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# AMBIGUITY TOLERANCE LEVELS IN SPANISH ACCOUNTING STUDENTS: A COMPARATIVE STUDY

NIVELES DE TOLERANCIA A LA AMBIGÜEDAD EN ESTUDIANTES ESPAÑOLES DE CONTABILIDAD: UN ESTUDIO COMPARATIVO

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## RESUMEN

**Background** - Ambiguity is the perception of inadequate information arising from certain characteristics of a situation. In a situation that demands evaluation or choice, the perception of ambiguity is threatening and presents a cognitive challenge. Research has examined AT (Ambiguity Tolerance) levels and their influence on decision making in business and financial scenarios.

**Aims** - This paper aims to investigate the AT levels of a sample of accounting students and to compare them with the AT levels of students on other social sciences degree courses.

**Instrument and Sample** - The instrument used is the Spanish version of MSTAT-II (McLain, 2008). The sample is composed of students enrolled on various degree courses at a Spanish University (Universidad de Huelva).

**Results and implications** - The results of the questionnaire present high levels of internal consistency with the sample. Accounting students are shown to present lower levels of AT than students enrolled on other social sciences degree courses. The implications for universities and education are discussed.

**KEY WORDS:** ambiguity tolerance, accounting education, competencias, skills

**JEL:** M-49

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## RESUMEN

La ambigüedad es la percepción de la inadecuación de la información que resulta de determinadas características de un escenario. En situaciones de toma de decisiones, la percepción de ambigüedad puede percibirse como una amenaza y supone un reto cognitivo. En esta línea la literatura ha tratado la incidencia de los niveles de tolerancia a la ambigüedad (AT) en la toma de decisiones en contextos empresariales y financieros.

Este trabajo trata de estudiar los niveles de AT en una muestra de estudiantes de contabilidad comparándolos con los niveles de otros estudiantes de otras carreras de ciencias sociales.

El instrumento usado es la versión española del MSTAT-II (McLain, 2008) y la muestra está compuesta por estudiantes de distintas carreras de ciencias sociales de la Universidad de Huelva.

Los resultados indican un alto nivel de consistencia interna del instrumento con esta muestra. Los estudiantes de contabilidad presentan niveles de tolerancia a la ambigüedad más bajos que el resto de sus compañeros en otras carreras. Por último, se debaten las implicaciones educativas para las universidades de estos resultados.

**PALABRAS CLAVE:** tolerancia a la ambigüedad, formación en contabilidad, competencias, capacidades.

# 1 INTRODUCTION

Ambiguity could be defined as the perception of inadequate information arising from certain characteristics of a situation (McLain, 2008). In a situation that demands evaluation or choice, the perception of ambiguity is threatening and presents a cognitive challenge in the form of desired, but absent or inaccessible information. Probabilities of future situational states can hardly be estimated and it may not even be possible to envision their underlying conditions, placing ambiguity in a realm of information paucity which is beyond risk<sup>2</sup> or uncertainty (e.g., Ellsberg, 1961; Pich et al, 2002). Thus, the core concept of “ambiguity” is a perceived absence of information that is desired in order to understand a situation and to make choices with predictable outcomes. Ambiguity is therefore a barrier that hampers decision making and prediction. Ambiguity tolerance (AT hereinafter) could be defined as the degree of acceptance of the cognitive challenge associated with ambiguity.

The relevance of ambiguity (and AT) in accounting was pointed out by Harding & Ren (2007): accounting is inherently related to judgment, which could itself be described as decision making in the face of ambiguity. The efficiency of a decision making process - core to the definition of accounting and to its utility - is determined by three factors (Smith, 1999): the requirements of the decision task; the knowledge, goals, information-processing limitations and personal characteristics of the decision maker; and the interaction between decision task and decision maker. AT is a key point in two of those factors: personal characteristics and interaction.

If future professionals in our disciplines are to deal successfully with ambiguity, business and accounting degrees must attract and retain students that, at the very least, are not intolerant of ambiguity. However, Amernic & Beechy (1984), drawing on work by Holland (1973) and Amernic et al (1979), pointed out that accounting professionals and students on the whole present a *conventional* type. Conventional type individuals (Holland, 1973) are characterized by their preference for activities that entail ordered and systematic manipulation of quantitative data and by an aversion to ambiguous, exploratory or unsystematic activities<sup>3</sup>. Therefore, while leaders of the profession are calling for more flexible and adaptable entry conditions, both professional accountants and new students attracted to the profession tend to harbor an aversion to ambiguity.

In line with that argument, this study aims to compare ambiguity tolerance levels between a sample of Spanish accounting students and students enrolled on other social sciences degree courses. This comparison could throw some light on the question as to whether accounting

(2) Hogarth (1989) defines risk as a situation in which the probability of an outcome is expressed by only one (known) probability distribution. In contrast, ambiguity is the inability to specify any precise probability distribution.

(3) Wang & Chan (1995) indicate that the preference for quantitative data by low AT individuals could be explained in the following way: reducing a complex situation to hard (quantitative) data may lead them to perceive the environment as less ambiguous than it really is.

courses are attracting appropriate students who will be able to meet future professional requirements, or, contrariwise, whether our students present a desirable characteristic at lower levels than their colleagues who have chosen to study other degree courses in the area of social sciences. The differences between the AT levels of Spanish students and those of students on similar courses in other countries are also compared.

The rest of the paper is structured as follows: the next section deals with the concept of ambiguity tolerance and its measures. Deeper reflection on the relevance of AT for business and accounting professionals and its effect on decision making is provided in the third section. The fourth section sets out the objectives of the paper, the sample, instrument and related statistical tests. Finally, the paper draws to a close with the results section followed by a discussion of their implications for the profession.

