-.32**	-.06	-.38**	-.22**	-.15*	.87					
8. ma1	.10*	.08	-.09	-.10	.01	-.07	.27**	.70				
9. pe1	.16*	.17*	.22**	.07	.24**	.20*	.11	.37**	.93			
10. ma3	.19*	.26**	.05	.05	.11	.05	.23**	.63**	.28**	.74		
11. pe3	.25**	.26**	.24**	.10	.31**	.22**	.13	.35**	.87**	.36**	.96	
12. gpa	-.37**	-.22**	-.25**	-.37**	-.34**	-.18*	.02	-.01	-.19*	-.10	-.13	-
M	1.99	2.94	1.89	1.90	2.03	2.32	2.56	3.94	2.47	3.91	2.22	6.22
SD	0.56	0.86	0.65	0.79	0.83	0.80	0.73	0.69	1.07	0.68	1.07	1.39

Note. cta = cognitive test anxiety, tax = test anxiety, thl = test hopelessness, tsh = test shame, cax = class anxiety, csh = class shame, tjo = test enjoyment. M = mean, SD = standard deviation. \*p < .05, \*\*p < .01. Cronbach's alphas are on the diagonal.

### **Criterion Validity of the S-CTAS: Achievement Goals, Cognitive Test Anxiety and Achievement Emotions**

A theoretical model (see Figure 1) in which achievement goals predict test emotions and, in turn, these predict achievement goals was specified as

follows: (a) academic performance is a negative predictor of performance goals, hopelessness, shame, and cognitive test anxiety, (b) mastery goals-Time 1 positively predict mastery goals-Time 3 and enjoyment and this, in turn, predicts mastery goals-Time 3, (c) performance goals-Time 1 positively predict performance goals-Time 3 and hopelessness, shame, and cognitive test anxiety and that these emotions, in turn, influence performance goals-Time 3, (d) given the larger number of studies that found relations between mastery goals and cognitive test anxiety, a plausible relation was supposed where mastery goals-Time 1 would predict cognitive test anxiety which, in turn, would predict mastery goals-Time 3.



*Figure 1.* Hypothesized model depicting the relationships between achievement goals and emotions.

The fit indexes suggested the proposed model provide adequate fit to the observed data ( $\chi^2/df = 1.29$ , IFI = .99, GFI = .97, CFI = .99, RMSEA = .044), and thus the feasibility of a model relating achievement goals and emotions is evidenced. Figure 2 shows the standardized solution, including proportion of explained variance for each variable. Non-significant paths from performance goals to cognitive test anxiety and test hopelessness have been suppressed in order to simplify the presentation.

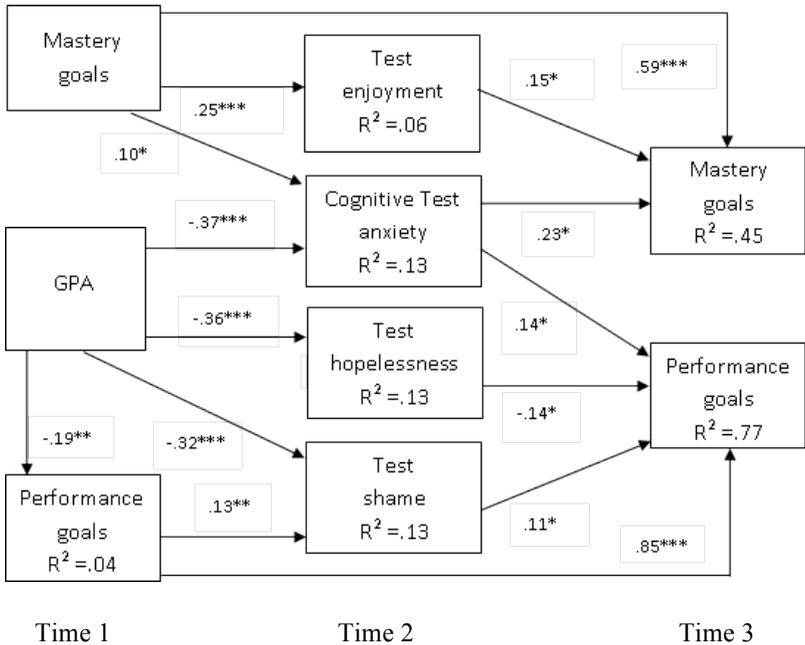


Figure 2. Standardized model for achievement goals and emotions.

### Discussion

Adapting an instrument of psychological measurement supposes a process that involves multiple empirical studies oriented to gather reliability and

validity evidences. In successive investigation such evidence was obtained through analytical approaches of increasing complexity that demonstrate the psychometric properties of the S-CTAS. Moreover, the S-CTAS was implemented in studies that included relationships with constructs derived from different theories which supported the development of the measure (Furlan, 2013; Furlan et al, 2008, 2009, 2010, 2014; Medrano & Moretti, 2013; Moyano, 2010).

