Ilkogretim Online - Elementary Education Online, 2021; Vol 20 (Issue 6): pp. 1763-1772
http://ilkogretim-online.org
doi: 10.17051/ilkonline.2021.06.170

Relationship Between Self-Efficacy And Test Anxiety Among Chinese Students: The Mediating Role Of Academic Motivation

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Abstract. This study examines the mediating role of academic motivation in the relationship between self-efficacy and test anxiety. The samples are 393 regular senior secondary school students studying in the Shandong province of China. Descriptive statistics analysis showed that the level of test anxiety is high, motivation at a moderate level and a lower level of self-efficacy. Regression analysis showed that academic motivation is significantly mediated the relationship between self-efficacy and test anxiety. In particular, test anxiety is fully mediated by belief in personal ability, whereas belief in ability grows with effort is marginally mediated. The findings were examined in terms of their implications for lowering test anxiety in demanding educational systems where students are expected to sit for a succession of high-stakes public tests.

Keywords: Gaokao, High school student, Entrance examination, Public examination, Correlational design

INTRODUCTION

In China, the higher education entrance examination, Gaokao, is recognized as one of the most challenging public examinations in the world (Zhuang, 2017). For decades, high school education crams students with gruelling and stressful practices for years in preparation for the Gaokao. This includes long schooling hours to attend and overwhelming assignments to complete (Kirkpatrick & Zang, 2011). This is because the Gaokao scores is the sole factor that determines admission to undergraduate programmes in prestigious universities in China. Certificates from these institutions are often viewed as a passport to a promising career profession that will provide wealth, status, and even power. Gaokao determines the entire student's future.

As a consequence, both the students and parents feel immense pressure to perform well in this examination. With their future at stake, high school students are often found to be excessively nervous and distressed even before facing the examination (Kellaghan & Greaney, 2019). This heightened the level of psychological distress and vexation in the face of assessment, referred to as test anxiety. Test anxiety is a response experienced by students when they perceive that they could fail in the examination (Zeidner & Matthews, 2003). Like any other form of anxiety, test anxiety has a destructive impact on the students if it is not appropriately managed.

Test anxiety

Test anxiety can be manifested through affective, cognitive and behavioural symptoms such as exhaustion due to excessive worrying and sudden inability to understand or retrieve their memory during examination (Soysa & Weiss, 2014). Observable symptoms include the lack of confidence, sleep and appetite for food. Some may even resort to drug abuse, alcohol and even self-torture. Many studies also reported that girls have higher levels of test anxiety than boys (Chen & Ye, 2007; Devine et al., 2012; Rani, 2017). In the worst possible scenario, a student with a high level of test anxiety may attempt suicide. According to Sun et al. (2011), Shandong province is one of the provinces with a higher than average rate of suicide among teenagers, especially during the months after the Gaokao results are announced.

Due to these devastating consequences of test anxiety, various constructs, models and measures have been developed to gauge test anxiety and hopefully, find the solutions along the way to curb the issue. Various types of intervention have been proposed ranging from behavioural, cognitive and behavioural-cognitive to study and test-taking skills (Cizek & Burg, 2006). Study and test-taking skill workshops equip students with better methods of learning and ways of tackling examination questions. These skills are found to boost students' self-efficacy (Wernersbach et al., 2014). Self-efficacy is one of the most heavily researched self-concepts that have a significant negative impact on test anxiety (Von Der Embse et al., 2018).

Self-efficacy and test anxiety

Self-efficacy is students' belief in their personal ability to perform within their expectations, cope with the studies and firm conviction that these abilities can grow with sheer effort (Gaumer Erickson et al., 2016). It is the vital ingredient for success among high school students. Students with a high level of self-efficacy would set appropriate high goals for their learning, select effective strategies to learn, concentrate in the classroom, manage their time and utilize the resources effectively, value learning, hold an optimistic view on the outcomes of their actions and took pride of their effort (Schunk & Ertmer, 2000). Thus, students with a strong conviction that their ability can be nurtured to reach their personal goals, would naturally put in more effort to study and have a positive view on the examination outcome (Luo et al., 2016). It also determines their ability to learn from their experience through self-reflection and self-regulate that boosts their overall well-being and competencies (Bandura, 2002). Thereupon, it is expected that boosting self-efficacy would reduce test anxiety, as shown in many past studies (Asayhesh et al., 2016; Onyeizugbo, 2010; Nie, Lau, & Liau, 2011; Onyeizugbo, 2010; Roick & Ringeisen, 2017; Schnell et al., 2015). A significant negative correlation of varying degrees between these variables is firmly established between different self-efficacy and test anxiety dimensions, respectively.

