HONG KONG JOURNAL OF SOCIAL SCIENCES

香港社會科學學報

第一的第 57 期 (2021 春/夏) Vol. 57 Spring/Summer 2021

Open Access Article

The Relationship of Grit, Career Adaptability, Self-Regulated Learning, and Academic Adjustment: Focusing on the Multiple Mediational Effects

Hyo Jin Lim[1], Mae Hyang Hwang[2], Hyesuk Ha[3]

[1] *Graduate School of Education, Seoul National University of Education, Seoul, South Korea*

[2] *Department of Education, Gyeongin National University of Education, Incheon, South Korea*

[3] *Department of Youth Education, Korea National Open University, Seoul, South Korea*

Received: May 27, 2021 ▪ Reviewed: June 23, 2021 ▪ Accepted: July 24, 2021 ▪ Published: August 30, 2021

Abstract:
This study aimed to examine the relationship of grit, career adaptability, self-regulated learning, and academic adjustment for students in the Open University in Korea. We specifically investigated how grit can be mediated by career adaptability and self-regulated learning. We administered survey questionnaires for 300 university students and analyzed 289 responses using confirmatory factor analysis and structural equation modeling. Results showed that the direct effect of grit on academic adjustment was not statistically significant; however, indirect effects via career adaptability and self-regulated learning were statistically significant. It suggests that when students' grit is higher, they are more likely to have higher career adaptability and self-regulated learning, impacting academic adjustment. Our research was conducted with students in the Open University, where the students took online-based courses throughout four academic years. The present findings indicate that grit can significantly facilitate academic adjustment for students in non-traditional institutions.

Keywords: grit, career adaptability, self-regulated learning, academic adjustment, multiple mediational effects.

毅力、职业适应性、自我调节学习和学业调整的关系：关注多重中介效应

摘要：
本研究旨在研究韩国开放大学学生的毅力、职业适应性、自我调节学习和学业调整之间的关系。我们专门

Corresponding Authors: Hyo Jin Lim, Graduate School of Education, Seoul National University of Education, Seoul, South Korea; email: hyolim@snue.ac.kr; Mae Hyang Hwang, Department of Education, Gyeongin National University of Education, Incheon, South Korea; email: maehyang@ginue.ac.kr; Hyesuk Ha, Professor, Department of Youth Education, Korea National Open University, Seoul, South Korea; email: maumaum@knou.ac.kr

研究了职业适应性和自我调节学习如何调节毅力。我们对300名大学生进行了调查问卷，并使用验证性因素分析和结构方程模型分析了289份答复。结果表明，毅力对学业调整的直接影响没有统计学意义；然而，职业适应性和自我调节学习的间接影响在统计上是显着的。这表明，当学生的毅力越高，他们就越有可能具有更高的职业适应性和自我调节学习，从而影响学业调整。我们的研究是在开放大学的学生中进行的，学生们在四个学年里都参加了在线课程。目前的研究结果表明，毅力可以显着促进非传统机构学生的学业调整。

关键词： 毅力、职业适应性、自我调节学习、学业调整、多重中介效应。

1. Introduction

With the rapid social changes, the need for life-long learning after school age increases for the adult population. This is also reflected in the paradigm shift in the education system because the modern knowledge-based economy and advanced information-communication technology (ICT) require new knowledge and skills continuously. It is surely known that distance education provides adult learners with the advantage of life-long learning due to its flexibility (Kara et al., 2019). Therefore, more and more adults enter college to meet the desire to pursue a quality life. Distance universities and open universities are burgeoning to meet the demand of adult learners (Cross, 2014; Neroni et al., 2018). Most distance/open universities have provided flexible, part-time programs using an online course delivery system (Archbald, 2011). The number of adults, who earned their undergraduate, graduate, and even doctorate degrees using this system, has been gradually growing (Cross, 2014). The pandemic confirms online teaching as the best solution, and the discussion on the benefits and downsides of online learning has begun.

Generally, adult learners who attend so-called non-traditional education institutions are very diverse in terms of age group, educational background, and motivation for going to school. However, for most of them, it is hard to balance working and studying, and the conflict often causes academic difficulties (Archbald, 2011; Cross, 2014; De Paepe et al., 2018). Recently, some studies try to deal with work-life conflict (WLB) more systematically in higher education (Atay & Bayraktaroglu, 2020). Because of the academic-family conflict, adult learners at distant colleges may have difficulty adapting to school life, earning credits, and even completing their degree programs (Choi & Kim, 2018).

However, research has shown that learners' intention to achieve the degree and other career goals is high, and the psychological characteristics seem to support them in adapting to academic work. Among the psychological characteristics, the importance of non-cognitive factors such as attitudes, values, and motivation are becoming critical (Lee & Stankov, 2013). The change of non-cognitive characteristics is relatively easier than that of cognitive ones (i.e., intelligence, aptitude). In the meantime, several studies support the hypothesis that non-cognitive factors are significantly associated with academic achievement (Steinmayr et al., 2019). One of the most important non-cognitive characteristics related to academic success is learning motivation. It is widely known to predict overall academic adjustment in terms of selecting, making an effort, and continuing learning behaviors.

Among the motivational variables, we paid our attention to persistence which makes it possible to overcome difficulties in the learning process. Successful academic adjustment is not a short-term outcome but a continuous developmental task that requires a large amount of commitment. Angela Duckworth once introduced the concept of grit, defined as "passion and perseverance for long-term goals" (Duckworth et al., 2007). Grit has two sub-factors: consistency of interest, capturing tendencies to pursue the same or similar activities over time, and perseverance of effort, capturing tendencies to overcoming difficulties and keeping working toward one's goals (Duckworth et al., 2007, 2011). One of the studies reported that grit affects student academic performance and success in first-year college students in physics (Bazelais et al., 2016). Grit has shown positive effects on organization members in the medical, educational, and enterprise fields. For example, workers with high grit levels are believed to make better use of their abilities and be less frustrated by common failures and setbacks, resulting in greater personal achievement and lower job burnout (Seguin, 2019).

To the best of our knowledge, there has been little research regarding grit and academic achievement, especially for non-traditional students. A few studies (Aparicio et al., 2017; Cross, 2014; MacCann et al., 2012) displayed grit's prediction on positive outcomes among adult learners; however, little is known how and why grit explains those outcomes. In other words, educators and researchers must delve into the mechanism of grit in predicting academic success.

The present study is inspired by the research gap mentioned above. For adult learners in distance-learning situations, it was found that when students perceived and committed to academic goals, their

motivation for an academic degree and academic success increased (Ahmet, 2019). It has been known that gritty people are more likely to pursue their goals in many circumstances (Duckworth et al., 2007, 2011). Under such a working background, adult learners need to keep persevered and stick to their original goal to insist on achieving their goal (Liang, 2021). Moreover, we assumed that grit's impact on academic success would be mediated by self-regulated learning and career adaptability.

