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ABSTRACT

This paper introduces a model of adaptive learning relevant to adult learners of English for academic purposes (EAP) in Australia. Adaptive learning refers to latent variables hypothesized to contribute to optimal performance in the language. The model comprises motivation, self-efficacy, language learning anxiety, language learning strategies, and oral performance. The study applies theorizing from educational psychology concerning achievement goals and self-efficacy to language learning. The paper reports on a pilot study conducted with 249 EAP learners to validate the instrumentation. The instrumentation will be used in a future study that seeks to support the proposed model of adaptive learning. (Contains 23 references.) (Author/KFT)

# Towards a Model of Adaptive Language Learning: A Pilot Study

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**Abstract**

This paper introduces a model of adaptive learning relevant to advanced adult learners of English for academic purposes (EAP) in Australia. Adaptive learning refers to latent variables hypothesised to contribute to optimal performance in the language. The model comprises motivation, self-efficacy, language learning anxiety, language learning strategies and oral performance. The study applies theorising from educational psychology concerning achievement goals and self-efficacy to language learning. This paper reports on a pilot study conducted with 249 EAP learners to validate the instrumentation. The instrumentation will be used in a future study which seeks to support the proposed model of adaptive learning

## Introduction

Research in education and language learning have mostly followed their own distinct theoretical and empirical paths. In educational There is a wealth of educational psychology theory largely unapplied in to language learning. This study attempts to develop links between these two disciplines by applying current theorising in educational research regarding the notion of adaptive learning to learning English as a second language.

The study concerns four major constructs hypothesised to contribute to adaptive learning: anxiety, self-efficacy, motivational goals and learning strategies. The aim of the study is to pilot instrumentation that will be used in a future study testing the proposed model of adaptive language learning.

Research suggests facets of adaptive learning include a task-orientated rather than a self-oriented goal, (Ames, 1992), accurate self-efficacy appraisals (Bandura, 1993), low test anxiety (Zeidner, 1998), and the use of appropriate learning strategies (Pintrich & DeGroot, 1990). In language learning research, language learning anxiety is considered to have a detrimental effect on language performance (Horwitz, Horwitz, & Cope, 1986), particularly speaking (Phillips, 1992). High motivation and the frequent use of language learning strategies (Oxford, 1990) are representative of effective learning.

Motivational goals are conceptualised as being task, performance approach or performance avoid goals. A task goal refers to an emphasis on motivation sustained by interest inherent in the learning task.A performance approach goal refers to motivation sustained by interest in personal success usually in comparison to others. A performance avoidance goal is a relatively recent conceptualisation and refers to an emphasis on not failing or appearing to lack ability. Educational psychology research suggests successful learners display a task goal orientation (Ames, 1992). More recent studies acknowledge that a performance approach orientation may also be related to success (Elliot & Church, 1997). A performance avoidance goal is thought to be indicative of non-adaptive learning (Middleton & Midgely, 1997).

Two constructs of language learning motivation are included in the model. an integrative goal orientation whereby motivation is sustained by interest in the target culture and its people; and an instrumental goal orientation which concerns pragmatic reasons for learning a language (Gardner, 1985).

Foreign language anxiety is defined as a situation specific anxiety which occurs in second language learning and use environments. Anxiety reactions consist of two components: emotionality and worry (Leibert & Morris, 1967). Emotionality refers to physiological and behavioural components of anxiety (sweating, blushing, nail-biting) while worry refers to the cognitive reactions of anxiety (self-deprecating thoughts, task irrelevant thoughts). It is the worry component of anxiety that is viewed as the most debilitating because it occupies cognitive capacity that would otherwise be directed to the task in hand. (Tobias, 1985).

In contrast to previous studies (Horwitz, Horwitz & Cope et al., 1986), (Aida, 1994), this study conceptualises second language speaking anxiety as a two-dimensional construct. Second language speaking anxiety is hypothesised as comprising two latent variables: in-class speaking anxiety, relating to anxiety experienced within the learning environment; and out-of-class anxiety, relating to anxiety experienced in the target language environment. Most previous studies have emphasised in-class anxiety. The distinction between in-class and out-of-class interaction is considered particularly relevant where language learners both study language in class and need to interact in the target language in their everyday lives, as is the case in with EAP students in Australia .

Self-efficacy is defined as "beliefs in one's capabilities to organise and execute the courses of action required to manage prospective situations" (Bandura, 1993). Self-efficacy differs from self-concept in the degree of specificity. Self-efficacy is domain specific and task specific. This construct has not been considered in depth in relation to language learning prior to this study. Language learning research has mainly focused on the construct of linguistic self-confidence (Noels, Pon, & Clement, 1996). This corresponds most closely to domain specific self-concept, however, the items used to measure this lack specificity, relying on a single item to measure confidence in each skill (speaking, listening, reading and writing).

Second language speaking self-efficacy, like anxiety, is also conceptualised as a dual-dimensional construct. Using Bandura's recommendations for scale construction (Bandura, 1995), a balance between specificity to task and generalisabilty beyond the sample in question was sought. A 1-100 can do type scale was used. The items were designed according to types of oral interactions: the place of interaction (in-class or out – of-class), level of formality of the interaction, the number of interlocutors, whether the interlocutors are native speakers of English, and responding or initiating interaction.