Here, the reported results provide some additional evidence of the convergent and divergent validity of the S-CTAS through examinations of the relationship between cognitive test anxiety and other class and test emotions scales. Furthermore, the findings verify the criterion validity of the S-CTAS on a theoretical model that included personal achievement goals and other achievement emotions such as test-related enjoyment, shame, and hopelessness (Pekrun, Goetz, Perry, Kramer, & Hochstadt, 2004).

### **Convergent and divergent validity of the S-CTAS**

Theoretically, tests and exams can be expected to trigger a wide variety of human emotions. Exam results are decisive for educational and occupational careers today, implying that high subjective values are attached to success and failure on exams. Since emotions are caused by events and objects bearing high positive or negative values, exams can be expected to trigger intense emotions. Exams are events which can be anticipated and recalled, implying that they can induce both prospective and retrospective emotions (Pekrun et al., 2004). According to this, we tested the convergent and divergent relations between anxiety and shame, hopelessness, and enjoyment, in test or class situations.

Correlations between measures of cognitive test anxiety (S-CTAS) and those made by another scale that assesses one-dimensional manifestation of test anxiety are very high, which provides evidence of the convergent validity of the S-CTAS. Also, scores of other scales evaluating negative emotions aroused by negative outcomes in testing situations, such as hopelessness and shame, showed similar correlations in magnitude and direction with the S-CTAS. Moreover, these magnitudes are similar to those observed by Pekrun et al. (2004, 2011). In doing so, it confirms the Pekrun's

(2006) taxonomy that states that emotions can be organized according to their object, valence and situational and temporal specificity. As measured in this research, anxiety, hopelessness and shame are negative-outcome emotions experienced in exams. Whereas anxiety and hopelessness are prospective emotions with uncertainty expectancies about failure and certainty of failure, shame differs in that is a retrospective emotion involving retrospective appraisals of poor performance during and after the exam. The similar correlations in magnitude may imply that, independent of the temporal specificity, all the negative emotions experienced in test and aroused by negative outcomes co-exist with the similar frequency, as Pekrun et al. (2004) informed. In other hand, test-related anxiety, hopelessness, and shame also share many elements (e.g., failure-related worry cognitions, Pekrun et al., 2004).

Two other correlations of S-CTAS scores with those obtained by measuring anxiety and shame in class were obtained. These correlations are lower than the above because the specific situation that arouses emotion is changed. It is known that class attendance involves less pressure for achievement and more autonomy than writing an exam (Pekrun, 2007). This would explain these differential correlations respect to test situations. Nonetheless, the relationship with anxiety in class is greater than with the shame in class, which is consistent since a different emotion it is estimated.

Finally, the correlation with the CTAS obtained by measuring test enjoyment was weak and negative, and this magnitude is fairly close to those informed by Pekrun et al. (2004, 2011). As mentioned above, enjoyment is an activity-related emotion experienced during the test taking involving enjoyment of the challenge implied by an exam. As the object and valence change, the negative and low relationship between test enjoyment and test anxiety is clear evidence of divergent validity.

### **Criterion Validity of the S-CTAS: Achievement Goals, Cognitive Test Anxiety and Achievement Emotions**

As seen in Figure 1, criterion validity was evidenced by the theoretical model in which achievement goals (and academic performance) (Time 1) predicted test emotions (Time 2) and, in turn, these predict achievement

goals (Time 3). Although the contribution to the variability of emotions is low, the goal variability explained by the antecedents (goals and emotions) is moderate to high. In consequence, relevant variables were included for the explanation of the achievement goals. Also, these results reveal the contribution of the measurements made by cognitive test anxiety to explain achievement goals. Specifically, cognitive test anxiety positively predicted performance goals and mastery goals, although the magnitude of the effect is low. Furthermore, both the mastery goals and the performance goals at the Time 1 were associated with the mastery goals and performance goals at the Time 3, demonstrating the stability of the goals (Zusho, Karabenick, Bonney, & Sims, 2007). The short temporal distance between Time 1 and Time 3 (four weeks) would, mainly, determining the observed stability.

Like many other researches (Church, Elliot, & Gable, 2001; Elliot & McGregor, 2001; Finney, Pieper, & Barron, 2004; Pekrun et al., 2002, 2004, 2009; Vansteenkiste et al., 2004; Wolters, 2004; Zeidner, 2007), a negative relation was attested from academic performance to performance goals, hopelessness, shame, and anxiety. Then, the lower academic achievement oriented students towards adopting performance goals. Moreover, the lower attainment would have facilitated appraisals related to undesired results, and these appraisals would have contributed to the arousal of negative outcome related emotions like hopelessness, shame, and anxiety.