Self-regulated learning is another important factor in academic success. Self-regulated learners tend to be "cognitively, motivationally, and behaviorally active participants in their learning" (Zimmerman, 1990), and those learners tend to have higher academic achievement in both traditional (Pintrich, 2004; Garcia & Pintrich, 2012) and non-traditional college settings (Artino & Stephens, 2009; Justice & Dornan, 2001; Wibrowski et al., 2017). Prior studies (Komarraju et al., 2009; Wolters & Hussain, 2015) demonstrated the positive correlation between grit and self-regulated learning. For example, Wolters and Hussain (2015) found out that grit's consistency predicted only some of the self-regulated strategies (i.e., time/environment management and procrastination) while grit's perseverance predicted all of the self-regulated strategies (i.e., self-efficacy, task values, strategies, time/environment management, and procrastination), suggesting that higher grit can take into account more self-regulated learning behavior.

In addition, grit has been proved as a predictor of career outcomes (Ting & Datu, 2020). Career adaptability represents the career outcomes of the adult population and involves the general competencies and specific behaviors necessary for anticipating and adapting to changing conditions (Savickas, 1997; Savickas & Porfeli, 2012). Previous studies (Duckworth et al., 2009; Robertson-Kraft & Duckworth, 2014) reported that successful teachers in their career, despite adversities, demonstrated higher grit in their job. Eskreis-Winkler et al. (2014) recognized that gritty people tend to retain their jobs longer (e.g., grittier sales employees were more likely to keep their jobs). Andera et al. (2016) also found that grittier workers behave less counterproductive in their job. Based on these finding, we hypothesize grit predict career adaptability of adult learners.

This study aimed to examine a relationship between grit, career adaptability, self-regulated learning, and academic adjustment. We also investigate how grit, directly and indirectly, predicts academic success via career adaptability and self-regulated learning. The scope of this study included quantitative and statistical analyses based on the survey responses collected from adult learners who enrolled in the Open University in Korea.

2. Methods

2.1. Participants

We surveyed 300 college students (91.7% of female students) recruited from an Open University in South Korea. Students live in various regions such as urban, rural, and metropolitan cities in South Korea. We distributed questionnaires to lecturers who agreed to participate in our study, and students were asked to respond to the survey during classes. The mean age of the subjects was 44.17 (SD = 7.79), freshmen were 1.7%, sophomores - 38.3%, juniors - 29.7 %, and seniors - 30.0%. We excluded 11 participants who answered patterned responses and finally analyzed 289 cases. Missing values (less than 5%) were imputed using a full information maximum likelihood (FIML) method.

2.2. Measures

Students were asked to answer items of grit, career adaptability, self-regulated learning, and academic adjustment. Grit was assessed by the translated version of the Grit-S (Short Grit scale) developed by Duckworth and Quinn (2009). Among the 12 items of Grit-O (Original Grit scale) (Duckworth et al., 2007), Duckworth and Quinn (2009) selected eight items that had higher correlations among others to create the Grit-S. The scale consists of four items of perseverance of effort (e.g., "I finish whatever I begin") and four items of consistency of interests (e.g., "I often set a goal but later choose to a different one"). Items of consistency of interests were reverse-coded, and reliability coefficients (Cronbach's α) were .80 for perseverance and .69 for consistency. The whole scale's α turned out to be .80.

Career adaptability was assessed by the Career-Adapt-Abilities Scale (CAAS) (Savickas & Porfeli, 2012). It contains 24 items, and those items are divided into four subscales that measure concern (e.g., "Thinking about what my future will be like"), control (e.g., "Making decisions of myself"), curiosity (e.g., "Exploring my surroundings"), and confidence (e.g., "Performing tasks efficiently"). The reliability coefficients (Cronbach's α) were .87 for concern, .83 for control, .80 for curiosity, and .90 for confidence, and .93 for the whole scale.

Self-regulated learning was assessed by adapted items from the Motivation Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1993). We used four subscales among MSLQ such as effort regulation (four items, e.g., "I work hard to do well in the class if I don't like what we are doing"), time management (five items, e.g., "I make good use of my study time for the class), study environment management (four items, e.g., "I usually study in a place where I can concentrate on my classwork"), and help-seeking (five items, e.g., "I ask the instructor to clarify concepts I don't understand well"). The reliability coefficients (Cronbach's α) were .62 for effort regulation, .87 for time management, .80 for study environment management, and .79 for help-

seeking, and .88 for the whole scale.

The academic adjustment was measured by ten items from Lee et al. (2008), who assessed the degree to which students perceive their academic issues in terms of class, assignment, and exam (e.g., "I have difficulties in finishing class assignments"). Items were reverse-coded so that a higher score of this scale represented a higher level of adjustment and the reliability coefficient (Cronbach's α) was .86. All items were measured on the five-point Likert-type scale ranging from 1 (= *strongly disagree*) to 5 (= *strongly agree*). Except for academic adjustment, all survey items underwent a back-translation process to confirm the consistency in meaning. We first translated all items into Korean and back-translated those items into English.

2.3. Analysis

We utilized a confirmatory factor analysis (CFA) to find out factor structure and a structural equation modeling (SEM) to test our hypothesized model. Since we hypothesized multiple mediators (i.e., career adaptability and self-regulated learning), we analyzed grit's direct and indirect effects on academic adjustment.

Before running the main analyses, we decided to use an item parceling method because there are too many measurement items, and our sample is not big enough. If there are too many items to measure one factor in a structural equation model analysis, measurement errors could be overestimated, and the fit may not be acceptable. Thus, items of grit and academic adjustment variables were divided into parcels according to the sequence of factor loadings within the same factor; items of career adaptability and self-regulation were divided into parcels according to their sub-factors. For example, four composite scores from subscales of career adaptability were created according to concern, control, curiosity, and confidence, and these scores were used as a parcel. Each parcel was used as a measured variable to reflect the latent variable.

To evaluate model fit, we used the Tucker–Lewis index (TLI), the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA). TLI and CFI over .90 and RMSEA under .08 indicate the mode fit data well (Hu & Bentler, 1999).

3. Results

3.1. Descriptive Statistics and Correlations among Variables

Descriptive statistics of study variables are presented in Table 1. There are no extreme values or outliers in terms of mean, standard deviation, skewness/kurtosis, suggesting that the normal distribution of study variables can be assumed. Correlation coefficients showed that all of the coefficients of variables were statistically significant at $p < .05$ level or above. Specifically, variables of grit were positively correlated with those of career adaptability (*r*s = .13 to .53) and self-regulation (*r*s = .22 to .43), and academic adjustment (*r*s = .16 to .48). Variables of career adaptability were positively correlated with those of self-regulated learning (*r*s = .26 to .43) and academic adjustment (*r*s = .44 to .93). Finally, self-regulated learning variables were also positively correlated with academic adjustment (*r*s = .17 to .38).