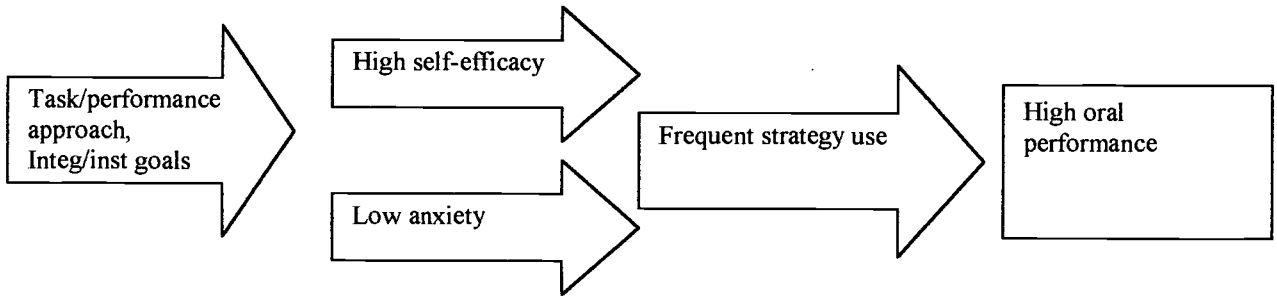
Language learning strategies may be defined as the conscious efforts made by learners to facilitate language learning. This study initially adopts the conceptualisation made by Schmidt & Watanabe, (2001) which classifies strategies as being cognitive, study skills, social and coping strategies.

The notion of adaptive learning concerns the relationship of unobservable constructs of learning to performance. It is believed that formulating such a relationship is the first step towards influencing learners' choices, thereby leading to better performance.

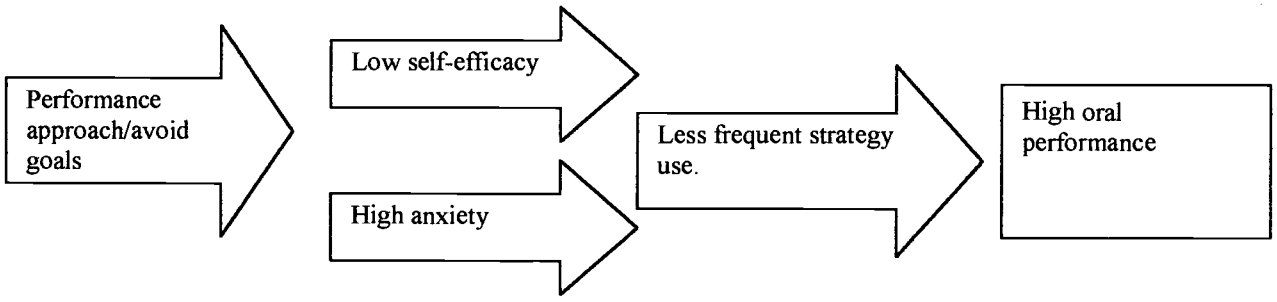
Figure 1 displays the proposed model of adaptive learning. Adaptive learning is conceptualised as being made up of task and approach motivational goals, integrative and instrumental language learning goal orientation, high perceived self-efficacy and frequent use of language learning strategies. Low self-efficacy, language learning anxiety and performance avoidance goals represent non-adaptive learning.

Figure 1
Framework for adaptive and non- adaptive learning

**Adaptive learning**




**Non-adaptive learning**




This study seeks to answer the following research questions:

1. Is the instrumentation to measure second language speaking anxiety and self-efficacy reliable and valid?
2. Is the distinction between in–class and out-of-class anxiety and self-efficacy appropriate?

## Method

### Participants

The participants in this study were 249 advanced EAP learners studying at accredited language centres in Australia. Most of these students were expecting to start university

within a few months. Participants were aged 17 - 45 ($M$ = 25), the sample was 55% female and 45% male. Ethnicity is illustrated in Table 1

Table 1
Ethnicity of participants

| | *N* | % |
|---|---|---|
| Chinese speaking background | 98 | 39.4% |
| Korean | 31 | 12.5% |
| Japanese | 21 | 8.4% |
| Other Asian countries | 73 | 29.3% |
| European and other nationalities | 26 | 10.4% |
| Total | 249 | 100% |

**Instrumentation**

The questionnaire piloted in this study consisted of a series of five point Likert type sub-scales to measure second language speaking anxiety, motivational goals, language learning goals and language learning strategies. Second language speaking self-efficacy employed a 1-100 can do type scale.

The scales to measure language anxiety and self-efficacy were constructed for this study while those measuring motivation and language learning strategies are established scales. The anxiety and self-efficacy items were constructed according to interaction environment, native speaker /non-native speaker interlocutors, level of formality, number of speakers, and initiating/ responding interactions in addition the anxiety items sought to capture worry and emotionality.

Five sub-scales of motivational goals were used in the study. Three academic achievement goal orientation sub-scales were adapted from the Patterns of Adaptive Learning Survey (PALS) (Midgley et al., 1997). Two language learning goal orientation sub-scales were adapted from the Attitude/Motivation Test Battery (AMTB) (Gardner, 1985).

Schmidt & Watanabes's (2001) strategies scale was used in this study which comprises four sub-scales according to cognitive, study skills, social and coping strategies. Table 2 lists the sub-scales of the questionnaire used in the pilot study.

The reliability for the PALS sub-scales varies across studies from $\alpha$ =.60 for performance avoid to $\alpha$ = .87 for all three constructs (Midgley et al., 1998). The reliability for language learning goals also varies because the scales have been used so many times. An example is given from Tremblay and Gardner (Tremblay & Gardner, 1995). They found the reliability for the integrative orientation sub-scale was $\alpha$= .50 and the reliability for the instrumental sub-scale was $\alpha$ = .71. The language learning strategies scale has not been widely used; it was selected on the grounds that sub-scale reliabilities were available. The reliabilities are as follows: cognitive learning strategies: $\alpha$ = .60 - .69, study skills learning strategies: $\alpha$ = .62 -.75, social language learning strategies: $\alpha$ = .71- .73, and coping strategies: $\alpha$ = .50- .64 across samples.(Schmidt & Watanabe, 2001).

