



The 3 x 2 Achievement Goal Model in Predicting Online Student Test Anxiety and Help-Seeking

Yan Yang, Jeff Taylor and Li Cao

Abstract: This study investigates the utility of the new 3 × 2 achievement goal model in predicting online student test anxiety and help-seeking. Achievement goals refer to students' general aims for participating in learning and the standard by which they judge their achievement (Pintrich, 2000). According to Elliot and his colleagues (2011), there are six types of achievement goals based on three dimensions of competence (self-, task-, and other-) and two dimensions of valence (approach and avoidance). The sample included 209 students enrolled in distance education classes who volunteered for the study. Separate hierarchical regression was employed to examine the predictive power of achievement goals in online student test anxiety and help-seeking beyond self-efficacy and demographic differences. Achievement goals predicted online help-seeking differently from traditional classes. Students who endorsed other-avoidance or self-approach goals reported more help-seeking, while those with other-approach or self-avoidance goals reported less help-seeking. The study results and practical implications for online instruction and course design are discussed.

Résumé: Cette étude examine l'utilité du nouveau modèle 3 × 2 des buts d'accomplissement à prédire l'anxiété au test et la demande d'aide de l'étudiant en ligne. Les buts d'accomplissement visent les buts généraux des étudiants pour participer à l'apprentissage et la norme par laquelle ils jugent leur accomplissement (Pintrich, 2000). Selon Elliot et ses collègues (2011), il existe six types de buts d'accomplissement en s'appuyant sur trois dimensions de la compétence (soi-, tâche-, et autrui-) et deux dimensions de valence (approche et évitement). L'échantillon comprenait 209 étudiants inscrits dans des classes d'enseignement à distance qui se sont portés volontaires pour l'étude. La régression hiérarchique distincte a été utilisée pour examiner le pouvoir prédictif des buts d'accomplissement de l'étudiant en ligne pour l'anxiété au test et la demande d'aide au-delà de l'auto-efficacité et des différences démographiques. Les buts d'accomplissement ont prédit la demande d'aide en ligne différemment de celle des classes traditionnelles. Les étudiants qui ont approuvé les buts autrui-évitement ou soi-approche ont signalé plus de demande d'aide, tandis que ceux avec les buts autrui-approche ou soi-évitement ont signalé moins de demande d'aide. Les résultats de l'étude et les implications pratiques pour l'enseignement en ligne et la conception de cours sont discutés.

Keywords: 3x2 achievement goal model, self-efficacy, test anxiety, help-seeking, online learning

Introduction

In the past decade, online education has become an important part of public universities in the United States and is becoming increasingly prevalent globally. Students enroll in online classes at a more rapidly increasing rate than traditional classes (Goldberg & Reimer, 2006). This increase in online enrollment is consistent across all ages and is expected to continue (Hoskins, 2011). To meet the needs of growing distance education, research in e-learning has been on the rise in recent years. However, still in its infancy stage, research in e-learning has much to explore in order to understand and overcome the unique challenges of e-learning and to achieve student success (McInnerney & Roberts, 2004; Dunn, Rakes, & Rakes, 2014). Among these challenges, the asynchronous nature of online courses have resulted in a communication barrier between students and teachers, leading to anxiety and hesitation in help-seeking which



could be critical to student success (Dunn et al., 2014; Schworm & Gruber, 2012; Song Tryon & Bishop, 2009). Many online students reported a feeling of isolation and anxiety, and less willingness in seeking help than traditional students in face-to-face classes, due to an absence of a relationship with their instructors and peers (McInnerney & Roberts, 2004; Song Tryon & Bishop, 2004; Vonderwell, 2003). Addressing anxiety and increasing help-seeking of online students, therefore, is of great importance for effective e-learning and instructional designing.

Recent research shows that test anxiety, among other types of anxiety, continues to affect students' learning and academic achievement in online settings (Joo, Lim, & Kim, 2012; von der Embse & Hasson, 2012). As a significant predictor of overall class performance (Huang, 2011), test anxiety plays a critical role in high-stakes standardized testing, one of the primary means of assessment in college-level courses (von der Embse & Hasson, 2012). For instance, in the summary of a literature review, Zeidner and Matthews (2005) reported an average correlation of -0.2 to -0.3 between test anxiety and academic performance, confirming the detrimental effects of test anxiety (Madsen, 1981). Test anxiety may cause a student to make reckless mistakes during testing as they rush to complete the test in time, thus lowering their grade on the test (Stowell, & Bennett, 2010). Further, Bembenuddy, McKeachie, Karabenick, and Lin (1998) observed that consistently harboring high test anxiety may cause a student to lose motivation in other areas of course work, further hindering their success.

While taking a test over the Internet instead of face-to-face may reduce test anxiety for most students (Cassady & Gridley, 2005; McGorry, 2012; Pentina & Neeley, 2007; Stowell, & Bennett, 2010), multiple studies show that test anxiety continues to significantly restrain student performance in online courses (Bembenuddy et al., 1998; Joo, Lim, & Kim, 2012; Stowell, & Bennett, 2010; von der Embse & Hasson, 2012). While online students do not have to worry so much about distractions, it seems that the time constraints and general intimidating nature of a standardized test still hinders online students in a way similar to traditional classrooms. Therefore, it is important to inspect antecedents of test anxiety and its implications in online settings. Whereas many students continue experiencing test anxiety in online settings, they are found to be less willing to seek help than in traditional face-to-face classes (McInnerney & Roberts, 2004; Song Tryon & Bishop, 2004; Vonderwell, 2003).

