

The Structural Relationship between Personality Types, Achievement Goals, Achievement Emotions and Self-regulated Learning Strategies of Undergraduates in Hong Kong

Lai-Ying Yip, Man-Tak Leung
Hong Kong Shue Yan University, Hong Kong

Abstract

The present research aims to investigate the relations how student's personality types (enneagram) and achievement emotions are related to their achievement goals and self-regulated learning strategies. Two hundreds and sixty-six undergraduates (159 females and 107 males) participated to complete a questionnaire consisting of four scales. To analyze the data, path analyses and structural equation modeling were used. Two structural equation models could be validly formulated and confirmed. The first model indicates that personality types (enneagram) can be effective and desirable constructs predicting on undergraduates' achievement goals and achievement emotions (negative), and subsequently to their self-regulated learning strategies. Questioner is the best predictor that individual who tends to be 'a questioner' would generate more negative achievement emotions (anger, anxiety, shame, hopelessness, boredom) in class and would adopt achievement goals (mastery avoidance, mastery approach, performance avoidance, performance approach), which would affect their self-regulated learning strategies. The second model states that enneagram can be desirable predictors on students' positive achievement emotions (enjoyment, pride) and subsequently to their self-regulated learning strategies. Performer is the best predictor that students who tend to be 'performers' would generate positive achievement emotions in class which make them dispense effective learning strategies. The present investigation may be the first one integrating personality types, achievement emotions, achievement goals and learning strategies of Chinese undergraduates, and also the exploration of the complex structure among these achievement variables. Thus, the present paper can provide new perspective for researchers in motivation and learning to study further. It can also implicate the significance of the influence of personality and achievement emotions on students' achievement goals and learning strategies. Hence, the implementation of suitable and comprehensive educational programmes aiming to cultivate students on desirable personality and achievement emotions is proposed and supported through the present study.

Keywords: Personality types, Enneagram, Achievement goals, Achievement emotions, Self-regulation learning strategies

Introduction

In Hong Kong, it was found that students' achievement goals were related to their learning strategies (Lau & Lee, 2008). However, there is a lack of complete research to find if there are other factors such as personality and emotions which could link to the achievement goals and learning strategies. Berg (2008) revealed that students would have some psychological and emotional problems in their academic environment and affect their learning. Thus, personality and achievement emotions can be the important issues to discuss. It is earnestly hoped that by undergoing this thorough research, more potential for factors affecting students' motivation and learning strategies can be found.

This research aims to investigate the relations between student's personality types and their achievement emotions, learning motivation and learning strategies. There are four constructs concerning enneagram (personality types), achievement emotions, achievement goals and self-regulation learning strategy. The present research would not only find their relationships with each other, but develop models for explaining their combination.

Literature Review

Personality Types

Enneagram is a personality model which includes nine personality types concerning perfectionist, giver, performer, individualist, thinker, questioner, optimistic, leader and peace-maker (Palmer, 1991).

The first type is perfectionist (Palmer, 1991). This type of people is careful and idealistic to be right, so they would easily procrastinate the work (Levine, 1999). They would strive to be perfect that they want to be faultless (Tallon & Sikora, 2006).

The second type is giver (Palmer, 1991). This type of people is caring that they are used to give to other for gaining love and admiration and evading being rejected (Levine, 1999). They would strive to be connected that they want to be loved and have good relationships with others (Tallon & Sikora, 2006).

The third type is performer (Palmer, 1991). This type of people is competent and well-organized that they would emphasize the result and evade the failure (Levine, 1999). They also avoid experiencing emotions for making the tasks be smooth (Palmer, 1991). They would strive to be outstanding and successful (Tallon & Sikora, 2006).

The fourth type is individualist (Palmer, 1991). This type of people is responsive, creative and emotional (Levine, 1999). They like being special one (Levine, 1999). They would strive to be unique that they want to be different (Tallon & Sikora, 2006).

The fifth type is thinker (Palmer, 1991). This type of people is personal and logical thinker (Levine, 1999). They like gaining knowledge (Levine, 1999). They would strive to be detached that they want to be self-determining (Tallon & Sikora, 2006).

The sixth type is questioner (Palmer, 1991). This type of people is loyal and responsible, but suspicious and fear of success and danger (Levine, 1999). They would strive to be secure that they want to be safe and involved in groups (Tallon & Sikora, 2006).

The seventh type is optimistic (Palmer, 1991). This type of people tend to be enjoyable that they like having fun, but dislike pain choices and keep promises (Levine, 1999). They would strive to be excited (Tallon & Sikora, 2006).

The eighth type is leader (Palmer, 1991). This type of people is straight that they are always leaders (Levine, 1999). They tend not to depend on others (Levine, 1999). They would strive to be strong that they want to show their power (Tallon & Sikora, 2006).

The ninth type is peace-maker (Palmer, 1991). This type of people is patient, but hard to make choices and set priorities (Levine, 1999). They would strive to be peaceful that they want to maintain in harmony with others (Tallon & Sikora, 2006).

Achievement Emotions

Achievement emotions meant the emotions related to achievement actions and results directly (Pekrun et al., 2011). Seven achievement emotions concerning enjoyment, pride, anger, anxiety, shame, hopelessness and boredom are emphasized in the present research (Pekrun et al., 2011). Enjoyment and pride belonged to positive emotions, whereas anger, anxiety, shame, hopelessness and boredom belonged to negative emotions (Pekrun et al., 2011). Each emotion included multi-component namely affective, cognitive, motivational and physiological components (Pekrun et al., 2011).

Achievement Goals

Achievement goals were defined as the reasons and intentions for people to have achievement actions in particular settings (Ames, 1992; as cited by Bong, 2009). There are four achievement goals concerning mastery-approach goal, performance-approach goal, mastery-avoidance goal and performance-avoidance goal (Bong, 2009). First, people who have mastery-approach goal would learn new knowledge in order to be more successful (Dweck & Leggett, 1988; as cited by Bong, 2009), while emphasizing the quality and improvement of their own performance (Bong, 2009). Second, people who have performance-approach goal would also tend to move toward success, but focus on

comparing their performance with their peers and desire to gain superiority (Bong, 2009). Third, people who have mastery-avoidance goal would fear failure and avoid showing that they cannot achieve the best they could (Bong, 2009). Fourth, people who have performance-avoidance goal would also avoid failure through not performing incompetence compared with their peers (Bong, 2009).

Self-regulated Learning Strategies

Self-regulated learning (SRL) is generally defined as a complicated process which combines people's self-learning process and motivational variables (Weinstein, Husman & Dierking, 2000; as cited by Cleary, 2006). It can help people control or adjust their behaviors efficiently.

Three factors concerning strategies of managing their learning environment and behavior, strategies of seeking and learning information and maladaptive regulatory behavior would be the focus of the present research (Cleary, 2006). First, strategies of managing their learning environment and behavior stated people how to organize their physical environment and study materials, manage the time, make the plans and be self-control (Cleary, 2006). Second, strategies of seeking and learning information indicated people how to search information from other sources and manipulate the information about subjects (Cleary, 2006). Third, maladaptive regulatory behavior meant the avoidance behavior with difficult learning and maladaptive self-management skills (Cleary, 2006).