Table 2

Sub-scales of questionnaire

| | |
|---|---|
| *Demographic questions* | *15 items* |
| *In class speaking anxiety*<br>"I have an uneasy feeling when the teacher asks me a question " | *11 items* |
| *Out of class speaking anxiety*<br>"I feel uncomfortable when I answer questions from a native speaker of English I do not know." | *11 items* |
| *Anxiety trait* | *1 item* |
| *In class speaking self-efficacy*<br>"Answer a question in English from my teacher in front of my English class" | *11 items* |
| *Out of class speaking self-efficacy*<br>"Take part in a conversation with more than one native speaker." | *11 items* |
| *Task motivation goal*<br>"I like English language learning tasks when I really have to think" | *5 items* |
| *Performance approach motivation*<br>"Doing better than other students in this class is important to me" | *6 items* |
| *Performance avoid motivation goal*<br>"One of my main goals is to avoid looking like I can't do my English tasks" | *5 items* |
| *Integrative language learning motivation goal*<br>"Studying English is important to me because it will allow me to better understand and appreciate Western culture." | *4 items* |
| *Instrumental language learning motivation goal*<br>"Studying English is important to me because I need it for my studies." | *4 items* |
| *Cognitive learning strategies*<br>"I try to relate new vocabulary words to other words I know." | *7 items* |
| *Study skills learning strategies*<br>" When I study, I carefully organise what I have learned in this class." | *8 items* |
| *Social learning strategies*<br>"I try to work with other students from this class on English assignments." | *3 items* |
| *Coping learning strategies*<br>"I repeat new vocabulary words to memorise them." | *6 items* |
| | *108 items* |

**Analyses**

Confirmatory factor analysis was selected as the most appropriate statistical method since decisions regarding constructs and observed variables had been made a priori. One factor congeneric models were estimated for all sub scales, and then five confirmatory factor analyses were performed on anxiety, self-efficacy, motivation goals, language learning goals and strategies. LISREL 8.3 was used in the analyses (Jöreskog & Sörbom, 1996).

Congeneric modelling and confirmatory factor analysis are techniques classified as structural equation modelling (SEM). SEM is less reliable with small samples and Chi square tests of data fit are sensitive to sample size. According to Boomsa (1983, cited in Tabachnick & Fidell, 1996, p.715), a sample size of 200 is adequate for small and medium size models. The sample size in the present study ($N$=249) is therefore adequate.

Because there were few missing responses, and these were not systematic, listwise deletion was selected to account for missing values. As is common practice with Likert scales, the variables were treated as continuous for the purpose of this analysis and covariance matrices were generated for all variables.

SEM is reasonably robust to violations of normality with the exception of severe kurtosis. Researchers vary in the acceptable level of kurtosis. Kline takes a middle line (based on the Monte Carlo studies of estimation methods used for SEM) (Kline, 1998) and suggests that values of kurtosis greater than 10 may suggest a problem. (Kline, 1998). Whilst the data in this study indicated kurtosis, none of the kurtosis values exceed 10.

To enhance multivariate normality, multivariate outliers were removed using the malanhobis distance statistic. Critical values of $\chi 2$ were assessed at $p$ = .001 level and cases higher than these were removed. Four cases were removed for anxiety, 10 cases were removed for self-efficacy, three cases for motivation and four cases for strategies.

In evaluating model fit, multiple indices of fit were used. In addition to reporting the chi square test statistic ($\chi 2$), normed chi square ($\chi 2$ /$df$) is reported since this is less sensitive to sample size. Values close to 1.0 indicate a good fit although values up to 3.0 may indicate a reasonable fit (Holmes-Smith, 2000). Additional indices of fit are reported: Goodness-of-Fit index (GFI) and Adjusted Goodness-of-Fit (AGFI). The GFI and AGFI should be greater than .95, although values greater than .9 indicate a reasonable fit. The Root Mean Square Residual (RMR) and Root Mean Square Error Approximation (RMSEA) are reported. Values below .05 indicate a good fit although large values for RMR are acceptable when other indices indicate a good fit. The Normed Fit Index (NFI) and the Non-Normed Fit index (NNFI) and the Comparative Fit Index (CFI) are reported. Values of these indices should be greater than .95 although values greater than .90 indicate a reasonable fit.

Construct reliability was calculated based on the confirmatory models. Such a method is considered superior to the traditional alpha coefficient since error variance is accounted for. This model based method was not possible for the strategies analysis since the hypothesised model was rejected and exploratory factor analysis was employed.

**Results**

In the case of the anxiety and self-efficacy scales items were removed and the model respecified on theoretical and empirical grounds. The items retained and their reliabilities are in table 3. The means and standard deviations for each construct are shown in table 4 and the covariance matrices are presented in appendix 2. Both anxiety and self-efficacy were hypothesised to be two-dimensional constructs. This was supported by the models. A better fitting model was achieved for two-dimensional rather than one-dimensional latent constructs indicated by the significant decreases in chi-square as indicated by table 5 and 6. Diagrams 1 and 2 in appendix 1 display the loadings of the observed variables on the latent variables for the two-factor models of anxiety and self-efficacy..

Table 3
Items retained from questionnaire sub-scales

| | | Reliability |
|---|---|---|
| Second language speaking anxiety in class | (6 items) | .78 |
| Second language speaking anxiety out of class | (6 items) | .75 |
| Second language speaking self-efficacy in class | (5 items) | .85 |
| Second language speaking self-efficacy out of class | (4 items) | .85 |
| Task motivation goal (PALS) | (5 items) | . 65 |
| Performance approach motivation goal (PALS) | (5 items) | . 87 |
| Performance avoidance motivation goal (PALS) | (5 items) | . 75 |
| Integrative goal orientation (Gardner) | (4 items) | . 67 |
| Instrumental goal orientation (Gardner) | (4 items) | . 63 |
| Cognitive language learning strategies | (11 items) | $\alpha = .81$ |
| Metacognitive language learning strategies | (8 items) | $\alpha = .61$ |
| Social language learning strategies | (3 items) | $\alpha = .66$ |