As an important strategy of self-regulated learning (Bembenuddy et al., 1998; Järvelä, Järvenoja, & Malmberg, 2012), appropriate help-seeking plays an essential role in students' academic success (Ryan et al., 1998). This has been found to be even more true for online classes (Mahasneh, Sowan, & Nassar, 2012) because various aspects of an online class can be confusing to students who are unfamiliar with them, in addition to many unique challenges of e-learning such as the asynchronous nature, the potential communication disconnect, and a sense of isolation. A multitude of studies (Aleven, McLaren, Roll, & Koedinger, 2006; Karabenick & Newman, 2006; Ryan, Gheen, & Midgley, 1998) found help-seeking to have a substantial impact on students' success in a class. Students from both traditional classrooms and distance education courses who actively sought help when needed performed much better than those who didn't.

In sum, past research has found that test anxiety is detrimental to students' academic performance (Ahmad, Hussain, & Azeem, 2012; Huang, 2011), whereas appropriate help-seeking can have a substantial positive impact on students' success (Aleven et al., 2006; Karabenick & Newman, 2006; Ryan et al., 1998). To help online students reduce test anxiety and increase help-seeking to meet the needs of growing e-learning (Goldberg & Reimer, 2006; Hoskins, 2011), it is imperative to study the antecedents of text anxiety and help-seeking, which include achievement goals (e.g., Yang & Taylor, 2013; Bong, 2009; Roussel, Elliot, & Feltman, 2011; Sun & Hernandez, 2012), self-efficacy (e.g., Yang & Taylor, 2013; Bandalos, Finney, & Geske, 2003; Bong, 2009; Putwain & Daniels, 2010; Roussel et al., 2011), and demographic characteristics such as age and gender (Ahmad et al., 2012; Putwain & Daniels, 2010; Rasor & Rasor, 1998; Ryan et al., 1998).

Achievement goals are described as students' general aims for participating in classwork, and the standard by which they judge their achievement (Pintrich, 2000). Students can set goals for working towards success or avoiding failure, and they may gauge their progress based on absolute criteria or previous performance, or in comparison with other students. The past three decades have witnessed an abundant advancement of achievement goal theories (Covington, 2000), progressing from the dichotomous to the newest 3×2 model. The original dichotomous model was comprised of two goal types: mastery and performance (Ames, 1984; Dweck & Leggett, 1988; Nicholls, 1984). Then it evolved into a trichotomous model which differentiated the performance goal into approach and avoidance valences (Elliot & Harackiewicz, 1996; Harackiewicz, Barron, & Elliot, 1998). The trichotomous model further advanced to bifurcate the mastery goal into approach and avoidance valences, forming a 2×2 matrix (Elliot & McGregor, 2001). According to the 2×2 model, students form achievement goals based on the definition (mastery vs. performance) and valence (approach vs. avoidance) dimensions of competence. Most recently, Elliot, Murayama, and Pekrun (2011) suggested a 3×2 model of achievement goals with a three-way definition of competence, i.e., self-, task-, and other-orientation, while retaining the two-way valence dimension. Self-based goals focus on one's personal performance, task-based goals on the ability to accomplish a task, and other-based goals on interpersonal standards in evaluating success. Figure 1 displays a graphic account of the evolution of achievement goal theory over the past three decades:

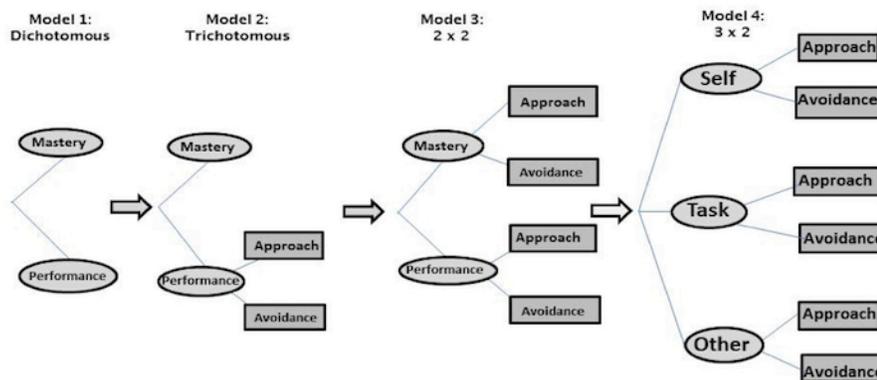


Figure 1: An evolutionary account of achievement motivation theory

Previous studies have discovered a significant link between achievement goals from the 2×2 model (Elliot & McGregor, 2001) and test anxiety and help-seeking (e.g., Yang & Taylor, 2013). Generally, students with performance-based goals reported greater test anxiety than those with mastery-based goals (Bandalos, et al., 2003; Bong, 2009; Roussel, et al., 2011; Sun & Hernandez, 2012). Performance-based goals have also been shown to negatively affect help-seeking (Bandalos, et al., 2003; Roussel et al., 2011; Schwinger & Stiensmeier-Pelster, 2011). However, these results have been inconsistent, with other studies showing only performance-avoidance goals result in decreased help-seeking (Putwain & Daniels, 2010; Putwain & Symes, 2012). Further, it is uncertain if these relationships found in traditional classes apply to online environments, and how the new 3×2 framework (Elliot et al., 2011) compares to the 2×2 model in predicting test anxiety and help-seeking.