Personality and Achievement Goals

As above mentioned, there are some studies to prove the relationships between personality and motivation (Major, Turner, & Fletcher, 2006; Bopp, Steinmayr, & Spinath, 2008). Bopp, Steinmayr and Spinath (2008) found the relationships between Big Five and achievement goals that neuroticism was positively related to both performance-approach and performance-avoidance goals, whereas extroversion and conscientiousness were positively correlated to mastery-approach goal. Therefore, it is expected that there would be a linkage between personality and people's achievement goals.

Personality and Achievement Emotions

Tallon and Sikora (2006) stated that enneagram has relationships with people's emotional intelligence which indicated people's management of their emotions. Palmer (1991) also claimed that enneagram have linkages with emotions. Thereby, it is referred that personality can link with emotions related to achievement actions and results (achievement emotion) (Pekrun et al., 2011).

Achievement Goals and Achievement Emotions

Some research discovered the relationships between achievement goals and achievement emotions (Daniales et al., 2009; Pekrun, Elliot, & Maier, 2006). It was found that mastery goals were positively related to enjoyment, hope and pride, and negatively related to boredom, anger and anxiety (Daniales et al., 2009; Pekrun, Elliot, & Maier, 2006). Besides, mastery-avoidance goals were positively related to anxiety (Bong, 2009). In addition, performance-approach goals were positively related to pride and hope (Pekrun, Elliot, & Maier, 2009), while Performance-avoidance goals were positively related to anxiety, hopelessness and shame (Pekrun, Elliot, & Maier, 2009).

Learning Goals and Self-regulated Learning Strategies

According to Ames and Archer (1998), students who have different goal orientation would adopt various learning ways and strategies which cause various achievements (as cited by Lau & Lee, 2008). People with mastery goal would be more motivated to learn and tend to use systematic learning strategies (Lau & Lee, 2008). It was also found that both mastery approach goal and mastery avoidance goal were positively associated to strategy use (Lau & Lee, 2008; Bong, 2009).

Moreover, the relationships between performance goals, strategies use and achievement were tested and found the inconsistency (Lau & Lee, 2008). In addition, performance avoidance goal was positively associated to help-seeking avoidance (Bong, 2009) and negatively associated to learning

attitudes (Lau & Lee, 2008).

Achievement Emotions and Self-regulated Learning Strategies

According to Pekrun, Goetz and Titz (2002), achievement emotions were related to learning including self-regulation. Positive emotions (enjoyment and pride) were positively related to manipulating of information and self-regulated learning (Pekrun, Goetz, & Titz, 2002; Pekrun et al., 2011), whereas negative emotions (anger, anxiety, shame, hopelessness and boredom) were negatively related to them (Pekrun et al., 2011).

Research Hypotheses

Referring to the literature review, four hypotheses are formed in order to show the expectations about the results of the research.

1. There exist significant relationships of Enneagram with both people's achievement goals and negative achievement emotions, and subsequent to their self-regulation learning strategies at $p = .05$.
2. There exist significant relationships of Enneagram with people's achievement goals and positive achievement emotions, and subsequent to their self-regulation learning strategies at $p = .05$.
3. A desirable structural model consisting of Enneagram, achievement goals, negative achievement emotions and learning strategies can be formulated and validated.
4. A desirable structural model consisting of Enneagram, achievement goals, positive achievement emotions and learning strategies can be formulated and validated.

Method

Participants

Two hundreds and sixty-six university students (159 females and 107 males) in Hong Kong participated (Age: $M = 20.80$, $SD = 1.21$). All of them will be based on convenient sampling. They studied in department of counselling and psychology, accounting, business administrative, economics and finance.

Enneagram Questionnaire

For assessing people's personality types, adapted Enneagram Questionnaire was used. Enneagram Questionnaire in the present study was adapted from Palmer (1991) as well as Baron and Wagele (1994). It had nine scales concerning perfectionist (six items), giver (six items), performer (six items), individualist (six items), thinker (six items), questioner (six items), optimistic (six items), leader (six items) and mediator (six items). For testing reliability and validity of the questionnaires, it was designed to be 54 items with 5-point Likert scale ranging from 1 (very not accurate) to 5 (very accurate).

The Patterns of Adaptive Learning Scales (PALS)

For assessing people's achievement goals, the adapted Patterns of Adaptive Learning Scales (PALS) was used. The adapted questionnaire included mastery-approach goal scale (six items), performance-approach goal scale (five items), performance-avoidance goal scale (six items) and mastery-avoidance goal scale (six items) (Bong, 2009). It was 5-point Likert scale ranging from 1 (completely not right), 3 (slightly right) to 5 (completely right). The reliabilities of these scales are from .69 to .84.

Achievement Emotions Questionnaire (AEQ)

For assessing people's achievement emotions, the adapted Achievement Emotions Questionnaire was used (AEQ; Pekrun, Goetz, Frenzel, Barchfeld, & Perry, 2011; as cited by Berg, 2008). There were 7 scales concerning enjoyment (three items), boredom (three items), anger (three

items), pride (three items), anxiety (three items), hopelessness (three items) and shame (three items) (Berg, 2008). It was 5-point Likert scale ranging from 1 (very disagree) to 5 (very agree). The reliabilities of all scales were good that their alpha coefficients are from .75 to .85 (Pekrun et al., 2011).

The Self-regulation Strategy Inventory (SRSI-SR)

For assessing the type of self-regulation strategy participants used, the adapted self-regulation strategy inventory (SRSI-SR; Cleary, 2006). There were three factors concerning strategies of managing their learning environment and behavior (twelve items), strategies of seeking and learning information (eight items) and maladaptive regulatory behavior (eight items) (Cleary, 2006). Twenty eight items were adopted from the original forty items. It was 7-point scale ranging from 1 (never) to (always). The internal reliability is very good that the alpha coefficient is .92.

Results

Descriptive Statistics and Correlational Analysis

Means, standard deviations and correlational analysis for the 23 measured variables from 4 questionnaires in this study are shown in Table 1. One hundred and fifty-three out of 253 correlations were statistically significant.

