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Testing a model of teaching for anxiety and success for English language teaching

Evrim Önem[a]* and İclal Ergenç[b]

[a]*Erciyes University, Kayseri, Turkey;* [b]*Ankara University, Ankara, Turkey*

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Much research has shown that there is a negative relationship between high levels of anxiety and success for English language teaching. This paper aimed to test a model of teaching for anxiety and success in English language teaching to affect anxiety and success levels at the same time in a control-experiment group with pre- and post-test study design. Anxiety levels were measured by anxiety questionnaires and electroencephalograph recordings of brain waves and success was measured by grammar tests prepared by the researcher. Results of Mann–Whitney *U* Test, Wilcoxon Signed Ranks Test and ANOVA pointed to a statistically significant difference in anxiety and success levels between the experiment and control group. Discussion of the results as well as implications for future research is presented.

Keywords: anxiety; learning; success; teaching; English as a Foreign Language

Introduction

Success is one of the key factors to measure an individual's worth in society. As a side effect, striving for success to achieve a better place in society brings anxiety to make things worse. Yet, although there seems to be different types of anxiety, such as mathematics anxiety, computer anxiety or even social anxiety, research showed a parallelism among different types of anxiety such as foreign language anxiety, test anxiety, and state and trait anxiety (MacIntyre, 1995; MacIntyre & Gardner, 1991; MacIntyre & Gardner, 1994; Önem, 2010). Therefore, one can conclude that they all stem from the same origin, 'the fear of failure' (Sarason & Mandler, 1952) to achieve the level of success expected by the society.

In English language teaching (ELT), high levels of anxiety may act as an inhibitor for learning and success. Much research has revealed a negative relationship between different types of anxiety such as foreign language or test anxiety and success (Aida, 1994; Bekleyen, 2004; Rodriguez & Abreu, 2003; Saito & Samimy, 1996; Saito, Garza, & Horwitz, 1999; Zeidner, 1998; etc.). Research also suggests that language skills can also be affected by anxiety. For example, Philips (1992, cited in Haskin et al., 2003) studied the relationship between speaking skill and anxiety and revealed a negative relationship. Similarly, after comparing the level of anxiety and success in speaking courses of learners of English as a Foreign Language (EFL) in Turkey, Dalkılıç (2001) presented results suggesting a negative relationship. Apart from the effects of

*Corresponding author. Email: eonem@erciyes.edu.tr

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anxiety on language skills, in some EFL contexts like Turkey, success is generally measured by grammar tests only (Işık, 2008). Results show a negative relationship between grammar tests and anxiety levels, especially in Turkey where English is a foreign language. For example, Batumlu and Erden (2007) focused on the relationship between Turkish prep class students' foreign anxiety level and success. Comparison of students' scores from a foreign language classroom anxiety scale (Horwitz, Horwitz, & Cope, 1986) and first and second Mid-term Exam results pointed to a negative correlation. In another study conducted in Turkey, Önem (2011) compared the scores received from grammar tests and the Test Anxiety Inventory (Spielberger, 1980) and reported a negative relation between test anxiety and success. Therefore, it can be concluded that high anxiety leads to a decrease in success.

In this research, a new model of teaching for anxiety and success in ELT proposed by Önem (2012) is tested in an EFL context. The aim of the model is twofold: to decrease the level of anxiety and to increase the level of learning and success. Therefore, in this article, a brief summary of the model is presented and is followed by the method of test of the model as well as results and discussion sections.

Model of teaching for anxiety and success

In the literature, different models suggested various explanations for the relationship between anxiety and success. For example, anxiety interferes with cognitive processes and leads to failure according to the Cognitive Interference Model (Sarason, 1984; Sarason, Pierce, & Sarason, 1996, 1991; Zeidner & Matthews, 2005). In the Study Skills Deficit Model, it is suggested that students either have poor study skills or cannot employ these skills during exams because of their anxiety level and end up with failure (Covington, 1992, 1998; Culler & Holahan, 1980; Naveh-Benjamin, McKeachie, Lin, & Hollinger, 1981; Zeidner, 1991, 1998). On the other hand, the Information Processing Model of Test Anxiety claims that the cognitive interferences and deficits in study skills combine and affect different stages of the human information-processing system such as input, processing and output (Beck & Clark, 1997; Tobias, 1985, 1986).

The Model of Teaching for Anxiety and Success (MTAS) proposed by Önem (2012) is based on the assumptions of the models mentioned above for anxiety and success. According to MTAS,

> as a result of study skills deficits or worrisome, self-related negative thoughts as well as negative expectancies, anxiety leads to cognitive interference, which in turn leads to an overflow in the limited capacity of working memory and negative effects on learning as well as success in the end. (Önem, 2012, p. 66)

By combining those assumptions, MTAS offers some basic components for study skills deficits, cognitive interference and deficits in information processing to be considered in ELT to decrease the level of anxiety as well as increasing the level of success and learning. Önem (2012) presented some examples for MTAS and also mentioned that exercises and activities based on these components are only limited with the expertise, needs and imagination of teachers. It was assumed that, if activities and exercises are designed and employed in respect of the model proposed by Önem (2012), their effects might reduce the effects of anxiety and enhance learners' level of learning. Therefore, in this research, MTAS is put to the test by being used

as a medium of instruction in a controlled ELT setting. The exercises and activities used are given under the 'instruction phase' in the next section.