Second, recent research has consistently shown that students' self-efficacy is a strong predictor of test anxiety (Bandalos et al., 2003; Putwain & Daniels, 2010) and help-seeking (Bong, 2009). Students with low self-efficacy were found to experience more test anxiety (Walker et al., 2009) and yet less likely to seek help (Roussel et al., 2011). With the rising popularity of online education, it is important to find out if the role of self-efficacy remains to be a significant variable for online classes. Third, prior studies have discovered significant differences in test anxiety and help-seeking based on age (Rasor & Rasor, 1998) and gender (Ahmad et al., 2012; Putwain & Daniels, 2010; Ryan et al., 1998). Younger students experienced more test anxiety

and were more prone to seeking help (Rasor & Rasor, 1998). Generally, girls were more likely to seek help than boys (Ryan et al., 1998). Girls who displayed high test anxiety were more likely to seek help than girls who displayed low test anxiety, however, boys who displayed high test anxiety were the least likely to seek help (Chapell et al., 2005), indicating a potential bias against help-seeking for males. It is unknown whether these findings still hold true for the online students, where the absence of physical proximity to the instructor and fellow students could play a role in help-seeking.

Since the nature of e-learning is very different from face-to-face classes, including the minimal physical presence of professors and students and limited interactions (e.g., Knapper, 1988; Murray, Hale, & Dozier, 2015), it is imperative to find out whether the significant roles of achievement goals and self-efficacy in predicting test anxiety and help-seeking translate to online settings. Overall, we hypothesized that achievement goals and self-efficacy would still be significant predictors of online test anxiety and help-seeking. However, we anticipated a notable difference in the effect of avoidance-based goals on students' help-seeking in online classes due to different fear factors. Students in traditional face-to-face classes may be more reluctant to seek help due to fear of looking incompetent, whereas those from e-learning courses may be more likely to seek help due to fear of failure. Students with avoidance-based goals in online classes may be more likely to seek help than those in face-to-face classes, because they may be less likely to fear looking inferior or incompetent through help-seeking due to no to limited physical contact. Findings from an earlier study (Yang & Taylor, 2013) suggest that fear of failure over fear of looking incompetent in online classes may have driven students with performance-avoidance goals to help-seeking using the 2×2 model (Elliot & McGregor, 2001). Nevertheless, it is unclear whether this difference between the two course-delivery formats stands using the new 3×2 model (Elliot et al., 2011). The present study controlled for age and gender differences in the first step and self-efficacy in the second step, in an attempt to investigate the unique contribution of achievement goals as predictors of test anxiety and help-seeking in online courses.

Theoretical Perspectives

Test Anxiety

The literature reveals that test anxiety derives from a combination of factors including students' demographic characteristics, self-efficacy beliefs, and achievement goals. Gender was shown to have a notable impact on test anxiety and help-seeking: boys who displayed high test anxiety were the least likely to seek help, however girls who displayed high test anxiety were more likely to seek help than girls who displayed low test anxiety (Chapell et al., 2005). Also, test anxiety has been shown to stem from feelings of low self-efficacy (Walker et al., 2009): students tend to feel more test anxiety when they endorse lower self-efficacy beliefs. Furthermore, in a literature review, Moller and Elliot (2006) found that performance-avoidance and mastery-avoidance goals were positively associated with test anxiety. The more performance or mastery-avoidance goals the students endorsed, the higher their reported test anxiety (Ayumi, Takuma, & Hirotsugu, 2006; Putwain & Symes, 2012). This could be because emphasizing a possible negative outcome, such as failing the test, increases their anxiety. Since test-anxiety is a strong predictor of poor class performance (Ahmad et al., 2012; Huang, 2011), it merits more studies to investigate the antecedents of test anxiety, especially in the e-learning environment where students take tests in a different environment than traditional classrooms.

Help-seeking

The literature shows that numerous factors may discourage a struggling student from seeking help, including self-efficacy and achievement goal orientation (Bandalos et al., 2003; Roussel, et al., 2011). Students with low self-efficacy were less likely to seek help (Roussel et al., 2011), especially when they didn't think that spending extra effort would improve performance. Also, students who endorse performance-based achievement goals were less likely to seek help

because they didn't see the intrinsic value in understanding course content (Bong, 2009; Linnenbrink, 2005). Further, prior studies have also found important differences in help-seeking between genders (Ahmad et al., 2012; Morgan, Ness, & Robinson, 2003; Putwain & Daniels, 2010; Ryan et al., 1998), with females being more likely to seek help than males (Morgan et al., 2003; Ryan et al., 1998). However, it is still unclear how these relationships apply to e-learning. Students may be further discouraged from seeking help in an online class, because physical closeness to the instructor is limited. It is therefore essential to investigate the factors that affect help-seeking in order to promote e-learning.

