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Perceptions and Incidence of Test Anxiety

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Perceptions and Incidence of Test Anxiety

Abstract

Test anxiety (TA) can lower student GPA and increase dropout rates in populations of university students. Despite numerous treatment options, many students still suffer from TA. The stigma attached to this type of anxiety and the incidence rates and perceptions of TA were quantified through surveys distributed to 1,099 students at a Canadian university. Results of this study indicated that 38.5% of students (30.0 % of males, 46.3 % of females) suffered from self-reported TA at some point over the course of their university career. The prevalence of TA varied by faculty, with the highest incidence among those students enrolled concurrently in Arts and Science, and Nursing students. While student perceptions varied by age, sex, and experience with TA, one third of students expressed negative and inaccurate views about TA. These negative perceptions may explain why 11.3% of surveyed students indicated they would not seek help for their TA as, for many, to do so would make them seem weak in the eyes of their colleagues. Further, 20.5% of students surveyed reported that they believe professors would be unable or unwilling to help. It may be the case that this negative perception towards TA makes it difficult for faculty and helping professionals to identify and intervene effectively. Faculty specific educational campaigns designed to educate students about TA, in particular about its prevalence and severity, are suggested as a method to circumvent the negative stigma surrounding this condition. Implementation of such educational policies will likely improve the educational experience and performance of students with TA, as well as improve student retention.

L'anxiété due aux examens peut faire baisser la moyenne cumulative des étudiants et augmenter le nombre de décrocheurs parmi les étudiants universitaires. Malgré les nombreuses options qui existent pour remédier à cela, un grand nombre d'étudiants souffrent de cette anxiété. La stigmatisation de ce type d'anxiété, ainsi que le taux d'incidence et les perceptions de l'anxiété due aux examens ont été quantifiés grâce à des sondages distribués à 1.099 étudiants dans une université canadienne. Les résultats de cette étude indiquent que 38,5 % d'étudiants (30,0 % d'hommes et 46,3 % de femmes) ont déclaré avoir souffert d'anxiété due aux examens à un moment ou à un autre au cours de leurs études universitaires. La prévalence de cette anxiété variait selon les facultés et la plus haute incidence se trouvait parmi les étudiants inscrits simultanément en lettres et sciences et en soins infirmiers. Les perceptions des étudiants variaient selon l'âge, le sexe et l'expérience préalable d'avoir souffert d'anxiété, toutefois un tiers des étudiants ont exprimé des opinions négatives et inexactes à propos de l'anxiété due aux examens. Ces perceptions négatives pourraient peut-être expliquer pourquoi 11,3 % des étudiants qui ont participé au sondage ont indiqué qu'ils n'allaient pas chercher à se faire aider pour réduire leur anxiété car, s'ils le faisaient, cela les ferait paraître encore plus faibles aux yeux de leurs collègues. De plus, 20,5 % des étudiants interrogés ont rapporté qu'ils pensaient que leurs professeurs seraient incapables de les aider ou peu disposés à le faire. Il est possible que cette perception négative à l'égard de l'anxiété due aux examens explique pourquoi il est difficile pour les professeurs et les autres professionnels aidants d'identifier le problème et d'intervenir efficacement. Les campagnes éducatives qui s'adressent spécifiquement aux professeurs et qui sont conçues pour éduquer les étudiants sur l'anxiété due aux examens, en particulier sur la prévalence et la gravité de cette anxiété, ont été suggérées comme moyen de circonvenir les stigmates négatifs qui entourent cette condition. La mise en oeuvre de telles politiques éducatives pourrait probablement améliorer l'expérience éducative et la réussite des étudiants qui souffrent d'anxiété due aux examens, elle pourrait également améliorer la rétention des étudiants.

Keywords

test anxiety; exam anxiety; incidence; perceptions; stigma

Cover Page Footnote

We would like to thank the Center for Enhanced Teaching and Learning for funding this project, as well as the instructors who gave up class time for our survey.