Method

Measurement of the level of success and anxiety

Means of data collection

In this research, three types of qualitative data collection methods were used.

Questionnaires

To measure participants' levels of different types of anxiety, three different anxiety questionnaires were administered.

- State and Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) was used to measure the levels of state and trait anxiety, signaling an acceptable view of general anxiety level as well. STAI is a four-point scale composed of 40 questions and has been commonly used in anxiety research (see Zeidner, 1998 for a review). The Turkish version of STAI (Öner & Le Compte, 1985) with Cronbach alpha coefficient reported as high as 0.83 for the State Anxiety Scale and 0.92 for the Trait Anxiety Scale was used as an efficient qustionnaire.
- Foreign Language Classroom Anxiety Scale (FLCAS; Horwitz, Horwitz, & Cope, 1986) was administered to evaluate the foreign language anxiety levels of the participants. FLCAS has been reported as reliable and valid for foreign language anxiety measurement in a series of research reports (Aida, 1994; Brown, Robson, & Rosenkjar, 2001; Rodriguez & Abreu, 2003). Aydın (1999) adapted FLCAS into Turkish and internal consistency of the adaptation was reported as 0.91. In addition to that, in order to have a more coherent statistical analysis among two four-point questionnaires, FLCAS used in the research was presented as a four-point test with an omission of the third option, '*sometimes*'.
- Test Anxiety Inventory (TAI; Spielberger, 1980) was used to assess the test anxiety levels of the research group. The Turkish version of TAI was prepared by Öner (1990) and Cronbach alpha coefficient was reported as 0.86. TAI was also administered at the end of the research as a post-anxiety test.

Grammar test

This study focused only on teaching grammar topics for two basic reasons. First, it would be easier to limit and control the variables which were out of the control of the researcher. For example, if MTAS was to be employed for speaking or listening skills, participants' activities on these skills outside the research could not have been controlled. Secondly, in the general EFL setting of Turkey, where this research took place, success is generally measured by grammar tests. Therefore to have a parallel approach, grammar was the key point of observation in this research.

To measure participants' level of knowledge and success before the teaching process, a grammar test prepared by the researcher consisting of 48 items was used

as a pre- and posttest. The grammar test included three different question types such as multiple choice, cloze questions and questions of rewriting or transferring sentences, and covered eight upper intermediate grammar topics. The grammar test included topics of conditionals third type, wish clauses, past perfect continuous tense, future perfect tense, future perfect continuous tense, passive voice, be-get used to, and past modal verbs. Cronbach alpha coefficient of the grammar test was calculated as 0.88, signalling a high level of reliability and validity. The grammar test was administered again as a post-test after the teaching process.

Electroencephalography recordings

Electroencephalography (EEG) is a non-invasive way of brain wave recording. Because of the technical limitations of EEG recordings such as eyes being closed and lying down without moving, it was assumed that participants would show similar reactions in terms of electrical brain activity while they answered test anxiety questionnaires read out loud by the researcher. Therefore, in order to measure the levels of anxiety along with TAI, each participant's electrical brain activity during stress was monitored and recorded on a computer via the Brain Quick EEG Device, using the program of SystemPlus v. 1.02.1098. Each session took approximately 15 minutes. Just like the grammar test and TAI, EEG sessions were conducted twice as pre- and post-EEG recordings.

Participants

Participants were selected among 435 (261 male, 174 female) pre-intermediate EFL students studying at Erciyes University, Turkey. With age ranging from 17 to 21, the mean of age was 18.93 (SD = 0.932). After administering STAI and FLCAS to evaluate levels of general and foreign language anxiety, 40 students (20 male, 20 female) who received the highest scores from STAI were informed about the research process in detail and volunteered to take part in further research.

Forming experiment and control group

The final 40 participants were given the grammar test as a pre-test to record their level of knowledge of the English grammar topics to be taught as part of this research by using the teaching model proposed. After the grammar test, all participants were administered TAI during EEG monitoring for the first time to record their test anxiety levels.

After recording levels of anxiety and success, 40 learners were divided into experiment and control groups of 20 (10 male, 10 female) by comparing their departments, scores from the university entrance exam, ages, average of scores obtained from English grammar exams held at prep class from the beginning of the term, and results of STAI, FLCAS and TAI. After comparing experiment and control groups' averages of the scores mentioned above, a *t*-test revealed no significant difference between groups ($t(38) = 1.48$, $p > 0.05$, $r = 0.23$). In addition to that, there was no meaningful difference between the experiment group's scores (mean = 8.5) and control group's scores (mean = 7.0) of the grammar test given as pre-test ($U = 191.50$, $p > 0.05$, $r = -0.04$). Therefore, the groups were accepted as equivalent.

Research process

An experiment and control group research with pre- and post-test design was followed in this study. At the beginning of the study, after forming experiment and control groups, both groups' level of success and anxiety were measured by the grammar test (pre-test) and TAI along with EEG recordings (first time). After that, the teaching phase for both groups began. At the end of the teaching phase, both groups' level of success and anxiety were measured again and the data obtained were compared to see whether MTAS had an effect on success, anxiety or both.