## 2 AMBIGUITY (IN)TOLERANCE AND MEASURES

Intolerance of ambiguity has its formal origins in the work of Frenkel-Brunswik (1948, 1949, and 1951). The concept was defined by case-study material gathered from interviews, which presented the characteristics of people at the two extremes of the continuum. Behavioral dispositions relating to ambiguity intolerance included (Furnham & Ribchester, 1995) the acceptance of attitudinal statements representing a rigid, *black-white* view of life, seeking for certainty, remaining closed to familiar characteristics of certain stimuli, and resistance to the reversal of fluctuating stimuli. With regard to problem solving, these authors indicate that people with low tolerance levels tend to dichotomize problems rigidly into fixed categories, to select solutions at an early stage and to maintain one solution in a perceptually ambiguous situation; as a consequence, they tend to adopt a premature closure.

Based on the work of Frenkel-Brunswik, several questionnaires were developed (e.g., Bhushan & Amal, 1986; Budner, 1962; Kischkel, 1984; MacDonald, 1970; Rydell & Rosen, 1966). These measures evolved from an initially strong emphasis on social and psychological relationships, such as authoritarianism, racism, ethnocentrism, and political orientations toward a somewhat broader conceptualization of AT as the study of an individual's orientation toward stimulus characteristics (Furnham & Ribchester, 1995).

The work of Budner (1962), a milestone in AT development, defined intolerance of ambiguity as the tendency to perceive and interpret ambiguous situations as sources of threat and proposed three defining characteristics for ambiguous situations:

- *Novelty*, also called newness or unfamiliarity (“no familiar cues”), challenges the perceiver to interpret a situation that presents information that has not previously been encountered elsewhere.

- *Complexity* (“great numbers of clues”), which overwhelms the perceiver who has to digest a lot of information to make sense of the situation.
- *Insolubility*, (“cues suggest different structures”), involving insoluble stimuli which contain information conflicts that must be solved if effective action with predictable effects is to be taken.

Although a new, or unfamiliar, situation may take time to interpret, it could be relatively simple in terms of the information to be processed. However, a complex stimulus presents a large volume of information that has to be interpreted. No single element of a complex stimulus may be unfamiliar in itself, but together it is difficult to extract the necessary information. An insoluble situation may imply a mild conflict involving ill-fitting elements or an impossibly contradictory one (McLain, 2008). Insoluble stimuli give rise to multiple interpretations (Poesio, 1996).

As possible responses to the perceived threat, Budner (1962) listed four types:

- Phenomenological denial (repression and denial)
- Phenomenological submission (anxiety and discomfort)
- Operative denial (destructive and reconstructive behavior)
- Operative submission (avoidance behavior)

His scale therefore reflected this 3x4 (situations x responses) design and has since been widely used. However, this scale has a number of psychometric shortcomings. Benjamin et al (1996) found that the scale had a low internal reliability ( $\alpha = .44$ ) and they failed to replicate the proposed factor structure. Subsequent AT scales (e.g., Rydell & Rosen, 1966; MacDonald, 1970) were also subject to criticism. Norton (1975) argued that those questionnaires were unreliable and had insufficient validity evidence. Furnham (1994) studied the four most popular AT scales (Norton, Rydell & Rosen, Budner, Walker). The results of the study indicated low internal reliability scores for Budner's and Walk's scales and a complex and unexpected factorial structure for the other two (Norton and Rydell & Rosen). Kirton (1981) obtained acceptable results, but only after a comprehensive reduction and modification of Budner's and McDonald's scales. McLain (2008) indicated that an examination of the face validity of the published scales reveals some potential explanations for the weaknesses. This author affirmed that some items lack a theoretical grounding; others include language or references that have become archaic. Moreover, incomplete, inadequate, and unbalanced tapping of theoretical dimensions are common problems. Those reasons led McLain (1993) to develop a short, neutral and context-independent measure of AT with acceptable psychometric characteristics<sup>4</sup>: the Multiple Stimulus Types Ambiguity Tolerance Scale, MSTAT-I.

(4) Internal reliability (Cronbach's  $\alpha$ ) is over .80 in all studies. McLain provides evidences of convergent and divergent validity: the scale correlates significantly and positively with other AT measures (McDonald, Budner, Storey & Aldag) and receptivity to change (Dunham et al) and negatively with a dogmatism scale (Troidahl & Powell). McLain (2008) provided further evidence on validity. Confirmatory factor analysis supports unidimensional factorial structure.

The key concepts for McLain are as follows: ambiguity is, as stated above, the perception of inadequate information arising from certain characteristics of a situation. Intolerance of ambiguity is defined following Budner (1962), as an aversion to this lack of information. Therefore, ambiguity tolerance is the degree of acceptance or even attraction to that lack of information (McLain, 2008). Kirton (1981) pointed out that the term “desirable”, in the attraction pole of AT, poses semantic problems. McLain (2008) explained that, although we normally desire adequate and clear information to make a decision and are frustrated by its inadequacy, there may be situations in which we are attracted to the challenge or the mystery associated with incomplete information, especially when the situation does not involve any negative prospects. However, there is also the possibility that ambiguity might be attractive when it leaves the door open to avoiding a negative situational outcome (Viscusi & Chesson, 1999). Thus, McLain (2008) postulates that both aversive and attractive orientations seem possible, and a definition of ambiguity tolerance should encompass that range of possibilities.

### 3 RELEVANCE OF AT IN ACCOUNTING AND MANAGEMENT SCENARIOS

Why is AT of interest in accounting, financial, and, broadly, managerial scenarios? Management and accounting are deeply linked to decision making under ambiguity and uncertainty. As stated by Jones & Davidson (2007), the essential idea is that graduates should be able to tolerate increasing levels of ambiguity in problem solving tasks, which they will frequently have to deal with in intuitive and creative ways.