Table 4
Means and standard deviations of constructs of adaptive learning

| Sub-scale | M | SD | n |
|---|---|---|---|
| anxiety in-class | 17.2 | 3.5 | 245 |
| anxiety out –of- class | 16.3 | 4.2 | 248 |
| efficacy in- class | 20.4 | 3.7 | 245 |
| efficacy out of class | 16.4 | 3.0 | 249 |
| motivation task goal | 19.2 | 3.5 | 246 |
| motivation performance approach goal | 14.4 | 5.3 | 246 |
| motivation performance avoid goal | 12.0 | 4.2 | 246 |
| motivation integrative goal | 16.5 | 2.9 | 248 |
| motivation instrumental goal | 16.6 | 2.4 | 248 |
| strategies cognitive | 37.1 | 6.0 | 242 |
| strategies social | 9.5 | 2.1 | 249 |
| strategies meta-cognitive | 23.0 | 3.9 | 245 |

Table 5
Comparison of fit indices for one factor and two factor solutions for speaking anxiety

| | $\chi^2$ | *p* | $\chi 2/df$ | RMR | RMSEA | GFI | AGFI | CFI | NFI | NNFI |
|---|---|---|---|---|---|---|---|---|---|---|
| Two factor model | 69.3 | .066 | 1.306 | . 040 | .036 | . 95 | .93 | .98 | .92 | .97 |
| One factor model | 91.91 | .000 | 1.70 | . 051 | .054 | . 94 | .91 | . 95 | .89 | .94 |

Table 6
Comparison of fit indices for one factor and two factor solutions for speaking self-efficacy

| | $\chi 2$ | *p* | $\chi 2/df$ | RMR | RMSEA | GFI | AGFI | CFI | NFI | NNFI |
|---|---|---|---|---|---|---|---|---|---|---|
| Two factor model | 59.17 | 000 | 2.46 | . 035 | . 079 | . 95 | .90 | . 96 | .94 | .94 |
| One factor model | 242.97 | 000 | 8.99 | . 051 | .185 | . 81 | .69 | . .84 | .82 | .79 |

In the analyses of the motivation goal sub-scales a three confirmatory model indicated a good fit to the data. Two items were removed from the sub-scales because of appropriacy to the sample in question and reported item replication. The fit indices are reported in table . The fit indices reported by Midgely and colleagues (1998) were similar to those in the present study. ( GFI = .95, CFI = .96, RMSEA = .049). Diagram 3 in appendix 1 contains the factor loadings for the variables measured. Midgely and associates reported loadings between . 42 - .81 with four factors having loadings below .65, this study reports loadings between . 45-. 85 with four factors having loadings below .55.

Table 7
Fit indices for academic motivational goals

| | $\chi^2$ | *p* | $\chi^2/df$ | RMR | RMSEA | GFI | AGFI | CFI | NFI | NNFI |
|---|---|---|---|---|---|---|---|---|---|---|
| CFA model | 59.17 | .00056 | 1.56 | . 079 | . 049 | . 93 | .90 | . 95 | . 87 | . 94 |

The model for language learning goals provided an adequate fit to the data. One item was removed to enhance fit. Table 8 displays the fit indices for language learning goals and diagram 4 in appendix 1 displays the latent variable factor loadings for integrative and instrumental motivational goals.

Table 8
Fit indices for language learning motivational goals

| | $\chi^2$ | *p* | $\chi^2/df$ | RMR | RMSEA | GFI | AGFI | CFI | NFI | NNFI |
|---|---|---|---|---|---|---|---|---|---|---|
| CFA model | 32.41 | .0020 | 2.49 | . 037 | . 078 | . 96 | .92 | . 92 | . 88 | . 87 |

The confirmatory model estimated for the learning strategies sub-scales did not provide an adequate fit to the data. Confirmatory techniques were abandoned in favour of exploratory data analysis.

Factor analysis was used, initially principal axis factoring (SPSS) with varimax rotation since this was the closest to the technique used by Schmidt & Watanabe, (2001). However, Schmidt and Watanabe's model was not replicated. Subsequently, an oblique rotation was chosen since it seemed likely that the factors would be correlated. A three - factor solution better described this data set. The factors were named cognitive, metacognitive and social. Table 1 in appendix 1 displays the factor loadings for the analysis.

The aim of the study was to assess the reliability and validity of the instrumentationto be used in the main study. The questionnaire sub-scales all displayed adequate to good internal consistency (anxiety in-class =.78, anxiety out of class = .75,

self-efficacy in class = .85, self-efficacy out of class = .85, performance approach goal = .87, performance, avoid goal = .75, task goal = .65, integrative goal = .67, instrumental goal = .63, cognitive strategies, $\alpha$ = .81, metacognitive strategies, $\alpha$ = .61, social strategies $\alpha$ = .66). Loadings on latent variables provide evidence for convergent validity of all the sub-scales.

**Discussion**

This pilot study provides preliminary evidence for the hypothesised dual-dimensional construct of second language speaking anxiety. However, there is concern regarding the rather high error variances in the anxiety confirmatory factor analysis. One possible explanation for these is the interpretation of the item stems. The anxiety items were constructed according to the type of oral interaction and anxiety reaction. Some items referred to emotionality reactions e.g. "*I feel nervous*", and others according to worry e.g. "*I think how poorly I am doing*". In addition eight of the items were reverse-coded, which may have caused some confusion. It is possible interpretation of the language used to describe worry and emotionality may vary according to the level of English competence and may be influenced by cultural familiarity. A total of 12 items were retained from the anxiety sub-scales for use in the main study, which will serve as a second pilot. The items retained refer to formal interactions and interactions with native speakers. Items referring to interactions with non-native speakers of English were removed since they did not seem relevant to the construct in question.

As with anxiety, a dual-dimensional construct of self-efficacy better described the present data. A total of nine items were retained for use in the main study. These items are clearly related to formal classroom interaction and interactions with native speakers. Again, items referring to non-native speaker interaction were removed. Furthermore, the self-efficacy scale involved rating a number between 1-100 based on perceived speaking confidence. Students found this a little confusing.

