

The influence of structural competitiveness on university students' task outcomes: The mediating role of achievement goals

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Abstract. Structural competitiveness has been rarely studied in previous studies. This study explored the influence of structural competitiveness on Chinese students' task performance, task interest (i.e., intrinsic motivation) and positive and negative affect, as well as the mediation of achievement goals based on the hierarchical model of achievement motivation. 134 undergraduate students from Nanjing Normal University participated in the research. Two preliminary studies were conducted to select appropriate anagrams used as experiment tasks. Results showed that there were significant differences in performance-approach and performance-avoidance goals and intrinsic motivation between competition group and control group, indicating the positive impact of competition in collectivist cultural background. However, the mediation effects of achievement goals were not significant.

Keywords: competitiveness; achievement goals; task performance; intrinsic motivation; positive and negative affect.

1. Introduction

Competitiveness in schools has become increasingly severe and influences students significantly. However, some cross-cultural studies have shown that competition has different impacts on people from different cultural backgrounds [1]. Specifically, students from individualistic countries were more likely to perceive competition as negative while pupils from collective cultural background tended to view competition as positive which can help themselves and the society make progress [2]. These different views of competition make it significant to explore the influence of competition on students from collectivist societies in mainland China to see whether the impact is different from western research results.

Structural competitiveness was regarded as another type of perceived environmental competitiveness that can influence people's behavior through affecting their perception of the situation [3]. Previous studies mainly studied trait and perceived environmental competitiveness, so exploring the influence of structural competitiveness can help us gain a more comprehensible understanding of competitiveness. Moreover, structural competitiveness can be manipulated in the lab which enabled us to figure out the causal relationships among variables, making up for the weaknesses of previous studies that mainly concentrated on correlations or predictions [4].

Previous studies usually focused on a limited number of achievement goals but failed to concentrate on all the four achievement goals using the 2×2 achievement goal model. There were performance-approach goal, performance-avoidance goal, mastery-approach goal and mastery-avoidance goal under this 2×2 classification. Performance-approach goal focused on the competence compared to others, such as achieving success. Performance-avoidance also referred to the competence relative to others, but concentrated on avoiding failure [5]. Mastery-approach goal required efforts to develop one's skills and abilities such as promoting one's learning abilities or understanding the material but mastery-avoidance goal aimed to avoid losing one's skills or abilities such as forgetting knowledge they have learned or not finishing the task.

Many studies have provided empirical support for relationships between competitiveness (both trait and perceived environmental competitiveness) and both performance-approach and performance-avoidance goals [4, 6]. However, seldom studies examined the links between

structural competitiveness and achievement goals. So this study can make up for the deficiencies of existing research.

The study mainly focused on three outcomes: task performance, emotions and interest. Task performance is a vital criterion to represent students' performance during the experiment process. The current study also concentrates on students' positive and negative emotions because former studies mainly examined the effects of competition on performance in school or workplace but ignored the psychological outcomes such as well-being or emotions [5]. Interest is a state of mind and is helpful for boosting students' inner motivation and making them enjoy their study. This study used the experimental method so that the findings of causal relationships can provide us with practical measures about how to improve students' performance, learning interest and emotions by changing competitiveness in a classroom setting.

The hierarchical model of achievement motivation (Figure 1) provided theoretical support to the mediation role of achievement goals [7].