The connection between ambiguity, problem solving and desired skills may be evidenced by analyzing (I) stakeholders' published statements, (II) published research on opinions expressed by employers and other relevant groups and (III) the results of empirical research into the links between AT and decision making.

#### *Institutional published statements and empirical support*

Professional accounting institutes, associations and international organizations now acknowledge that entry level professionals should present certain characteristics, which Arthur Andersen & Co., (1989), in their so-called “White Paper,” indicated that “*individuals seeking to be successful in the diverse world of public accounting must be able to use creative problem-solving skills in a consultative process. They must be able to solve diverse and unstructured problems in unfamiliar settings. They must be able to comprehend an unfocused set of facts; identify and, if possible, anticipate problems; and find acceptable solutions. This requires an understanding of the determining forces in a given situation and the ability to predict their effects*”. This same opinion is also present in position statement N° 2 of the Accounting Education Change Commission (AECC, 1990): “*the ability to identify and solve*

*unstructured problems in unfamiliar settings and to apply problem-solving skills in a consultative process*” is listed among the desired capabilities of a professional.

The International Federation of Accountants, in International Education Guideline N° 9 (IFAC, 1996), literally transcribed the statement of the AECC. International Education Standard N° 3 (IFAC, 2008, par. 14), points out that individuals seeking to become professional accountants should acquire intellectual skills, among others, which will enable a professional accountant to identify and to solve problems, to make decisions and to exercise sound judgment in complex organizational situations and unfamiliar settings, as well as in changing environments (IFAC, 1996).

The American Institute of Certified Public Accountants (AICPA, 2009) published a document that maps the skills identified in the AICPA Core Competency Framework that are relevant to its assessment process. One of these core competencies - problem solving and decision-making - is defined as the ability to discern the true nature of a situation and then determine the principles and techniques needed to solve problems or make judgments. This competency includes the ability to identify uncertainties surrounding the interpretation or significance of information and evidence, and to describe the implications of ambiguities when estimates are required.

In a European context, the skills framework of the Common Content Project (2006) sets out a similar view: entry level professional accountants should be able to structure problems and to operate in unstructured situations involving elements of risk and uncertainty; more specifically, by identifying issues in organizational contexts, by generating and validating solutions to complex problems and by prioritizing and trading off solutions to complex problems.

The results of published research support the opinions held by stakeholders. The ability to solve problems under ambiguous situations is of the highest importance in the opinion of academics (May et al, 1995), employers and professional accountants (see, for instance, Arquero, 2000; Arquero et al, 2009; Hassall et al, 2003), who believe that those skills should be developed by the students throughout their university career. Along these lines, alumni surveyed by Deppe et al. (1991) pointed out that the most important competence that they developed in their post college employment was the ability to “*solve diverse and unstructured problems in unfamiliar settings*”, although they believed that this competence should have been acquired through formal education.

#### *Empirical research on the links between AT and decision making*

Pratt (1980) suggests that ambiguity-intolerant individuals seek to ignore uncertainty, fail to recognize it, or act to reduce the threat of uncertainty. Amernic & Beechy (1984) indicated that ambiguity tolerance is central to the concept of *cognitive complexity*, which allows individuals to locate relevant information in highly complex environments and to integrate this information in complex ways; key abilities to problem solving skills in complex scenarios.



As a result, low ambiguity tolerant individuals are likely to present behavioral and cognitive dispositions (such as seeking out and maintaining early solutions, premature closure, difficulties with sourcing and integrating information in complex situations etc,) that are incompatible with the required problem solving and decision making skills, which could affect their judgment in comparison with more tolerant individuals. This is the underlying leitmotiv of the research that is reviewed in this section.

Gul (1986), in an experiment with managers using accounting information for personnel decisions, and Ghosh & Ray (1997), in a series of experiments with MBA students acting as consultants, found that individuals with low AT had less confidence in their decisions than individuals with high AT when uncertainty was involved. Within the context of professional judgment, low AT individuals are more likely to actively reduce the perceived threat by applying fixed rules in a “black-and-white” manner and by quickly adopting available answers to various questions (Lowe & Reckers, 1997; MacDonald, 1970; Pincus, 1990; Zebda, 1991) or by looking for additional information to reduce ambiguity, thereby reducing the efficiency of the decision-making process (Dermer, 1973; Wharton et al 1999).

In their experiment with a sample of undergraduate students, Ebeling & Spear (1980) found that students with higher levels of AT performed various problem solving tasks with different levels of task ambiguity better than intolerant students. Similar results were obtained by Amernic & Beechy (1984) with a sample of accounting students: students with higher levels of cognitive complexity (concept related with ambiguity tolerance) performed significantly better than individuals with lower levels in unstructured questions.

Focusing on decision making in accounting and financial settings, AT levels appear to affect judgment and decisions. Tsui (1993) found that AT levels had an effect on the judgment of people using accounting information. Two groups were classified using their AT score. Individuals in both groups were given identical financial information about a company including a footnote disclosure on an uncertainty issue regarding pending litigation and a “subject to” audit qualification. Their perceptions of loan risk and their reactions to uncertainties in the audit reports differed according to their AT level. Low-tolerant individuals tended to perceive higher levels of risk under the same circumstances. Wright & Davidson (2000) obtained similar results: tolerance for ambiguity significantly affected risk-assessment judgment and interest-rate decisions when decision makers evaluated a commercial loan. Liedtka et al (2008) found that ambiguity intolerant evaluators obtained lower performance scores for a firm, despite it having a relatively strong balance of scorecard indicators, than more tolerant individuals. In their experiment, there were no differences when evaluating cases that showed poor performance indicators, which led them to conclude that ambiguity intolerant individuals are more likely to ignore or discount ambiguous information when the ambiguity relates to positive information. These findings are consistent with those of Lowe & Reckers (1997), who pointed to differences between auditors’ decisions that were related to

their AT levels. Individuals who were more tolerant of ambiguity would attend more to available non-outcome information, whereas intolerant individuals tended to focus exclusively on the unfavorable outcomes. The correlation between AT and misrepresentation of information also arose in the experimental work of Yurtsever (2001), who once again found a positive correlation between AT and the outcomes of negotiation. Ghosh (1994) also found that the greater the tolerance for ambiguity, the greater the effectiveness of the negotiator.