Achievement Goals

Prior research has established a link between achievement goals and test anxiety and help-seeking, although it has been somewhat inconclusive as to the nature of the relationships (Huang, 2011; Ryan et al., 1998). Past studies show that mastery-based goals are associated with positive effects (e.g., decreased test anxiety and increased help-seeking), while performance-based goals are associated with detrimental effects (Bong, 2009; Linnenbrink, 2005; Roussel et al., 2011). For instance, Shen and Tam (2008) found that students who emphasize comparison with other students (a feature of performance-based goals) had increased test anxiety. Furthermore, students focusing on their performance may be drawn to negative emotions when they feel incompetent compared to other students, thereby avoiding situations that evoke these negative emotions (seeking help). Conversely, if they set mastery-based goals, they tend to focus on the task itself and channel their worrying into productive means of mastering content (Zeidner & Matthews, 2005). Therefore, students with performance-based goals may experience higher test anxiety yet avoid seeking help, whereas those with mastery-based goals may choose to seek help so as to decrease their test anxiety.

Students with mastery-based goals have been reported to intentionally seek help more than those with performance goals (Järvelä et al., 2012), which may be due to their emphasis on continued self-improvement. However, other studies found both mastery and performance-approach goals are associated with positive effects on test anxiety and help-seeking (Ayumi et al., 2006; Roussel et al., 2011; Sungur & Senler, 2010), while avoidance goals are associated with detrimental effects. This may be because trying to avoid a negative outcome (failure) leads to higher test anxiety, while working for a positive outcome (success) leads to proactive behavior such as appropriate help-seeking, regardless of students' mastery or performance goal orientation. Similarly, Moller and Elliot (2006) reported that performance-avoidance and mastery-avoidance were positively associated with test anxiety and maladaptive help-seeking. Other studies have agreed that avoidance goals are good predictors of test anxiety (Ayumi et al., 2006; Putwain & Symes, 2012).

Generally, mastery-avoidance goals were correlated with low test-anxiety, meanwhile performance-avoidance goals were correlated with the opposite (Ayumi et al., 2006; Sun & Hernandez, 2012). However, the precise effect of mastery-avoidance and performance-avoidance goals remains inconclusive. Some studies show both mastery and performance-avoidance goals lead to high test anxiety (Huang, 2011; Putwain & Symes, 2012), while others show only performance-avoidance goals result in high test anxiety (Ayumi et al., 2006; Putwain & Symes, 2012). In view of the contradictory results from the literature, more studies are warranted to examine the roles of achievement goals in test anxiety and help-seeking, especially for e-learning.

Much research has focused on how achievement goals influence students' motivation (Elliot & Harachiewicz, 1996; Schwinger & Stiensmeier-Pelster, 2011), academic effort (Phan, 2012; Sun & Hernandez, 2012), learning strategies (Ames & Archer, 1988; Liem, Lau, & Nie, 2008), and performance attainment (Liem et al., 2008; Nelson, 1983; Pintrich, 2000). However, little research was found in testing the applicability of the new 3×2 model to empirical data (Ilker, Arslan, & Demirhan, 2011). In a recent study (Yang & Cao, 2013), approach-based goals in the 3×2 and the 2×2 models were found to have indirect effects on online students' help-seeking.

However, it remains uncertain how the two full models compare regarding their effects on online test anxiety and help-seeking.

Self-efficacy

Self-efficacy is defined as the perception of one's own capability at performing a task (Ahmad et al., 2012). For the purpose of our study, self-efficacy refers to students' level of belief in themselves to achieve success in their course work. Prior research has shown that students' self-efficacy is a significant predictor of test anxiety (Bandalos et al., 2003; Putwain & Daniels, 2010; Ryan et al., 1998) and help-seeking behaviors (Bong, 2009). Numerous studies have shown low self-efficacy to be the best indicator of test anxiety (Ryan et al., 1998; Walker et al., 2009), and both directly and indirectly linked to overall class performance (Ahmad et al., 2012; Liem et al., 2008) due to its effect on test anxiety and help-seeking. Students with high self-efficacy were found to be more likely to seek help than those with low self-efficacy (Roussel et al., 2011) who probably needed help more. Students with high self-efficacy are more likely to organize and self-regulate their learning than those with low self-efficacy who did not think that spending extra effort would result in improved performance (Sungur & Senler, 2010).

The well-esteemed S-REF (self-referent executive function) model of test anxiety conceptualizes test anxiety as negative self-beliefs about test-taking capability (defined herein as self-efficacy), which therein produce behaviors intended to avoid facing the fear of the test (Zeidner & Matthews, 2005). According to this model, students with low self-efficacy tend to think they will not usually perform well on tests, which can lead to high test anxiety and, therefore, avoiding proactive methods of dealing with test anxiety such as seeking help. Regrettably, this behavior is self-destructive, causing the student to perform even worse on the test, thereby approving their already low self-efficacy beliefs, and in the end causing them to avoid properly preparing for tests in the future (Zeidner & Matthews, 2005).

There seems to be a notable difference in levels of self-efficacy between the genders (Ryan et al., 1998), and in its effect on help-seeking (Putwain & Daniels, 2010). Females showed significantly lower self-efficacy, and were more likely to seek help than males (Ryan et al., 1998). As most prior studies have been conducted in face-to-face classes, it is still unclear whether the relationships found between self-efficacy and test anxiety and help-seeking would apply to e-learning and distance education settings.