Table 1

Zero-order Correlations, Means, and Standard Deviations for Study Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Enneagram																							
1. Perfectionist	--																						
2. Giver	.08	--																					
3. Performer	.32**	.02	--																				
4. Individualist	.12	.03	.29**	--																			
5. Thinker	.11	.13*	.02	.42**	--																		
6. Questioner	.27**	.08	.38**	.56**	.39**	--																	
7. Optimistic	-.06	.00	.25**	-.06	-.18*	-.07	--																
8. Leader	.21**	.11	.48**	.16*	.07	.29**	.23**	--															
9. Peace-maker	-.11	.13*	.13*	.40**	.40**	.30**	-.02	.12*	--														
Achievement Goals																							
10. MP	.23**	.10	.29**	.10	-.04	.12	.16*	.14*	-.05	--													
11. MA	.42**	.06	.33**	.50**	.28**	.47**	-.01	.10	.22**	.42**	--												
12. PP	.17**	-.06	.42**	.28**	.03	.25**	.04	.15*	.21**	.40**	.42**	--											
13. PA	.04	.05	.18**	.26**	.15*	.32**	-.03	.10	.17**	.25**	.44**	.38**	--										
Achievement Emotions																							
14. Enjoyment	.10	.09	.17**	.05	-.04	-.01	.06	.08	-.05	.56**	.20**	.14*	.04	--									
15. Pride	.09	-.01	.42**	.22**	.01	.24**	.11	.28**	.23**	.27**	.31**	.56**	.21**	.29**	--								
16. Anger	.02	.02	.19**	.26**	.16*	.35**	-.12	.16*	.18**	-.07	.22**	.17**	.46**	-.06	.20**	--							
17. Anxiety	.08	.13*	.10	.33**	.24**	.38**	-.15*	.01	.25**	-.02	.45**	.28**	.48**	.07	.27**	.44**	--						
18. Shame	-.04	.13*	.05	.33**	.29**	.41**	-.13*	.04	.31**	-.04	.25**	.16**	.48**	.01	.17**	.57**	.70**	--					
19. Hopelessness	-.04	.05	.07	.23**	.23**	.29**	-.11	.11	.19**	-.16**	.23**	.01	.45**	-.07	.06	.65**	.53**	.59**	--				
20. Boredom	-.12*	.06	.03	.13*	.22**	.27**	.01	.17**	.26**	-.37**	.03	.02	.28**	-.42**	.02	.48**	.34**	.47**	.53**	--			
Self-regulation learning strategy																							
21. Manage	.32**	-.01	.16**	.04	-.05	.05	.02	.04	-.12	.35**	.25**	.18**	.09	.27**	.19**	-.03	.10	-.05	-.04	-.16**	--		
22. Seek	.21**	.13*	.22**	-.01	-.01	.09	.04	.15*	.06	.27**	.14*	.14*	-.04	.25**	.23**	-.10	.00	-.08	-.08	-.11	.58**	--	
23. Maladaptive	-.16*	.16*	.16*	.24**	.16*	.25**	.12*	.23**	.40**	-.06	.13*	.08	.42**	-.13*	.11	.34**	.25**	.38**	.41**	.34**	-.16*	-.03	--
<i>M</i>	6.89	6.49	6.39	5.95	6.61	5.78	10.93	6.09	6.42	15.15	9.43	15.80	12.55	11.94	9.38	6.87	7.75	11.60	4.82	14.00	22.83	18.58	14.86
<i>SD</i>	1.22	1.20	1.20	1.47	1.25	1.34	2.03	1.24	1.45	3.28	1.54	3.76	3.44	2.53	1.82	2.18	1.92	3.27	1.41	3.52	3.83	2.92	3.98

Note: MP = Mastery-approach goal; MA = Mastery-avoidance goal; PP = Performance-approach goal; PA = Performance-avoidance goal; Manage = managing their learning environment and behavior; Seek = strategies of seeking and learning information; Mala = maladaptive regulatory behavior

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

Reliability Analysis

In pilot test, the reliability analysis with Cronbach's alpha was conducted for the scales of four questionnaires. All Questionnaire indicated satisfactory reliabilities, $\alpha > .60$.

In main study, the reliability analysis with Cronbach's alpha was also conducted for the scales of five questionnaires in the final test (see Table 2). In enneagram questionnaire, 6 scales indicated satisfactory reliabilities, $\alpha > .60$. However, 3 scales concerning giver, thinker and peace-maker had low reliabilities ($\alpha < .60$), although their reliabilities passed in the pilot test. Due to the low reliabilities, these three scales need to be deleted. In PALS, 4 scales also indicated good reliabilities, $\alpha > .70$. In AEQ, 7 scales indicated satisfactory reliabilities, $\alpha > .60$. One items of the anger scale need to be deleted for reaching the satisfactory reliability. In SRSI-SR, 3 scales indicated satisfactory and good reliabilities, $\alpha > .60$.

Table 2

Coefficient Alphas and Items Comprising the Scales of Four Questionnaires

Scale	α
Enneagram	
1. Perfectionist	.67
2. Giver	.41
3. Performer	.60
4. Individualist	.76
5. Thinker	.51
6. Questioner	.61
7. Optimistic	.64
8. Leader	.75
9. Peace-maker	.45
Achievement Goals	
10. Mastery-approach goal	.79
11. Mastery-avoidance goal	.73
12. Performance-approach goal	.77
13. Performance-avoidance goal	.77
Achievement Emotions	
14. Enjoyment	.72
15. Pride	.67
16. Anger	.61
17. Anxiety	.64
18. Shame	.74
19. Hopelessness	.60
20. Boredom	.77
Self-regulation learning strategy	
21. Manage	.74
22. Seek	.67
23. Maladaptive	.74

Confirmatory Factor Analysis

As above mentioned, confirmatory factor analysis would be conducted after parceling and deleting some items for making the models be fitter (Holt, 2004). After item parceling and deletion, confirmatory factor analysis was conducted.

The results showed that the scales of all questionnaires except SRSI-SR had good fit to the data concerning CFI or GFI is higher than .90. The details are as below:

In enneagram questionnaire, $\chi^2(50) = 118.63$, Goodness of Fit Index (GFI) = .93, Comparative Fit Index (CFI) = .94, Root Mean Square Error of Approximation (RMSEA) = .072. All factor loadings were significant, and the average factor loading was .70.

In AEQ, $\chi^2(254) = 560.42$, GFI = .85, CFI = .94, RMSEA = .07. All factor loadings were significant, and the average factor loading was .63.

In PALS, $\chi^2(129) = 436.70$, GFI = .83, CFI = .91, RMSEA = .10. All factor loadings were significant, and the average factor loading was .66.

In SRSI-SR, $\chi^2(62) = 208.04$, GFI = .89, CFI = .89, RMSEA = .094. All factor loadings were significant, and the average factor loading was .63.

Path Analysis about Personality Types, Achievement Goals, Negative Achievement Emotions and Self-regulated Learning Strategies

Figure 1 exhibited relationships between enneagram, achievement goals, negative achievement emotions and self-regulated learning strategies. For the relationships between personality (exogenous variables) and achievement goals (intermediary variables), perfectionist was significantly associated with mastery-approach goal ($\beta = .18$, $p < .01$) and mastery-avoidance goal ($\beta = .36$, $p < .001$). Performer was significantly related with mastery-approach goal ($\beta = .17$, $p < .05$) and performance-approach goal ($\beta = .34$, $p < .001$). Individualist was significantly related with mastery-avoidance goal ($\beta = .37$, $p < .001$) and performance-approach goal ($\beta = .18$, $p < .05$). Questioner was significantly related with mastery-avoidance goal ($\beta = .17$, $p < .05$) and performance-avoidance goal ($\beta = .29$, $p < .001$). Optimistic was significantly related with mastery-approach goal ($\beta = .16$, $p < .05$). Leader was significantly related with mastery-avoidance goal ($\beta = -.15$, $p < .05$).