Table 1 Descriptive statistics

	Mean	SD	Skewness	Kurtosis
CI1	2.93	0.77	0.09	- 0.57
CI2	3.33	0.78	- 0.39	- 0.14
PE1	3.34	0.77	0.13	- 0.45
PE2	3.73	0.74	- 0.12	- 0.26
CONS	3.80	0.59	- 0.20	0.11
CONT	3.96	0.49	- 0.21	0.66
CURI	3.87	0.48	0.04	0.33
CONF	3.69	0.54	- 0.03	- 0.24
EFFR	3.47	0.52	0.34	0.08
TIMM	2.96	0.72	0.41	0.26
ENVM	3.50	0.66	- 0.05	0.15
HELP	2.93	0.62	0.20	0.15
ACD1	3.94	0.63	- 0.20	- 0.07
ACD2	3.67	0.64	- 0.32	0.29
ACD3	3.89	0.62	- 0.44	0.62
ACD4	4.09	0.53	- 0.02	0.53

Note: CI - consistency of interest, PE - perseverance of effort, CONS - concern, CONT - control, CURI - curiosity, CONF - confidence, EFFR - effort regulation, TIMM - time management, ENVM - study environment management, HELP - help-seeking, ACD - academic adjustment. Table 1 is the authors' design.

3.2. Confirmatory Factor Analysis

Results from the CFA model without any error covariance revealed that the four-factor solution fit was marginally acceptable based on the fit indices (χ^2 = 243.745 [*df* = 98, $p < .001$], TLI = .892, CFI = .912, RMSEA = .072, C.I. = .061, .084). Therefore, we freed one error covariance path based on modification indexes if they had pointed to significant covariation among error terms. This path involved items that were adjacent on the survey, and two indicators were loaded on the same latent variable (i.e., academic adjustment). The final CFA model showed a satisfactory fit (χ^2 = 222.208 [*df* = 97, $p < .001$], TLI = .908, CFI = .926, RMSEA = .067, C.I. = .055, .078). All factor loadings were statistically significant at $p < .001$ level, and the standardized coefficients were larger than .30, showing the measured variables appropriately reflected the hypothesized factor structure.

The patterns of correlation among latent variables were similar to those of zero-order correlations; however, the coefficients became larger since the

measurement errors were controlled. For instance, grit was positively correlated with career adaptability (Φ = .73), and self-regulation (Φ = .73), and academic adjustment (Φ = .50). Career adaptability and self-regulation were positively correlated with academic adjustment (Φs = .56, 59, respectively) (Table 2).

Table 2 Standardized and unstandardized factor loadings for the measurement model

		B	SE	Beta	*p*
Grit	←CI1	1.000	0.000	0.423	.000
	←CI2	1.360	0.229	0.576	.000
	←PE1	1.706	0.279	0.734	.000
	←PE2	1.581	0.268	0.707	.000
Career Adaptability	←Concern	1.000	0.000	0.718	.000
	←Control	0.852	0.076	0.737	.000
	←Curiosity	0.921	0.078	0.798	.000
	←Confidence	0.976	0.090	0.742	.000
Self-regulated Learning	←Effort regulation	1.000	0.000	0.675	.000
	←Time management	1.470	0.147	0.759	.000
	←Help-seeking	0.815	0.122	0.474	.000
	←Environment	1.113	0.132	0.597	.000
Academic Adjustment	←AA1	1.000	0.000	0.453	.000
	←AA2	1.855	0.306	0.554	.000
	←AA3	3.007	0.434	0.759	.000
	←AA4	3.061	0.479	0.815	.000
Correlations among Latent Variables					
Grit	↔Career Adaptability	0.099	0.019	0.730	.000
Grit	↔Self-regulated Learning	0.088	0.018	0.725	.000
Career Adaptability		0.104	0.016	0.670	.000
Grit	↔Academic Adjustment	0.035	0.009	0.503	.000
Career Adaptability		0.049	0.010	0.556	.000
Self-regulated Learning		0.046	0.009	0.588	.000

Note: CI - parcel of consistency of interest, PE - parcel of perseverance, AA - parcel of academic adjustment. Table 2 is the authors' design.

3.3. Structural Equation Modeling

We tested the SEM among grit, career adaptability, self-regulated learning, and academic adjustment. The hypothesized model was also found to have a reasonable fit (χ^2 = 226.353 [*df* = 98, p < .001], TLI = .905, CFI = .923, RMSEA = .068, C.I. = .056, .079). Table 3 and Figure 1 showed standardized path coefficients in SEM. Grit predicted career adaptability (β = .774, p < .001) and self-regulated learning (β = .777, p < .001). Career adaptability and self-regulated learning significantly predicted academic adjustment (βs = .325 and .403, p < .05, respectively), but grit did not significantly predict academic adjustment (β = -.030, p = .897). Finally, self-regulated learning also predicted negatively academic maladjustment (β = -.326, p < .01).

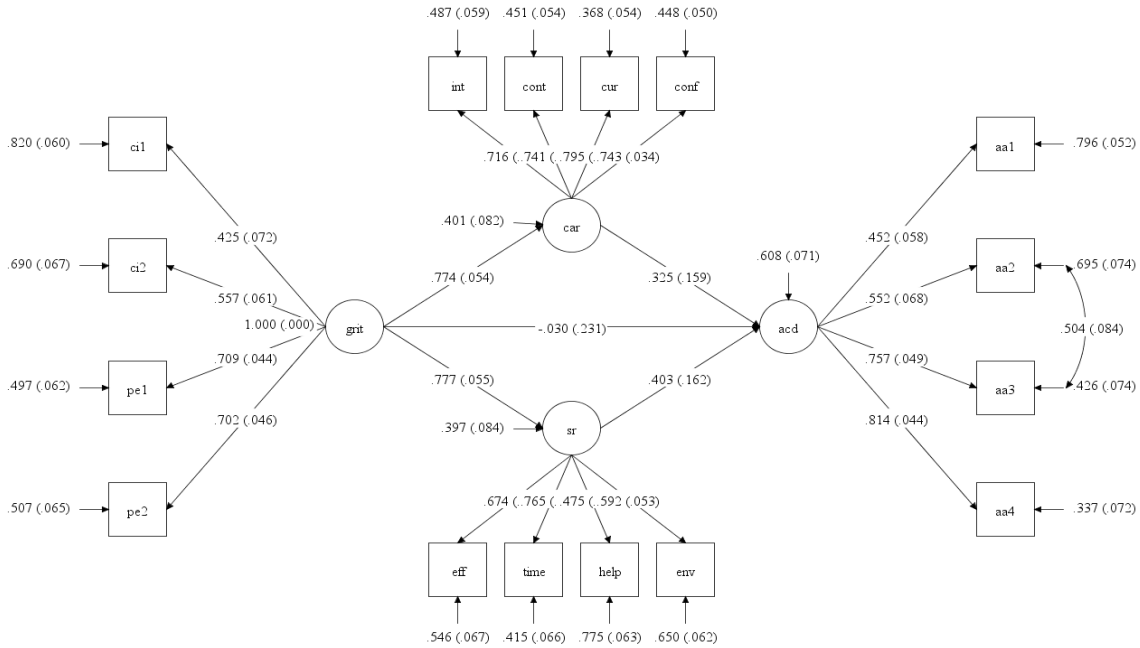

Figure 1 Standardized path coefficients of the research model

Note: CI - parcels of consistency of interest, PE - parcels of perseverance of effort, INT - concern, CONT - control, CUR - curiosity, CONF - confidence, EFF - effort regulation, TIME - time management, ENV - study environment management, HELP - help-seeking, CAR - career adaptability, SR - self-regulated learning, AA - parcels of academic adjustment, ACD - academic adjustment. Figure 1 is the authors' design.