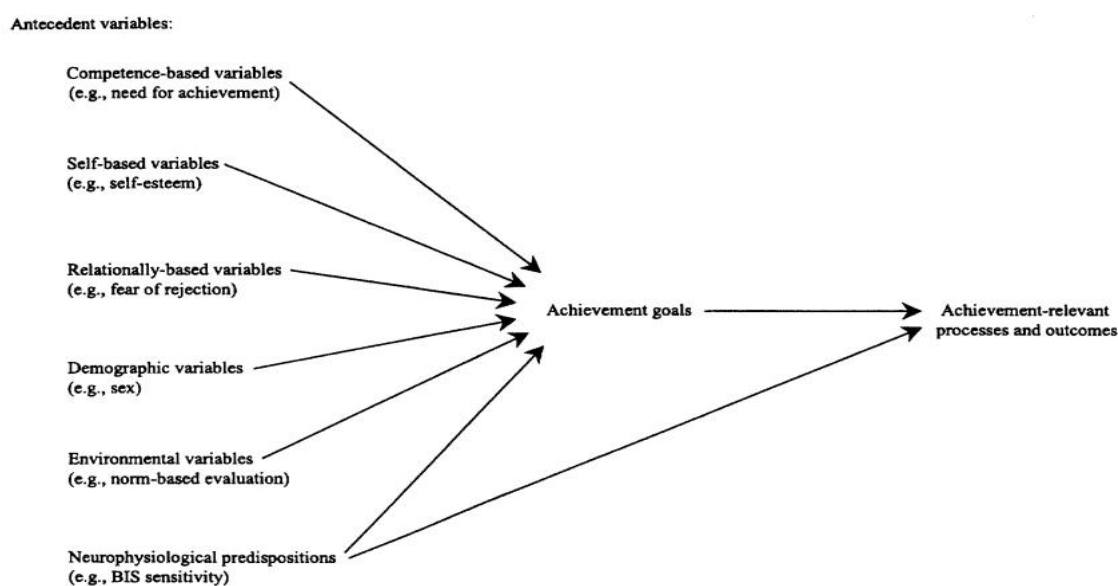


Fig. 1 The hierarchical model of achievement motivation (Elliot, 1999)

Research question was raised based on the above literature review: will structural competitiveness influence university students' task performance, emotions and interest via achievement goals?

2. Preliminary studies

An anagram task was chosen in the study because it has been frequently used in psychological literature and is sensitive to motivational manipulation [8], which is consistent with the purpose of this study. In order to obtain two different sets of anagram tasks (one for baseline and the other for post manipulation) of moderate level of difficulty and consistent familiarity, we conducted two preliminary studies.

2.1 Preliminary study 1

2.1.1 Method

Five undergraduates from School of Psychology, Nanjing Normal University who were proficient in English completed this study. All of them have passed CET-6. The material of this study were 205 five-letter words from the Gilhooly and D Hay (1977) list of single-solution words. Two or three-move anagrams were constructed randomly. This study was conducted using E-prime 2.0. Firstly, a slide of instruction was presented. Then a practice session that included 5 example anagrams was presented. The full set of 200 anagrams were then presented to the participants

randomly. After each anagram, the participants were asked to evaluate the familiarity of the word using a seven-point scale (1 = "totally unfamiliar," 7 = "totally familiar") instead of a five-point scale [9].

2.1.2 Results

In order to measure the degree of agreement between 5 raters on the familiarity rating of 200 words, SPSS was used to calculate Kendall's coefficient of concordance (Table 1). The results indicated that the score consistency of different raters was relatively high (Kendall's $W = 0.694$, $p < 0.001$).

Table 1 Kendall's coefficient of concordance

N	Kendall's W	Chi-Square	df	Asymp. Sig.
5	0.694	690.362	199	< .001

The difficulty of anagrams were selected based on the average time and accuracy of each set. To specify, SPSS was used to calculate the Z scores of the average time and accuracy of the 200 anagrams. Then, we selected those anagrams whose Z scores of both average time and accuracy ≥ -1 and ≤ 1 to get anagrams with a moderate level of difficulty. In this way, 84 words were left.

2.2 Preliminary study 2

40 undergraduate students (11 males, 29 females) from Nanjing Normal University participated in this study. Using the similar method and procedure of the last study, we selected the 84 anagrams from the first preliminary study again and finally obtained 39 anagrams.

3. Main Study

3.1 Method

Participants. 89 undergraduate students (24 males, 65 females) from Nanjing Normal University participated in this study. And 85 valid samples left. The mean age of the 85 students was 20.1647, and the standard deviation was 1.53411. There were 24 males and 61 females. Grade was 28.2% freshman, 31.8% sophomore, 15.3% junior and 24.7% senior. Major was 68.2% Liberal Arts, 31.8% Science. Participants were randomly assigned to either a competition condition (44 participants) or a control condition (41 participants) by drawing lots.