For the relationships between personality (exogenous variables) and negative achievement emotions (intermediary variables), performer, optimistic and leader had no significant relationship with any negative achievement emotions. However, perfectionist was significantly related with shame ($\beta = -.15$, $p < .05$) and boredom ($\beta = .22$, $p < .01$). Individualist was significantly related with anxiety ($\beta = .16$, $p < .05$). Questioner was significantly ($p < .001$) related with anger ($\beta = .28$), anxiety ($\beta = .32$), shame ($\beta = .41$), hopelessness ($\beta = .22$) and boredom ($\beta = .33$).

For the relationships between achievement goals (intermediary variables) and learning strategy (endogenous variables), mastery-approach goal was significantly ($p < .001$) related with managing their learning environment and behavior ($\beta = .36$) and strategies of seeking and learning information ($\beta = .28$). Mastery-avoidance goal had not significant relationship with any learning strategy. Performance-approach goal was significantly ($p < .05$) related with strategies of seeking and learning information ($\beta = .14$) and maladaptive regulatory behavior ($\beta = .15$). Performance-avoidance goal was significantly related with strategies of seeking and learning information ($\beta = -.19$, $p < .01$) and maladaptive regulatory behavior ($\beta = .29$, $p < .001$).

For the relationships between achievement emotions (intermediary variables) and learning strategy (endogenous variables), anger and hopelessness had not significant association with any learning strategy. However, anxiety was significantly related with managing their learning environment and behavior ($\beta = .23$, $p < .001$) and maladaptive regulatory behavior ($\beta = -.13$, $p < .05$). Shame was significantly ($p < .001$) related with managing their learning environment and behavior ($\beta = -.25$) and maladaptive regulatory behavior ($\beta = .23$). Boredom was significantly ($p < .05$) related with maladaptive regulatory behavior ($\beta = .13$).

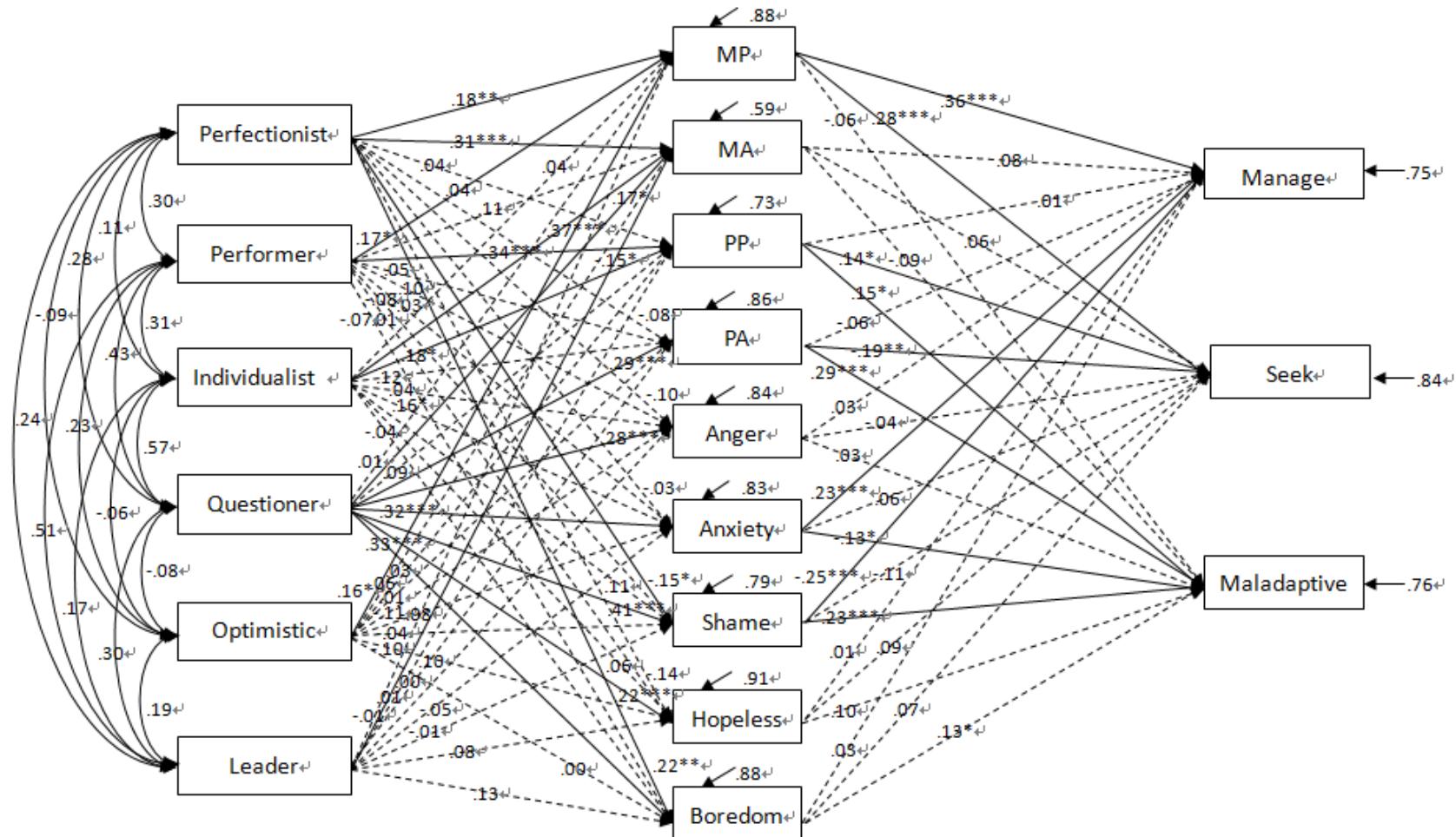


Figure 1. The path model showing the effects of enneagram on achievement goals, negative achievement emotions and self-regulated learning strategies. Note: MP = Mastery-approach goal; MA = Mastery-avoidance goal; PP = Performance-approach goal; PA = Performance-avoidance goal; Manage = managing their learning environment and behavior; Seek = strategies of seeking and learning information; Mala = maladaptive regulatory behavior; Dot line = no significance * $p < .05$ ** $p < .01$ *** $p < .001$

Path Analysis about Personality Types, Achievement Goals, Positive Achievement Emotions and Self-regulated Learning Strategies

Figure 2 exhibited relationships between enneagram, achievement goals, positive achievement emotions and self-regulated learning strategies. For the relationships between personality (exogenous variables) and achievement goals (intermediary variables), perfectionist was significantly related with mastery-approach goal ($\beta = .18$, $p < .01$) and mastery-avoidance goal ($\beta = .36$, $p < .001$). Performer was significantly related with mastery-approach goal ($\beta = .17$, $p < .05$) and performance-approach goal ($\beta = .34$, $p < .001$). Individualist was significantly related with mastery-avoidance goal ($\beta = .37$, $p < .001$) and performance-approach goal ($\beta = .18$, $p < .05$). Questioner was significantly related with mastery-avoidance goal ($\beta = .17$, $p < .05$) and performance-avoidance goal ($\beta = .29$, $p < .001$). Optimistic was significantly related with mastery-approach goal ($\beta = .16$, $p < .05$). Leader was significantly related with mastery-avoidance goal ($\beta = -.15$, $p < .05$).