Academic motivation and test anxiety

Another important predictor of test anxiety is academic motivation. Academic motivation is the intention and energy that direct a person's academic self-concept towards the person's goals and achievement (Deci & Ryan, 2012; Guay et al., 2010). It is vital for the student's wholesome development both physically and mentally (Dweck,

2013). It is the strongest predictor of the direction and consistency of student's behaviour, student's perception of the school environment and active participation in the school (Wang & Eccles, 2013). Thus, motivation is an important indicator of student's learning behaviour, ; as focus and level of effort exerted in the classroom (Abeysekera & Dawson, 2015). Deci and Ryan (2012) proposed Self-Determination Theory (SDT) that places motivation as a spectrum of behaviours ranging from non-self-determined (amotivation) to self-determined (intrinsic motivation).

Intrinsic motivation is marked by the self-determined behaviour that represents the natural tendency to learn, explore and master new things that contribute towards enjoyment and inherent satisfaction in life. For this reason, students who have a strong intrinsic motivation are more engaged in learning as they view learning as interest and enjoy the process (Deci & Ryan, 2016). They act autonomously and willingly with a sense of endorsement rather than being compelled to. On the other hand, extrinsic motivation is the force that drives a person to engage in a certain action to achieve particular goals. Extrinsic motivation is divided into integrated, identified, introjected and external regulation. The other end of the spectrum is amotivation, which refers to the lack of intention or action to perform a particular activity. Turner, Chandler and Heffer (2009) found that higher level self-efficacy is associated with higher levels of intrinsic and extrinsic motivation and lower levels of amotivation.

Students with a high level of motivation strive for academic excellence, but unfortunately, this also comes with greater levels of test anxiety (OECD, 2019). PISA studies in more than 55 countries found that students with higher motivation level correspond to a higher level of test anxiety. A study by Cheng et al. (2014) and Ünal-Karagüven (2015) also reported similar findings. A study by Stoeber (2009) shed a different light on this. It is found that while introjected and extrinsic motivation did positively correlate with test anxiety, intrinsic motivation had a reverse impact. likewise, Olatoye (2009) found a negative correlation between motivation as a whole and test anxiety. In fact, intrinsic motivation can buffer the detrimental impact of high levels of test anxiety on academic achievement (Khalaila, 2015).

With the ambiguity surrounding the relationship between motivation and test anxiety, this study seeks to clarify how the different aspects of motivation interplay in the relationship between self-efficacy and test anxiety. Specifically, this study aims to address the following two research questions:

a. What are the current levels of self-efficacy, motivation and test anxiety among students in the sample?
b. Does motivation mediate the relationship between self-efficacy and test anxiety?

METHODS

To answer the research questions, the researchers utilized a correlational design. In this study, the researchers seek a relationship between self-efficacy, motivation, and test anxiety. Furthermore, this study examines the role of motivation in the relationship between self-efficacy and test anxiety. This study was conducted in Shandong province. The province has the highest regular senior secondary school student's density, with a total of 553,774 students across 620 schools (MOE, 2020).

A total of 393 students from 4 regular senior secondary schools took part in this study. Among them, almost half (182 students) are male, while the rest are female students. Chinese versions of the instruments were used in this study to ensure that the

students can comprehend each of the items. Online questionnaires were used where the participants would first seek permission from their parents before receiving the link to the questionnaire. The students were given a month time to complete the questionnaire at their own pace.

This study adopted three different instruments. Self-efficacy was measured using 13-items adopted from Self-Efficacy Formative Questionnaire developed by Gaumer Erickson and Noonan (2018) (α = .907). It is divided into two dimensions, belief in personal ability and belief that ability grows with effort that work on a 5-point Likert scale ranging from 1 (not very like me) to 5 (very like me). Academic motivation was measured with 28-items adopted from the Academic Motivation Scale (AMS-HS 28) developed by Vallerand et al. (1992) (α = .919). It comprises intrinsic motivation, extrinsic motivation and amotivation that work on a 5-point Likert scale ranging from 1 (does not correspond at all) to 5 (corresponds exactly). Lastly, test anxiety was measured using the Test Anxiety Scale (TAS) developed by Sarason and Sarason (1990). It comprises 37-items of True or False (α = .908). The total score was calculated based on the number of items where the student rated as True. A student is considered low-test anxiety for a score below 12, medium-test anxiety between 12 and 20, and high-test anxiety for a score above 20.