Since the direct effect of grit on academic adjustment was not statistically significant, we assumed the mediation effect of career adaptability and self-regulated learning. In other words, grit can be mediated by career adaptability and self-regulated learning in predicting academic adjustment. To confirm our

hypothesis, we analyze the specific indirect effects of grit on academic adjustment.

Table 3 Path coefficients for structural equation model

		B	SE	Beta	*p*
Grit	←CI1	1.000	0.000	0.425	.000
	←CI2	1.311	0.274	0.557	.000
	←PE1	1.644	0.424	0.709	.000
	←PE2	1.564	0.467	0.702	.000
Career Adaptability	←Concern	1.000	0.000	0.716	.000
	←Control	0.859	0.084	0.741	.000
	←Curiosity	0.920	0.096	0.795	.000
	←Confidence	0.979	0.111	0.743	.000
Self-regulated Learning	←Effort regulation	1.000	0.000	0.674	.000
	←Time management	1.482	0.152	0.765	.000
	←Help-seeking	0.818	0.148	0.475	.000
	←Environment	1.105	0.133	0.592	.000
Academic Adjustment	←AA1	1.000	0.000	0.452	.000
	←AA2	1.854	0.316	0.552	.000
	←AA3	3.008	0.461	0.757	.000
	←AA4	3.064	0.590	0.814	.000
	←Grit	- 0.019	0.163	- 0.030	.897
Academic Adjustment	←Career Adaptability	0.164	0.085	0.325	.041
	←Self-regulated Learning	0.227	0.097	0.403	.013
Self-regulated Learning	←Grit	0.880	0.201	0.777	.000
Career Adaptability	←Grit	0.980	0.265	0.774	.000

Note: CI-parcel of consistency of interest, PE-parcel of perseverance, AA-parcel of academic adjustment. Table 3 is the authors' design.

3.4. Analysis of Effect Decomposition

To examine the grit's effect in detail, we utilized bias-corrected bootstrapping procedures (Hayes, 2013). In the current analysis, we used bootstrap samples to generate 95% confidence intervals around the parameter estimate. We determined an effect to be statistically significant if the confidence interval did not include zero. Table 4 displays statistically significant total, direct, and indirect effects of grit. Results showed that the direct effect of grit on academic adjustment was not statistically significant; however, indirect effects via career adaptability (B = .160) and self-regulated learning (B = .200) were statistically significant, meaning when a student's grit is higher, they are more likely to have higher career adaptability and self-regulated learning, which increase academic adjustment.

Table 4 Effects on grit on academic adjustment

	B	Beta	LLCI	ULCI
Total effect	0.341	0.534	0.392	0.676
Total indirect effect	0.360	0.564	0.179	0.949
Grit→Career Adaptability→Academic Adjustment	0.161	0.251	0.003	0.499
Grit→Self-regulated Learning→Academic Adjustment	0.200	0.313	0.049	0.576
Direct effect Grit→Academic Adjustment	- 0.019	- 0.030	- 0.483	0.423

Note: The bootstrap sample size is 5,000. The indirect effect is considered significant when the confidence intervals do not contain zero. LLCI - the lower limit of the 95% bias-corrected bootstrap confidence interval; ULCU - the upper limit of the 95% bias-corrected bootstrap confidence interval. Table 4 is the authors' design.

4. Discussion

We have learned from our previous studies that grit brings a better outcome when other critical characteristics, especially career adaptability and self-regulation, are sufficient. Our study addresses that there is a significant relationship between grit and career adaptability and self-regulation.

First, people who show high levels of grit also have high career adaptability so that they are proactive and strive for their future careers. This finding suggests that grit positively affects career development (Eskreis-Winkler et al., 2014) and career adaptability. Career adaptability is affected by psychological temperament because of its feature of psychologically positive resources, and it often results in adaptive behavior (Savickas, 2013). In addition, career adaptability is found to enhance career development during adolescence and career preparation and ameliorate stress levels and misbehavior (Hirschi, 2009; Sultisiani & Handoyo, 2017; Pouyand et al., 2012).

Our results are consistent with the previous studies that students show better career adaptability with higher grit (Bowman et al., 2015). According to a recent study, grit (particularly consistency of interest) has a significant effect on the career adaptability of college students. Consistency of effort is a sub-factor of grit and has a statistically significant relationship with career interest, career control, career curiosity, and career confidence, sub-factors of all career adaptability (Han, 2018). It also has been demonstrated that there is a positive relationship between consistency of effort and career adaptability in high school and college students (Jeong, 2019). In Jeong's study, college students showed higher consistency of effort and career adaptability than high school students.

Second, we have also noted that the students show better self-regulation as they have higher grit to change their reaction to the environmental stimuli to adapt to it better. The results of our study support the idea that the relationships between grit and self-regulation are consistent with those of previous research (Armstrong et al., 2018; Duckworth et al., 2007; Duckworth & Quinn, 2009; Wolters & Hussain, 2015). Grit shares some aspects of self-regulation to resist the temptation, bearing the pain during the process. This implies that grit has the characteristics of a person who endeavors to achieve goals (Duckworth et al., 2016). In other words,

the initiation of grit is self-regulation because enduring temptation is the first step of accomplishing a goal. As a result, our present study is significant. It shows the synergistic effect of career adaptability and self-regulation on academic success, investigated as separate constructs in previous studies. Our finding indicates that a high level of grit is critical for better self-regulation and career adaptability simultaneously.

Third, we demonstrated the positive effect of grit on academic adjustment, well known in previous studies. Grit has a positive effect on academic achievement (Strayhorn, 2014; Wolters & Hussain, 2015) and school adjustment (Ha et al., 2015; Slick & Lee, 2014). Notably, our finding further reveals that grit plays an indirect role in predicting the outcome, supporting the prior research showing that grit functions through mediation variables rather than directly impacts achievement. Indeed, it has been reported by many researchers that the mediation variables do increase academic achievement (Bashant, 2014; Duckworth & Eskreis-Winkler, 2015; Strayhorn, 2014). Our findings indicate that career adaptability and self-regulated learning are significant mediators between grit and academic adjustment.

5. Conclusion

This study examined the relationship between grit, career adaptability, self-regulated learning, and academic adjustment. We specifically investigated how grit indirectly predicted academic success through career adaptability and self-regulated learning. When a student's grit is higher, s/he is more likely to have higher career adaptability and self-regulated learning, which may influence academic adjustment.