In the typical academic environment, often heavily dependent on the practice of formal testing and entrance examinations, tests and examinations represent a potent stressor that can impact a student's performance in school (Cassady & Johnson, 2002; Vitasari, Wahab, Othman, Herawan, & Sinnadurai, 2010). Given the potential negative consequences associated with poor test performance or failure, it is not surprising that students consistently cite exam and grade-related worries as their greatest sources of anxiety (Furr, Westefeld, McConnell, & Jenkins, 2001). The experience of high levels of exam-related anxiety is referred to in the literature as test anxiety (TA) and is characterized by cognitive, behavioural, and physiological responses induced by academic testing (Zeidner, 1998). Common behavioural expressions of TA can include poor study skills and procrastination. These behaviours may be experienced before, during, or after an examination (Gregor, 2005; Liebert & Morris, 1967; Spielberger & Gonzalez, 1980; von der Embse, Barterian, & Segool, 2013). The relationship between TA and other anxiety disorders is currently unclear. Some evidence suggests TA may be related to, and interact with, general anxiety disorders (Hopko, Hunt, & Armento, 2005; In'nami, 2006), while other studies suggest that TA may be a separate condition (Hopko et al., 2005; Wittmaier, 1972). Further complicating these relationships, TA can range from mild to severe, and, in some cases, anxiety, termed facilitative anxiety, can improve performance (Cassady & Johnson, 2002).

Regardless, TA has been identified as a serious issue affecting the academic performance of college students (Cassady & Johnson, 2002; Chapell et al., 2005; Szafranski, Barrera, & Norton, 2012; Vitasari et al., 2010). Previous research suggests that 15-40% of university students experience functionally impairing levels of TA, depending on the survey methodology used and population studied (Abolghasemi, Golpour, Narimani, & Ghambari, 2009; Hill, 1984; Szafranski et al., 2012; Vitasari et al., 2010; von der Embse et al., 2013). In fact, TA may be a contributing factor to 15-29% of student withdrawals from post-secondary institutions (Khalaila, 2014; Spielberger, 1962). More specifically, females report higher levels of TA than males (Chapell et al., 2005; Egbochuku & Obodo, 2005; Szafranski et al., 2012; Zaheri, Shahoei, & Zaheri, 2012), and there is evidence to suggest that the negative association commonly found between TA and poor academic performance is stronger in females (Chapell et al., 2005; Ferrando, Varea, & Lorenzo, 1999; Szafranski et al., 2012; Zaheri et al., 2012). However, the relationship between TA and academic performance may be more complicated, as females may exhibit higher levels of test anxiety than males, but do not always suffer from reduced performance (Zeidner, 1990).

Personal and situational variables may also contribute to the incidence of TA. For example, in one study, socioeconomic status, age, sex, and ethnicity were reported to predict TA (Putwain, 2007). Moreover, features of the classroom environment, such as positive regard expressed by the professor towards students, have been shown to influence students' motivations, attitudes, and competence (Eccles et al., 1993; Vallerand, Fortier, & Guay, 1997). These factors may interact with TA and influence student performance. Despite these studies into the factors that may contribute to TA, there is little research looking at the relationship between student perceptions and TA. The identification of this relationship is important for several reasons. First, perceptions of TA may differ depending on demographic and academic factors. Determining how perceptions of TA vary may offer insights into the thought processes underlying TA.

Second, identifying perceptions of TA has the potential to inform policy makers on how students view this condition which may aid in the design of effective educational and treatment policies. For instance, information on perceptions about TA may offer insight into the student populations for which education is most needed.

For this study, two surveys were administered to students attending a Canadian university with the objective of getting a broad understanding of student perceptions of TA. The research goals of the study were to: (a) determine student perceptions of TA (how students view TA and those who suffer from this condition); (b) investigate whether or not a negative stigma exists around this condition; and (c) quantify the prevalence of TA on campus. More specifically, we wanted to quantify the perceptions students hold towards TA and those who suffer from it, student perceptions of the institutional commitment to addressing TA, and the perceived treatability of TA. We also wanted to determine if perceptions varied by age, sex (Putwain, 2007), or the amount of time in school. With regards to the negative stigma potentially surrounding TA, we wanted to determine what proportion of the student population held negative views about TA. We also attempted to quantify the proportion of students who would not seek treatment for TA as a result of this stigma.