For the relationship between personality (Exogenous variables) and positive achievement emotions (intermediary variables), perfectionist, individualist, questioner, optimistic and leader had no significant relationship with all positive achievement emotions. Only performer was significantly related with pride ($\beta = .35$, $p < .001$).

For the relationships between achievement goals (intermediary variables) and learning strategy (endogenous variables), mastery-approach goal was significantly related with managing their learning environment and behavior ($\beta = .26$, $p < .001$) and strategies of seeking and learning information ($\beta = .17$, $p < .01$). Mastery-avoidance goal was significantly related with managing their learning environment and behavior ($\beta = .16$, $p < .05$). Performance-approach goal had no significant relationship with any learning strategy. Performance-avoidance goal was significantly related with strategies of seeking and learning information ($\beta = -.14$, $p < .05$) and maladaptive regulatory behavior ($\beta = .45$, $p < .001$).

For the relationships between achievement emotions (intermediary variables) and learning strategy (endogenous variables), enjoy was significantly related with maladaptive regulatory behavior ($\beta = -.20$, $p < .001$). Pride was significantly related with strategies of seeking and learning information ($\beta = .18$, $p < .01$).

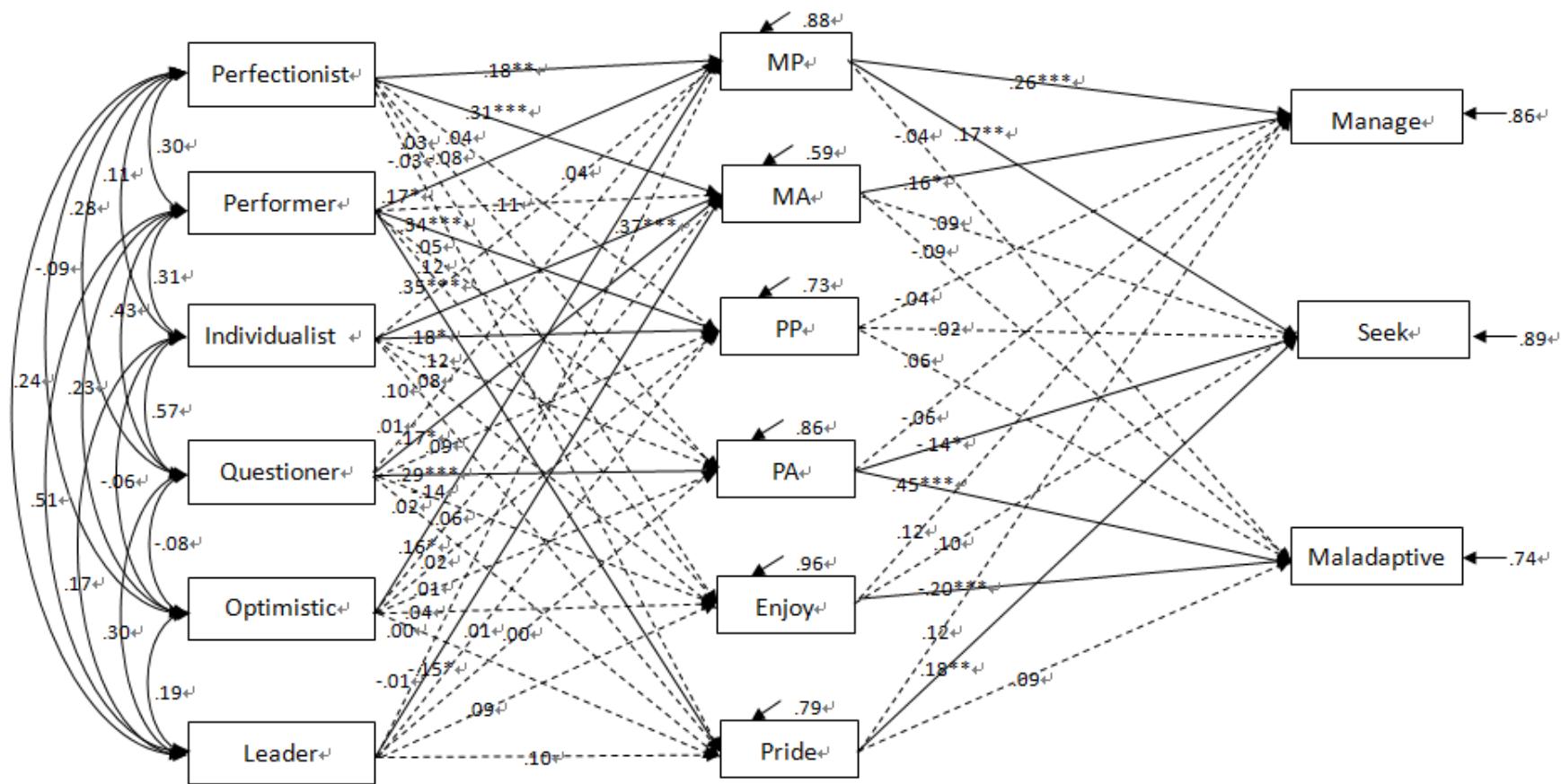


Figure 2. The path model showing the effects of enneagram on achievement goals, positive achievement emotions and self-regulated learning strategies. Note: MP = Mastery-approach goal; MA = Mastery-avoidance goal; PP = Performance-approach goal; PA = Performance-avoidance goal; Manage = managing their learning environment and behavior; Seek = strategies of seeking and learning information; Mala = maladaptive regulatory behavior; Dot line = no significance * $p < .05$ ** $p < .01$ *** $p < .001$

Structural Equation Modeling (SEM) with Personality Types, Achievement Goals, Negative Achievement Emotions and Self-regulated Learning Strategies

The relations between the observed variables and their underlying latent variables including enneagram, achievement goals, negative achievement emotions and self-regulation learning strategy are shown in Figure 3. The hypothesized model was tested with maximum likelihood method, $\chi^2(61) = 228.18$, Goodness of Fit Index = .86, Comparative Fit Index = .91, Root Mean Square Error of Approximation = .11. Since CFI is slightly higher than .9 and the chi-square ratio is 3.74 (< 4.0), therefore a fairly fit model could be established.

Enneagram included 3 observed variables concerning performer, individualist and questioner. Enneagram was ($p < .001$) significantly related with performer ($\beta = .51$), individualist ($\beta = .70$) and questioner ($\beta = .79$). It showed that questioner was the best predictor in this model.

Achievement goals also included 3 observed variables concerning mastery-avoidance goal, performance-approach goal and performance-avoidance goal. Achievement goals were ($p < .001$) significantly related with mastery-avoidance goal ($\beta = .78$), performance-approach goal ($\beta = .66$) and performance-avoidance goal ($\beta = .60$).