RESULTS

The level of self-efficacy, academic motivation and test anxiety based on gender is shown in Table 1. Both male and female students recorded a high level of test anxiety with a large standard deviation. For self-efficacy, the value is considered low (Gaumer Erickson & Noonan, 2018). Meanwhile, intrinsic and extrinsic motivations are at a moderate level, but amotivation is slightly lower.

Table 1: Self-efficacy, academic motivation and test anxiety among male and female students

	Male		Female	
Variable	**Mean**	**SD**	**Mean**	**SD**
Self-efficacy				
Belief in personal ability	3.63	0.74	3.63	0.72
Belief that ability grows with effort	3.87	0.77	3.82	0.75
Academic motivation				
Intrinsic motivation	3.69	0.81	3.72	0.73
Extrinsic motivation	3.77	0.74	3.87	0.66
Amotivation	2.79	1.00	2.34	0.92
Test anxiety	20.77	9.62	20.31	7.65

Relationship between Variables

The bivariate correlations between self-efficacy, academic motivation, and test anxiety (Table 2) reveal significant relationships between these variables. Both dimensions of self-efficacy have substantial and positive relationships with both intrinsic and extrinsic motivation. There are observable negative relationships between

these four variables with amotivation and test anxiety. Only amotivation correlates positively with test anxiety.

Table 2: Bivariate correlations for self-efficacy, academic motivation and test anxiety

	Variable	1	2	3	4	5
1	Belief in personal ability					
2	Belief that ability grows with effort	.666**				
3	Intrinsic motivation	.515**	.519**			
4	Extrinsic motivation	.455**	.470**	.816**		
5	Amotivation	-.105*	-.143**	-.224**	-.186**	
6	Test anxiety	-.114*	-.153**	-.174**	-.116*	.185**

* p < .05; ** p < .01

Path analysis

Since significant correlations are found between the variables, this is followed up with path analysis using maximum likelihood estimation. The final model is presented in Figure 1 with standardized regression weight. Schreiber et al. (2006) specified that an acceptable model could be determined from various indicators such as Tucker-Lewis Index (TLI) and Comparative Fit Index (CFI) and above .95 and Root Mean Square Error of Approximation (RMSEA) below .06. Hence, this model did achieve a good fit with χ^2 (3, N = 393) = 7.489, TLI = .973, CFI = .995 and RMSEA = .062. This model exposed that academic motivation partially mediated the relationship between self-efficacy and test anxiety. To be exact, the effect of belief that ability grows with effort on test anxiety is partially mediated by all three dimensions of motivation. Meanwhile, the effect of belief in personal ability on test anxiety is completely mediated by intrinsic and extrinsic motivation.

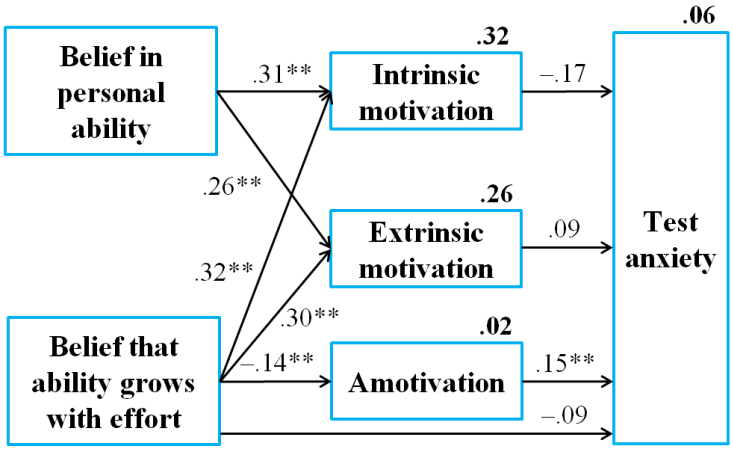

Figure 1: Path analysis for self-efficacy, motivation and test anxiety.