Method

This study was conducted at a major Canadian university (~11,000 undergraduate students), located in a small Canadian city. Two questionnaires were distributed to students during class time and students were asked to fill in both surveys, though participation was voluntary. Classes were selected for participation based upon the willingness of the instructors to give up class time, and represented a wide variety of faculties (Table 1). Approximately 2% of instructors allowed us access to their class. All faculty and instructors on campus were contacted via email or in person, and were given the opportunity to participate. Data were collected from the classes of the instructors who responded. First year students were surveyed in their second semester, so that all students had experienced university level exams by the time they completed the questionnaires. The study protocols were approved by the institution's Research Ethics Board. All participants provided written consent.

Table 1
Percentage of Students Reporting Severe¹ Test Anxiety (TA) by Faculty

Faculty	% TA (N)
Arts/Science ²	53.6 (19)
Nursing	52.3 (130)
Computer Science	42.9 (14)
Kinesiology	42.3 (104)
Science	40.1 (133)
Forestry	38.9 (36)
Engineering	38.2 (131)
Business	37.8 (114)
Arts	36.5 (104)
Unspecified	9.7 (31)

Note.¹ Students self-reported that their TA lowered their performance at some point in their academic career.

²Arts/Science represents the concurrent degree where students obtain bachelor's degrees in both the arts and science faculties.

Questionnaires

The *Test Anxiety Inventory* (TAI) (Spielberger & Gonzalez, 1980; Szafranski et al., 2012) is a 20-item self-report psychometric measure designed to assess individual differences in TA. Participants respond on a 4-point Likert scale with anchors 1 “almost never” to 4 “almost always.” The TAI generates a total score (TAI-T) as well as worry (TAI-W) and emotionality (TAI-E) subscales. The worry subscale reflects cognitive concerns about the consequences of failure while TAI-E reflects reactions of the autonomic nervous system. The TAI, and its subscales, has proven both reliable and valid in assessing TA among samples consisting of high-school students, university students, and community members (Spielberger & Gonzalez, 1980; Szafranski et al., 2012). The TAI also demonstrated reliability in the present sample ($\alpha = .96$).

The *Perceptions of Test Anxiety Survey* (PTAS) was created by the authors for this study to measure perceptions of TA severity, the students' view of the University's commitment to TA, and the treatability of TA. Participants were asked to respond to 22 items using a 1 “strongly disagree” to 7 “strongly agree” Likert scale. The PTAS was reliable in the present sample, $\alpha = .72$. Ratings on the PTAS were subjected to a principal components analysis to extract latent components underlying the survey. The PTAS also contained a written section asking about experiences with TA (e.g., Have you ever experienced TA at any point over the academic career which negatively influenced academic performance? Have you ever sought help for TA? What TA services are available on campus?). As part of the survey package, students completed a *demographics* questionnaire asking for information about age, sex, ethnicity, level of education, and faculty.

Data Analysis

Test Anxiety Inventory. We used student scores on the TAI-T, TAI-W, and TAI-E to characterize our sample. Beyond sex differences, further investigation into TAI data (faculty,

age, etc.) was not possible, as in order to maximize confidentiality, TAIs were not paired to perception surveys.

Perceptions of TA. A principal components analysis was performed on the 22-item PTAS to derive the latent constructs underlying student perceptions. Several iterations of principal components analysis were performed until the best solution was uncovered. Participant scores on the components extracted were generated using regression in SPSS Factor, and these scores were used as dependent variables in subsequent analyses. Independent samples *t*-tests were used to assess if perceptions of TA varied by sex, experience with TA, or knowledge of institutional TA services. As not all participants responded to all survey items, degrees of freedom vary between tests. Independent hierarchical linear regressions were used to assess whether age and years of education were predictors of perceptions of TA after controlling for sex. Inflation of familywise error was corrected using the Holms-Bonferroni correction procedure.