While much research inquired the influence of achievement goals on achievement emotions, it is generally assumed, although not studied, that achievement goals influence achievement emotions which in turn influence achievement goals (Pekrun, 2006). This relation would complete the dynamic cycle of reciprocal influence between achievement goals and achievement emotions. As hypothesized, mastery goals predicted enjoyment and this, in turn, predicted mastery goals. This is because mastery goals focus on the process of the achievement activity in itself and enjoyment is experienced while performing a task. So, mastery goals lead to students seek mastering the task, and this would lead them to enjoy the class and be excited about learning (Pekrun et al., 2006, 2009). Then, the enjoyment is characterized by attributing the success to mastering the task itself, and this perceived control allows the student to seek mastering the task.

As it was expected, performance goals positively explained shame and this, in turn, positively predicted performance goals. Performance goals involve concerns by the normative results and these concerns have demonstrated be responsible of the negative appraisals of control that arouse shame (Pekrun et al., 2006, 2009; Sánchez-Rosas, 2015a; Sánchez-Rosas & Pérez, 2015), since shame involves worries about exposing students' incompetence in comparison the others. Once activated shame, it is more likely that students adopt goals focused in the normative performance.

On the other hand, performance goals at Time 1 did not predict anxiety and hopelessness. However, according to our hypothesis and other studies, anxiety (Bandalos et al., 2003; Bong, 2009; Daniels et al., 2008, 2009; Duchesne & Rattelle, 2010; Gaudreau, 2012; King et al., 2012; Koul et al., 2009; Linnenbrink, 2005; Pekrun et al., 2006, 2009; Putwain & Symes, 2012; Shih, 2005, 2008; Sideridis, 2007) positively predicted performance goals at the Time 3, evidencing criterion validity for the S-CTAS. Surprisingly, and contrary to the expectations (King et al., 2012; Pekrun et al., 2006), hopelessness becomes a negative predictor of performance goals. When students have doubts as to their ability to control their test performance, and if success is perceived as not being attainable and failure to be certain, they are more likely to experience negative emotions such as anxiety or hopelessness (Pekrun, 2006). On one hand, this lack of controllability regarding future outcomes (uncertainty) could lead to the adoption of outcome-related goals, maybe in the hope of controlling the subsequent attainment. But, on the other hand, the certainty concerning future failure that is inherent to hopelessness could decrease the performance goals because nothing could be done to control the performance.

Similar to other studies (Bong, 2009; Gaudreau, 2012; Koul et al., 2009; Putwain & Symes, 2012; Sideridis, 2008), mastery goals at the Time 1 positively predicted cognitive test anxiety and this, in turn, positively predicted mastery goals at the Time 3. It is important to note, however, that negative achievement emotions are not always detrimental (i.e., they do not always produce negative effects; Pekrun, 2006). On one hand, as in this case, the motivation (mastery goals at the Time 1) may determine an emotional response mobilizing the resources needed to achieve mastery. On the other hand, the negative activating emotion, such as the test anxiety, could actually

increase one's motivation (mastery goals at the Time 3) to study and prepare for the test (Artino & Jones, 2012). In this case, a negative activating emotion has effectively facilitated mastery goals, which could have a positive overall effect on future learning and performance (Pekrun, 2006). These results demonstrate that the association between anxiety-mastery goals and hopelessness-performance goals can be quite complex, resulting from dynamic, reciprocal interactions between affect, cognition, and behavior (Linnenbrink & Pintrich, 2004).

In sum, the scope of the reported studies are important, while increasing the available evidence of validity for the Spanish cognitive test anxiety scale (Furlan, 2013; Furlan et al, 2008, 2009, 2010, 2014; Medrano & Moretti, 2013; Moyano, 2010). which demonstrates the usefulness of the instrument for research.

Although the reported results have the potential to increase our understanding of the topics under investigation, they should be considered with caution. While the evidence provided is theoretically and empirically strong, the observed criterion validity evidence has some limitations.

In analyzing the criterion validity, the model did not discriminate between the approach and avoidance dimensions of the achievement goals (Elliot & Murayama, 2008). Consequently, the positive and negative features of both dimensions could not be distinguished. However, not being a purely theoretical investigation, it was considered sufficient and more parsimonious to analyze a smaller number of variables to provide criterion validity. This decision was based on moderate and high relationship of different achievement goals. Added to this, a model of partial mediation was not assessed, but simultaneously the intervening effects, the variance explained and the model fit, were assessed. It may be interesting to test the direct influence of achievement goals at Time 1 on achievement goals at Time 3 separate from the mediating variables tested here to see how much of a change is influenced by those variables.

Also, gender differences are an important aspect not addressed in this research. Sánchez-Rosas (2013) found unfavorable differences for women in achievement-related anxiety, shame, and hopelessness. Consequently, for a more rigorous analysis of the scale should be considered gender differences. The sample had a strong presence of women and psychology and social

sciences students. Both factors could introduce bias into the examination and should be controlled for in future investigations. Future research should ensure the minimum sample sizes and multi-group analyses should also be conducted to establish that the scales demonstrate the same or different results.

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