While most of the previous studies on grit have focused on adolescents and undergraduate students, we collected data from adult learners in the non-traditional educational system. These students take online courses throughout four academic years; therefore, self-paced academic progress has been considered critical for them. The results showed that grit significantly affected academic and career success, even in distance learning. It has been suggested that the Open University helps adult learners in terms of the cognitive (e.g., academic aptitude) and affective (e.g., motivation to learn) aspects (Simpson, 2004). However, because many adult students have full-time jobs, they often cannot acquire sufficient time to study. Also, some students are likely to struggle with the online-based course system that learners and professors are physically separated. For these reasons, many students experience maladjustment or fail courses (Garrison & Anderson, 2003; Hermans et al., 2009). Based on the present study results, it is expected that students would be successful when the university helps them build their grit for self-motivation to improve career adaptability and self-regulation.

6. Limitations and Further Study

First, further study is needed to strengthen our findings by using a different method in that we only used self-report measures that are relatively subjective. Further research can be conducted by using a better method to measure the level of grit, such as observations of teachers and instructors. Second, future research is needed to generalize our findings by studying different age groups in other universities in other countries. Third, it would be important to investigate how to strengthen grit for better career adaptability and self-regulation. This will eventually help us learn how to improve academic adjustment for adult learners. Thus, it is necessary to develop a program or an intervention to apply the present findings to the higher education field.

Authors' Contributions

All authors conceived the research hypotheses and contributed to write and revise the manuscript. Hyo Jin Lim performed statistical analyses and presented methodology and interpretation. Mae Hyang Hwang worked out the introduction of the study and supervised data collection and analysis. Hyesuk Ha collected the data, discussed the results, and worked as a corresponding author.

References

[1] AHMET, H.S. (2019). The relationship between academic motivation and academic achievement of the students. *Asian Journal of Education and Training,* 5(2), 309-315. https://doi.org/10.1016/j.sbspro.2011.03.111

[2] ANDERA, C., RICCARDO, S., STEPHAN, D., & ARIANNA, C. (2016). Grit or honesty-humility? New insights into the moderating role of personality between the health impairment process and counterproductive work behavior. *Frontiers in Psychology,* 7, 1799. https://doi.org/10.3389/fpsyg.2016.01799

[3] APARICIO, M., BACAO, F., & OLIVEIRA, T. (2017). Grit in the path to e-learning success. *Computers in Human Behavior,* 66, 388-399. https://doi.org/10.1016/j.chb.2016.10.009

[4] ARCHBALD, D. (2011). The emergence of the non-traditional doctorate: A historical overview. *New Directions for Adult Continuing Education,* 129, 7-19. https://doi.org/10.1002/ace.396

[5] ARMSTRONG, A., VAN DER LINGEN, E., LOURENS, L., & CHEN, J.Y-J. (2018). Towards a new model of grit within a cognitive-affective framework of self-regulation. *South African Journal of Business Management,* 49(1), 495-508. https://doi.org/10.4102/sajbm.v49i1.13

[6] ARTINO, A.R., & STEPHENS, J.M. (2009). Academic motivation and self-regulation: A comparative analysis of undergraduate and graduate

students learning online. *The Internet and Higher Education,* 12(3-4), 146-151. https://doi.org/10.1016/j.iheduc.2009.02.001

[7] ATAY, E., & BAYRAKTAROGLU, S. (2020). The relationship of work-life conflict and organizational voice in higher education sector: A case study in Turkey. *Eurasian Journal of Business and Economics*, 13(25), 53-74. https://doi.org/10.17015/ejbe.2020.025.04

[8] BASHANT, J. (2014). Developing grit in our students: Why grit is such a desirable trait, and practical strategies for teachers and schools. *Journal for Leadership and Instruction,* 13(2), 14-17. Retrieved from https://files.eric.ed.gov/fulltext/EJ1081394.pdf

[9] BAZELAIS, P., LEMAY, D.J., & DOLECK, T. (2016). How does grit impact college students' academic achievement in science? *European Journal of Science and Mathematics Education,* 4(1), 33-43. https://doi.org/10.30935/scimath/9451

[10] BOWMAN, N.A., HILL, P.L., DENSON, N., & BRONKEMA, R. (2015). Keep on truckin' or stay the course? Exploring grit dimensions as differential predictors of educational achievement, satisfaction, and intentions. *Social Psychological and Personality Science*, 6(6), 639–645. https://doi.org/10.1177/1948550615574300

[11] CHOI, H.J., & KIM, B.U. (2018). Factors affecting adult student dropout rates in the Korean cyber university degree programs. *The Journal of Continuing Higher Education,* 66(1), 1–12. https://doi.org/10.1080/07377363.2017.1400357

[12] CROSS, T.M. (2014). The gritty: Grit and non-traditional doctoral student success. *Journal of Educators Online,* 11(3), 3-24. https://doi.org/10.9743/JEO.2014.3.4

[13] DE PAEPE, L., ZHU, C., & DEPRYCK, K. (2018). Drop-out, retention, satisfaction and attainment of online learners of Dutch in adult education. *International Journal on E-Learning*, 17(3), 303–323.

[14] DUCKWORTH, A.L., & ESKREIS-WINKLER, L. (2015). Grit. In WRIGHT, J.D. (ed.) *International encyclopedia of the social and behavioral sciences*. 2nd ed. Elsevier, pp. 397-401.

[15] DUCKWORTH, A.L., GENDLER, T.S., & GROSS, J.J. (2016). Situational strategies for self-control. *Perspectives on Psychological Science,* 11(1), 35-55. https://doi.org/10.1177/1745691615623247

[16] DUCKWORTH, A.L., KIRBY, T., TSUKAYAMA, E., BERSTEIN, H., & ERICSSON, K. (2011). Deliberate practice spell success: Why grittier competitors triumph at the National Spelling Bee. *Social Psychological and Personality Science*, 2(2), 174-181. https://doi.org/10.1177/1948550610385872

[17] DUCKWORTH, A.L., PETERSON, C., MATTHEWS, M.D., & KELLY, D.R. (2007). Grit: perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92(6), 1087-1101. https://doi.org/10.1037/0022-3514.92.6.1087

[18] DUCKWORTH, A.L., & QUINN, P.D. (2009). Development and validation of the Short Grit Scale (GRIT-S). *Journal of Personality Assessment,* 91(2), 166-174. https://doi.org/10.1080/00223890802634290

[19] DUCKWORTH, A.L., QUINN, P.D., & SELIGMAN, M.E. (2009). Positive predictors of teacher effectiveness. *The Journal of Positive Psychology,* 4(6), 540-547. https://doi.org/10.1080/17439760903157232

[20] ESKREIS-WINKLER, L., DUCKWORTH, A.L., SHULMAN, E.P., & BEAL, S. (2014). The grit effect: Predicting retention in the military, the workplace, school and marriage. *Frontiers in Psychology,* 5, 36. https://doi.org/10.3389/fpsyg.2014.00036

[21] GARCIA, T., & PINTRICH, P.R. (2012). Self-regulated learning in college students: Knowledge, strategies, and motivation. In PINTRICH, P., BROWN, D., & WEINSTEIN, C.E. (eds.) *Student motivation, cognition, and learning.* Routledge, pp. 129-150.