Negative achievement emotions included 5 observed variables concerning anger, anxiety, shame, hopelessness and boredom. Negative achievement emotions were ($p < .001$) significantly related with anger ($\beta = .73$), anxiety ($\beta = .75$), shame ($\beta = .83$), hopelessness ($\beta = .77$) and boredom ($\beta = .61$).

Self-regulated learning strategies included 2 observed variables concerning managing their learning environment and behavior as well as strategies of seeking and learning information. Self-regulation learning strategies were ($p < .001$) significantly related with managing their learning environment and behavior ($\beta = .85$) as well as strategies of seeking and learning information ($\beta = .69$).

For the relationships between latent variables, enneagram was positively significantly ($p < .001$) related with achievement goals ($\beta = .80$) and achievement emotions ($\beta = .54$). It revealed that the influence of enneagram with achievement goals was higher than that with achievement emotions. At the meanwhile, achievement goals were positively related with self-regulation learning strategy ($\beta = .46$, $p < .001$), whereas achievement emotions were negatively related with self-regulation learning strategy ($\beta = -.28$, $p < .001$).

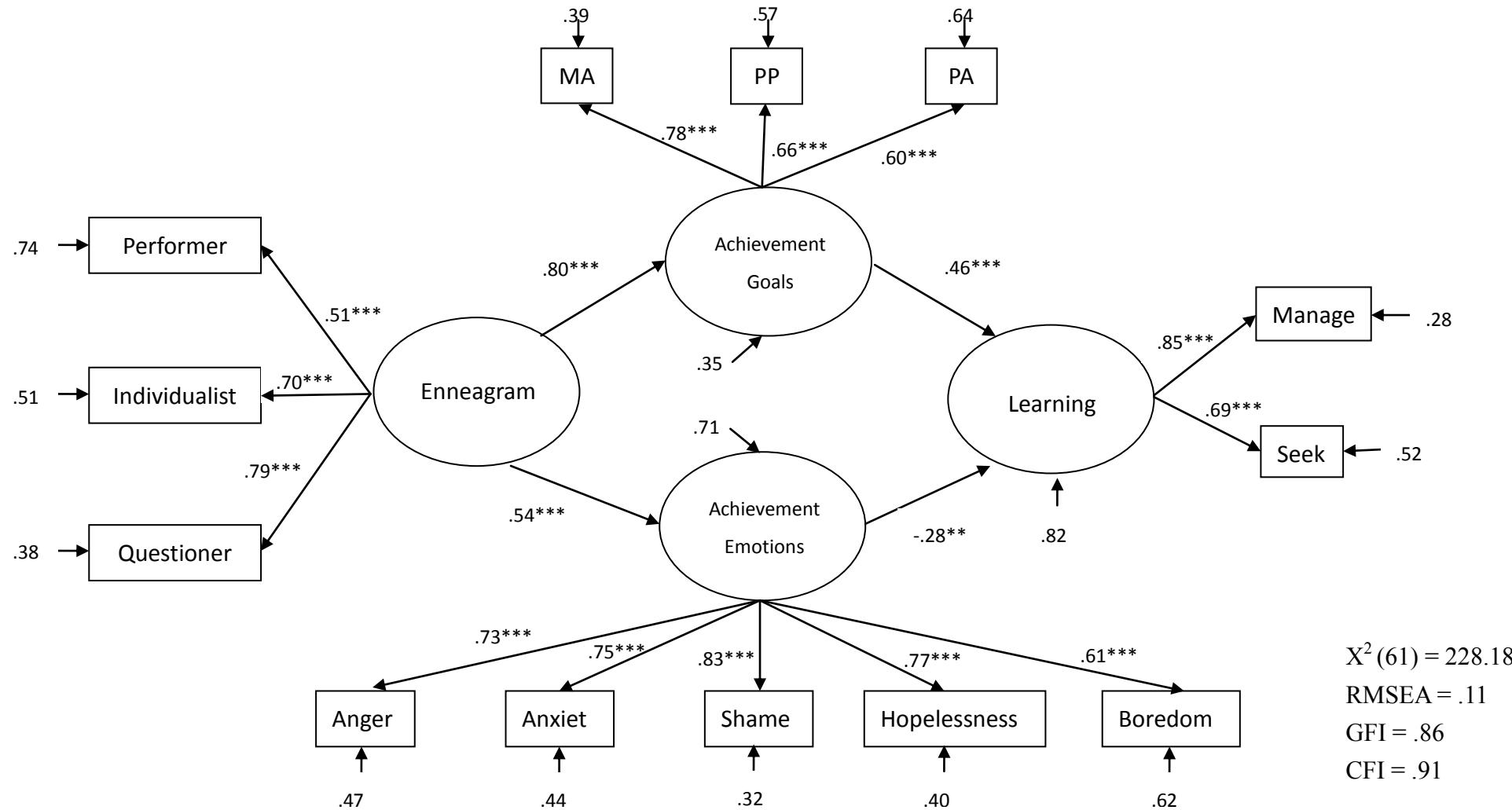


Figure 3. The structural model of the link between Enneagram, achievement goals, achievement emotions and self-regulation learning strategies. Note: MP = Mastery-approach goal; MA = Mastery-avoidance goal; PP = Performance-approach goal; PA = Performance-avoidance goal; Manage = managing their learning environment and behavior; Seek = strategies of seeking and learning information; Mala = maladaptive regulatory behavior; RMSEA = Root Mean Square Error of Approximation; GFI = Goodness of Fit Index; CFI = Comparative Fit Index ** $p < 0.01$ *** $p < 0.001$

SEM with Personality Types, Positive Achievement Emotions and Self-regulated Learning Strategies

The relations between the observed variables and their underlying latent variables including enneagram, positive achievement emotions, achievement goals and self-regulation learning strategy were computed. However, it was found that both GFI and CFI of the model are $.81 > .90$, so the model cannot be established.

Eliminating the achievement goals, the good relations between the observed variables and their underlying latent variables including enneagram, positive achievement emotions and self-regulation learning strategy were found (see Figure 4). The hypothesized model was tested with maximum likelihood method, $\chi^2(25) = 97.75$, Goodness of Fit Index = .87, Comparative Fit Index = .91, Root Mean Square Error of Approximation = .11. Since CFI is higher than .9, a fairly fit model could be established.

Enneagram included 5 observed variables concerning perfectionist, performer, individualist, questioner and leader. Enneagram was ($p < .001$) significantly related with perfectionist ($\beta = .39$), performer ($\beta = .76$), individualist ($\beta = .48$), questioner ($\beta = .60$) and leader ($\beta = .58$). Performer was the best predictor in this model.

Positive achievement emotions included 2 observed variables concerning enjoy and pride. Positive achievement emotions were ($p < .001$) significantly related with enjoy ($\beta = .41$) and pride ($\beta = .77$).

Self-regulated learning strategies included 2 observed variables concerning managing their learning environment and behavior as well as strategies of seeking and learning information. Self-regulation learning strategy was ($p < .001$) significantly related with managing their learning environment and behavior ($\beta = .72$) as well as strategies of seeking and learning information ($\beta = .80$).