In a broader managerial context, a CEO's capacity to tolerate ambiguity in turbulent environments appears to influence financial performance more than any other factor (Westerberg et al, 1997). Those authors showed that, in highly turbulent environments which threaten the very survival of small fragile firms, the critical resource that appears to enhance both market and financial performance, namely the ability to tolerate ambiguity, clearly resides in the CEO.

#### *AT and accounting education*

Terms like unfamiliar settings, complex or unstructured problems, unfocused facts, and changing environments, which have been used when defining key skills for entry level accountants and managers, are deeply related to the definition of ambiguity. Furthermore, research suggests that ambiguity intolerant individuals present behavioral dispositions that negatively affect essential problem solving and decision-making skills. Those results indicate that accountants and accounting information users should be able to deal with ambiguity at a professional entry level.

Consequently, if educational policies are to be coherent, students following degrees that are closely related to accounting should not present intolerance to ambiguity. However, the scarce few studies that compare the AT levels of accounting students with those of other students reveal that students studying accounting present lower levels of AT.

Elias (1999) compared a sample of accounting students with the published national norms. His findings indicated that accounting students were significantly less tolerant of ambiguity than the national norms (at 1% level). Within the sample, males and non-traditional students (those aged 25 or older) presented higher levels of AT (significant at 10% and 5%, respectively). Lamberton et al, (2005) compared AT levels among accounting students with different interests (majors in accounting and majors in accounting information systems). Their results indicated that students following a traditional accounting major scored significantly lower ( $p < 1\%$ ) in AT than their colleagues majoring in AIS. They also found significant differences associated with gender.

## **4 OBJECTIVES, SAMPLE, INSTRUMENT AND STATISTICAL ANALYSES**

The main objective of this research is to study the AT levels of Spanish accounting students in comparison with those of students on other closely related degree courses (social sciences),

in order to ascertain whether the degree course is attracting students who possess the attributes needed for future professional success. Based on the results of previous research the first hypothesis could be stated as follows.

H1: Accounting students present lower levels of AT than other students.

This first hypothesis is split into two sub hypothesis:

H1a: Spanish Accounting students present lower levels of AT than Spanish students enrolled on other social sciences degrees

H1b: Spanish Accounting students present lower levels of AT than their counterparts in other countries

Published research supports the existence of differences in AT level associated with certain personal data (Elias, 1999; Lamberton et al, 2005; McLain, 2008). As a secondary objective, the relationship of AT with gender and age will be studied.

Thus, the second and third hypotheses state that:

H2: There are differences in AT levels between males and females.

H3: There are differences in AT levels associated with the age of the respondent.

H2 and H3 will be tested for the whole sample and not only the accounting students.

The sample is composed of 619 students enrolled on various university degree courses in the area of “social sciences” at the University of Huelva, which include law (n: 99; 16% of the sample), accounting and management<sup>5</sup> (n: 366; 59% of the sample) and psychology and educational sciences (n: 154; 25% of the sample).

The age of the respondents ranged from 17 to 62 years old. The mean was 22; the median, 21, and 95% of the respondents were 27 or younger. In relation to gender, 64% of the respondents were female and 36% male.

The instrument used in the study was the MSTAT-II (McLain, 2008), a shorter version of the MSTAT-I (McLain, 1993). The scale was designed in order to obtain a short (13-item) but psychometrically adequate measure of ambiguity tolerance which may be used in conjunction with other instruments without causing cognitive fatigue. The items are designed for five-category Likert-type responses ranging from strongly disagree to strongly agree. Higher-scale scores indicate greater ambiguity tolerance (the instrument is included in the appendix).

(5) There is no specific degree for accounting in Spain. Management & business administration degrees provide a solid training in accounting and finance, where those areas have a relevant weight in the curriculum as compulsory subjects. According to the results of Arquero et al (2009), nigh on 70% of the alumni on the degree courses surveyed in their study had relevant professional experience in accounting and finance.

The questionnaires were administered during class time in the presence of the teacher in charge of the group and a researcher. The objectives of the project were explained and students were asked to participate on a voluntary basis. The relevance of sincere answers was stressed which remained confidential at all times. Only a token number of students (less than 1%) failed to participate.

### *Statistical analysis*

Statistical analysis was performed with SPSS 13.0. Variance analyses (ANOVA and MANOVA) and the t-test were used to test the differences of AT scores associated with the explanatory factors, along with the Levene test for equal variances. Dunnett's T3 for ANOVA post hoc contrast analysis was applied as a pair wise comparison test that is appropriate when equal variances are not assumed.

Correlation analysis was performed by using the Pearson's coefficient (bivariate). The internal reliability of the scale was assessed using the Guttman Split-Half Coefficient and Cronbach's alpha. This coefficient was also calculated when deleting elements for the scale.

Continuous variables (age) were reclassified into intervals. The Chi square test was used to test for differences between distributions (cross tables).

## 5 RESULTS

Flawed or incomplete data appeared in less than five percent of the questionnaires. 606 questionnaires were eventually used to obtain the AT score. The reliability obtained with this sample is quite high: Cronbach's alpha is .816 (13 items,  $n = 606$ ) and this coefficient could not be higher by deleting any element of the scale. The Guttman Split-Half Coefficient is .741. The correlation item-scale is quite high (ranging from .42 to .67) and significant ( $p < .001$ ) for all elements, which is consequent with the one-dimensional structure of the scale. These results are similar to McLain's (1993, 22 items version,  $\alpha = .86$ ; 2008, 13 items version,  $\alpha = .826$ ) and are indicative of an adequate internal reliability of the scale for the sample.