Principal components extraction. Principal components extraction was used to estimate number of factors, presence of outliers, absence of multicollinearity, and factorability of the correlation matrix. With an $\alpha = .001$ cut-off level, there were no univariate outliers, however 50 cases produced scores that were identified as multivariate outliers exceeding $\chi^2(22) = 48.27$ and were removed from principal components extraction. The final principal components extraction was performed on 16-items from the PTAS. Results indicated that the sampling was adequate and inter-correlations were strong enough to merit principal components extraction; Kaiser-Meyer-Olkin measure of sampling adequacy = .86. Further, the null hypothesis that variables are uncorrelated was rejected using Bartlett's test of sphericity $\chi^2(120) = 4725.43$, $p < .001$. Three principal components were extracted. Communality values (h^2), as seen in Table 2, were moderate in magnitude. The lowest communality extracted was .27 and the highest was .72, indicating that between 27% and 72% of item variability was predictable by the underlying components. Component one (Importance of TA) was composed of ten items, component two (Institutional Commitment to TA) of four items, and component three (Treatability of TA) of two items. There is some concern that component three may not be reliable, as it only consisted of two items (Tabachnick & Fidell, 2012). As such, component three will be interpreted with caution. When orthogonal rotation was required, components interpreted as "importance of TA" and "institution commitment to TA" were correlated .34. Further, components interpreted as "institution commitment to TA" and "treatability of TA" were correlated .22. Oblique rotation was chosen because correlations were modest and persisted across components. Loadings of variables on components, communalities, and percent of variance accounted for are shown in Table 2. Variables are ordered by item number and component loading to facilitate ease of interpretation. Loadings under .33 (10% of variance) were suppressed.

Table 2
Principal Component Analysis of Student Perception Survey – Pattern Matrix

Item	Factor 1	Factor 2	Factor 3	h^2
	Importance of TA	Institution Commitment to TA	Treatability of TA	
1) The consequence of test anxiety is as great as the consequences of other anxiety disorders	.63			.42
4) Test anxiety should be considered a true anxiety disorder	.78			.62
5) Test anxiety deserves a high level of attention from the university and its professors	.78			.61
6) Test anxiety may prompt students to leave post secondary education	.53			.30
7) Test anxiety is not a severe enough form of anxiety to merit recognition or treatment	-.67			.46
8) Individuals with a comprehensive understanding of course material may perform poorly during exam situations due to feelings of anxiety related to testing	.70			.51
9) Professors should go out of their way to identify students with test anxiety?	.67			.45
10) Professors should identify test anxiety in a confidential manner	.52			.27
12) People who identify themselves as suffering from test anxiety should be accommodated in some manner (i.e., given additional time to write, write the test in a separate room)	.65			.45
13) Test anxiety causes individuals to perform poorly during academic testing	.64			.43

Table 2 (continued)

Item	Factor 1	Factor 2	Factor 3	h^2
	Importance of TA	Institution Commitment to TA	Treatability of TA	
3) Students can feel confident that the university has a policy surrounding test anxiety		.74		.56
16) The university raises adequate awareness into the services available for test anxiety		.81		.65
18) Professors are adequately trained to recognize the signs of test anxiety in students		.67		.45
21) The university has adequate services to accommodate test anxiety		.81		.66
14) Test anxiety can be treated easily			.84	.65
19) The treatment of test anxiety would be a difficult task			-.79	.72
% of Variance	29.22	14.18	7.97	

Note. $N = 1099$ (460 males)

Results

TAI

Characteristics of the population of student respondents for each survey are summarized in Table 3. Table 4 summarizes the results of the TAI-T, TAI-W, TAI-E, which were similar to that of the normative distribution of college undergraduates. Females had higher average TAI – T, $t(1040) = 7.40$ $p < .01$, TAI-W, $t(1065) = 7.86$, $p < .01$, and TAI-E, $t(1065) = 5.11$, $p < .01$, TAI-T scores than males.