Teaching phase

The teaching phase for the experiment and control groups had similarities in terms of the time, topics and course material. For example, the teaching phase included four lessons of 50 minutes per week for each group and was completed in four and a half weeks with a total of 18 lessons, and both groups used the same course materials designed by the researcher as course materials during this phase (an example of the course material is given in Appendix 1).

Teaching phase consisted of traditional language teaching warm-up sections related to the theme of the unit presenting the subject and deduction of grammar rules, activities to reinforce and post-instruction activities such as speaking or writing exercises. However, the fundamental difference in the teaching phase between the experiment and control groups was in the teaching methods. Activities and exercises created according to MTAS were employed with the experiment group while the control group did not receive any special treatment in terms of teaching apart from the traditional instruction methods. The teaching phase for both groups is presented below.

Teaching phase for the experiment group

Pre-teaching: At the beginning of the teaching phase before the teaching process started, the experiment group had two extra lessons focusing on study skills as part of the teaching model tested in this research. During these two lessons, learners' awareness for differences in their affective learning styles was raised by informing them about visual, auditory or kinesthetic learner styles as well as presenting related exercises suggested by Frender (1990, p. 26). After this, general study strategies adapted from the literature shown in Table 1 were studied with the experiment group.

The experiment group was also taught the note-taking strategies proposed by Frender (1990, p. 72). All these strategies were mentioned repeatedly during teaching the grammar topics to the experiment group. The experiment group was also taught some breathing and relaxation techniques to employ in case of high anxiety levels. For example, as mentioned by Önem (2012, p. 72), 'students were asked to close their eyes, inhale for two seconds through their nose, hold for two seconds, exhale through their nose again in two seconds, hold still for another two seconds and start again' during a test to re-focus their attention. Students were encouraged to use this technique during the grammar test used as the post-test as well as all other tests. The final activity which took part before the teaching process included showing the movie, *What the Bleep Do We Know!?* as part of promoting a positive attitude and self-esteem proposed in MTAS. The movie was about how feelings and

Table 1. Study strategies presented to the experiment group.

Strategies	Goal	Activities
Re-organizing, semantic mapping, relating	Relating new information to previous information and restructuring	Creating spider graphs, tables, schemas, using arrows to visualize the connection among information, using newly learned words in sentences, using mnemonics
Grouping	Classifying information according to categories	Grouping information according to their meanings, similarities and differences
Emphasizing, highlighting	Visualization of the flow of thought and words learned, emphasizing the important information	Highlighting, using colored pencils and circling
Rehearsal, repetition	Keeping new information in short-term memory	Silent repetition, re-telling
Summarizing	Making new information meaningful	Revealing the main idea and sub-ideas, reading between lines, re-stating the ideas by using own sentences
Imagining	Making learning and recalling processes efficient	Creating mental visual or auditory images, visualizing the event or situation mentally, creating humor, exaggerating
Guessing	Guessing the meaning of a word out of context	Checking the previous/latter words/ sentences, checking syntactic features of the unknown word, trying to replace the word
Breaking to pieces	Making a word or a sentence meaningful by resembling it to other known words or sentences	Breaking words down to morphemes, breaking sentences down to syntactic units
Elaborating	Connecting new information with previous information by creating contexts	Creating clues, a new context, associations and key words to assist recalling
Self-monitoring	Monitoring the level of learning and emotional state	Checking the extent to which the subject is learned, checking whether meanings and structures of the subject can be re-created, employing breathing and relaxation in case of a negative affective state
Focusing	Re-directing attention from intrinsic and environmental stimuli to the task at hand	Employing breathing and relaxation exercises and techniques

emotions can affect people positively. A short discussion on activities and how participants felt about them took place after every activity.

During teaching: In order to prevent the negative effects of affective filter in the beginning, there was an attempt to establish an unbiased, friendly and 'safe' learning environment. For example, before starting a new grammar subject, learners were encouraged by telling them how easy the new topic was (Önem, 2012). Such positive suggestions were thought to be of help for learners to avoid their negative biases towards the new grammar subject and to create a positive attitude towards the language.

Music, sound effects and code switching were also used to promote a friendly learning environment and to make lessons more interesting and fun. For instance, when learners were working on the exercises, the researcher played music in the background and used funny sound effects after the learners answered the questions together in the class. During the introduction of a new subject, as the learners were native speakers of Turkish, the researcher switched between Turkish and English by altering the tone, stress and pitch. This way, learners were expected to be kept interested and refocus their attention.

Error correction was another point taken into consideration in MTAS and was reflected in this study. As Önem (2012, p. 71) suggested,

> for most teenagers as well as other learners, classes are social environments where nobody wants to be embarrassed or humiliated by making mistakes and being laughed at and this is a huge inhibitor for learning since learning cannot be separated from making mistakes.

Therefore, in the teaching phase from pre-teaching until the end of the post-teaching phase, learners were told quite frequently that it was quite normal to make errors as making mistakes were signs of progress. Another activity created in respect of MTAS was writing some incorrect sentences on the board and asking learners to identify and correct errors without calling which student made which error. Employing such error correction techniques was expected to have a more positive effect on learners' self-esteem as well as their understanding of a 'safe' classroom environment.