[22] GARRISON, D.R., & ANDERSON, T. (2003). Exploring tutor and student experiences in online synchronous learning environments in the performing arts. *Creative Education,* 3(7), 1269-1280. https://doi.org/10.4236/ce.2012.37186

[23] HA, H.S., LIM, H.J., & HWANG, M.H. (2015). The group difference of grit and self-control and its relations to school maladjustment, academic achievement, and predictability of personality. *Journal of Lifelong Learning Society,* 11(3), 145-166. https://doi.org/10.26857/JLLS.2015.08.11.3.145

[24] HAN, J.W. (2018). The effect of grit and resilience on the career adaptability of college students majoring in secretarial studies. *Journal of Secretarial Studies,* 27(4), 5-27. https://doi.org/10.35605/jss.2018.12.27.4.5

[25] HAYES, A.F. (2013). *Introduction to mediation, moderation, and conditional process analysis. A regression-based approach.* New York: The Guilford Press.

[26] HERMANS, C.M., HAYTKO, D.L., & MOTT-STENERSON, B. (2009). Student satisfaction in web-enhanced learning environments. *Journal of Instructional Pedagogies*, 1, 1-19. Retrieved from https://aabri.com/manuscripts/09147.pdf

[27] HIRSCHI, A. (2009). Career adaptability development in adolescence: Multiple predictors and

effect on sense of power and life satisfaction. *Journal of Vocational Behavior,* 74(2), 145-155. https://doi.org/10.1016/j.jvb.2009.01.002

[28] HU, L.T., & BENTLER, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal,* 6(1), 1-55. https://doi.org/10.1080/10705519909540118

[29] JEONG, E. (2019). Effects of grit and optimism on career adaptability for high school students and college students. *The Korean Journal of Educational Methodology Studies,* 31(2), 359-383.

[30] JUSTICE, E.M., & DORNAN, T.M. (2001). Metacognitive differences between traditional-age and nontraditional-age college students. *Adult Education Quarterly,* 51(3), 236-249. https://doi.org/10.1177/074171360105100305

[31] KARA, M., ERDOGDU, F., KOKOC, M., & CAGILTA, K. (2019). Challenges faced by adult learners in online distance education: A literature review. *Open Praxis,* 11(1), 5-22. https://doi.org/10.5944/openpraxis.11.1.929

[32] KOMARRAJU, M., KARAU, S.J., & SCHMECK, R.R. (2009). Role of the Big Five personality traits in predicting college students' academic motivation and achievement. *Learning and Individual Differences*, 19(1), 47-52. https://doi.org/10.1016/j.lindif.2008.07.001

[33] LEE, H.J., HWANG, M.H., & KWON, J.H. (2008). *A study of analysis effectiveness and improvement strategies of mentoring in Open University.* Seoul: Research Institute of Distant Education.

[34] LEE, J., & STANKOV, L. (2013). Higher-order structure of non-cognitive constructs and prediction of PISA 2003 mathematics achievement. *Learning and Individual Differences,* 26, 119-130. https://doi.org/10.1016/j.lindif.2013.05.004

[35] LIANG, Q. (2021). Lift the grit's veil: The literature review and prospects of grit. *Psychology,* 12(4), 580-594. https://doi.org/10.4236/psych.2021.124036

[36] MACCANN, C., FOGARTY, G.J., & ROBERTS, R.D. (2012). Strategies for success in education: Time management is more important for part-time than full-time community college students. *Learning and Individual Differences,* 22(5), 618-623. https://doi.org/10.1016/j.lindif.2011.09.015

[37] NERONI, J., MEIJS, C., LEONTJEVAS, R., KIRSCHNER, P.A., & DE GROOT, R.H.M., (2018). Goal orientation and academic performance in adult distance education. *International Review of Research in Open and Distributed Learning,* 19(2), 192-208. https://doi.org/10.19173/irrodl.v19i2.3440

[38] PINTRICH, P.R. (2004). A conceptual framework for assessing motivation and self-regulated learning in college students. *Educational Psychology Review,* 16(4), 385-407. https://doi.org/10.1007/s10648-004-0006-x

[39] PINTRICH, P.R., SMITH, D.A., GARCIA, T., & MCKEACHIE, W.J. (1993). Reliability and predictive validity of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement,* 53(3), 801-813. https://doi.org/10.1177/0013164493053003024

[40] POUYAND, J., VIGNOLI, E., DOSNON, O., & LALLEMAND, N. (2012). Career adaptabilities scale - France form: Psychometric properties and relationships to anxiety and motivation. *Journal of Vocational Behavior,* 80(3), 692-697. https://doi.org/10.1016/j.jvb.2012.01.021

[41] ROBERTSON-KRAFT, C., & DUCKWORTH, A.L. (2014). True grit: Trait-level perseverance and passion for long-term goals predicts effectiveness and retention among novice teachers. *Teachers College Record,* 116(3), 1-25. Retrieved from https://www.tcrecord.org/content.asp?contentid=17352

[42] SAVICKAS, M.L. (1997). Career adaptability: An integrative construct for life-span, life-space theory. *Career Development Quarterly*, 45(3), 247-259. https://doi.org/10.1002/j.2161-0045.1997.tb00469.x

[43] SAVICKAS, M.L. (2013). Career construction theory and practice. In LENT, R.W., & BROWN, S.D. (eds.) *Career development and counseling: Putting theory and research to work*. John Wiley & Sons, pp. 147-183.

[44] SAVICKAS, M.L., & PORFELI, E.J. (2012). Career Adapt-Abilities Scale: Construction, reliability, and measurement equivalence across 13 countries. *Journal of Vocational Behavior*, 80(3), 661-673. https://doi.org/10.1016/j.jvb.2012.01.011

[45] SEGUIN, C. (2019). A survey of nurse leaders to explore the relationship between grit and measures of success and well-being. *Journal of Nursing Administration,* 49, 125-131. https://doi.org/10.1097/NNA.0000000000000725

[46] SIMPSON, O. (2004). The impact on retention of interventions to support distance learning students. *Open Learning: The Journal of Open, Distance and e-Learning,* 19(1), 79-95. https://doi.org/10.1080/0268051042000177863

[47] SLICK, S.N., & LEE, C.S. (2014). The relative levels of grit and their relationship with potential dropping-out and university adjustment of foreign students in Korea. *Journal of Digital Convergence,* 12(8), 61-66. https://doi.org/10.14400/JDC.2014.12.8.61

[48] STEINMAYR, R., WEIDINGER, A.F., SCHWINGER, M., & SPINATH, B. (2019). The importance of students' motivation for their academic achievement: Replicating and extending previous findings. *Frontiers in Psychology,* 10, 1730. https://doi.org/10.3389/fpsyg.2019.01730

[49] STRAYHORN, T.L. (2014). What role does grit

play in academic success of black male collegians at predominately white institutions? *Journal of African American Studies*, 18(1), 1-10. https://doi.org/10.1007/s12111-012-9243-0

[50] SULTISIANI, W., & HANDOYO, S. (2017). Career adaptability: the influence of readiness and adaptation success in the education context: A literature review. *Advances in Social Science, Education and Humanities Research*, 133, 195-205.