For the relationships between latent variables, enneagram was positively significantly related with achievement emotions ($\beta = .64$, $p < .001$), which were also positively related with self-regulation learning strategy ($\beta = .47$, $p < .001$).

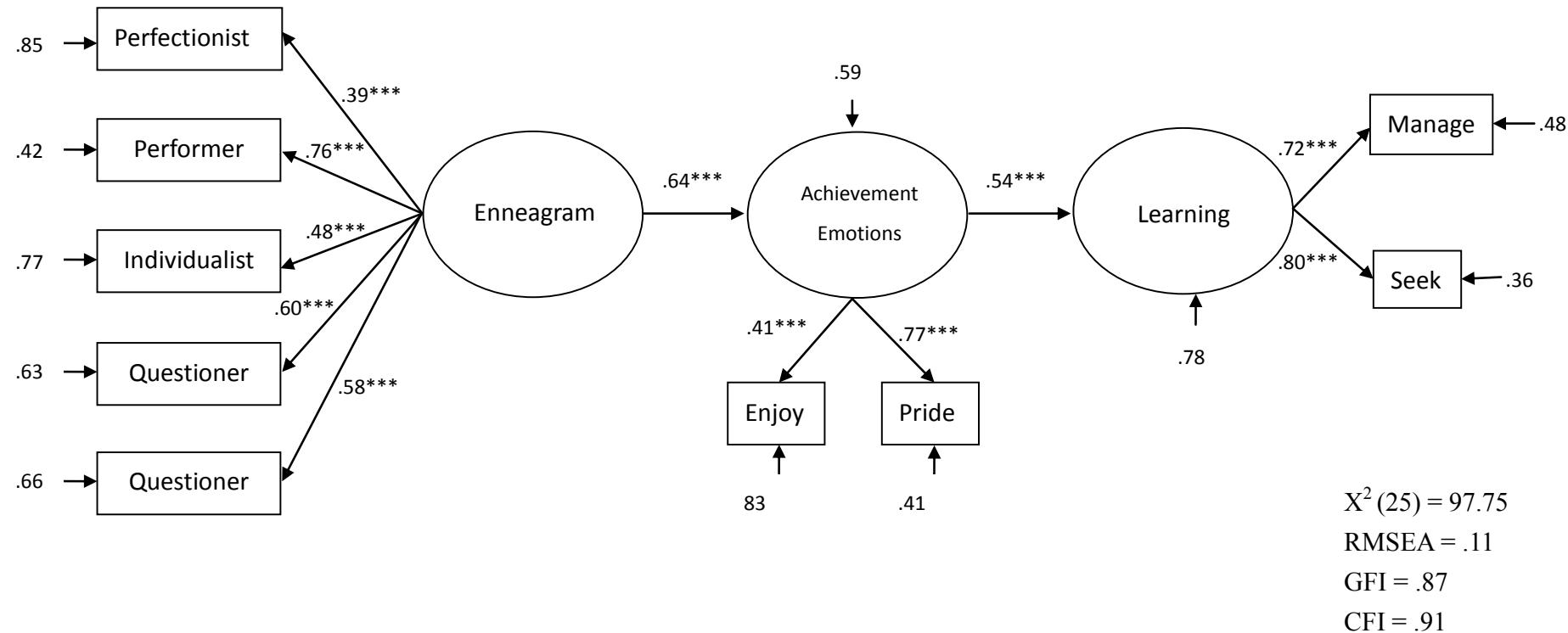


Figure 4. The structural model of the link between enneagram, positive achievement emotions and self-regulated learning strategies. Note: Manage = managing their learning environment and behavior; Seek = strategies of seeking and learning information; Mala = maladaptive regulatory behavior; RMSEA = Root Mean Square Error of Approximation; GFI = Goodness of Fit Index; CFI = Comparative Fit Index *** $p < .001$

Discussion

The present research is to develop path diagrams and models for investigating the relations of student's personality types their achievement goals, achievement emotions and self-regulation learning strategy.

Path analyses

Referred to hypothesis 1, it was proved that there exist significant relationships of enneagram with both people's achievement goals and negative achievement emotions, and subsequent to their self-regulation learning strategies. The results showed that questioner was the strongest predictor. Questioner had significant relationships with mastery-avoidance goal, performance-avoidance goal and all negative achievement emotions. Questioners strive to be secure (Tallon & Sikora, 2006) and feel scared of success and danger (Levine, 1999), so they tend to trigger negative emotions, fear failure and adopt avoidance goals.

Secondly, perfectionist had significant positive relationships with mastery-approach goal, mastery-avoidance goal and boredom, whereas it had significant negative relationships with shame. Perfectionists are careful and emphasize to do the right things (Levine, 1999). They are eager to be prefect (Tallon & Sikora, 2006), so they like mastering different tasks (mastery-approach goal) and avoiding failure (mastery-avoidance goals) when learning.

Thirdly, individualist had significant positive relationships with mastery-avoidance goal, performance-approach goal and anxiety. They are also emotional and responsive (Levine, 1999), so they may feel anxious easily. Individualists strive to be unique, so they tend to avoid failure (mastery-avoidance goal) and like competing with other (performance-approach goal).

In general, it is consistent with previous study that mastery-approach goal had significant positive relationships with managing and seeking learning strategies. People who had mastery-approach goal tend to use strategy (Ablard & Lipschultz, 1998). It is also consistent that performance-avoidance goals had negative relationship with seeking learning strategy, but positive relationship with maladaptive regulatory behavior. People who had performance-avoidance goals would tend not to seek help and have negative learning skills (Bong, 2009; Lau & Lee, 2008). To explain the inconsistency between performance-approach goals and learning strategies, the present study was found that, affected by negative achievement emotions, performance-approach goals had positive significant relationships with seeking learning strategies and maladaptive regulatory.

Surprisingly, not all negative achievement emotions were negatively related to self-regulation learning strategies (Pekrun et al., 2011). Shame had positive significant relationship with maladaptive regulatory behavior, but negative significant relationship with managing learning strategy. Boredom had positive significant relationship with maladaptive regulatory behavior. However, anxiety was positively related to managing environment and behavior, but negatively related to maladaptive. Anger and hopelessness had no relationship with any learning strategies.

Referred to hypothesis 2, it was proved that there exist significant relationships of enneagram with people's achievement goals and positive achievement emotions, and subsequent to their self-regulation learning strategies. The results showed that performer was the only predictor. It had positive relationships with mastery-approach goal, performance-approach goal and pride which were also positively related to all self-regulated learning strategies. Performers are competent and well-organized (Levine, 1999). They strive to be outstanding (Tallon & Sikora, 2006), so they are interested in mastering different tasks (mastery-approach goal) and compete with other (performance-approach goal). They can control emotions well (Palmer, 1991) that may be the reason for the linkage with positive achievement emotions.

Consistent with the previous study, positive achievement emotions linked with self-regulated learning strategies (Pekrun, Goetz, & Titz, 2002; Pekrun et al., 2011). Pride had positive significant relationship with seeking learning strategy. Enjoyment had negative significant relationship with maladaptive regulatory behavior.