The native language of the experiment group was used from time to time when introducing or explaining a grammar topic. The basic reason for using Turkish was making the learners feel more comfortable since, according to Lazarus (1991), anxiety in foreign language learning is closely connected with the 'loss of meaning in native language'. Therefore, limited use of Turkish was allowed in the interaction between the researcher and students and the students among themselves during teaching. Another use of native language in the experiment group was to point to the syntactic similarities between native and target language. For example, Turkish has no equivalent for past perfect tense in English. Yet, two separate tense suffixes in Turkish, *-mış* for past participle and *-dı* for simple past can be combined to refer to past perfect tense. For instance, *he had burned it* can be translated into Turkish as *O onu yakmıştı* (*-tı* is an allomorph of *-dı*). As mentioned by Önem (2012, p. 73), 'pointing to such similarities and helping learners to make positive transfers between languages can lead to better coding, less interference and better recalling clues.' Therefore during teaching, such syntactic similarities between native and target language were highlighted by using the native language.

On the other hand, making positive transfers between two languages cannot always be possible. Therefore, in cases where it was difficult to make such positive transfers between the target language and native language, the researcher tried to make inter-language connections during teaching. For instance, present participle was highlighted as a reference to an action in progress in most cases during teaching past perfect continuous tense. Similarly, during teaching future perfect tense, learners were told that past participles generally refer to a finished action and all 'perfect' tenses are similar to each other in this sense.

After teaching: As part of the desensitization for exams proposed by MTAS, the experiment group was given grammar tests prepared by the researcher at the end of

each lesson. Grammar tests included 20 multiple choice grammar questions, all of which covered only the grammar topics taught at the lesson. After every test, papers were collected and re-distributed to the group randomly and learners were asked to grade the papers without revealing the final score after the researcher gave the answers. Then, a short discussion about the results and questions took place and any unclear topic was explained. Parallel with MTAS, sometimes students were asked to volunteer to re-explain the topics. Yet, learners were told that the tests were for themselves and the results were neither kept as records nor included in the study during all these exams.

Teaching phase for the control group

The control group used the same course materials in the same amount of time. However, their teaching phase did not include any pre-teaching or post-teaching activities or exercises stated in MTAS for raising awareness of differences in affective learning styles, teaching study strategies and note-taking strategies and desensitization for exams. No activities to promote a positive attitude such as encouraging, using music, code switching or creating a friendly class (the environment was not hostile of course) or breathing and relaxation exercises took place in the control group. Native language was neither allowed nor used during classes and the researcher did not point to any similarities between syntactical structures of native and target language as well as connecting new and old syntactic structures.

Data analysis

All data obtained from the pre- and post-grammar tests, first and second TAI and EEG recording results were compared inter-group and intra-group. For inter-group comparisons, Mann–Whitney *U* Test was employed to see if MTAS caused a difference between the groups in terms of success and anxiety level. Wilcoxon Signed Ranks Test was used when comparing the results intra-group to see whether there are any differences in terms of success and anxiety level caused by MTAS within groups. ANOVA was used to see whether there was a statistically significant difference among the answers to different types of questions on the pre- and post-grammar tests to triangulate the results. All data analysis was conducted with SPSS 15.0.

Results

Results in this study are presented in two subsections. In the first section, the results referring to the relation between MTAS and success are presented. In the second section, the results referring to the relation between MTAS and anxiety are given.

The relationship between MTAS and success

Inter-group comparison of the results of the pre- and post-grammar tests is given in Table 2.

These results suggest that the difference between the pre-test results of the control group (mean = 7.00) and the experiment group (mean = 8.50) was not statistically significant ($U = 191.50$, $p > 0.05$, $r = -0.04$). However, a significant

Table 2. Inter-group comparison of the results of pre- and post-grammar test.

	Pre-test	Post-test
Mann–Whitney *U*	191.500	111.000
Wilcoxon *W*	401.500	321.000
Z	−0.231	−2.415
Asymptotic significance (two-tailed)	0.817	0.016
Exact significance [2 × (one-tailed significance)]	0.820	0.015

Table 3. Intra-group comparison of the results of pre- and post-grammar test.

		Experiment group	Control group
Z		−3.464	−2.242
Asymptotic significance (two-tailed)		0.001	0.025
Monte Carlo significance (two-tailed)		0.000	0.023
99% confidence interval	Lower bound	0.000	0.019
	Upper bound	0.001	0.027
Monte Carlo significance (one-tailed)		0.000	0.013
99% confidence interval	Lower bound	0.000	0.010
	Upper bound	0.001	0.016

difference in terms of post-test results of the control group (mean = 10.00) and the experiment group (mean = 20.50) is seen ($U = 111.00$, $p < 0.05$, $r = -0.38$).

Intra-group comparison of the results of the pre- and post-grammar tests is given in Table 3.

Results show that the difference between the post-test results (mean = 20.50) and pre-test results (mean = 8.50) of the experiment group was statistically significant ($T = 6.00$, $p < 0.001$, $r = -0.55$). Similarly, the difference between post-test results (mean = 10.50) and pre-test results (mean = 7.00) of the control group was statistically significant ($T = 39.50$, $p < 0.05$, $r = -0.35$).