*p < .05 and **p < .01

Note: Parameters are reported in standardized coefficients. R^2 was written in bold at the upper right side of the criterion variable.

DISCUSSION and CONCLUSIONS

This study reveals that all the students reported low levels of self-efficacy. This is expected since the participants reported high level of test anxiety and the negative correlation between self-efficacy and test anxiety are well established. This is verified with the further bivariate correlation that proves the negative correlation between both dimensions of self-efficacy and test anxiety. The study by Nie et al. (2011) demonstrated that students with low level of self-efficacy, they become susceptible to test anxiety when facing a highly important task.

In this case, facing Gaokao would be a critical task for the students. Social Cognitive Theory stated that students lacking self-efficacy would not strongly believe in their ability to overcome the examination. However, when students feel that their ability can be nurtured and grow with sustained effort, it would affect their anxiety arousal and perceptions on the likelihood of failure in examination (Bandura, 2006).

The significant positive relationship between amotivation and test anxiety and the negative relationship between intrinsic motivation and test anxiety, are also in line with other studies (Rajiah, Coumaravelou & Ying, 2014; Khalaila, 2015). However, the positive relationship between extrinsic motivation and test anxiety is in contrast with the study by Stoeber (2009) and Rajiah et al. (2014). The plausible explanation for this is that extrinsic motivation is multifaceted, as shown in the Self-Determination Theory, where the perceived locus of causality ranges from internal to external (Deci & Ryan, 2016). The internal locus of causality is the students' belief in the autonomous nature of their actions. In this study, the students exhibit a stronger internal locus of causality, which is more closely related to intrinsic motivation, leading to lower test anxiety levels.

This current study provides empirical evidence to support the mediating role of academic motivation in the relationship between self-efficacy and test anxiety. Within the framework of Self-Determination Theory, autonomy, competence, and relatedness form the core of motivation. Since self-efficacy nurtures student's ability and competency, this would raise their level of motivation, both intrinsic and extrinsic. Students can internalize adaptive behaviour and learning strategies. Consequently, this reduces the debilitating effect of test anxiety, and the stress resulted from Gaokao. Kader (2016) divulged that the students with a strong internal locus of causality are less likely to procrastinate in academic tasks and suffer from fear of failure. On that ground, amotivation would naturally increase test anxiety.

Therefore, a more holistic approach is required in tackling test anxiety among the regular senior secondary school students who would be facing Gaokao. Besides strengthening the student's competency level through the study skills and test-taking skills (Cizek & Burg, 2006), schools, teachers and parents ought to work together to create a supportive environment that nurtures autonomy and relatedness among the student (Deci & Ryan, 2016). Not only would this boost the level of motivation towards self-determined behaviour and managing test anxiety, but it would also have various impacts on other educational outcomes.

This study demonstrates the mediating role of academic motivation in mitigating the effect of low self-efficacy on test anxiety among secondary school students. More importantly, this study also clarified the ambiguous role of academic motivation on test anxiety. The intrinsic and extrinsic motivations of students reduce test anxiety rather than increasing them. When the students have external or impersonal locus of causality in their motivation, it heightens their test anxiety level. Since both male and female

students struggle with the high test anxiety and low level of self-efficacy, immediate interventions are required to address this issue. Generally, strengthening both self-efficacy and motivation would reduce test anxiety of the students, especially for those who are facing high-stakes public examinations like Gaokao.

REFERENCES

Abeysekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: definition, rationale and a call for research. Higher Education Research & Development, 34(1), 1-14.

Asayesh, H., Hosseini, M. A., Sharififard, F., & Taheri Kharameh, Z. (2016). The relationship between self-efficacy and test anxiety among the paramedical students of Qom University of Medical Sciences. Journal of Advances in Medical Education, 1(3), 15-23.

Bandura, A. (2002). Social cognitive theory in cultural context. Applied psychology, 51(2), 269-290.

Bandura, A. (2006). Guide for constructing self-efficacy scales. Self-efficacy beliefs of adolescents, 5(1), 307-337.

Chen, S. S., & Ye, G. Q. (2007). Test Anxiety of Senior High School Students and its Relationship with Academic Self-Efficacy. Journal of Zhangzhou Normal University (Natural Science), 3.

Cheng, L., Klinger, D., Fox, J., Doe, C., Jin, Y., & Wu, J. (2014). Motivation and test anxiety in test performance across three testing contexts: The CAEL, CET, and GEPT. Tesol Quarterly, 48(2), 300-330.