Table 3

Summary of Respondents for the Test Anxiety Inventory (TAI) and the Perceptions of Test Anxiety Survey (PTAS)

Age	Total Sample ¹		Survey		
	Years Post-secondary education	Ethnicity		TAI	PTAS
20.32 (3.37)	1.50 (1.65)	86% Caucasian	Sample Size	1083	1099
			Proportion Male	0.43	0.44
			Proportion Undergraduate Population Sampled	0.13	0.13

Note. ¹ Means and standard deviations are reported for age and years in post-secondary education. Demographic information is based on the PTAS respondents.

Table 4

Means and standard deviations for the Test Anxiety Inventory (TAI)

TAI Score	Total	Male	Female
Total	43.00 (14.47)	39.34 (13.07)	45.67 (14.81)
Worry	15.83 (5.98)	14.75 (5.40)	16.61 (6.23)
Emotionality	18.19 (6.36)	16.47 (5.80)	19.47 (6.45)

Perceptions of Test Anxiety

In the perceptions survey, 38.5 % (30.0 % of males, 46.3 % of females) of students self-reported having suffered from episodes of TA serious enough to reduce performance at some point in their academic career. Table 1 presents the prevalence of TA by faculty. Of the surveyed students, 11.3% stated that they would not seek help for TA as this would suggest weakness. Similarly, 20.5% of students would not approach their professors about TA, reporting that their instructor would be unable or unwilling to assist. Finally, 32.2% of the

students surveyed expressed negative views which could contribute to the stigma surrounding TA. The most common negative views given by students were: “TA is not a true anxiety disorder,” “TA is due only to being lazy and unprepared,” “TA is a sign of weakness,” and “no accommodations should be given.”

Demographic Predictors of Test Anxiety Perceptions

Scores on component one, “the importance of TA,” varied by sex, $t(1010) = 8.38$, $SE = 0.06$, $p < .017$, $d = 0.56$. Females, $M = .22$, $SD = .93$, perceived the consequences of TA to be of more importance than males, $M = -.29$, $SD = 1.01$. Perceptions about the institution’s commitment to TA were also found to vary by sex, $t(1010) = 2.49$, $SE = 0.06$, $p < .025$, $d = 0.16$. Males, $M = .09$, $SD = .92$, scored higher than females, $M = -.07$, $SD = 1.06$, on component two, indicating that men hold more favourable perceptions about institutional commitment to TA. Scores on component three, “treatability of TA,” did not vary by sex $t(1010) = 0.72$, $SE = 0.05$, $p > .05$, $d = 0.5$.

Age was a significant unique predictor of component two, “institutional commitment to TA,” $\Delta F(1, 1002) = 10.44$, $SE = .98$, $p < .017$ $\Delta R^2 = .01$, after adjusting for sex. Older students scored lower on component two, ($\beta = -0.03$, $t = 3.23$, $p < .01$), indicating that older students held more negative perceptions about institutional commitment to TA. Age was a significant and unique predictor of component one (importance of TA), $\Delta F(1, 1002) = 4.86$, $SE = .97$, $p < .025$ $\Delta R^2 = .01$, after adjusting for sex. Older students scored higher on component one, $\beta = 0.02$, $t = 2.20$, $p < .025$, indicating that older individuals perceived greater consequences associated with TA. Age was not a significant unique predictor of component three (treatability of TA), $\Delta F(1, 1002) = 0.30$, $SE = 1.00$, $p > .05$ $\Delta R^2 = .00$.