Comparison of the results for different types of questions on pre-test and post-test

To triangulate the final results obtained by comparing the pre- and post-test results of the groups, groups' answers to different types of questions (multiple choice, cloze questions and questions of rewriting or transferring sentences) were compared to check whether any statistically significant difference between groups took place. The results are given in Table 4 and Table 5 shows the mean scores for the answers given to each type of questions by both groups.

As seen in Tables 4 and 5, comparison of the results of the pre-test did not show a statistically significant difference between groups in terms of the answers for the multiple choice questions [$F_{(1,\ 38)} = 0.12$, $p = 0.915$], cloze test questions [$F_{(1,\ 38)} = 0.201$, $p = 0.657$] and rewriting questions [$F_{(1,\ 38)} = 2.357$, $p = 0.133$]. However, comparison of the results of the post-test revealed a statistically significant difference between groups in terms of the answers for the multiple choice questions [$F_{(1,\ 38)} = 8.176$, $p = 0.007$], cloze test questions [$F_{(1,\ 38)} = 5.864$, $p = 0.020$] and rewriting questions [$F_{(1,\ 38)} = 4.247$, $p = 0.046$] with higher mean scores.

Table 4. Comparison of the results of groups for different types of questions.

		Sum of squares	df	Mean square	*F*	Significance
mc_post	Between groups	0.047	1	0.047	8.176	0.007
	Within groups	0.218	38	0.006		
	Total	0.265	39			
ct_post	Between groups	0.058	1	0.058	5.864	0.020
	Within groups	0.376	38	0.010		
	Total	0.434	39			
rw_post	Between groups	0.141	1	0.141	4.247	0.046
	Within groups	10.262	38	0.033		
	Total	10.403	39			
mc_pre	Between groups	0.000	1	0.000	0.012	0.915
	Within groups	0.155	38	0.004		
	Total	0.155	39			
ct_pre	Between groups	0.000	1	0.000	0.201	0.657
	Within groups	0.024	38	0.001		
	Total	0.024	39			
rw_pre	Between groups	0.019	1	0.019	2.357	0.133
	Within groups	0.309	38	0.008		
	Total	0.328	39			

Note: mc, multiple choice; ct, cloze tests; rw, rewriting; post, post-test; pre, pre-test.

Table 5. Mean scores for the answers given to each type of question by both groups.

		Mean	SD	SE
mc_post	Experiment	0.8358696	0.07677039	0.01716638
	Control	0.7673913	0.07467637	0.01669814
	Total	0.8016304	0.08240418	0.01302924
ct_post	Experiment	0.7285714	0.10659145	0.02383457
	Control	0.6523810	0.09185729	0.02053991
	Total	0.6904762	0.10551952	0.01668410
rw_post	Experiment	0.7375000	0.17631088	0.03942431
	Control	0.6187500	0.18793808	0.04202423
	Total	0.6781250	0.18965112	0.02998648
mc_ pre	Experiment	0.6467391	0.06573971	0.01469985
	Control	0.6489130	0.06200117	0.01386388
	Total	0.6478261	0.06308287	0.00997428
ct_pre	Experiment	0.5202381	0.02222148	0.00496887
	Control	0.5238095	0.02785227	0.00622796
	Total	0.5220238	0.02493523	0.00394261
rw_pre	Experiment	0.5500000	0.12434036	0.02780335
	Control	0.5062500	0.02795085	0.00625000
	Total	0.5281250	0.09167031	0.01449435

Note: mc, multiple choice; ct, cloze tests; rw, rewriting; post, post-test; pre, pre-test.

The relationship between MTAS and anxiety

In this research, whether MTAS had an effect on anxiety level was analyzed by comparing the data obtained from the first and second TAI and EEG recordings. The results were compared both inter and intra the groups.

Table 6. Inter-group comparison of the scores of first and second TAI.

	First TAI	Second TAI
Mann–Whitney U	128.000	126.000
Wilcoxon *W*	338.000	336.000
Z	−1.950	−2.005
Asymptotic significance (two-tailed)	0.051	0.045
Exact significance [2 × (one-tailed significance)]	0.052	0.046

Table 7. Intra-group comparison of the scores of first and second TAI.

		Experiment group	Control group
Z		−2.248	−2.233
Asymptotic significance (two-tailed)		0.025	0.026
Monte Carlo significance (two-tailed)		0.023	0.021
99% confidence interval	Lower bound	0.019	0.018
	Upper bound	0.027	0.025
Monte Carlo significance (one-tailed)		0.012	0.011
99% confidence interval	Lower bound	0.009	0.008
	Upper bound	0.014	0.014

Comparison of first and second TAI scores

Inter-group comparison of the results of the first and second TAI is given in Table 6.

These results suggest that the difference between first TAI scores of the control group (mean = 39.00) and the experiment group (mean = 45.50) was not statistically significant ($U = 128.00$, $p > 0.05$, $r = -0.31$). On the other hand, a significant difference between second TAI scores of the control group (mean = 35.00) and the experiment group (mean = 40.50) was obtained ($U = 126.00$, $p < 0.05$, $r = -0.32$).

Intra-group comparison of the scores of the first and second TAI is given in Table 7.