Cizek, G. J., & Burg, S. S. (2006). Addressing test anxiety in a high-stakes environment: Strategies for classrooms and schools. Corwin.

Deci, E. L., & Ryan, R. M. (2012). Self-determination theory. In P. A. M. Van Lange, A. W. Kruglanski, & E. T. Higgins (Eds.), Handbook of Theories of Social Psychology.

Deci, E. L., & Ryan, R. M. (2016). Optimizing students' motivation in the era of testing and pressure: A self-determination theory perspective. In Building autonomous learners (pp. 9-29). Springer.

Devine, A., Fawcett, K., Szűcs, D., & Dowker, A. (2012). Gender differences in mathematics anxiety and the relation to mathematics performance while controlling for test anxiety. Behavioral and Brain Functions, 8(1), 33.

Dweck, C. S. (2013). Self-theories: Their role in motivation, personality, and development. Psychology press.

Fallan, L., & Opstad, L. (2016). Student Self-Efficacy and Gender-Personality Interactions. International journal of higher education, 5(3), 32-44.

Gaumer Erickson, A. S., Soukup, J. H., Noonan, P. M., & McGurn, L. (2016). Self-Efficacy Questionnaire. Lawrence, KS: University of Kansas. Center for Research on Learning.

Gaumer Erickson, A.S. & Noonan, P.M. (2018). Self-efficacy formative questionnaire. In The skills that matter: Teaching interpersonal and intrapersonal competencies in any classroom. Corwin.

Guay, F., Ratelle, C. F., Roy, A., & Litalien, D. (2010). Academic self-concept, autonomous academic motivation, and academic achievement: Mediating and additive effects. Learning and Individual Differences, 20(6), 644-653.

Hong, M. (2015, July 1). Girls outperform boys among Gaokao top scorers. ECNS Wire. Retrieved from http://www.ecns.cn/cns-wire/2015/07-01/171421.shtml

Kader, A. A. (2016). Debilitating and facilitating test anxiety and student motivation and achievement in principles of microeconomics. International Review of Economics Education, 23, 40-46.

Kellaghan, T., & Greaney, V. (2019). Public Examinations Examined. The World Bank.

Khalaila, R. (2015). The relationship between academic self-concept, intrinsic motivation, test anxiety, and academic achievement among nursing students: Mediating and moderating effects. Nurse Education Today, 35(3), 432-438.

King, R. B. (2016). Gender differences in motivation, engagement and achievement are related to students' perceptions of peer—but not of parent or teacher—attitudes toward school. Learning and Individual Differences, 52, 60-71.

Kirkpatrick, R., & Zang, Y. (2011). The negative influences of exam-oriented education on Chinese high school students: Backwash from classroom to child. Language testing in Asia, 1(3), 36.

Luo, W., Ng, P. T., Lee, K., & Aye, K. M. (2016). Self-efficacy, value, and achievement emotions as mediators between parenting practice and homework behavior: A control-value theory perspective. Learning and Individual Differences, 50, 275-282.

MOE (2019). Ministry of Education, China. 中国人民共和国教育部. Retrieved online from http://en.moe.gov.cn/documents/statistics/2017/national/201808/t20180808_344699.html

Nie, Y., Lau, S., & Liau, A. K. (2011). Role of academic self-efficacy in moderating the relation between task importance and test anxiety. Learning and Individual Differences, 21(6), 736-741.

OECD (2019, January 17). How is students' motivation related to performance and anxiety? OECD Education and Skills Today. Retrieved from https://oecdedutoday.com/how-is-students-motivation-related-to-performance-and-anxiety/

Olatoye, R. A. (2009). Students' test anxiety, motivation for examinations and science achievement in junior secondary schools in Ogun State, Nigeria. International Journal of Psychology and Counselling, 1(10), 194-198.

Onyeizugbo, E. U. (2010). Self-efficacy, gender and trait anxiety as moderators of test anxiety. Electronic Journal of Research in Educational Psychology, 8(1), 299-312.

Putwain, D. W. (2008). Test anxiety and GCSE performance: The effect of gender and socio-economic background. Educational Psychology in Practice, 24(4), 319-334.

Putwain, D., & Daly, A. L. (2014). Test anxiety prevalence and gender differences in a sample of English secondary school students. Educational Studies, 40(5), 554-570.