Years of education was a significant predictor of component two (institutional commitment to TA), $\Delta F(1, 981) = 10.56$, $SE = .98$, $p < .017$ $\Delta R^2 = .01$, after adjusting for sex and age. Students with more years of post-secondary education scored lower on component two, $\beta = -0.06$, $t = 3.25$, $p < .017$, indicating that additional years of education were associated with more negative perceptions about institutional commitment to TA. Years of education was a near significant unique predictor of component one (severity of TA) $\Delta F(1, 981) = 3.50$, $SE = .96$, $p = .06$, $\Delta R^2 = .003$, after adjusting for sex and age. Older students tended to score higher on component one, $\beta = 0.04$, $t = 1.87$, $p = .06$. Years of education was not a significant unique predictor of component three (treatability of TA), $\Delta F(1, 981) = 1.61$, $SE = 1.00$, $p > .05$ $\Delta R^2 = .00$.

Identification of Services and Test Anxiety Perceptions

Students were asked to identify TA services that they were aware of on campus as a part of the written component on the PTAS. One hundred thirty-four (12.2 %) students were able to correctly identify at least one TA service available on campus. Scores on component two varied by knowledge of TA services $t(767) = 4.35$, $SE = 0.10$, $p < .017$, $d = 0.40$. Students who correctly identified TA services, $M = .29$, $SD = 1.12$, perceived greater institutional commitment to TA than those who could not correctly identify services, $M = -.14$, $SD = 0.99$. Scores on component one varied by knowledge of TA services, $t(767) = 3.26$, $SE = 0.10$, $p < .025$, $d = 0.32$. Students who correctly identified TA services, $M = .30$, $SD = 0.96$, perceived greater consequences of TA than those who could not correctly identify

services, $M = -.01$, $SD = 0.99$. Scores on component three varied by knowledge of TA services, $t(767) = 3.07$, $SE = 0.10$, $p < .05$, $d = 0.30$. Students who correctly identified TA services, $M = .05$, $SD = 0.99$, perceived TA to be more difficult to treat than those who could not correctly identify services, $M = -.25$, $SD = 1.02$.

Perceptions of Test Anxiety Differ among Students who have Experienced Test Anxiety

Scores on component one, severity of TA, varied by self-identification of TA, $t(967) = 13.29$, $SE = 0.06$, $p < .017$, $d = 0.86$. Students who self-identified having experienced TA, $M = .49$, $SD = 0.76$, perceived greater consequences of TA than those who have not experienced TA, $M = -.31$, $SD = 1.00$. Scores on component two, institutional commitment to TA, varied by self-identification of TA, $t(967) = 7.01$, $SE = 0.06$, $p < .025$, $d = 0.45$. Students who self-identified having experienced TA, $M = -.28$, $SD = 1.03$, held less favourable perceptions about institutional commitment to TA than those who did not report experiencing TA, $M = .17$, $SD = 0.92$. Scores on component three, treatability of TA, varied by self-identification of TA, $t(967) = 2.76$, $SE = 0.07$, $p < .05$, $d = 0.18$. Students who self-identified having experienced TA, $M = .11$, $SD = 1.04$, perceived TA as more difficult to treat than those who did not report experiencing TA, $M = -.07$, $SD = 0.99$.

Discussion

In contrast to the wealth of information in the literature surrounding the negative impacts of TA on students (Abolghasemi et al., 2009; Hill, 1984; Szafranski et al., 2012; Vitasari et al., 2010; von der Embse et al., 2013), our results suggest that TA was not only common (PTAS: 38.5% of students), but also misunderstood on the campus we surveyed. Nearly one third of students expressed negative and inaccurate views (i.e., TA is due only to being lazy or unprepared) concerning TA. Further, 11.3% of students reported that they would not seek help for TA as to do so would make them appear weak in the eyes of their colleagues. Given that TA has the potential to lower student academic performance (Abolghasemi et al., 2009; Hill, 1984; Szafranski et al., 2012; Vitasari et al., 2010; von der Embse et al., 2013) and decrease student retention (Khalaila, 2014; Spielberger, 1962), our results suggest that TA may influence academic performance and student retention at this institution. It is also likely that the negative stigma surrounding this condition interferes with students' seeking treatment. This situation suggests that more education into the prevalence and management of TA is likely warranted.