Research Questions

In order to address the research gap and improve effectiveness of distance education, the present study investigated the roles of achievement goals in online students' test anxiety and help-seeking. In particular, our study attempted to find out whether the six types of achievement goals of the 3×2 model (Elliot et al., 2011) predict online students' help-seeking behaviors and test anxiety as compared to four types of achievement goals of the 2×2 model (Elliot & McGregor, 2001) in traditional classes, while controlling for self-efficacy, age, and gender. In the present study, we addressed four research questions in particular: (1) How do achievement goals in the 3×2 model predict online student test anxiety and help-seeking beyond self-efficacy, age, and gender? (2) How does self-efficacy predict online students' test anxiety and help-seeking beyond age and gender? (3) Are there age and gender-based differences in online students' test anxiety and help-seeking? (4) How does the new 3×2 model compare with the older 2×2 model in predicting online students' test anxiety and help-seeking?

Methods

Participants

Participants consisted of 209 students who voluntarily participated in the study to receive course credit in various classes delivered 100% online at a public comprehensive university in

the Southeastern USA. While varied in the actual tests and assignments, these 100% online classes included both tests and projects as assessment methods, and shared similar online help resources, such as technology help and troubleshooting, distance learning library services, a 24/7 helpline, a frequently asked questions (FAQ) page on internet, tutorials for navigating the online classes, test-taking skills, class project guidelines and tutorials, and grading rubrics, etc. The students from these online classes took a series of surveys after they completed two major open-book and timed tests during the middle of a semester. The sample was predominantly white (67%), female (80%), graduate students (50%), living off-campus (91%), and employed (74%). Most of them (53%) had over 10 credit hours of online classes at the time of participation. Their age ranged from 19-59 years old ($M = 28.8$, $SD = 8.97$).

Procedure and Measures

Participants were asked to fill out a series of surveys about their achievement goals, motivation, and e-learning experience on a 7-point Likert scale ranging from “not true of me” (1) to “extremely true of me” (7) (See Table 1 for α values). Besides the demographics of the participants, the measures included:

The 3 × 2 Achievement Goal Questionnaire (Elliot et al., 2011) was used to measure the self-, task-, and other-approach and the self-, task-, and other-avoidance goals. All six subscales of this questionnaire were used to measure students' six types of achievement goals, with each subscale consisting of three items. A sample item for the self-approach subscale was “to do well on the exams in this class relative to how well I have done in the past on such exams,” self-avoidance was “to avoid doing worse on the exams in this class than I normally do on these types of exams,” other-approach was “to do better than my classmates on the exams in this class,” other-avoidance was “avoid doing worse than other students on the exams in this class,” task-approach was “get a lot of questions right on the exams in this class,” and task-avoidance was “to avoid getting a lot of questions wrong on the exams in this class.”

The Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich, Smith, Garcia, & McKeachie, 1993) was used to evaluate online students' self-efficacy, test anxiety and help-seeking with the self-efficacy subscale consisting of eight items, test anxiety subscale of five items, and help-seeking subscale of four items (one reverse code item). A sample item for self-efficacy subscale was “I'm confident I can do an excellent job on the assignments and tests in this course,” test anxiety was “I feel my heart beating fast when I take an exam,” and help-seeking was “I try to identify students in this class whom I can ask for help if necessary.” The item that was reversely coded for the help-seeking subscale was “even if I have trouble learning the material in this class, I try to do the work on my own, without help from anyone.”

Results

The means and standard deviations of the variables are summarized in Table 1, along with the alpha coefficients for multi-item variables and bivariate correlations for all variables in the study. As Table 1 shows, self-efficacy is negatively associated with test anxiety ($r = -.230$, $p < .01$) but not with help seeking ($r = .09$, $p > .05$). The higher self-efficacy online students have, the less test anxiety they feel. However, achievement goals are associated with both test anxiety and help-seeking in different ways. Both self-avoidance and other-avoidance goals are positively associated with test anxiety and help-seeking. The more self- or other- avoidance goals online students endorse, the greater the test anxiety they feel, and the more help-seeking they reported. Surprisingly, self-approach, other-approach, and task-avoidance goals were positively associated with help-seeking, but not with test anxiety. The more self- or other-approach or task-avoidance goals online students endorse, the more they seek help.

Table 1. Descriptive statistics and Pearson's correlation coefficients of the main variables (N = 209)

Variables	Mean	SD	α	1	2	3	4	5	6	7	8	9
1. Age	28.78	8.97	NA	-								
2. Self-Efficacy	5.31	1.08	.90	.23**	-							
3. Self-Approach	5.66	1.35	.83	-.10	.07	-						
4. Self-Avoidance	5.82	1.41	.89	-.20**	-.12	.71**	-					
5. Task-Approach	6.36	0.89	.89	.09	.14*	.53**	.34**	-				
6. Task-Avoidance	6.32	0.91	.84	.01	.03	.45**	.55**	.65**	-			
7. Other-Approach	4.71	1.67	.89	-.10	.05	.40**	.34**	.22**	.17*	-		
8. Other-Avoidance	5.25	1.68	.93	-.10	.01	.40**	.49**	.17*	.37**	.74**	-	
9. Test Anxiety	4.00	1.57	.82	-.20**	-.30**	.00	.19**	-.08	.10	.06	.19**	-
10. Help-Seeking	3.68	1.30	.63	-.38**	.09	.24**	.16*	.09	.15*	.16*	.28**	.24**

Note. ** $p < .01$. * $p < .05$ (2-tailed).