The motivation sub-scales, as expected,were both reliable and valid although two items were removed due to inapplicability to the sample. The results regarding the strategies sub-scales indicated that the data did not fit the hypothesised model based on previous research (Schmidt and Watanabe, 2001). This data set was better explained by a three-factor model of learning strategies corresponding to cognitive, metacognitive and social strategies.

**Conclusions**

The questionnaire, with modifications,was demonstrated to be valid and reliable with modifications. It is proposed to revise the questionnaire to exclude those items that did not load onto the latent variables. It is also proposed to gather further data of a qualitative nature to supplement the questionnaire data

The anxiety items produced high error variances, believed to be caused by comprehension problems. In the main study it is proposed that the notions of worry and emotionality be addressed employing qualitative research methodology (semi-structured interview) where comprehension can be negotiated between participant and researcher.

The self-efficacy scale will be reduced to a 10 point rating scale to make completion of the questionnaire less confusing for the students and also to facilitate analysis.

A further study is required for cross-validation of the anxiety and self-efficacy scales

It is proposed to include items referring to motivation intensity in the main study to supplement the language learning goals data

To date there has been a lack of consistency between samples of learners and learning strategy categorisation. There is no doubt that strategy use is related to adaptive learning. But it is possible that the categorisation of strategies is so context dependent that generalisations beyond very specific populations (e.g. Chinese learners of English for Academic purposes studying in university language centres) is not possible. Given the specific and very large population of students from Confucian heritage cultures (Chinese, Korean, Japanese, Vietnamese) learning EAP in Australia further information regarding the learning strategies of this group would be most valuable. Learning strategy use and preference will be further explored in the main study using semi-structured interviews.

It is concluded that there is sufficient support for the constructs to consider the proposed model, which will be tested in a further study. The relationship between the constructs and oral performance will be of primary interest.

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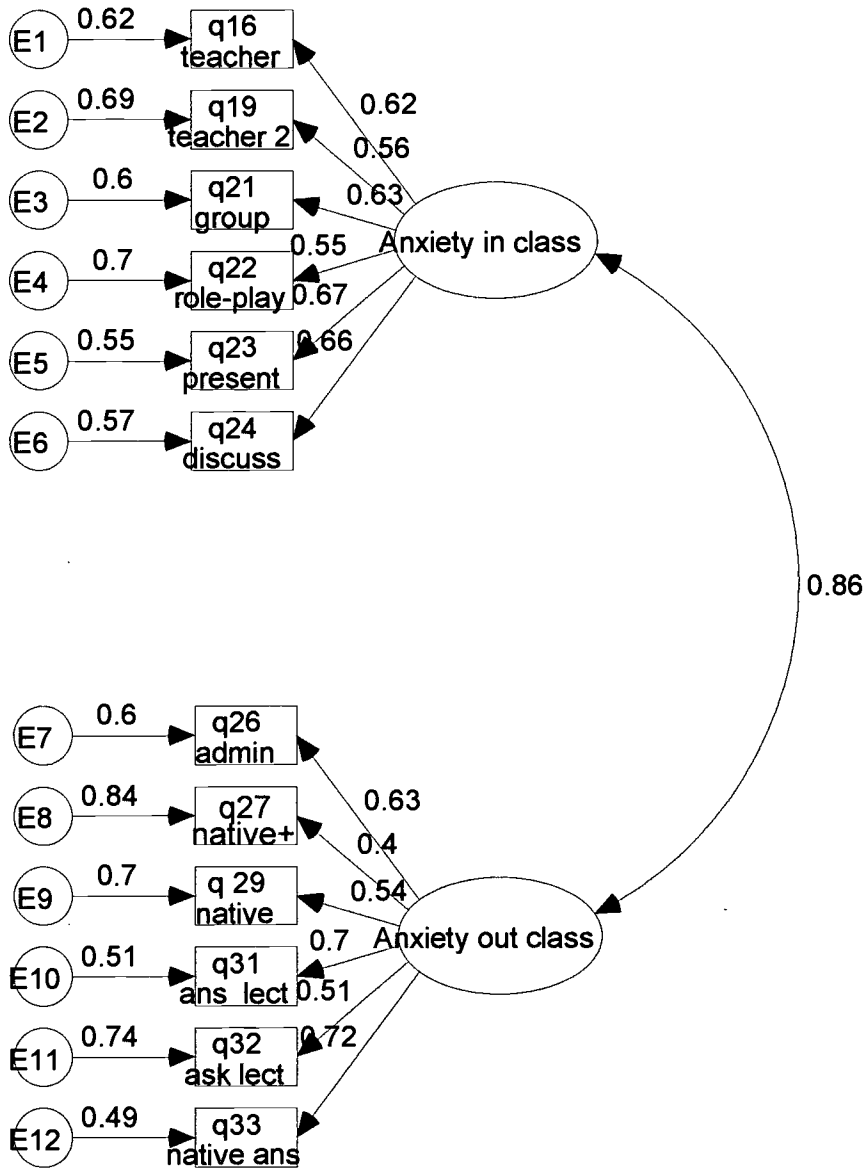
**Appendix 1**