Results show a statistically significant difference between the second TAI (mean = 40.50) and first TAI (mean = 45.00) scores of the experiment group ($T = 34.00$, $p < 0.05$, $r = -0.36$). The difference between the second TAI scores (mean = 35.00) and first TAI scores (mean = 39.00) of the control group was also statistically significant ($T = 34.50$, $p < 0.05$, $r = -0.35$).

Comparison of first and second EEG recordings

EEG recordings, which took place while administrating TAI for the first and second time, were used to measure anxiety levels of groups in addition to TAI to triangulate the results. While analyzing the EEG recordings, the appearance of theta waves were taken into consideration only because unless there is pathology in the brain, alpha waves are seen most of the times and beta waves appear as a reaction towards inner or environmental stimuli. After all, all learners in both groups showed these two types of waves during EEG recordings. Therefore, emergence of these waves was excluded in the data analysis. On the other hand, research suggests that emergence of theta waves originates from limbic and hippocampal structures of the brain, which control emotional situations (Aftanas, Pavlov, Reva, & Varlamov,

Table 8. Inter-group comparison of first and second EEG recordings.

	First EEG	Second EEG
Mann–Whitney *U*	180.000	130.500
Wilcoxon *W*	390.000	340.000
Z	−0.628	−2.448
Asymptotic significance (two-tailed)	0.530	0.014
Exact significance [2 × (one-tailed significance)]	0.602	0.060

Table 9. Intra-group comparison of first and second EEG recordings.

		Experiment group	Control group
Z		−3.162	−0.577
Asymptotic significance (two-tailed)		0.002	0.564
Monte Carlo significance (two-tailed)		0.002	1.000
99% confidence interval	Lower bound	0.001	1.000
	Upper bound	0.004	1.000
Monte Carlo significance (one-tailed)		0.001	0.502
99% confidence interval	Lower bound	0.000	0.489
	Upper bound	0.002	0.514

2003; Öniz, 2006). As the most obvious difference between groups would have been expected to take place between the emergences of theta waves, only the presence rates of theta waves seen in both groups were taken into consideration in the analysis. The presence of theta waves in any part of the recording was marked as 1, while absence was marked as 0. As was done for the pre-test and post-test results of the grammar test and first and second TAI scores, the presence of theta waves in groups were compared inter-group and intra-group.

Inter-group comparison of the first and second EEG recordings is given in Table 8.

These results suggest that the difference between the experiment groups' (mean = 1.00) and the control groups' (mean = 0.50) first theta wave scores was not statistically significant ($U = 180.00$, $p > 0.05$, $r = -0.10$). Yet, there was a significant difference between experiment groups' (mean = 0.00) and control groups' (mean = 40.50) second theta wave scores ($U = 130.50$, $p < 0.05$, $r = -0.39$).

Intra-group comparison of the first and second EEG recordings is given in Table 9.

Results show that the difference between the experiment groups' theta scores from the first EEG recordings (mean = 1.00) and the second EEG recordings (mean = 0.00) was statistically significant ($T = 0$, $p < 0.01$, $r = -0.50$). However, the difference between the control groups' scores from first EEG recordings (mean = 0.50) and second EEG recordings (mean = 0.00) was not statistically significant ($T = 2$, $p > 0.05$, $r = -0.09$).

Discussion

As this research aimed to test whether MTAS (Önem, 2012) had an effect on success and anxiety, the results of comparison should be discussed separately.

The comparison of pre-test and post-test results shows an increase in the levels of success in both groups. This may be considered as both groups took advantage of the teaching phase, which may be intriguing at first glance. However, this also proves that the researcher was unbiased in terms of teaching as the control group also raised their scores and success levels. In other words, the researcher had a positive attitude in terms of teaching since if it was otherwise, there should not have been any difference.

On the other hand, the increased level seen in the experiment group is higher. Although there was no statistically significant difference between the groups, the experiment group achieved higher scores as seen by the mean scores of the groups. From a different perspective, the percentage of both groups' knowledge on the grammar topics were calculated as 16.2% by the pre-test before the teaching phase, and 28.8% (control group) and 38.9% (experiment group) after the teaching phase by the post-test, which also confirms the findings. In addition to that, the percentage of absenteeism in terms of the teaching phase in both groups also turned out to be statistically insignificant ($t(358) = 0.952$, $p > 0.05$, $r = 0.05$), which suggests that both groups attended to the research and teaching process in similar numbers. Considering the similar success level measured by the pre-test, the experiment and control groups were equal in terms of their success at the beginning of the research. However, during the research, the only difference between the groups was the model of teaching, MTAS, and it is plausible to conclude that the teaching phase employing MTAS had an effect on the difference between the groups.