H1, H2 and H3 proposed differences in AT levels by degree, gender and age. As there could be relationships between the independent variables, univariate analysis could lead to erroneous interpretations. Cross tabulations and Chi square tests were therefore performed in order to verify the relationships between the independent variables. Table 1 shows the cross table degree by gender. Although the gender distributions in accounting and law degrees were similar, there was a larger presence of female students in psychology and educational sciences, which represented a significant difference (Chi square  $p < .01$ ). No other differences were found. In order to control for both variables at the same time, a multiple analysis of variance (MANOVA) was performed.

TABLA 1.- CROSSTABLE DEGREE BY GENDER

		Male	Female	Total
Accounting	Count	143	221	364
	Percentage	39.29%	60.71%	100
Law	Count	41	58	99
	Percentage	41.41%	58.59%	100
Psychology and Educ. Sciences	Count	36	116	152
	Percentage	23.68%	76.32%	100
Total sample	Count	220	395	615
	Percentage	35%	64%	100

The results of the MANOVA (table 2) indicated that there were significant differences in the AT score associated with the degree, but no significant differences were found by gender. Students of both law and psychology following educational sciences degree courses presented higher levels of AT than accounting students.

TABLA 2.- AT SCORE BY GENDER AND DEGREE

Panel A. Descriptives

		Mean	STD	n
Male	Accounting	38.68	8.421	141
	Law	40.24	8.387	41
	Psych. & Ed Sciences	40.61	8.001	36
Female	Accounting	37.49	7.121	216
	Law	40. 76	7.466	55
	Psych. & Ed. Sciences	40.44	8.404	113
Sample		38.99	7.938	602

Panel B. Tests of Significance (MANOVA)

Source of Variation	SS	DF	MS	F	Sig of F
WITHIN+RESIDUAL	36,867.29	598	61.65		
Gender	64.27	1	64.27	1.04	.308 (n.s.)
Degree	973.91	2	486.96	7.90	0.000
(Model)	1.003.70	3	334.57	5.43	0.001
(Total)	37,871.00	601	63.01		

R-Squared = .027; Adjusted R-Squared = .022

With regard to gender differences, noticeable differences in AT scores by gender (38.7 for male versus 37.5 for female students, but not significant) only appear to be found for accounting students. Given that gender is not found to have any influence on AT scores, a one-way ANOVA was performed that included a post-hoc analysis, in order to check the differences in AT score between students by degree (table 3). The results pointed to significant differences in AT scores by degree courses. Accounting students scored much lower in AT than their colleagues.

Post-hoc comparisons confirmed that the students studying accounting exhibited significantly lower levels of AT than those exhibited by law students ( $p < 5\%$ ) and students studying psychology & education sciences ( $p < 1\%$ ). No differences were found between the AT levels of other groups of students.

TABLA 3.- AT SCORE BY DEGREE

## Panel A. Descriptives

	N	Mean	STD	Std.Error
Accounting	359	37.95	7.65	0.40
Law	96	40.54	7.83	0.80
Psych. & Ed. Sc.	151	40.52	8.23	0.67
Total	606	39.00	7.92	0.32

ANOVA Sig. of F: 0.000; Robust test sig. (Welch) 0.001

## Panel B. Post hoc multiple Comparisons Dunnett T3

AT score (I)	AT score (J)	Mean Difference (I-J)	Std. Error	Sig.
Accounting	LAW	-2.592	0.896	0.013
Accounting	Psicol. & Ed. Sc.	-2.567	0.782	0.004
LAW	Psicol. & Ed. Sc.	0.025	1.043	1.0 (n.s.)

After comparing accounting students with other Spanish students enrolled on social sciences degrees, we compared the scores of Spanish students with results obtained for American undergraduate business students by McLain (2008). The results (table 4) indicate that the Spanish students of accounting in this study clearly have lower AT levels than their American colleagues ( $p < 1\%$ ). Spanish students not studying accounting also presented lower scores, but the difference was only significant to a confidence level of 10%.

TABLA 4.- COMPARISON OF SPANISH STUDENTS WITH MCLAIN RESULTS

		N	Mean	STD	dif of means	t-test sig
Spanish students	Other social sciences	247	40.53	8.06	-0.87	0.09
	Accounting	359	37.95	7.65	-3.45	0.000
USA students	Business	528	41.4	7.54	-	-

The results support H1, insofar as accounting students showed significantly lower AT levels in comparison with other Spanish social sciences students and when compared with students on similar degree courses in the USA. On the contrary, the results do not support H2 insofar as there was no evidence of significant differences in AT between male and female students. In order to test H3, age distribution was assigned as equally as possible into 3 intervals, excluding the central interval for contrast purposes (table 5).

TABLA 5.- DESCRIPTIVES BY AGE

	Mean	STD	n
Up to 20 years old	38.03	7.49	228
23 years or over	39.44	8.20	202

T test p value: 0.064. Equal variances assumed (Levene test n.s.)

The results indicated that older students presented higher levels of AT (39.44 versus 38.03). The p value of the T-test shows that this difference is significant to 0.064. Given the level of confidence, these results partially support H3.