Measures. The 39 anagrams selected from preliminary studies were randomly assigned to A and B tasks. Task A used for baseline test contained 19 anagrams to avoid the differences of score were caused by participants' previous English competence while Task B included 20 anagrams and was used in formal experiment test. The number of anagrams participants solved within 5 minutes represented their task performance because the time used to solve all the anagrams of each task was more than 5 minutes.

We used the Chinese Revised Version of Achievement Goal Questionnaire [10] to examine achievement goals. Each achievement goal has three items to describe it using a 1 to 7 scale. The average score of every three items was the level of each achievement goal. The Chinese Version of Inner Motivation Questionnaire (Chen) was used to test students' inner motivation and interest with a Likert 7-point scale. The Chinese Revised Edition [11] which includes 20 emotional words (10 positive and 10 negative words) was used to assess the positive and negative affect adopting a Likert 7-point score.

Procedure. The subjects were randomly divided into the competition experimental group and control group.

Baseline test. Participants of two groups finished the anagram A task in 5 minutes. Then they were asked to finish the inner motivation questionnaire and the emotion questionnaire to appraise their positive and negative emotions this week.

Posttest. Participants were asked to complete anagram B task and we manipulated competition through giving different instructions to participants in two groups.

The instruction of competition group said: next, you will complete another set of anagram task for the same five minutes, but this time you are competing against a participant in the office across from the lab who will finish the same experiment task at the same time. The number of anagrams you solve in 5 minutes is your task score. You must try your best to compete with the participants in the opposite office because we will give you the corresponding fee according to your loss, win or draw. If you win, you can get an additional fee of 5 RMB, and finally get 15 RMB; If you lose, you will lose 5 RMB, and finally get 5 RMB. If it is a tie, you will still get 10 RMB with no change.

While the instruction shown to the control group said: next, you will complete another set of anagram task for the same five minutes. The number of anagrams you solve in 5 minutes is your task score. Please try your best to complete the task, and we will inform you of your score after the task.

After understanding the above instructions, participants finished the Achievement Goal Questionnaire and then the anagram B task in 5 minutes. The experimenter recorded the number of anagrams correctly completed by the subjects within 5min and used it as their performance score. After the task, subjects finished the intrinsic motivation questionnaire to evaluate their interest of this experiment task and positive and negative emotions questionnaire to see their emotions after doing the task.

3.2 Results

3.2.1 Reliability analysis

We used SPSS to do the reliability analysis and got the Cronbach's alpha of every questionnaire. The results showed that the Cronbach's alpha of most questionnaires were over 0.80, indicating a rather high reliability. Only the reliability of mastery-approach and mastery-avoidance goals were less than 0.8, however, they were both over 0.6. Thus, the questionnaires used in this research had very good reliability on the whole.

3.2.2 Differences in demographic variables

SPSS was used to examine the differences in variables among students of different ages, sexes, grades and majors. The results of One-Way ANOVA showed that age significantly influenced performance-approach goal ($F=4.162$, $p=.001$) and performance-avoidance goal ($F=2.941$, $p=.012$). The results of Independent-Samples T Test showed significant difference in positive emotion between two groups ($t=-3.153$, $p=.002 < .01$). So age and major were added to covariate in the mediation analysis afterwards.

3.2.3 The impact of structural competitiveness on the mediators and outcomes

We used t test to see the differences in variables between competition group and control group.

From Table 2, there were no significant differences in variables tested beforehand between two groups, so the differences of the variables examined later could be caused by different experiment conditions.