Incidence of Test Anxiety

Using self-report measures, we identified the prevalence of TA over the course of a university academic career. At some point in their university career, 38.5 % (30% of males, 46.3 % of females) of students self-reported experiencing TA to an extent that impaired academic performance. To our knowledge, this is the first study to examine TA in this manner. The level of TA (38.5%) at this institution is near the high end of the range (15-40%) observed on other campuses (Abolghasemi et al., 2009; Hill, 1984; Szafranski et al., 2012; Vitasari et al., 2010; von der Embse et al., 2013). Inter-study variation in TA prevalence may be a result of different methods used to quantify TA, demographic differences, or institutional

and policy differences. Our prevalence figure must be interpreted with caution for two reasons. First, our assessment instruments do not represent a formal diagnosis of TA. A formal diagnosis would only be made after triangulating evidence using various sources, including interviews, observations, and self-report tests. Second, this figure may underestimate the number of students who find TA to be a concern given that TA is associated with weakness or inadequacy. Regardless, using self-report measures we observed a sex dichotomy in the prevalence of TA. Considering the PTAS results, women reported experiencing higher levels of TA over the course of their university career than men. A similar observation was made using the TAI, as women scored higher on the TAI-T, TAI-W, and TAI-E, indicating that women report a stronger tendency to experience TA than men (Table 4). This sex dichotomy is similar to that found in the literature (Egbochuku & Obodo, 2005; Hannon, 2012; Hembree, 1988; Szafranski et al., 2012; Zaheri et al., 2012; Zeidner, 1990), suggesting that self-report (PTAS) and TAI scores may be assessing similar constructs.

When separated into faculty groups (Table 1), results indicate that self-reported TA varied between faculties. The authors are unaware of any other studies that looked at variation in TA between academic faculties. The highest levels of TA were observed in students concurrently enrolled in the faculty of Arts and Science, as well as Nursing. The lowest levels were observed among students enrolled in the faculty of Arts. Science, Engineering, and Nursing faculties typically have more high-stakes exams than Arts, potentially explaining the higher observed levels of TA in these faculties. There was substantial variation between faculties, with values ranging from 36-54%. At the institution we surveyed, TA is often addressed by services and programs such as seminars, courses, and professional counselling that are offered on a university wide basis. The variation in levels of TA between faculties suggests that such large scale programs may be ineffective. For instance, the most effective strategy for treating a test anxious student in Engineering may be radically different than what would help a test anxious student in History. Perhaps the most efficient manner of treatment would be faculty specific seminars and workshops, coupled with counselling. While our study did not deal with this issue, what causes the inter-faculty variation is an interesting question. Do specific faculties attract more or less test anxious students? Or do specific faculties induce TA through testing strategies or expectations? More work is required to fully understand this question. However, the specific TA values associated with each faculty should be interpreted cautiously. In the case of some faculties our sample size was small, and in all cases we measured the proportion of students who had suffered from TA at some point over their university career.

Student Perceptions of TA

Overall there was a mixture of positive and negative views expressed about TA, although a negative stigma clearly existed. Of those surveyed, 32.2% of students expressed negative and uninformed (i.e., TA is due only to being lazy or unprepared) views about those who suffer from this condition. Contrary to student beliefs, TA is not something everyone can overcome on their own. In fact, numerous studies suggest that simply studying more, while neglecting the anxiety, is not a guarantee of improvement (Cassady & Johnson, 2002; Ergene, 2003; Mitchell & Ng, 1972; Szafranski et al., 2012; von der Embse et al., 2013). A combination of study skill/exam training and psychological treatment often results in

improvements in performance and a decrease in anxiety (Ergene, 2003; Gregor, 2005; Lent & Russell, 1978; Mitchell & Ng, 1972; von der Embse et al., 2013). The negative stigma surrounding TA may be hindering students from seeking the help they need, as 11.3% of surveyed students indicated that they would not seek help, as to do so would make them appear weak. Further, 20.5% of students reported that they feel professors would be unable or unwilling to help with issues related to TA. Overcoming the negative stigma associated with TA may enable students to get help in a timely fashion. Education programs and contact between non-affected and affected individuals have proven effective for overcoming such stigma in mental-illness, and similar strategies could be adopted for TA (see Pinfold et al., 2005). Reducing levels of TA would likely improve student educational experiences and performance, as well as improve student retention.

