



Exploring Grit and Big Five Personality as Predictors of Foreign Language Achievement

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ABSTRACT

This study examines grit—trait-level perseverance and prolonged passion for primary goals—in a foreign language learning context. The participants of this study were 384 English as a Foreign Language (EFL) learners from different academic majors studying at Yazd University. They had enrolled in General English (GE) courses. A questionnaire and an inventory were administered to assess their grit and a set of five assumed predictors, respectively. This investigation sought two main objectives: to examine (a) the relationships between grit and big five personality traits, and (b) the roles of grit and big five personality traits as predictors of L2 achievement. Using structural equation modeling (SEM), we explored links among grit, five predictors of grit, and L2 achievement. The results indicated that three variables of big five personality traits (conscientiousness, extraversion, and openness to experience or intellect) are important predictors of grit in language learning. Furthermore, grit as a novel construct considerably predicted L2 achievement to a large extent and mediated the influence of the five predictive factors on L2 achievement. Grit, thus, constitutes a predictor of L2 learning and acts as an essential yet under-investigated role for success in language learning that is conceptually and empirically different from existing constructs.

KEYWORDS: Big five personality, Grit, L2 achievement, Predictors of grit

1. Introduction

Both literally and figuratively, people take journeys throughout their lifetimes. Education life may be regarded as one of these journeys. Nowadays, individuals may commence their education at a young age, either formally or informally, and endeavor to excel from that point onward. Success in any aspect of life necessitates a combination of skills, attributes, and personal qualities that an individual must possess. Nevertheless, irrespective of possessing a particular factor that impacts success, it is evident that such attributes or personal traits have a positive effect on academic results. Considering the fact that learning a language is like a marathon, not a sprint (Mercer, 2018), one of the personal traits that of vital importance is grit. Grit is as “a passion and perseverance to accomplish long-term goals whatever the obstacles and no matter how long it may take” (Duckworth et al., 2007, p. 541).

There has been growing interest in non-cognitive variables which influence students' academic success (Duckworth & Yeager, 2015). One of these variables, which has drawn much public attention in the educational and psychological literature, is grit. Grit is defined as “perseverance and passion for long-term goals” (Duckworth et al., 2007, p. 1087). Duckworth and Quinn (2009) asserted that grit can positively predict students' achievement and persistence, even beyond more traditional variables such as IQ. Research has shown that grittier students persist in doing valuable but unpleasant activities even in confrontation with setbacks and challenges (Duckworth et al., 2011).

Grit, which comprises perseverance of effort and consistency of interests, has been shown to predict life success and school achievement (Duckworth et al., 2007). It refers to extreme stamina and effort and it is a good predictor of life success such as scholastic achievement across the life span, graduation from high school, and job retention (Eskreis-Winkler et al., 2014). Grittier students often perceive school achievement to be like a marathon, and thus, persist longer, invest greater effort in their work to achieve their short and long-term goals (Fong & Kim, 2019). The combined evidence from the previous studies suggests that grit represents an efficient capacity that enables students to successfully navigate experiences of academic difficulty.

Similarly, according to Mihaela (2015), one of the personal traits that determines academic success is the personality factor. Therefore, this personality factor is a concern of education practitioners and researchers. One personality approach that can be used to identify aspects of personality is the big five personality approach (De Raad & Mlačić, 2015) and this approach is known as the structure of the personality model (De Raad & Mlačić, 2017). Neuroticism, extraversion, openness, agreeableness, and conscientiousness are 5 personality aspects of the big five personality approach model (McCrae & Costa Jr, 2008). Regarding language learning, Rosito (2018) found that these five aspects of big five personality traits have a significant impact on the students' academic achievement. Besides, Bhagat, Shetty, Husain, Mat, Simbak, Aung, and Oo, (2019) concluded that personality is the combination of individual character as an asset for academic achievement. In short, the big five personality traits can positively predict academic achievement.

In the field of educational research, the role that is played by intellectual and non-intellectual factors is widely acknowledged (Duckworth & Seligman, 2005). Grit, which is regarded as a non-intellectual factor and personal trait, can be defined as the ability to strive for a desirable goal with passion and without desisting in case of any obstacles. Therefore, as applies to every part of life, individuals who have higher levels of grit are more laborious in dealing with challenges and thus achieve more in the end. In general, some studies discover a relationship between grit and academic performance (Chang, 2014; Lee, 2017; Mason, 2018; Luthans, Luthans & Chaffin, 2019). However, the number of studies focusing on such issues in the field of English Language Learning is quite low and even scarce for the Iranian EFL context. Little research has been conducted to investigate whether students who belong to different types of Big Five personality traits might differ in their L2 achievement and it is the principal goal of this research study.

Therefore, this study explores Iranian EFL Learners' Grit in the language classroom and investigates the relationship between grit profiles, its big five personality traits predictors, and its L2 learning achievements. In the current study, it is hoped that understanding L2 learners' grit, sheds more light on how grit affects the L2 learners' success and failure and helps the teachers and teacher trainers achieve a fine-grained understanding of the ways through which they can help their students improve their state of grit.

2. Literature review

2.1. Conceptualizing grit

Duckworth et al. (2007, p. 1087) defined grit as “the tendency to sustain interest and effort toward very long-term goals”. Grit entails working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress. Duckworth et al. (2007) defined grit as trait-level perseverance and maintained passion for superordinate goals that foreground the sustained and intentional pursuit of a long-term outcome. Perseverance is more often studied as an outcome than as a predictor. For example, perseverance in difficult or impossible tasks has served as the dependent variable in studies of optimistic attribution style, self-efficacy, goal orientation, and depletion of self-control resources (see, e.g., Bandura, 1977; Baumeister et al., 1998; Elliott & Dweck, 1988; Muraven, Tice, & Baumeister, 1998; Seligman & Schulman, 1986). However, the study of perseverance as a predictor, in particular as a stable individual difference, was of keen interest to psychologists in the first half of the 20th century. In a review of the existing literature of his day, Ryan (1939, p. 737) concluded that “the existence of a general trait of persistence, which permeates all behavior of the organism, has not been established, though evidence both for and against such an assumption has been revealed”. Very recently, positive psychology has renewed interest in the empirical study of character in general and in the trait of perseverance in particular (Peterson & Seligman, 2004).