Based on the significant correlation matrix, hierarchical regression analyses were performed to see if achievement goals have incremental prediction capability on online test anxiety and help-seeking beyond self-efficacy, while controlling for possible demographic differences using SPSS Version 21. All continuous predictors were centered to reduce multicollinearity. Separate hierarchical regression analyses were undertaken for the two criterion variables, test anxiety and help-seeking. Gender and age were entered as a covariate in the first step (Model 1), self-efficacy was added in the second step to examine the possible incremental effect of students' self-efficacy (Model 2), and the six types of achievement goals from the 3×2 model (Elliot et al., 2011) were added in the last step to find out their distinctive predictive power (Model 3). Regression results showed substantial differences in the predictive patterns of test anxiety and help-seeking online (Table 2).

Test Anxiety

Table 2 indicates that 17% of online student test anxiety was accounted for by the predictor variables listed. Gender and age made up 5% of the variance, with self-efficacy adding an additional 6%. Students' achievement goal orientations (AGO) predicted another 6% of the variance. None of the AGO variables made noteworthy contributions to test anxiety. Nevertheless, self-efficacy played a substantial role.

Table 2. Hierarchical regression analyses examining predictors of online test anxiety and help-seeking

Variable Sets	Beta (β) Weights					
	Test Anxiety			Help-Seeking		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
<i>Demographics</i>						
Sex	.08 (.21)	.05 (.11)	.04 (.10)	.03 (.06)	.05 (.13)	.03 (.08)
Age	-.20** (-.02)	-.14* (-.02)	-.11 (-.01)	-.39*** (-.04)	-.43*** (-.05)	-.42*** (-.05)
Self-efficacy		-.26*** (-.26)	-.23** (-.23)		.19** (.19)	.15* (.15)
<i>Achievement goals</i>						
Self-Approach			-.13 (-.013)			.27** (.27)
Self-Avoidance			-.14 (-.14)			-.23* (-.23)
Task-Approach			-.09 (-.09)			-.02 (-.02)
Task-Avoidance			.08(.08)			.06(.06)
Other-Approach			-.09(-.09)			-.19*(-.19)
Other-Avoidance			.22 (.22)			.37*** (.37)
R^2	.05**	.11***	.17*	.15***	.18**	.28***
R^2 change		.06***	.06*		.04**	.10***

Note. The variable for gender takes the value of '0' for female students and '1' for males.

*** $p < .001$. ** $p < .01$. * $p < .05$.

Help-Seeking

Table 2 also shows that 28% of online student help-seeking was accounted for by the predictor variables listed. Gender and age contributed 15% of the variance, with self-efficacy adding an additional 4%. Students' achievement goal orientations (AGO) predicted another 10% of the variance. Of the AGO variables, the other-avoidance subscale made the most significant contribution to help-seeking (Beta = .37, $p < .001$), followed by self-approach (Beta = .27, $p < .01$), self-avoidance (Beta = -.23, $p < .05$), and other-approach (Beta = -.19, $p < .05$). However, age (Beta = -.42, $p < .001$) was an important predictor in the full model besides self-efficacy (Beta = .15, $p < .05$). The older the students, the less help-seeking they reported. Meanwhile, the higher a student's self-efficacy, the more they seek help.

Discussions

Our results found that achievement goals played different roles in online test anxiety and help-seeking, and that self-efficacy beliefs are important in both aspects of e-learning. Our first research question asked how achievement goals in the 3×2 model predict online student test anxiety and help-seeking beyond self-efficacy and demographics. The results showed that while achievement goals played an important role in online help-seeking, they were not

significant in regards to test anxiety. Students who focused on the attainment of self-based competence or the avoidance of other-based incompetence reported more help-seeking, while those who tried to avoid self-based incompetence or achieve other-based competence reported less help-seeking. In other words, our study results revealed that the more students aimed to improve performance or avoid doing worse than others, the more help-seeking they reported. On the contrary, the more students intended to do better than others or avoid doing worse than before, the less help-seeking they reported.

Our second research question asked how self-efficacy predicts online student test anxiety and help-seeking beyond demographic factors. Our results illustrated the significant role of students' self-efficacy in both test anxiety and help-seeking, confirming the previous results (e.g., Putwain & Daniels, 2010; Roussel et al., 2011; Yang & Taylor, 2013). The higher self-efficacy beliefs students endorse, the less test anxiety they experienced, and the more help-seeking they reported not only in face-to-face classes but also in online classes. Consistent with the previous findings that self-efficacy is negatively related to test anxiety (Bandalos et al., 2003; Boom, 2009; Yang & Taylor, 2013), our results indicate that the higher the self-efficacy, the lower test anxiety students reported. Meanwhile, our results confirm an earlier finding that self-efficacy is an important predictor of help-seeking (Ryan et al., 1998).

Our third research question asked about the age and gender differences in online students' test anxiety and help-seeking. Our results show that neither gender nor age mattered in online test-anxiety, a finding inconsistent with the significant gender effect on test anxiety and help-seeking found in traditional classes (Ahmad et al., 2012; Chapell et al., 2005; Putwain & Daniels, 2010; Ryan et al., 1998). However, we found a significant age difference in online help-seeking. The older the students, the less help-seeking they reported, confirming the role of age in online help-seeking (Yang & Taylor, 2013).