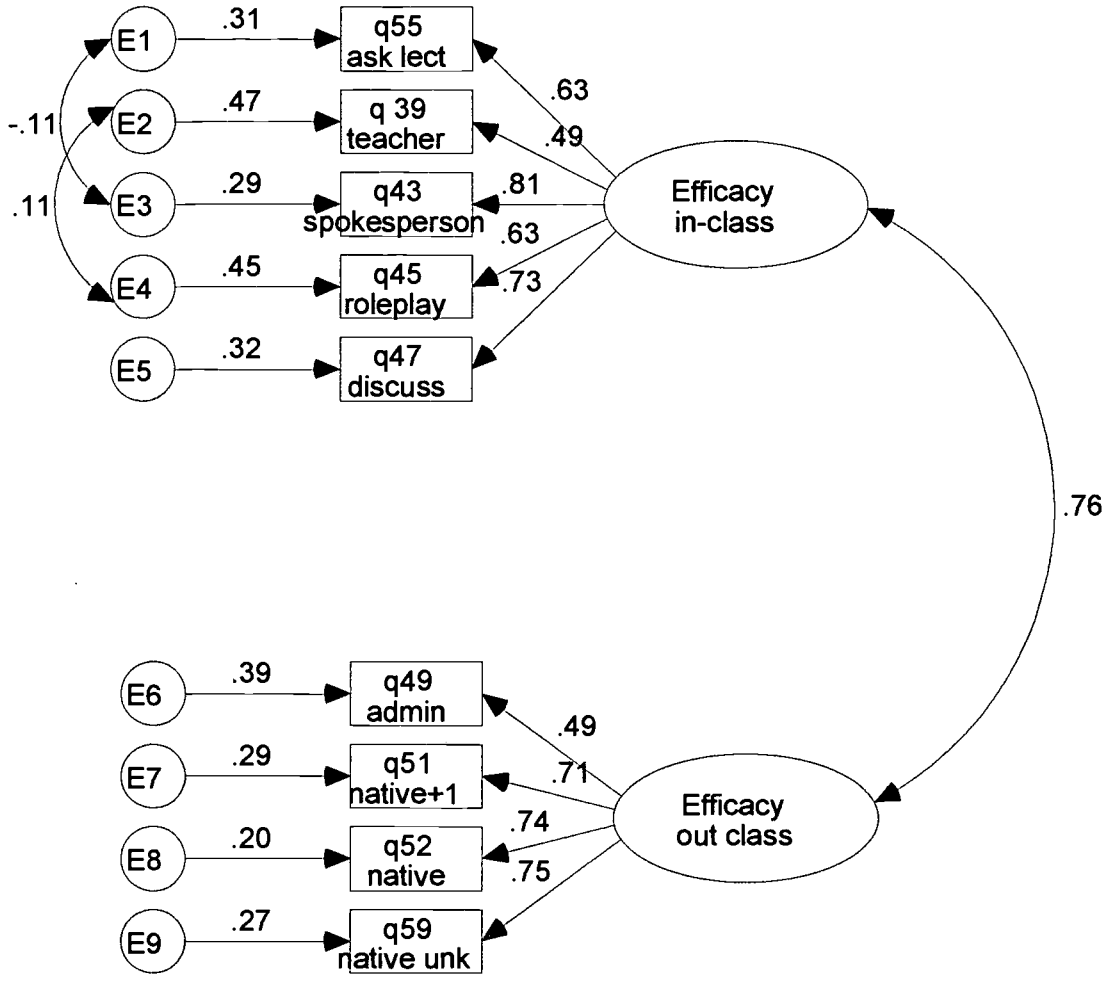
Diagram 1

Two-factor standardised solution for anxiety




Chi-square = 69.23, df = 53, p- value = .06647, RMSEA = .036

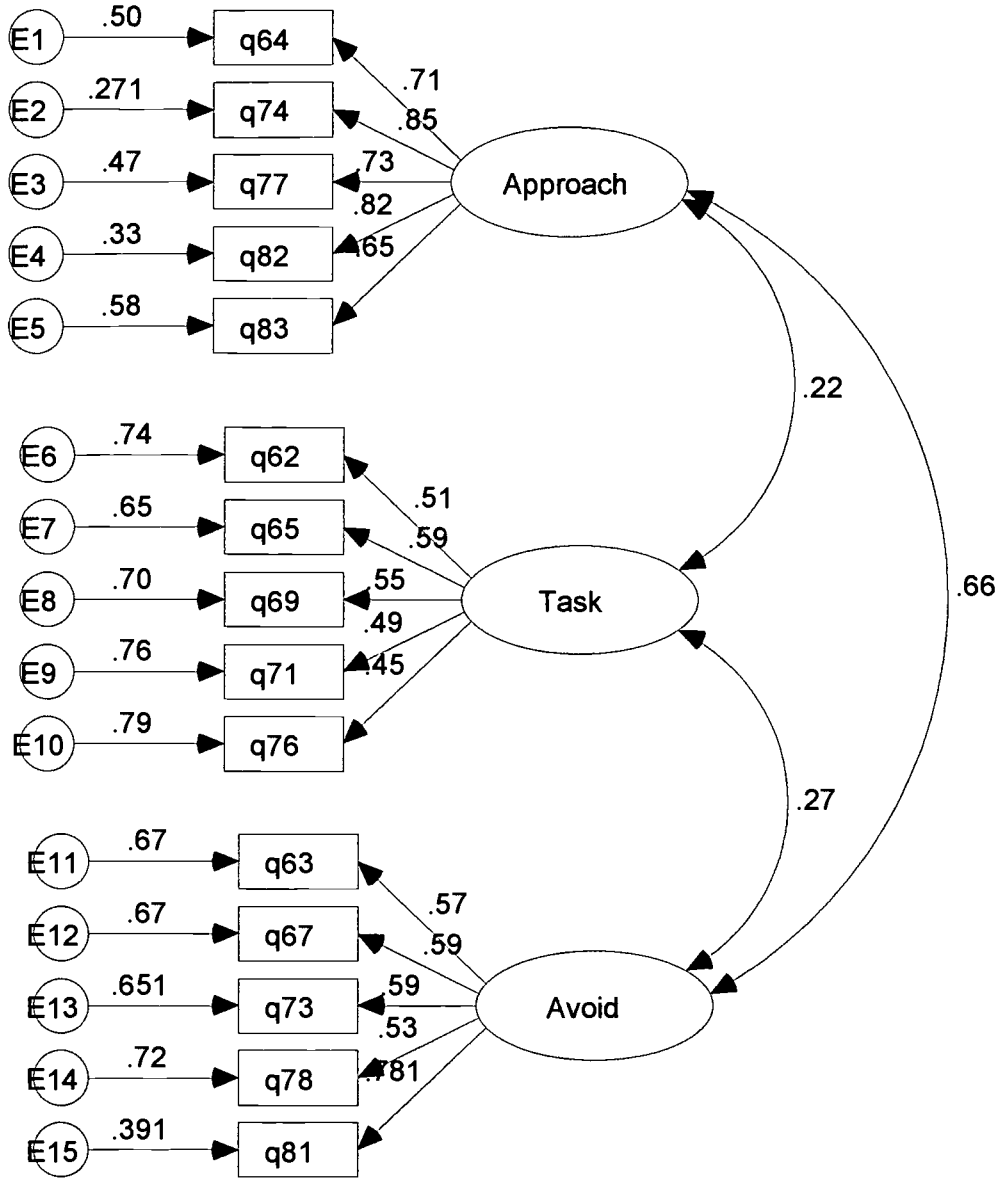
Diagram 2
Two- factor standardised solution for self-efficacy