5 DISCUSSION

Spanish students currently enrolled on accounting courses, as well as being future entrepreneurs, are the future professionals in management, accounting, finance and business generally. Workplace demands, disclosed in relevant professional organizations statements, indicate that those future professionals should be able to deal with diverse and unstructured problems in unfamiliar settings and comprehend an unfocused set of facts; making decisions and exercising sound judgment in complex organizational situations. The results of this research

highlight that ambiguity tolerance-intolerance is a key trait that explains individual performance under uncertainty (Ebeling & Spear, 1980; Yurtsever, 2001) as well as decision making and perception in managerial, financial and accounting decision-making situations (among others, Hartmann, 2005; Gul & Tsui, 1994; Wright & Davidson, 2000). Those cognitive differences could, finally, affect the performance of the firm (Westerberg et al 1997) and its ability to adapt to change (Judge et al, 1999; Walker et al, 2007). Future professionals need these attributes to deal effectively with ambiguity and ambiguous problems and situations.

Our universities must attract, retain and teach individuals with the necessary interests, attitudes, and competencies, if they are to seek an assurance that our future professionals will be able to deal with tomorrow's challenges. At the very least, with regard to AT traits, our results indicate that students show significantly lower levels than students on other closely related degree courses and even than students on similar degree courses in other countries. Lower levels of a desired characteristic could negatively affect future performance in the workplace and might even imply a lower chance of access a professional career or promotion. As a possible explanation of these lower AT levels, Amernic & Beechy (1984) and Lamberton et al (2005) pointed to a self-selection bias. Students choose their degrees based on perceptions or stereotypes on the characteristics of the job, the required skills, the perceived difficulty, etc. In that case, universities and professional bodies are perhaps not communicating the required profile and the capabilities needed for a successful professional career in accounting and management.

If we take the position of Sherrill (2001), who affirms that AT is a stable personality trait that is not easily malleable in educational settings, then the only alternative for universities is to select entry-level students with suitable characteristics. However, in line with McLain (2008), the association of AT scores with age could lead to a different view: individuals are exposed to greater ambiguity over time and are increasingly comfortable with ambiguity as they experience it. This interpretation leaves the door open to educational experiences designed to improve ambiguity tolerance. According to DeRoma et al, (2003) tolerance of ambiguity may be an important variable to assess and to develop so that students - our future professionals - are better prepared for unstructured elements of their courses that promote critical thinking and parallel the complexities of the professional world. Amernic & Beechy (1984) expressed the same opinion: if the intention is to attract accounting students who will be able to function in unstructured situations, then introductory accounting courses should be designed to attract students with high levels of AT. Banning (2003) and Huber (2003) suggested that it is possible to design and implement activities in order to increase tolerance for ambiguity. Basing his experiment on case study methods, Banning (2003) also obtained a positive association between AT and performance.

Thus, the main implications for universities are that increased emphasis on educational experiences could lead to AT improvements (including assessment of progress). Moreover, a key point in attracting suitable students relates to structured communication actions that



define and document the required capabilities for a successful professional career based on accounting and management degree courses. In our opinion, both lines of action should be taken on board by universities. Indeed, the first set of activities (educational experiences to improve AT) fits into the educational innovations (more active teaching methods, use of case studies, etc.) that are claimed to lie at the core of the Bologna process. Communication actions, or at least those that target new student intakes, are not easily implemented. In our educational context, an active flow of communication between university and secondary schools, to promote universities and their degree courses (and professional careers) among future university students is hardly comparable with those of other countries. Relevant information should be given once students enroll on a specific degree course. In any case, a clear view of what is expected from future professionals in each area is valuable information for students and could indirectly impact on students' future expectations with regard to their degree courses.

#### *Limitations and extensions*

Although the sample of students is large enough to be indicative of trends, specific characteristics associated with the sample and its local contexts or cultural differences could affect any extrapolation or generalization of the results. Broader samples that might include students from other universities could enrich the results and add to these conclusions.

The effect of controlled exposure to ambiguous stimuli and the content of AT in an educational context is an interesting topic for further development. Certain complex subjects, which challenge students with ambiguous tasks (such as Financial Statement Analysis, Firms Valuation, etc.) are valuable fields for experiments and longitudinal studies.

APPENDIX

The measure is scored as the sum of item responses after reversing the responses for those items that are reverse-scored (marked with an R).

The items are answered in a 5 point Likert scale, indicating the level of agreement, from 1 - I strongly disagree with this statement, 2 - I mildly disagree with this statement, 3 - I am “in between”, neutral, i.e. I neither agree nor disagree with this statement, 4 - I mildly agree with this statement, 5 - I strongly agree with this statement.

MSTAT- II items
1. I don't tolerate ambiguous situations well. R
2. I would rather avoid solving a problem that must be viewed from several different perspectives. R
3. I try to avoid situations that are ambiguous. R
4. I prefer familiar situations to new ones. R
5. Problems that cannot be considered from just one point of view are a little threatening. R
6. I avoid situations that are too complicated for me to easily understand. R
7. I am tolerant of ambiguous situations.
8. I enjoy tackling problems that are complex enough to be ambiguous.
9. I try to avoid problems that don't seem to have only one “best” solution. R
10. I generally prefer novelty over familiarity.
11. I dislike ambiguous situations. R
12. I find it hard to make a choice when the outcome is uncertain. R
13. I prefer a situation in which there is some ambiguity.

The Spanish version of the instrument is available on request from the authors.