The fourth research question about how the 3×2 model compares with the 2×2 model in predicting online test anxiety and help-seeking led to distinct predictive patterns of achievement goals toward help-seeking from the two models. Both performance-avoidance ($r = .19, p < .05$) in a previous study (Yang & Taylor, 2013) and other-avoidance ($r = .37, p < .001$) in the present study were significant predictors of online help-seeking, supporting the likeness of the two subscales as Elliot and his colleagues proposed (2011). However, while no other types of goals from the 2×2 framework were found to be significant in the full model from a previous study (Yang & Taylor, 2013), three other types of achievement goals from the new 3×2 model predicted help-seeking in the present study: self-approach ($r = .27, p < .01$), self-avoidance ($r = -.23, p < .05$), and other-approach ($r = -.19, p < .05$), suggesting the conceptual difference between the 2×2 framework and new 3×2 model as posited by Elliot and his colleagues (Elliot et al., 2011).

Adding to an earlier result of the differential effect of intrapersonal vs. normative evaluation on test anxiety and help-seeking (Bandalos et al., 2003), our results support the fundamentally distinct roles of valence dimensions of the achievement goal theory as well, i.e., approach vs. avoidance orientation. For instance, prior results show that students with mastery-based goals (therein called learning goals) displayed lower test anxiety and more help-seeking, whereas those with performance-based goals sought less help and experienced greater test anxiety (e.g., Bandalos et al., 2003; Linnenbrink, 2005). Our results, however, showed not only the definition but also the valence dimension of the achievement goals matters in online test anxiety and help-seeking. Students who focused on doing better than before sought help more, whereas those who aimed to avoid doing worse than before sought help less. Interestingly, the valence effect was reversed in the relationship between other-based goals and online help-seeking. Students who were concerned with outperforming others reported less help-seeking, while those concerned with avoiding doing worse than others sought help more.

We found that students who endorsed self-approach and other-avoidance goals were the most likely to seek help. One possible explanation for this is that because personal interaction with

the instructor and other students in online classes is limited, students with other-avoidance goals were not as afraid to seek help as in face-to-face classrooms, reinforcing the potentially different fear factors in help-seeking in online classes (Yang & Taylor, 2013). Noting the different course delivery format amongst the different study results of avoidance goals in help-seeking (Bandalos et al., 2003; Bong, 2009; Roussel et al., 2011; Yang & Taylor, 2013), it seems what mattered in traditional classes may not be as salient in online classes. Instead of the fear of looking stupid through help-seeking in face-to-face classes, online students may actually be more motivated to seek help due to the fear of doing worse than others. Nevertheless, students may be more likely to seek help to master course content in both traditional and online classes. The perplexing discrepancy in the relationship between achievement goals and help-seeking between face-to-face and online classes merits further studies to disentangle the differences as well as similarities between the different course delivery formats.

Practical Implications

E-learning can be an isolating experience that leads to poor performance as a result of test anxiety and lack of help-seeking (e.g., Ahmad et al., 2012; Karabenick & Newman, 2006; van & Gruber, 2012). Therefore, it is essential to find ways to reduce online students' test anxiety and encourage them to seek help in the learning process. This study set out to examine the predictive power of online students' achievement goals on test anxiety and help-seeking, while controlling the potential effects of self-efficacy, age, and gender. Our findings have important implications for e-learning and distance education. First, as online instructors or course designers, we need to structure our online courses in a way that focuses on learning, mastering the course content, and making progress rather than on competition among students. Making an online course more interesting, engaging, and interactive will likely create an e-learning environment where students feel comfortable and motivated to seek help, hence, increase their course satisfaction and academic success. Instead of high-stake tests or vague assignments, online course instructors might use assessment strategies that focus on learning or mastering of the course content. They can also apply higher-level assessment strategies, such as cooperative learning, concept mapping, or hands-on projects to break down big assignments into smaller assignments, or online assignments that require interactions and discussions and the like (e.g., Cziprok & Popescu, 2015; Grant, 2002; Karakuyu, 2010; Slavin, 2011). These alternative assessment strategies would not only promote online students' motivation, collaborative skills, and help-seeking, but also prepare them for the high-stakes standardized tests (Cziprok & Popescu, 2015). On the contrary, as our findings suggest, students are much less likely to seek help when they perceive that their online classes induce competition or offer minimal instructions or scaffolding. Providing positive and specific instructions through audio/video instructions, tutorials, project guidelines, and grading rubrics etc. would encourage online students to follow instructions and seek help needed in an online setting.

Second, consistent with previous research findings (Yang & Taylor, 2013; Bandalos, et al., 2003; Bong, 2009; Putwain & Daniels, 2010), our results show that self-efficacy negatively predicted test anxiety while positively predicted help-seeking. Online instructors and course designers need to provide clear guidance, instructions, and assistance to boost students' confidence in achieving success in their course work. These strategies include better and more available online study and exam preparation tools and formative assessments with feedback that emulates the summative assessments. Making the course assignments appropriately challenging, while not overwhelmingly difficult, with additional course assistance and formative assessments will not only reduce students' test anxiety, but also increase their likelihood to seek help when they can foresee success with efforts.

Third, our results show age as an important factor in online students' test anxiety and help-seeking: that is, the older they get, the less test anxiety they experience, but also the less likely they are to seek help. Online instructors and course designers need to be more attentive to younger students who may need more encouragement in reducing test anxiety, while

motivating older students to seek the needed help more. As both test anxiety and help-seeking are critical in e-learning, online instructors and course designers need to consider the age factor in reducing students' test anxiety and encouraging help-seeking.