As mentioned earlier, the research also focused on whether MTAS had an effect on the answers to different types of questions; since much research proved that anxiety causes cognitive interference, which in turn results in overloading the capacity of working memory and has negative effects on encoding, processing and recalling new information (Chandler & Fisher, 1996; Naveh-Benjamin et al., 1981; Sarason, 1984; Tobias, 1986). Similarly, it was also found that different question types have different effects on anxiety. For example, multiple choice and cloze test questions have a lower effect on anxiety than short answer or rewriting questions as clues would assist better recall processes (Everson, Tobias, Hartman, & Gourgey, 1993; Mueller, Bailis, & Goldstein, 1979; Naveh-Benjamin et al., 1981; Rocklin & Thompson, 1985; Zeidner, 1998). Therefore, to see the effects of anxiety, groups' answers to different types of questions were analyzed. The results showed no statistically significant difference among different types of questions in pre-test and, interestingly, although the mean scores of multiple choice and cloze test questions of the pre-test were closer to each other, the mean scores of rewriting or transformation questions, depending on recreating the information, were lower than the other types (see Tables 4 and 5). As suggested by Naveh-Benjamin et al. (1981), the reason for that was poor and shallow encoding of the new information because of anxiety. However, the statistically significant difference found in comparison of the post-test results shows that the experiment group took advantage of the teaching phase and the increase in the level of success did not include only the multiple choice and cloze test questions but also the rewriting questions as well. The increase in the level of success in the rewriting questions especially proposed that MTAS had a positive effect on recalling and recreating information by encoding and creating recall clues effectively. As a result, MTAS is proved to be an effective variable on the relation between anxiety, cognitive interference and success in this research.

As for the effect of MTAS on anxiety, apart from the results for different types of questions related with anxiety, the TAI scores and the presence of theta waves of both groups before and after the teaching phase were compared. The results of TAI showed that there was not any statistically significant difference found between the first TAI results, which suggest that groups had similar levels of anxiety before the teaching phase. However, the difference between second TAI scores pointed to a statistically significant difference between groups' levels of anxiety. As the fundamental difference between groups was the employment of MTAS in the experiment group, MTAS can be accepted as a reason for this difference in anxiety levels. In other words, MTAS can be considered to be effective in terms of decreasing the levels of anxiety.

Interestingly, the intra-group comparison of both groups' TAI scores showed a statistically significant difference. This suggests that anxiety levels in both groups declined, which was unexpected as the decline should have only been observed in the experiment group. Although the decrease seen in the mean scores of anxiety level of experiment group (4.5) is higher than that of the control group's (4), it seems that the control groups took advantage of the teaching phase too. As this result is similar to the difference seen in the intriguing intra-group comparison of the control group, this may suggest that the unbiased attitude of the researcher may have affected the control group. Another reason for this difference may also be related with 'big fish little pond effect' (Goetz, Preckel, Zidner, & Schleyer, 2008; Marsh, 1987; Marsh & Parker, 1984; Zeidner & Schleyer, 1999). According to this model, learners adjust their academic self-perception in respect of other learners and promote a better and higher self-value when considering themselves in a better situation than the other learners in the classroom or vice versa. According to Zeidner and Schleyer (1999), this may have an effect on anxiety level. As part of the nature of the research, both experiment and control groups consisted of learners with similar anxiety levels and this may have caused the statistically significant difference seen in the control groups' level of anxiety scores.

EEG recordings are useful to clarify and triangulate the interesting results. As seen in the previous chapter, groups did not show a statistically significant difference in terms of theta waves before the teaching phase, which can be concluded as both groups were similar in terms of their anxiety levels, parallel with the results of the comparison of first TAI scores. However, a statistically significant difference in terms of theta waves was observed between groups' second EEG recordings, which took place after the teaching phase. Although intra-group comparison yielded a statistically significant difference between first and second EEG recordings of the experiment groups, such a difference was not found between the recordings of the control group. These results show that only the level of theta waves seen in the experiment group before the teaching phase decreased after the teaching phase. As research suggests that there is a relationship between theta waves and anxiety (Aftanas & Pavlov, 2005; Aftanas et al., 2003; Lewis, Weekes, & Wang, 2007; Öniz, 2006; Strelets, Garakh, & Novototskii-Vlasov, 2007; Umryukhin, Dzebrailova, & Korobeinikova, 2004) and a decrease in emergence of the waves can be interpreted as a decrease in the anxiety level as well, which seems to be the case with the experiment group which received MTAS only as a treatment in this research. When considering the results of TAI and EEG recordings together, it is obvious that MTAS had a positive effect on decreasing the level of anxiety.

When all the data and results of success and anxiety are considered, it can be accepted that in this research, MTAS had an effect on the level of success and anxiety. As the results show, MTAS was effective in terms of increasing the level of success and learning. Parallel with that, it also caused a decrease in the level of anxiety and led to less anxious learners. Finally, one can conclude that the proposed model of teaching which was put to the test in this research passed the test to be considered as an effective variable on success and anxiety in teaching English as a foreign language.

Conclusion

Anxiety is a very common inhibitor of success and learning. It is an accepted fact now that a negative relationship between high levels of anxiety and English learning is present. Most studies in literature are either descriptive for the relationship between anxiety and success or present solutions for only one side of this relationship. In this research, based on the models for anxiety and success, a new teaching model for anxiety and success (Önem, 2012) was put to test in an experiment and control group research design. Results showed that MTAS was effective in increasing the level of success while decreasing the level of anxiety.

In this research, as a limitation, the level of effectiveness for separate components of MTAS was not analyzed. In other words, all components of MTAS were accepted as contributing factors and which component was more effective in terms of success and anxiety was not studied. In further research, the degree of effectiveness for each component can be studied to see if there is any significant difference among them. This way, the most effective component can be focused on more and newer activities and exercises can be developed.