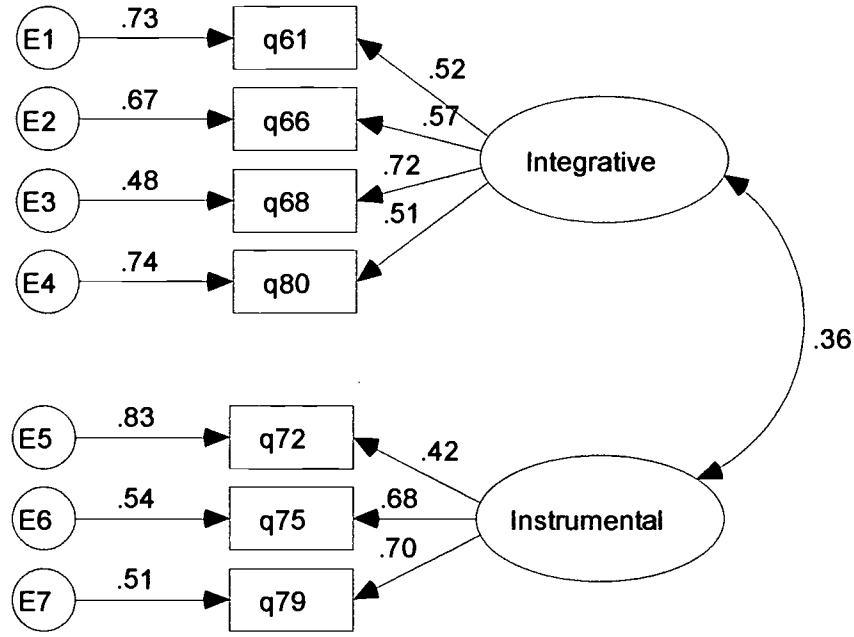

Chi-square = 59.17, df = 24, p-value = .00008, RMSEA =.079

Diagram 3

Three-factor standardised solution for academic goal orientation




Chi-square = 136.46, df = 87, p-value = .00056, RMSEA = .049




Chi-square = 32.41, df = 13, p-value = .00209, RMSEA = .078

Table 1
Factor analysis of pilot data

| | Cognitive | Social | Meta-cognitive |
|---|---|---|---|
| Q107(coping) keeping up | **.63** | .02 | -.04 |
| Q103 (coping) memorise words | **.60** | -.08 | -.04 |
| Q96 (study skills) organise | **.60** | .04 | .11 |
| Q 100 (study skills) review before test | **.58** | .02 | .16 |
| Q98 (Study skills) place to study | **.54** | -.06 | -.09 |
| Q99 (study skills) re-read course materials | **.52** | .05 | .04 |
| Q106 (coping) look up word | **.46** | -.02 | -.07 |
| Q108 (coping) know what's on test | **.46** | .07 | -.07 |
| Q97 (study skills) feedback | **.43** | .09 | -.06 |
| Q89 (cognitive) evaluate | **.38** | .03 | .14 |
| Q105 (coping) see words before speaking | **.32** | -.06 | **.37** |
| Q104 (coping) find gaps | **.30** | .18 | .19 |
| Q93 (social) discuss with classmates | .06 | **.78** | .21 |
| Q92 (social) work with others | -.01 | **.64** | .07 |
| Q94 (social) ask other for help | -.01 | **.43** | -.01 |
| Q86 (cognitive) relates to other languages | -.16 | -.11 | -.09 |
| Q85 (cognitive) relate vocabulary | .07 | .09 | **.60** |
| Q90 (cognitive) preview | **.26** | -.01 | **.44** |
| Q87 (cognitive) guess | -.05 | .16 | **.40** |
| Q95 (social) practice native speaker | .09 | -.06 | **.35** |
| Q88 (cognitive) look for patterns | .01 | .07 | **.33** |
| Q91 (cognitive) clarify | .08 | .13 | **.28** |

Extraction model: Principal Axis Factoring
Rotation method: Oblimin with Kaiser Normalization