[51] TING, L.C., & DATU, J.A.D. (2020). Triarchic model of grit dimensions as predictors of career outcomes. *The Career Development Quarterly*, 68(4), 348-360. https://doi.org/10.1002/cdq.12241

[52] WIBROWSKI, C.R., MATTHEWS, W.K., & KITSANTAS, A. (2017). The role of a skills learning support program on first-generation college students' self-regulation, motivation, and academic achievement: A longitudinal study. *Journal of College Student Retention: Research, Theory & Practice*, 19(3), 317-332. https://doi.org/10.1177/1521025116629152

[53] WOLTERS, C.A., & HUSSAIN, M. (2015). Investigating grit and its relations with college students' self-regulated learning and academic achievement. *Metacognition and Learning*, 10(3), 293-311. https://doi.org/10.1007/s11409-014-9128-9

[54] ZIMMERMAN, B.J. (1990). Self-regulated learning and academic achievement: An overview. *Educational Psychologist*, 25(1), 3-17. https://doi.org/10.1207/s15326985ep2501_2

参考文:

[1] 艾哈迈德，H.S. (2019)。学生学业动机与学业成绩的关系。亚洲教育与培训杂志，5(2)，309-315。https://doi.org/10.1016/j.sbspro.2011.03.111

[2] ANDERA, C., RICCARDO, S., STEPHAN, D., & ARIANNA, C. (2016)。坚毅还是诚实谦逊？对人格在健康损害过程和适得其反的工作行为之间的调节作用的新见解。心理学前沿，7，1799. https://doi.org/10.3389/fpsyg.2016.01799

[3] APARICIO, M., BACAO, F., & OLIVEIRA, T. (2017)。在电子学习成功之路上勇往直前。人类行为中的计算机，66，388-399。https://doi.org/10.1016/j.chb.2016.10.009

[4] ARCHBALD, D. (2011)。非传统博士学位的出现：历史概述。成人继续教育的新方向，129，7-19。https://doi.org/10.1002/ace.396

[5]阿姆斯特朗，A.，范德林根，E.，洛伦斯，L.，和陈，J.Y-J。(2018)。在自我调节的认知-情感框架内迈向新的勇气模型。南非商业管理杂志，49（1），495-508。https://doi.org/10.4102/sajbm.v49i1.13

[6] ARTINO, A.R., & STEPHENS, J.M. (2009)。学业动机和自我调节：本科生和研究生在线学习的比较分析。互联网与高等教育，12(3-4)，146-151。https://doi.org/10.1016/j.iheduc.2009.02.001

[7] ATAY, E., & BAYRAKTAROGLU, S. (2020)。高等教育部门工作与生活冲突与组织话语权的关系：以土耳其为例。欧亚商业与经济杂志，13(25)，53-74。https://doi.org/10.17015/ejbe.2020.025.04

[8] BASHANT, J. (2014)。培养学生的毅力：为什么毅力是如此理想的特质，以及教师和学校的实用策略。领导力与教学杂志，13（2），14-17。取自 https://files.eric.ed.gov/fulltext/EJ1081394.pdf

[9] BAZELAIS, P., LEMAY, D.J., & DOLECK, T. (2016)。毅力如何影响大学生在科学方面的学业成绩？欧洲科学与数学教育杂志，4(1)，33-43。https://doi.org/10.30935/scimath/9451

[10] BOWMAN, N.A., HILL, P.L., DENSON, N., & BRONKEMA, R. (2015)。继续卡车运输还是坚持到底？探索勇气维度作为教育成就、满意度和意图的差异预测因子。社会心理和人格科学，6（6），639-645。https://doi.org/10.1177/1948550615574300

[11] CHOI, H.J., & KIM, B.U. (2018)。影响韩国网络大学学位课程成年学生辍学率的因素。继续高等教育杂志，66（1），1-12。https://doi.org/10.1080/07377363.2017.1400357

[12] 克罗斯，T.M. (2014)。坚毅：坚韧不拔和非传统的博士生成功。在线教育工作者杂志，11（3），3-24。https://doi.org/10.9743/JEO.2014.3.4

[13] DE PAEPE, L., ZHU, C., & DEPRYCK, K. (2018)。成人教育中荷兰语在线学习者的辍学、保留、满意度和成就。国际电子学习杂志，17（3），303-323。

[14] 达克沃思，A.L.，& ESKREIS-WINKLER，L. (2015)。砂砾。在 WRIGHT，J.D. (编。) 国际社会和行为科学百科全书。第二版。爱思唯尔，第 397-401 页。

[15] 达克沃斯，A.L.，GENDLER，T.S.，& 格罗斯，J.J. (2016)。自我控制的情境策略。心理科学观点，11（1），35-55。https://doi.org/10.1177/1745691615623247

[16] 达克沃斯，A.L.，柯比，T.，冢山，E.，BERSTEIN,

H., & ERICSSON, K. (2011)。刻意练习拼写成功：为什么更坚韧的竞争对手在全国拼字比赛中获胜。社会心理与人格科学，2(2)，174-181。https://doi.org/10.1177/1948550610385872

[17] 达克沃斯，A.L.，彼得森，C.，马修斯，M.D.，& KELLY, D.R. (2007)。毅力：对长期目标的坚持和热情。人格与社会心理学杂志，92（6），1087-1101。https://doi.org/10.1037/0022-3514.92.6.1087

[18] 达克沃斯, A.L., & 奎因, P.D. (2009)。短砂砾秤(砂砾-秒)的开发和验证。人格评估杂志，91（2），166-174。https://doi.org/10.1080/00223890802634290

[19] 达克沃斯, A.L., 奎因, P.D., & 塞利格曼, M.E. (2009)。教师效能的积极预测因素。积极心理学杂志，4（6），540-547。https://doi.org/10.1080/17439760903157232

[20] ESKREIS-WINKLER, L., DUCKWORTH, A.L., SHULMAN, E.P., & BEAL, S. (2014)。毅力效应：预测在军队、工作场所、学校和婚姻中的保留率。心理学前沿，5, 36。https://doi.org/10.3389/fpsyg.2014.00036

[21] GARCIA, T., & PINTRICH, P.R. (2012)。大学生自我调节学习：知识、策略和动机。在 PINTRICH, P., BROWN, D., & WEINSTEIN, C.E. (编辑。) 学生动机、认知和学习。劳特利奇，第 129-150 页。

[22] GARRISON, D.R., & ANDERSON, T. (2003)。在表演艺术的在线同步学习环境中探索导师和学生的体验。创意教育，3(7)，1269-1280。https://doi.org/10.4236/ce.2012.37186

[23] HA, H.S., LIM, H.J., & HWANG, M.H. (2015)。毅力和自制力的群体差异及其与学校适应不良、学业成绩和人格可预测性的关系。终身学习学会杂志，11（3），145-166。https://doi.org/10.26857/JLLS.2015.08.11.3.145

[24] 韩，J.W. (2018)。毅力和韧性对秘书学专业大学生职业适应能力的影响[J].秘书研究杂志，27（4），5-27。https://doi.org/10.35605/jss.2018.12.27.4.5