Structural Equation Models

Two SEMs with enneagram which had good fitness were established. In SEM one, the linkages between enneagram, achievement goals, achievement emotions and self-regulated learning strategies was found. The model is consistent with the hypothesis. Enneagram as personality had relationships with both achievement goals except mastery-approach goals (Bopp et al., 2008) and all negative achievement emotions (Pekrun et al., 2011). It is noted that enneagram affected the achievement goals more than the achievement emotions. The reasons need to have further examination. In line with the past studies, achievement goals were positively related to learning strategy (Lau & Lee, 2008), whereas negative achievement emotions were negatively related to learning strategy (Pekrun et al., 2011).

Notably, the hypothesized model between enneagram, achievement goals, positive achievement emotions and learning strategies cannot be formed that was not well-supported in the present study. Nonetheless, eliminating the achievement goals, a model with good fitness was formed. In line with the past studies, enneagram affected the positive achievement emotions (Pekrun et al., 2011) which also affected learning strategies (Pekrun et al., 2002; Pekrun et al., 2011).

Conclusion

The present study contributes to prove the relationships among personality, achievement goals, achievement emotions and self-regulated learning strategies. The main findings were that two structural equation models can be formulated and validated.

From theoretical perspective, the present paper can provide new direction for researchers to study further. The present study also explored new personality measurements and examined the concept of educational psychology such as achievement emotions and self-regulated learning strategies.

From an applied perspective, people can also be aware of the influence of personality and achievement emotions on learning motivation and learning strategies. More programs which aim to cultivate students to have good emotions are suggested.

There are some limitations in the present research. Reliabilities of enneagram were not stable. Three scales of enneagram concerning giver, thinker and peace-maker even lower than .60 in the main study which needed to be deleted. In the future studies, developing good enneagram questionnaires was suggested.

As above mentioned, model 2 linking enneagram, positive achievement emotions and self-regulation learning strategy with good fitness was formed only when eliminating the achievement goals. There may be a need to have further study to examine why the model work in eliminating the achievement goals.

References

- Ablard, K. E., & Lipschultz, R. E. (1998). Self-regulated learning in high-achieving students: Relations to advanced reasoning, achievement goals and gender. *Journal of Educational Psychology, 90*(1), 94-101.
- Ames, C. (1992). Classrooms: Goals, structure, and student motivation. *Journal of Educational psychology, 84*, 261-271.
- Ames, C., & Archer, J. (1998). Achievement goals in the classrooms: Students' learning strategies and motivation processes. *Journal of Educational Psychology, 80*, 260-267.
- Bandalos, D. L., & Finney, S. J. (2001). Item parceling issues in structural equation modeling. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation*

modeling: New developments and techniques. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Baron, R., & Wagele, E. (1994). *The Enneagram made easy: Discover the 9 types of people.* San Francisco: Harper.

Berg, C. (2008). Academic emotions in student achievement: Promoting engagement and critical thinking through lessons in bioethical dilemmas. *Maricopa Community College.* Retrieved from: <http://mcli.maricopa.edu/files/mil/reports/cberg-report.pdf>.

Bong, M. (2009). Age-related differences in achievement goal differentiation. *Journal of Educational Psychology, 101*(4), 879-896.

Bopp, T., Steinmayr, R., & Spinath, B. (2008). Personality and achievement motivation: Relationship among Big Five domain and facet scales, achievement goals, and intelligence. *Personality and Individual Differences, 44*, 1454-1464.

Cheung, W. L. (2008). A model for integrating fixed-, random-, and mixed-effects meta-analyses into structural equation modeling. *Psychological Methods, 13*(2), 182-202.

Cleary, T. J. (2006). The development and validation of the Self-regulation Strategy Inventory – self-report. *Journal of school Psychology, 22*, 307-322.

Danialles, L. M., Stupnisky, R. H., Pekrun, R., Haynes, T. L., Perry, R. P., & Newall, N. E. (2009). A longitudinal analysis of achievement goals: From affective antecedents to emotional effects and achievement outcomes. *Journal of Educational Psychology, 101* (4), 948-963.

Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*, 256-273.

George, D., & Mallory, P. (2009). *SPSS for windows step-by-step: A simple guide and reference: 16.0 update* (9th ed.). Boston, MA: Allyn & Bacon.

Holt, J. K. (2004). *Item parceling in structural equation models for optimum solutions.* Paper presented to the Annual Meeting of the Mid-Western Educational Research Association, Columbus, OH, October 13 – 16.

Kline, R. B. (1991). Latent variable path analysis in clinical research: A beginner's tour guide. *Journal of Clinical Psychology, 47*(4), 471-484.

Lau, K., & Lee, J. (2008). Examining Hong Kong students' achievement goals and their relations with students' perceived classroom environment and strategy use. *Educational Psychology, 28*(4), 357-372.

Levine, J. (1999). *The enneagram intelligences: Understanding personality for effective teaching and learning.* London: Bergin & Garvey.

Major, D. A., Turner, J. E., & Fletcher, T. D. (2006). Linking proactive personality and the Big Five to motivation to learn and development activity. *Journal of Applied Psychology, 91*(4), 927-935.

Neukrug, E. S., & Fawcett, R. C. (2010). *Essentials of testing and assessment: A practical guide for counselors, social workers and psychologists* (2nd Ed.). Belmont, CA:

Brooks/Cole.

Palmer, H. (1991). *The enneagram: Understanding yourself and other in your life*. San Francisco: Harper.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2006). Achievement goals and discrete achievement emotions: A theoretical model and prospective test. *Journal of educational psychology*, 98(3), 583-597.

Pekrun, R., Elliot, A. J., & Maier, M. A. (2009). Achievement goals and achievement emotions: Testing a model of their joint relations with academic performance. *Journal of Educational Psychology*, 101(1), 115-135.

Pekrun, R., Goetz, T., Frenzel, A. C., Barchfeld, P., & Perry, R. P. (2011). Measuring emotions in students' learning and performance: The Achievement Emotions Questionnaire (AEQ). *Contemporary educational psychology*, 36, 36-48.

Pekrun, R., Goetz, T., & Titz, W. (2002). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research. *Educational Psychologist*, 37(2), 91-105.

Scott, C. (2004). *Back translation: Same questions – different continent*. Retrieved from <http://www.atc.org.uk/winter2004.pdf>.

Stage, F. K., Carter, H. C., & Nora, A. (2004). Path analysis: An introduction and analysis of a decade of research. *Journal of Educational Research*, 98(1), 5-12.

Streiner, D. L. (2005). Finding our way: An introduction to path analysis. *Canadian Journal of Psychiatry*, 50(2), 115-123.

Tallon, R., & Sikora, M. (2006). *Awareness to action: The Enneagram, emotional intelligence, and change*. Scranton: University of Scranton Press.

Weinstein, C. E., Husman, J., & Dierking, D. R. (2000). Self-regulation interventions with a focus on learning strategies. In M. Boekaerts, P. Pintrich, & M. Zeidner (Eds.), *Self-regulation: Theory, research, and applications* (pp.727-747). Orlando, FL: Academic Press.