## 1 | REFERENCES

- Accounting Education Change Commission. (AECC) (1990). Objectives of Education for Accountants: Position Statement No.1 *Issues in Accounting Education* 5, pp. 307 - 312.
- American Institute of Certified Public Accountants (2009). Mapping of the Core Competency Framework to the Skills Tested on the CPA Exam. Available online at <http://ceae.aicpa.org/Resources/Education+and+Curriculum+Development>
- Amernic, J. H. and Beechy, T. (1984). Accounting students' performance and cognitive complexity: some empirical evidence, *The Accounting Review*, 59, April, pp. 300–313.
- Amernic, J.; Aranya, N. & Polluck, J. (1979). Is there a generally accepted standard accountant? *CA Magazine*, October, pp. 34-42.
- Arquero Montaña, J.L. (2000). Capacidades no técnicas en el perfil profesional en contabilidad: las opiniones de docentes y profesionales. *Revista Española de Financiación y Contabilidad*. Vol. XXIX, 103, 149-172.
- Arquero, J.L. Donoso, J.A. Jiménez, S.M. and González, J.M. (2009), “Análisis exploratorio del perfil demandado para administración y dirección de empresas: implicaciones para el área contable. (Exploratory analysis of the educational profile for BA: implications for accounting)”, *Revista de Contabilidad - Spanish Accounting Review*. 12 (pend).
- Arthur Andersen & Co., (1989). *Perspectives on Education: Capabilities for Success in the Accounting Profession*. New York.
- Banning, K.C. (2003). The Effect of the Case Method on Tolerance for Ambiguity. *Journal of Management Education*, Vol. 27, 5, pp. 556-567
- Benjamin, A.J.; Riggio, R.E. & Mayes, B.T. (1996). Reliability and Factor Structure of Budner's Tolerance for Ambiguity Scale. *Journal of Social Behavior and Personality*. Vol. 11. No. 3. pp. 625-632.
- Bhushan, L.I., & Amal, S.B. (1986) A situational test of intolerance of ambiguity, *Psychologia*, Vol. 29, pp.254-261.
- Budner J. (1962) Tolerance of ambiguity as a personality variable, *Journal of Personality*, Vol. 30, pp.29-40.
- Common Content Project (2006). *The skills framework*. Available online at: [www.commoncontent.com](http://www.commoncontent.com)
- Deppe, L.A.; Sonderegger, E.O.; Stice, J.D.; Clark, D.C & Streugling, G.F. (1991). Emerging competencies for the practice of accountancy. *Journal of Accounting Education*, 9, Fall, pp. 257-290.
- Dermer, J.D. (1973). Cognitive Characteristics and the Perceived Importance of Information. *The Accounting Review*, Vol. 48, No. 3, pp. 511-519.
- DeRoma, V.M., Martin, K.M. & Kessler, M.L. (2003). The relationship between tolerance for ambiguity and need for course structure. *Journal of Instructional Psychology*, Vol. 30. June, pp. 104-109.
- Ebeling, K.S. & Spear, P. (1980). Preference and performance on two tasks of varying ambiguity as a function of ambiguity tolerance. *Australian Journal of Psychology*, Vol. 32, 2 August, pp. 127 - 133.

- Elias Z, E. (1999). An Examination of Nontraditional Accounting Students' Communication Apprehension and Ambiguity Tolerance. *Journal of Education for Business*, Vol. 75, 1, pp. 38-41.
- Ellsberg, D. (1961) Risk, ambiguity, and the Savage axioms, *Quarterly Journal of Economics*, Vol. 75 (November), pp.643-669.
- Frenkel-Brunswik, E. (1948). Tolerance of ambiguity as a personality variable, *American Psychologist*, Vol. 3, pp.268.
- Frenkel-Brunswik, E. (1949). Intolerance of ambiguity as an emotional and perceptual personality variable, *Journal of Personality*, Vol. 18, pp. 108-143.
- Frenkel-Brunswik, E. (1951). Personality theory and perception. In R. Blake y G. Ramsey (Eds.), *Perception: An approach to personality*. New York: Oxford University Press.
- Furnham, A. (1994). A content, correlational and factor analytic study of four tolerance of ambiguity questionnaires. *Personality and Individual Differences*, 16, pp. 403-410.
- Furnham, A., y Ribchester, T. (1995). Tolerance of ambiguity: A review of the concept, its measurement and applications. *Current Psychology*, Vol. 14, pp. 179-199.
- Ghosh, D. & Ray, MR. (1997). Risk, Ambiguity, and Decision Choice: Some Additional Evidence. *Decision Sciences*. Vol. 28, 1, pp. 81-104.
- Ghosh, D. (1994). Tolerance for Ambiguity, Risk Preference, and Negotiator Effectiveness. *Decision Sciences*. Vol. 25, 2, pp. 263-280
- Gul, F. A. (1986) Tolerance for ambiguity, auditors' opinions and their effects on decision making. *Accounting and Business Research*. Vol. 16, pp. 99-105.
- Gul, FA & Tsui, JSL. (1994). Perceptions of Auditor Independence: The Moderating Role of Personality. *Corporate Governance: An International Review*. Vol. 2, 4, pp. 203 – 209.
- Harding, N y Ren, M. (2007). The importance in accounting of ambiguity tolerance at the national level. Evidence from Australia and China. *Asian Review of Accounting*. Vol. 15 No. 1. pp. 6-24.
- Hartmann, F. (2005). The effects of tolerance for ambiguity and uncertainty on the appropriateness of accounting performance measures. *Abacus*. Vol. 41, 3, pp. 241 – 264
- Hassall, T; Joyce, J; Arquero, J.L. & Donoso, J.A. (2003). The Vocational Skills Gap For Management Accountants: The Stakeholders Perspectives. *Innovations in Education and Teaching International*. Vol: 40-1, pp. 78-88.
- Hogarth, R. (1989). Ambiguity in competitive decision-making: Some implications and tests. In P. C. Fishburn & I. Lavelle (Eds.), *Annals of Operations Research*, 19, pp. 31-50
- Holland, J.L. (1973). *Making vocational choices. A theory of careers*. Prentice Hall.
- Huber, n. (2003). An Experiential Leadership Approach for Teaching Tolerance for Ambiguity. *Journal of Education for Business*; Vol. 79, 1; pp. 52-55.
- International Federation of Accountants. Education Committee. (1996). *IEG 9 Prequalification Education, Assessment of professional competence and experience requirements of professional accountants*. N.Y., IFAC.
- International Federation of Accountants. International Accounting Education Standards Board. (2008). *IES 3 Professional Skills*. In *International Education Standards 1-8*. N.Y., IFAC.