**Appendix 2**

**Covariance matrices**

Table 1
Anxiety covariance matrix

| | Q16 | Q19 | Q21 | Q22 | Q23 | Q24 |
|---|---|---|---|---|---|---|
| Q16 | 1.01 | | | | | |
| Q19 | 0.44 | 1.24 | | | | |
| Q21 | 0.51 | 0.43 | 1.11 | | | |
| Q22 | 0.36 | 0.34 | 0.40 | 1.17 | | |
| Q23 | 0.43 | 0.47 | 0.51 | 0.50 | 1.39 | |
| Q24 | 0.33 | 0.47 | 0.40 | 0.35 | 0.59 | 1.02 |
| Q26 | 0.45 | 0.35 | 0.33 | 0.36 | 0.40 | 0.38 |
| Q27 | 0.25 | 0.23 | 0.19 | 0.27 | 0.32 | 0.21 |
| Q29 | 0.32 | 0.35 | 0.27 | 0.26 | 0.35 | 0.35 |
| Q31 | 0.38 | 0.27 | 0.39 | 0.38 | 0.52 | 0.39 |
| Q32 | 0.26 | 0.22 | 0.27 | 0.34 | 0.37 | 0.34 |
| Q33 | 0.39 | 0.41 | 0.46 | 0.43 | 0.53 | 0.53 |
| | *Q26* | *Q27* | *Q29* | *Q31* | *Q32* | *Q33* |
| Q26 | 1.05 | | | | | |
| Q27 | 0.34 | 0.93 | | | | |
| Q29 | 0.47 | 0.26 | 1.25 | | | |
| Q31 | 0.45 | 0.19 | 0.42 | 0.98 | | |
| Q32 | 0.28 | 0.11 | 0.27 | 0.38 | 1.02 | |
| Q33 | 0.46 | 0.33 | 0.51 | 0.58 | 0.47 | 1.31 |

Table 2
Self-efficacy covariance matrix

| | *Q39* | *Q43* | *Q45* | *Q47* | *Q49* | *Q5* |
|---|---|---|---|---|---|---|
| Q39 | 0.71 | | | | | |
| Q43 | 0.37 | 0.95 | | | | |
| Q45 | 0.41 | 0.56 | 0.84 | | | |
| Q47 | 0.43 | 0.59 | 0.43 | 0.83 | | |
| Q49 | 0.21 | 0.32 | 0.24 | 0.35 | 0.64 | |
| Q51 | 0.23 | 0.38 | 0.32 | 0.33 | 0.33 | 0.79 |
| Q52 | 0.21 | 0.42 | 0.32 | 0.41 | 0.38 | 0.53 |
| Q55 | 0.31 | 0.40 | 0.36 | 0.44 | 0.35 | 0.36 |
| Q59 | 0.22 | 0.46 | 0.35 | 0.42 | 0.33 | 0.54 |
| | *Q52* | *Q55* | *Q59* | | | |
| Q52 | 0.75 | | | | | |
| Q55 | 0.37 | 0.71 | | | | |
| Q59 | 0.55 | 0.42 | 0.83 | | | |

Table 3
Motivational goals covariance matrix

| | Q64 | Q74 | Q77 | Q82 | Q83 | Q62 |
|---|---|---|---|---|---|---|
| Q64 | 1.80 | | | | | |
| Q74 | 1.07 | 1.62 | | | | |
| Q77 | 0.95 | 1.00 | 1.65 | | | |
| Q82 | 0.92 | 1.06 | 0.86 | 1.42 | | |
| Q83 | 0.75 | 0.87 | 0.98 | 0.86 | 1.74 | |
| Q62 | 0.16 | 0.16 | 0.06 | 0.13 | 0.07 | 1.09 |
| Q65 | 0.07 | 0.11 | -0.01 | 0.00 | -0.02 | 0.37 |
| Q69 | 0.35 | 0.23 | 0.12 | 0.15 | 0.05 | 0.30 |
| Q71 | 0.09 | 0.23 | 0.04 | 0.22 | 0.07 | 0.29 |
| Q76 | 0.06 | 0.09 | 0.13 | 0.05 | 0.03 | 0.17 |
| Q63 | 0.34 | 0.41 | 0.24 | 0.44 | 0.28 | 0.18 |
| Q67 | 0.37 | 0.42 | 0.26 | 0.50 | 0.40 | 0.19 |
| Q73 | 0.21 | 0.43 | 0.32 | 0.38 | 0.25 | -0.01 |
| Q78 | 0.25 | 0.51 | 0.41 | 0.45 | 0.37 | 0.17 |
| Q81 | 0.60 | 0.84 | 0.72 | 0.75 | 0.52 | 0.05 |

| | Q65 | Q69 | Q71 | Q76 | Q63 | Q67 |
|---|---|---|---|---|---|---|
| Q65 | 1.25 | | | | | |
| Q69 | 0.38 | 0.98 | | | | |
| Q71 | 0.41 | 0.23 | 1.42 | | | |
| Q76 | 0.23 | 0.18 | 0.24 | 0.61 | | |
| Q63 | -0.02 | 0.25 | 0.10 | 0.08 | 1.50 | |
| Q67 | 0.11 | 0.18 | 0.28 | 0.13 | 0.55 | 1.57 |
| Q73 | -0.06 | 0.11 | 0.17 | 0.06 | 0.56 | 0.43 |
| Q78 | 0.04 | 0.22 | 0.21 | 0.19 | 0.47 | 0.56 |
| Q81 | 0.02 | 0.18 | 0.23 | 0.08 | 0.64 | 0.68 |

| | Q73 | Q78 | Q81 |
|---|---|---|---|
| Q73 | 1.14 | | |
| Q78 | 0.34 | 1.39 | |
| Q81 | 0.63 | 0.55 | 1.57 |

Table 4
Language learning goals covariance matrix

| | Q61 | Q66 | Q68 | Q80 | Q72 | Q75 | Q79 |
|---|---|---|---|---|---|---|---|
| Q61 | 0.64 | | | | | | |
| Q66 | 0.29 | 1.42 | | | | | |
| Q68 | 0.30 | 0.50 | 0.96 | | | | |
| Q80 | 0.18 | 0.30 | 0.35 | 0.91 | | | |
| Q72 | 0.09 | 0.14 | 0.09 | 0.01 | 0.63 | | |
| Q75 | 0.07 | 0.12 | 0.08 | 0.08 | 0.16 | 0.47 | |
| Q79 | 0.11 | 0.09 | 0.08 | 0.25 | 0.16 | 0.25 | 0.57 |

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