Table 2 The influence of structural competitiveness on pretest variables

	df	t	Sig. (2-tailed)
Baseline test score	83.000	-0.179	0.858
Intrinsic motivation questionnaire of course learning	83.000	0.664	0.508
Positive affect in the latest week	79.080	0.265	0.792
Negative affect in the latest week	82.000	-1.248	0.216

The results (Table 3) showed that participants' performance-approach goal between two groups had significant difference ($t=4.893$, $p<.001$). And subjects' performance-approach goal of the competition group (5.30 ± 1.23) exceeded that of control group (3.71 ± 1.70). Also, there was a significant difference ($t=3.73$, $p<.001$) in performance-avoidance goal between competition and control groups. Student's performance-avoidance goal of competition group (5.35 ± 1.27) surpassed that of control group (4.15 ± 1.63). What is also worth mentioning was the difference ($t=1.99$, $p=.05$)

in mastery-approach goal between two groups. The mastery-approach goal of competition group (4.51 ± 1.25) was over that of control group (4.33 ± 1.36). Additionally, the inner motivation of participants from two groups had significant difference ($t=2.669$, $p<0.01$). And the subjects' inner motivation of competition group (5.57 ± 0.88) was greater than that of control group (4.99 ± 1.11).

Table 3 The influence of structural competitiveness on the mediators and outcomes

	df	t	Sig. (2-tailed)
Performance-approach goal	82(70.493)	4.893	.000***
Performance-avoidance goal	82(73.775)	3.732	.000***
Mastery-approach goal	82	1.990	.050
Mastery-avoidance goal	83	0.614	.541
score	83	0.569	.571
intrinsic motivation of this experiment task	83	2.669	.009**
Positive affect after finishing the experiment	83	1.256	.213
Negative affect after finishing the experiment	83	-1.255	.213

3.2.4 Mediation analysis

We conducted the mediation analysis using the PROCESS of SPSS. The competition group was given the value 1 and the control group was given the value 0. However, all the indirect effects of independent variables (competition) on dependent variables (task performance, inner motivation and positive and negative emotions) via achievement goals were not significant because the values of Boot LLCI and Boot ULCI all included 0.

4. Discussion

4.1 The influence of competition on achievement goals

Both performance-approach and performance-avoidance goals of participants in competition group surpassed those of subjects from control group so the presence or absence of competition had an effect on the achievement goals of performance dimension. This result was consistent with previous studies which showed that trait and perceived environmental competitiveness could positively predict both performance-approach and performance-avoidance goals in job or classroom context [5]. As a result, our study confirmed this finding in the lab environment. These findings could be explained by the characteristic of structural competitiveness because participants in the competition group are more likely to feel that others are competing with them and want to become more successful. The comparison of others thus motivates their performance goals and makes them try to gain better performance and avoid worse performance, therefore boosting their performance-approach and performance-avoidance goals.

The results also showed that structural competitiveness could lead to the higher level of mastery-approach goal, which was consistent with the previous finding that trait competitiveness was positively correlated with mastery-approach goal among Chinese students [12]. In other words, competitiveness perceived by students is beneficial to help them focus on mastering more knowledge and skills, showing the positive meaning of competitiveness in China.

4.2 The influence of competition on dependent variables

Significant difference in inner motivation between competition group and control group was found. Participants from competition group had greater inner motivation towards the task compared with those from control group, indicating that competition could promote students' inner motivation or interest, which was very different from some western research results. In fact, scientists in western countries always thought competitiveness would bring many negative effects such as the reduction of motivation [13]. The reason why the competition benefited Chinese student's motivation may be because they usually thought competition was crucial for self-improvement [2]. So the competition students perceived in the lab made them try to improve their task performance

and thus foster their inner motivation towards the experiment, which further demonstrated the adaptability of competition in Chinese culture.

This finding is very instructive for pedagogy and could be applied to school situations. Since the presence of competition is very likely to make students enjoy the activities they are involved in, adding competition to the classroom situation is a possible way to trigger students' learning interest. In addition, schools can organize exams and lead students to compete their scores with each other to boost their inner motivation.

5. Limitations and Future directions

The results of mediation analysis led to deeper thinking.

On the one hand, although previous studies confirmed that trait and environmental competitiveness predicted behavior through achievement goals, few studies focused on whether structural competitiveness will influence outcomes via achievement goals. Under such circumstances, further studies are needed to examine the mediation effect of achievement goals when it comes to structural competitiveness.

On the other hand, there were some limitations of our study. Although some studies concentrating on structural competitiveness got the mediation effect of achievement goals by experiment without checking whether the manipulation was successful, problems still existed in this process. So it was necessary to check and ensure whether the manipulation was successful when we did our experiment.

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