Experience with TA, experience in academic settings, and knowledge of services appeared to influence perceptions of TA. Female students had a higher prevalence of TA and viewed TA as a more serious condition, with more severe consequences. Furthermore, students who had experienced TA viewed TA as a more serious condition that was harder to treat. Similarly, students who might be more likely to have been exposed to TA (older and more educated) viewed TA as a more serious condition with more severe consequences. Finally, despite the institution having excellent TA services (e.g., workshops, seminars, and counselling), experiencing TA, age, greater education, and sex (female) were associated with negative views of this institution's commitment to TA. On the positive side, students correctly identifying TA services had a more positive view of institution commitment to TA. This suggests that experience with, and education about, the available services could improve student perception. Unfortunately, only 12.2% of students could correctly identify services available on campus.

Limitations

Several limitations of our study must be acknowledged. First, only collecting data from classes taught by instructors who volunteered for this study may represent a bias in the instructor's view of TA. Given that instructors and the classroom climate they create can influence student TA (Eccles et al., 1993; Vallerand et al., 1997), this may have resulted in a sampling bias in our study. Secondly, our inability to pair the TAI with the PTAS, and its demographic survey, limited our ability to analyse how demographic factors influenced TAI scores. Further, as our self-reported measure of TA quantified if students had experienced TA at any point in their academic career, upper-year students would be more likely to respond in a positive manner than first or second-year students, based upon their extended time in post-secondary education. Finally, we assessed first-year students in the second semester to ensure that all respondents had experienced university level exams. However, some students may leave university after the first semester due to TA, therefore, the results of the TAI and the PTAS may underestimate the incidence and severity of TA on campus.

Recommendations

Numerous treatments for TA are available, and they are often highly effective (Ergene, 2003; Gregor, 2005; von der Embse et al., 2013). As such, our recommendations will not touch upon treatment. Instead, we suggest that universities take steps to further

educate staff and students about TA. As detailed above, knowledge of TA and the services the institution provided influenced perceptions of TA in a positive direction. This suggests that educating staff and students about TA may combat the negative stigma we observed. However, as prevalence of TA varied between faculties (Table 1), it seems likely that the most effective educational campaign may need to be faculty specific. Implementation of such educational policies will likely improve the educational experience and performance of students with TA, as well as improve student retention.

Conclusion

We found relatively high levels of TA on the surveyed campus, with a strong sex dichotomy. Female students viewed TA as a more severe condition, and student perceptions varied by age, sex, and experience with TA. Furthermore, evidence of a negative stigma surrounding this disorder was observed, with nearly one third of students expressing negative and inaccurate views about TA. Given the negative impact of TA on students (Abolghasemi et al., 2009; Hill, 1984; Szafranski et al., 2012; Vitasari et al., 2010; von der Embse et al., 2013), as well as the treatability of TA (Ergene, 2003; Gregor, 2005; von der Embse et al., 2013), the presence of a negative stigma may result in students not seeking treatment and suffering needlessly. The findings from this investigation suggest that educating students about TA may help students overcome the stigma and seek treatment. Moreover, as the incidence of TA varied between faculty, treatment strategies which operate at the faculty scale, rather than campus wide, may be more effective. Implementation of such educational policies will likely improve the educational experience and performance of students with TA, as well as improve student retention. Moreover, education may also have the added bonus of improving how students view the institution's commitment to addressing TA.

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