[25]海耶斯，A.F.（2013）。中介、调节和条件过程分析简介。基于回归的方法。纽约：吉尔福德出版社。

[26] HERMANS, C.M., HAYTKO, D.L., & MOTT-STENERSON, B. (2009)。学生在网络增强型学习环境中的满意度。教学教育学杂志，1, 1-19。取自 https://aabri.com/manuscripts/09147.pdf

[27] HIRSCHI, A. (2009)。青春期职业适应性发展：多重预测因素和对权力感和生活满意度的影响。职业行为杂志，74（2），145-155。https://doi.org/10.1016/j.jvb.2009.01.002

[28] HU, L.T., & BENTLER, P.M. (1999)。协方差结构分析中拟合指数的截止标准：传统标准与新替代方案。结构方程建模：多学科期刊，6(1)，1-55。https://doi.org/10.1080/10705519909540118

[29] JEONG, E. (2019)。勇气和乐观对高中生和大学生职业适应能力的影响。韩国教育方法研究杂志，31（2），359-383。

[30] JUSTICE, E.M., & DORNAN, T.M. (2001)。传统年龄与非传统年龄大学生的元认知差异。成人教育季刊，51(3)，236-249。https://doi.org/10.1177/074171360105100305

[31] KARA, M.、ERDOGDU, F.、KOKOC, M. 和 CAGILTA, K. (2019)。在线远程教育成人学习者面临的挑战：文献综述。打开实践，11（1），5-22。https://doi.org/10.5944/openpraxis.11.1.929

[32] KOMARRAJU, M., KARAU, S.J., & SCHMECK, R.R. (2009)。大五人格特质在预测大学生学业动机和成就中的作用。学习与个体差异，19（1），47-52。https://doi.org/10.1016/j.lindif.2008.07.001

[33] LEE, H.J., HWANG, M.H., & KWON, J.H. (2008)。开放大学导师制分析有效性及改进策略研究. 首尔：远程教育研究所。

[34] LEE, J., & STANKOV, L. (2013)。非认知结构的高阶结构和比萨2003数学成绩的预测。学习与个体差异，26, 119-130。https://doi.org/10.1016/j.lindif.2013.05.004

[35]梁青（2021）。揭开勇气的面纱：勇气的文献综述和前景。心理学，12（4），580-594。https://doi.org/10.4236/psych.2021.124036

[36] MACCANN, C., FOGARTY, G.J., & ROBERTS, R.D. (2012)。教育成功的策略：对于非全日制社区大学生来说，时间管理比全日制更重要。学习与个体差异，22（5），618-623。https://doi.org/10.1016/j.lindif.2011.09.015

[37] NERONI, J., MEIJS, C., LEONTJEVAS, R., KIRSCHNER, P.A., & DE GROOT, R.H.M., (2018)。成人远程教育的目标导向和学业成绩。开放和分布式学习研究国际评论，19(2)，192-208。https://doi.org/10.19173/irrodl.v19i2.3440

[38] PINTRICH, P.R. (2004)。评估大学生动机和自我调节学习的概念框架。教育心理学评论，16（4），385-

407。https://doi.org/10.1007/s10648-004-0006-x

[39] PINTRICH, P.R., SMITH, D.A., GARCIA, T., & MCKEACHIE, W.J. (1993)。学习动机策略问卷(MSLQ)的可靠性和预测效度。教育和心理测量，53（3），801-813。https://doi.org/10.1177/0013164493053003024

[40] POUYAND, J., VIGNOLI, E., DOSNON, O., & LALLEMAND, N. (2012)。职业适应性量表 - 法国形式：心理测量特性以及与焦虑和动机的关系。职业行为杂志，80（3），692-697。https://doi.org/10.1016/j.jvb.2012.01.021

[41] ROBERTSON-KRAFT, C., & DUCKWORTH, A.L. (2014)。真正的毅力：特质水平的毅力和对长期目标的热情可以预测新手教师的有效性和保留率。师范学院记录，116（3），1-25。取自 https://www.tcrecord.org/content.asp?contentid=17352

[42] SAVICKAS, M.L. (1997)。职业适应性：寿命、生活空间理论的综合结构。职业发展季刊，45(3)，247-259。https://doi.org/10.1002/j.2161-0045.1997.tb00469.x

[43] SAVICKAS, M.L. (2013)。职业生涯建设理论与实践。在 LENT, R.W., & BROWN, S.D. (编辑。) 职业发展和咨询：将理论和研究付诸实践。约翰威利父子公司，第 147-183 页。

[44] SAVICKAS, M.L., & PORFELI, E.J. (2012)。职业适应能力量表：13个国家的结构、可靠性和测量等效性。职业行为杂志，80（3），661-673。https://doi.org/10.1016/j.jvb.2012.01.011

[45] SEGUIN, C. (2019)。一项针对护士领导者的调查，以探讨毅力与成功和幸福的衡量标准之间的关系。护理管理杂志，49，125-131。https://doi.org/10.1097/NNA.0000000000000725

[46]辛普森，O.（2004）。对支持远程学习学生的干预措施的保留的影响。开放学习：开放、远程和电子学习杂志，19(1)，79-95。https://doi.org/10.1080/0268051042000177863

[47] SLICK, S.N., & LEE, C.S. (2014)。毅力的相对水平及其与韩国外国学生潜在辍学和大学调整的关系。数字融合杂志，12（8），61-66。https://doi.org/10.14400/JDC.2014.12.8.61

[48] STEINMAYR, R., WEIDINGER, A.F., SCHWINGER, M., & SPINATH, B. (2019)。学生动机对其学业成就的重要性：复制和扩展以前的发现。心理学前沿，10，1730. https://doi.org/10.3389/fpsyg.2019.01730

[49] STRAYHORN, T.L. (2014)。在以白人为主的机构中，毅力在黑人男大学生的学业成功中扮演什么角色？非裔美国人研究杂志，18（1），1-10。https://doi.org/10.1007/s12111-012-9243-0

[50] SULTISIANI, W., & HANDOYO, S. (2017)。职业适应性：教育背景下准备和适应成功的影响：文献综述。社会科学、教育和人文研究进展，133，195-205。

[51] TING, L.C., & DATU, J.A.D. (2020)。勇气维度的三元模型作为职业成果的预测指标。职业发展季刊，68(4)，348-360。https://doi.org/10.1002/cdq.12241

[52] WIBROWSKI, C.R., MATTHEWS, W.K., & KITSANTAS, A. (2017)。技能学习支持计划对第一代大学生自我调节、动机和学业成绩的作用：纵向研究。大学生保留期刊：研究、理论与实践，19（3），317-332。https://doi.org/10.1177/1521025116629152

[53] 沃尔特斯, C.A., & HUSSAIN, M. (2015)。调查毅力及其与大学生自主学习和学业成绩的关系。元认知与学习，10（3），293-311。https://doi.org/10.1007/s11409-014-9128-9

[54] ZIMMERMAN, B.J. (1990)。自我调节学习和学业成就：概述。教育心理学家，25（1），3-17。https://doi.org/10.1207/s15326985ep2501_2