Rajiah, K., Coumaravelou, S., & Ying, O. W. (2014). Relationship of test anxiety, psychological distress and academic motivation among first year undergraduate pharmacy students. International Journal of Applied Psychology, 4(2), 68-72.

Rani, R. (2017). Test anxiety among school students. International Journal of Advanced Education and Research, 2(4), 151-154.

Rastegar, M., & Heidari, N. (2013). The relationship between locus of control, test anxiety, and religious orientation among Iranian EFL Students. Open Journal of Modern Linguistics, 3(01), 73.

Roick, J., & Ringeisen, T. (2017). Self-efficacy, test anxiety, and academic success: A longitudinal validation. International Journal of Educational Research, 83, 84-93.
Sarason, I. G., & Sarason, B. R. (1990). Test anxiety. In Handbook of social and evaluation anxiety (pp. 475-495). Springer.
Schnell, K., Ringeisen, T., Raufelder, D., & Rohrmann, S. (2015). The impact of adolescents' self-efficacy and self-regulated goal attainment processes on school performance—Do gender and test anxiety matter?. Learning and Individual Differences, 38, 90-98.
Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. The Journal of educational research, 99(6), 323-338.
Schunk, D. H., & Ertmer, P. A. (2000). Self-regulation and academic learning: Self-efficacy enhancing interventions. In Handbook of self-regulation (pp. 631-649). Academic Press.
Shen, L., Yang, L., Zhang, J., & Zhang, M. (2018). Benefits of expressive writing in reducing test anxiety: A randomized controlled trial in Chinese samples. Plos one, 13(2).
Soysa, C. K., & Weiss, A. (2014). Mediating perceived parenting styles–test anxiety relationships: Academic procrastination and maladaptive perfectionism. Learning and Individual Differences, 34, 77-85.
Stoeber, J., Feast, A. R., & Hayward, J. A. (2009). Self-oriented and socially prescribed perfectionism: Differential relationships with intrinsic and extrinsic motivation and test anxiety. Personality and Individual Differences, 47(5), 423-428.
Sun, J., Guo, X., Ma, J., Zhang, J., Jia, C., & Xu, A. (2011). Seasonality of suicide in Shandong China, 1991–2009: associations with gender, age, area and methods of suicide. Journal of affective disorders, 135(1-3), 258-266.
Turner, E. A., Chandler, M., & Heffer, R. W. (2009). The influence of parenting styles, achievement motivation, and self-efficacy on academic performance in college students. Journal of college student development, 50(3), 337-346.
Ünal-Karagüven, M. H. (2015). Demographic Factors and Communal Mastery as Predictors of Academic Motivation and Test Anxiety. Journal of Education and Training Studies, 3(3), 1-12.
Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Senécal, C. B., & Vallières, É. F. (1992). Academic Motivation Scale (AMS-HS 28): High School Version. Educational and Psychological Measurement, 52.
Von Der Embse, N., Jester, D., Roy, D., & Post, J. (2018). Test anxiety effects, predictors, and correlates: A 30-year meta-analytic review. Journal of Affective Disorders, 227, 483-493.
Wang, M. T., & Eccles, J. S. (2013). School context, achievement motivation, and academic engagement: A longitudinal study of school engagement using a multidimensional perspective. Learning and Instruction, 28, 12-23.
Wernersbach, B. M., Crowley, S. L., Bates, S. C., & Rosenthal, C. (2014). Study skills course impact on academic self-efficacy. Journal of Developmental Education, 37(3), 14-33.
Yang, S. H. (2012). Exploring college students' attitudes and self-efficacy of mobile learning. Turkish Online Journal of Educational Technology-TOJET, 11(4), 148-154.

Zeidner, M., & Matthews, G. (2003). Test Anxiety. Encyclopedia of Psychological Assessment. Sage Publications Ltd.

Zhu, P. (2020, March 26). Preparing For China's National College Entrance Exam Under The Shadow Of COVID-19. SUP China. Retrieved from https://supchina.com/2020/03/26/preparing-for-gaokao-under-the-shadow-of-covid-19/

Zhuang, P. H. (2017, June 8). Gaokao: How one exam can set the course of a student's life in China? Retrieved from https://www.scmp.com/news/china/society/article/2097512/gaokao-how-one-exam-can-set-course-students-life-china