Limitations of the Study

Our study has yielded important and interesting findings. However, these results need to be taken with caution due to the following limitations. First, our data were collected from a relatively small sample size, and only from online courses for majors in one discipline (Education). Although we referred to the findings of our previous studies and of the related studies carried out in traditional classrooms settings, we cannot make definitive statements about the comparison between online and traditional courses since we did not collect data from traditional courses in our research design. Further, our study used convenience and purposive instead of random sampling, which afforded us with limited generalizability of our study results. However, since we purposely sampled participants from the purely online classes, our findings may be generalized to similar online populations. In order to improve the generalizability of the findings, future studies may collect data from a larger sample size and consider a design with random selection of students from both online and traditional courses.

Significance of the Study

The increasing popularity of e-learning, combined with the recently developed 3×2 achievement goal model (Elliot et al., 2011), and the potentially different learning dynamics between face-to-face and online courses (Mahasneh et al., 2012) led to the present study. As a continuation of our effort to understand the roles of achievement goals in predicting online test anxiety and help-seeking, the present study contributed to e-learning and distance education in the following ways. First and foremost, the present study advanced the research of achievement goals in the online learning environment. No known study has examined the roles of the six types (3×2 model) of achievement goals in predicting online test anxiety and help-seeking while controlling for the potential age and gender effect. In particular, our results demonstrated that a significant conceptual difference exists between the older 2×2 and the most recent 3×2 achievement goal models. In our earlier studies, we examined the older 2×2 achievement goal model (Yang & Taylor, 2013) and part of the most recent 3×2 achievement goal (only approach-goals, no avoidance-goals were examined in the study) (Yang & Cao, 2013) in predicting online test anxiety and help-seeking. The present study extended this line of research by using the full conceptual model of 3×2 .

Second, the present study appeared to be the first to compare the two prominent achievement goal models (i.e., the 2×2 and 3×2 models) in predicting online test anxiety and help-seeking in the recent self-regulated e-learning literature. More specifically, the present study differed from the previous studies in that it looked beyond self-efficacy to investigate the potential incremental effects of the six types of achievement goals on test anxiety and help-seeking in e-learning. Third, besides self-efficacy, the present study controlled for the potential age and gender factor in examining the role of achievement goals in online test anxiety and help-seeking, making our study an original effort in this regard. Although we found similar results of self-efficacy in predicting online test anxiety and help-seeking as previous studies (Putwain & Daniels, 2010; Roussel et al., 2011), we found contradictory results regarding age and gender in the present study. The present study shows that neither age nor gender seemed to matter in online test anxiety, but age did matter in online help-seeking, consistent with our earlier findings (Yang & Taylor, 2013).

Our results confirmed that what worked in traditional classrooms might not function in the same manner in e-learning. In comparison with the detrimental effects of performance-based goals and positive effects of mastery-based goals on learning including help-seeking and test anxiety in face-to-face settings (Bandalos et al., 2003; Boom, 2009; Linnenbrink, 2005), our study highlighted the positive roles of other-avoidance and self-approach goals in online help-

seeking. This finding suggests that online instructors and course designers need to avoid mechanically copying the so-called effective techniques from traditional classroom settings to the e-learning environment. Becoming aware and understanding the unique characteristics of e-learning is important for effective online teaching and instructional design. More specifically, online instructors and course designers need to create an e-learning environment conducive to help-seeking by focusing on learning, mastering course content, and making progress instead of encouraging competition among online students. Apparently, more studies are needed to disentangle the complexity of the roles of achievement goals in test anxiety and help seeking for both the traditional face-to-face classes and e-learning.

While revealing a possible fundamental difference in motivational dynamics in e-learning, our results suggest a similarity in the critical role of self-efficacy in test anxiety and help-seeking between the two course delivery formats. Similar to the significant links between self-efficacy and test anxiety and help-seeking in face-to-face classes from earlier results (Putwain & Daniels, 2010; Roussel et al., 2011), our results confirmed that the higher self-efficacy, the less test anxiety, and the greater the probability of help-seeking (Yang & Taylor, 2013). This finding suggests that it is critical for online instructors and course designers to create a learning environment that is supportive and builds confidence in students to be successful at course work. As help-seeking is even more crucial in e-learning, where students' academic success depends more on the different types of instructional support available and the help-seeking behaviors they engage in compared to those of traditional face to face classes (Aleven et al., 2006; Kabernick & Newman, 2006), future studies, to promote effective e-learning, could investigate the possible difference in the nature of online help-seeking in light of the different types of help-seeking (e.g., adaptive vs. maladaptive) (Ryan, Patrick, & Shim, 2005).

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Authors

Yan Yang is an Associate Professor of Educational Psychology in the Department of Educational Technology and Foundations, College of Education, University of West Georgia. Her research interests include the role of motivation in distance education and multicultural education. E-mail: yyang@westga.edu

Jeff Taylor is an undergraduate student of psychology at the University of West Georgia. His research interests are positive psychology and motivational strategies. E-mail: jhamby3@my.westga.edu

Li Cao is a Professor of Educational Psychology in the Department of Educational Technology and Foundations, College of Education, University of West Georgia. His research interests include metacognition and self-regulation in e-learning. E-mail: lcao@westga.edu