Another limitation of the study was teaching grammar. As mentioned, testing language success by testing grammar skill is common in the EFL setting of this research and therefore although other language skills were considered in the lessons, MTAS focused activities and exercises on grammar in this research. In another study, MTAS can be altered to be used in teaching different skills of English such as reading or listening skills to see the extent of its effectiveness.

The results obtained in the research can be used by EFL professionals in language classes where high levels of anxiety accommodate low levels of success. Considering the basic components of MTAS, teachers can create some activities and exercises parallel with their needs to help their learners feel less anxious during classes. In EFL contexts like Turkey, where heavy emphasis is put on grammar, MTAS can be useful in terms of learning more effectively. For example, as proposed by MTAS, teaching strategies to be employed both in and outside the class can utilize better grammar skills. Parallel with this, learners can cope with their learning inhibitions caused by high levels of anxiety by raising their self-awareness via such teaching and learning models. In other words, metaphorically, MTAS can enable learners to be taught how to fish instead of being given some. As a result of chain reaction, learners with higher self-confidence can be more successful and less anxious during the learning of a foreign language.

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Appendix 1.

Unit 1 – Inventions

Speaking

- What do you think is the most important invention of the 20th century? Why?
- Talk about how has a certain invention of the 20th century changed our lives?
- Below are some inventions. Which do you think is the most remarkable? Why?

II.

Stainless steel by Harry Brearley	Television by Philo Farnsworth
World Wide Web by Tim Berners-Lee	Helicopter by Igor Sikorsky
Credit card by Frank X. McNamara	DNA fingerprinting by Alec Jeffreys
Nuclear reactor by Enrico Fermi	Personal computer by Xerox PARC

[Retrieved from http://en.wikipedia.org/wiki/Timeline_of_historic_inventions on July 9, 2009.]

Reading

(1) Read the title of the story. What do you think it is about?

C U @ 8

Many inventions have changed lives incredibly. The past have been revolutionized into the present by the invention of computers, credit cards, cell phones, and other new technologies. Yet, it is believed that the invention of instant messaging, or IMing has also an important effect on social lives.

Instant messaging has a lot of practical uses. When it was first introduced, the only function of instant messaging was to allow Internet users to communicate from the far reaches of the globe with just the click of a mouse. Making it possible to chat with several people at once, instant messaging has become a preferred mode of communication. As it increases in popularity across the globe, communication is being transformed into a more and more impersonal style. Just like once letters which were used before, talking on the phone will slowly be replaced with the development of electronic communication. With the appearance of instant messaging also came the birth of a new, abbreviated, slang. IM users often ‘speak’

without capitalization, punctuation, or spelling. 'I will talk to you later', for example is written as 'ill ttyl' in an instant message. Laughter has been reduced to 'lol', which stands for 'laughing out loud', and 'smileys' such as :-) and :-(are being used to show happiness or to express sadness. The dangers of IMing shouldn't be ignored.

The influence of instant messaging in today's world is clear. Though its creation did not have an immediate and obvious impact, there is no question that the world has been altered greatly since its invention. Unlike many recent inventions, instant messaging has brought a lasting change to the world's communication and language of today.

[Retrieved and adapted from http://www.articlesbase.com/technology-articles/studentscholarshipsorg-greatest-inventions-of-the-21st-century-1595131.html on July 9, 2009.]

(2) Read the text again and answer the questions.

(a) What are the practical uses of instant messaging?
(b) According to the author, what is the threat of instant messaging towards language?
(c) What is a 'smiley'?

Grammar

(1) Look at the underlined words in the text and answer the questions.

(a) Do we know the subject of the words?
(b) What are the time of the tenses? How do you define the time of the tense?
(c) What is the verb used before the main verb?
(d) What is the form of the main verb used?

(2) Can you transform these sentences into passive? Why not?

(a) She was dancing.
(b) I am working.
(c) We went home at 1 am.

(3) Choose the correct sentence.

(a) I have been finished the work.	I have finished the work.
(b) She called me yesterday.	She was called me yesterday.
(c) They are being changed the windows.	They are changing the windows.
(d) He was checking the oil.	He was being checked the oil.

(4) Rewrite the sentences.

(a) We have redecorated our living room.

_____

(b) She didn't tell me what to do.

_____

(c) They are repairing the car now.

_____

(d) I will send you the e-mail later.

_____

(e) You were writing your paper when she was on her way home.

_____

(5) Write the active forms of the sentences.

(a) The house is being painted at the moment by the workers.

_____

(b) This report should be finished immediately by us.

_____

(c) She has been sent to a public school by her mother.

_____

(d) Instant messaging is used everywhere in the world by teenagers.

_____

Speaking

- Can you write any examples of abbreviated use of your language?
- Some people say instant messaging is a good and practical way to communicate, some don't. What do you think? Work in groups and compare your ideas.

Evaluate yourself: Yes (✓) or No (×) – Now ...

- I can give my ideas about important inventions of 20th century.
- I can understand a reading text about a particular invention of 20th century if it is intermediate level.
- I can transform active sentences into passive in written form.
- I can transform passive sentences into active in written form.
- I can express my ideas about a simple topic.