- Jones, S.H. & Davidson, R.A. (2007). Measuring the Problem-Solving Abilities of Accounting and Other Business Students: A Comparison and Evaluation of Three Methods. *Accounting Education*, 16, 1, 65 – 79.
- Judge, T.A., Thoreson, C.J., Pucik, V. & Welbourne, T.M. (1999), Managerial coping with organizational change: a dispositional perspective, *Journal of Applied Psychology*, Vol. 84, pp. 107-122.
- Kirton, M.J. (1981). A reanalysis of two scales of tolerance of ambiguity. *Journal of Personality Assessment*, 45, pp. 405-414.
- Kischkel, K-H. (1984) A scale for the measurement of ambiguity tolerance, *Diagnostica*, Vol. 30, pp.144-154.
- Lamberton, B.; Fedorowicz, J. & Roohani, S.J. (2005). Tolerance for Ambiguity and IT Competency among Accountants. *Journal of Information Systems*. Vol. 19, 1 Spring, pp. 75-95.
- Liedtka, S.L.; Church, B.K. & Ray, M.R. (2008). Performance Variability, Ambiguity Intolerance, and Balanced Scorecard-Based Performance Assessments. *Behavioral Research In Accounting*. Vol 20, 2, pp. 73–88.
- Lowe, D.J. & Reckers, P.M.J. (1997). The influence of outcome effects, decision aids usage, and intolerance of ambiguity on evaluations of professional audit judgment. *International Journal of Auditing*, Vol. 1, 1, pp. 43-59.
- MacDonald, A.P. (1970) Revised scale for ambiguity tolerance: Reliability and validity, *Psychological Reports*, Vol. 26, pp.791-798.
- May, G. S., Windal, F. W., & Sylvestre, J. (1995). The need for change in accounting education: an educator survey. *Journal of Accounting Education*, Vol. 13, 1, pp. 21–43.
- McLain, D.L. (1993) The MSTAT-I: A new measure of an individual's tolerance for ambiguity, *Educational and Psychological Measurement*, Vol. 53, pp.183-189.
- McLain, D.L. (2008). Evidence of the Properties of an Ambiguity Tolerance Measure (MSTAT-II). *Psychological Reports*. Article currently under review.
- Norton. R. (1975). Measurement of ambiguity tolerance. *Journal of Personality Assessment*. 39, pp. 607-619.
- Pich, M.T., Loch, C.H., & DeMeyer, A. (2002). On uncertainty, ambiguity, and complexity in project management. *Management Science*, Vol. 48, pp. 1008-1023.
- Pincus, K. V. (1990) Auditor individual differences and fairness of presentation judgments. *Auditing: A Journal of Practice and Theory*, Vol. 9, pp. 150–166
- Poesio, M. (1996). Semantic ambiguity and perceived ambiguity. In K. van Deemter and S. Peters (Eds), *Semantic ambiguity and underspecification*, (pp. 159-201). Stanford, CA: CSLI.
- Pratt, J. (1980) The effects of personality on a subject's information processing: a comment. *The Accounting Review*, Vol. 55, pp. 501–506
- Rydell, S.T., & Rosen, E. (1966). Measurement and some correlates of need-cognition. *Psychological Reports*, Vol. 19, pp. 139-165.

- Sherrill, WW. (2001). Tolerance of Ambiguity among MD/MBA Students: Implications for Management Potential. *The Journal of Continuing Education in the Health Professions*, Vol. 21, pp. 117–122.
- Smith, M. (1999). Personality issues and their impact on accounting and auditing. *Managerial Auditing Journal*, Vol. 14, 9, pp. 453-460
- Tsui, J. (1993). Tolerance for ambiguity, uncertainty audit qualifications and banker's perceptions. *Psychological reports* Vol. 72, 1, 3, pp. 915-919.
- Viscusi, W.K., y Chesson, H. (1999) Hopes and fears: The conflicting effects of risk ambiguity, *Theory and Decision*, Vol. 47, pp.153-178.
- Walker, HK, Armenakis, AA & Bernerth, JB. (2007). Factors influencing organizational change efforts. An integrative investigation of change content, context, process and individual differences. *Journal of organizational Change Management*. Vol. 20, 6, pp. 761-773.
- Wang, P. & Chan, P.S. (1995). Top management perception of strategic information processing in a turbulent environment. *Leadership & Organization Development Journal*. Vol. 16, 7, pp: 33-43.
- Westerberg, M.; Singh, J; & Hackner, E. (1997). Does the CEO matter? An empirical study of small Swedish firms operating in turbulent environments. *Scandinavian Journal of Management*. Vol. 13, 3, pp. 251-270.
- Wharton, R.R.; Parry, L.E. & Buntzman, G. (1999). Success or bankruptcy: the relationship between personal and goal orientation and simulation performance. In Diana Page Sandra Morgan Ed. *Developments in Business Simulation and Experiential Learning, Volume 26*, Association for Business Simulation and Experiential Learning.
- Wright, M.E. & Davidson, R.A. (2000). The Effect of Auditor Attestation and Tolerance for Ambiguity on Commercial Lending Decisions. *Auditing: A Journal of Practice & Theory*. Vol. 19, 2, pp. 67-81.
- Yurtsever G. (2001). Tolerance of ambiguity, information, and negotiation. *Psychological reports*. Vol. 89, 1, pp. 57-64.
- Zebda, A. (1991) The problem of ambiguity and vagueness in accounting. *Behavioural Research in Accounting*, Vol. 3, pp. 117–145.