In context, grit is primarily assessed through Angela Duckworth's twelve-item (Grit-O) and eight-item (Grit-S) self-report scales and these are the primary measures of grit applied across the majority of research studies on grit. Factor analysis procedures with these measures have identified that grit is comprised of two components, or factors (Duckworth et al., 2007). The Grit-S (i.e., the Short Grit Scale) retains this two-factor structure with four fewer items and improved psychometric properties (Duckworth & Quinn, 2009).

The first factor, consistency of interests, has been defined in the literature as a goal- and action-oriented long-term behavior—this is distinct from an individual or situational interest (Muenks et al., 2017). Consistency of interests is assessed via six items on the Grit-O, each measured using a five-point Likert scale: 1) I often set a goal, but later choose to pursue a different one; 2) New ideas and new projects sometimes distract me from previous ones; 3) I become interested in new pursuits

every few months; 4) My interests change from year to year; 5) I have been obsessed with a certain idea or project for a short time but later lost interest, and 6) I have difficulty maintaining my focus on projects that take more than a few months to complete.

The second factor, perseverance of effort, is conceptualized as the tendency to continue working toward a particular goal (Muenks et al., 2017). Perseverance of effort is also assessed via six items on the Grit-O, each measured using a five-point Likert scale: 1) I have achieved a goal that took years of work; 2) I have overcome setbacks to conquer an important challenge; 3) I finish whatever I begin; 4) Setbacks don't discourage me; 5) I am a hard worker, and 6) I am diligent.

Perseverance has been conceptualized as the capacity to remain focused and committed to both short- and long-term goals in the face of adversity (Constantin et al., 2011). Thus, perseverance reflects the perseverance of effort component of grit but does not necessarily address consistency of interests. Although constructs related to grit may have slight deviations in their operational definitions, they may provide important insight into relevant relationships within the current body of literature. Researchers have sought to disentangle grit from conceptually similar constructs and their findings provide support for investigating grit along with these related constructs. For example, Crede, Tynan, & Harms (2017) conducted a full meta-analysis to disentangle grit from other constructs, including conscientiousness, self-control, mental toughness, and cognitive ability. This research identified that grit is highly correlated with conscientiousness. In addition, this research identified that several of these related constructs were also strongly associated with academic performance.

The importance of intellectual talent to achievement in academic performance and all professional domains is well established, but less is known about other individual differences that predict success. During the last decade, there has been an increasing interest in identifying factors that make individuals excel and be more successful compared to others of equal intelligence, especially in the field of education (Duckworth et al., 2007). Apart from cognitive ability, talent and opportunity, high achievers demonstrate a variety of non-cognitive or motivational characteristics such as creativity, commitment, emotional intelligence, growth mindset, gratitude, self-confidence, and emotional stability (Duckworth, et al., 2007; Dweck, Walton, & Cohen, 2014). Such qualities have been found to positively impact academic outcomes, social relationships, as well as psychological and physical well-being (Duckworth & Gross, 2014; Duckworth & Yeager, 2015). More than 100 years before work on grit as one of the non-cognitive factors, Galton (1892) collected biographical information on eminent judges, statesmen, scientists, poets, musicians, painters, wrestlers, and others. Ability alone, he concluded, did not bring about success in any field. Rather, he believed high achievers to be triply blessed by "ability combined with zeal and with capacity for hard labour" (Galton, 1892, p. 33). Similar conclusions were reached by Cox (1926) in an analysis of the biographies of 301 eminent creators and leaders drawn from a larger sample compiled by J. M. Cattell (1903). Estimated IQ and Cattell's rank order of eminence were only moderately related ($r = .16$) when the reliability of data was controlled for. Rating geniuses on 67 character traits derived from Webb (1915), Cox concluded that holding constant estimated IQ, the following traits evident in childhood predicted lifetime achievement: "persistence of motive and effort, confidence in their abilities, and great strength or force of character" (Cox, 1926, p. 218). Following these studies, grit has become a central phenomenon in recent educational research (Gray & Mannahan, 2017) and as Duckworth (2016) states, it plays a much more significant role in students' success than talent. Both facets of grit are fundamental ingredients of success since perseverance of effort contributes to the achievement of mastery despite failure, and consistency of interest is essential in engaging in deliberate practice to reach mastery (Credé et al., 2016).

Duckworth et al. (2007) asserted that grit was an important predictor of success for a variety of individuals, including National Spelling Bee contestants, salespeople at a vacation-time-share company, students at West Point Military Academy, and Teach for America teachers. For instance, WSSDA Research Blast (2014) indicates that grittier students are more likely to pursue their graduate-level education. Therefore, defining grit can be considered essential to better understand its role in the educational context. Furthermore, Duckworth et al. (2007) introduced the construct of grit, defined as trait-level perseverance and passion for long-term goals, and showed that grit predicted achievement in challenging domains over and beyond measures of talent. For instance, at the U.S. Military Academy, West Point, cadets higher in grit were less likely to drop out than their less gritty peers, even when controlling for SAT scores, high school rank, and a measure of big five conscientiousness. In four separate samples, grit was found to be either orthogonal to or slightly inversely correlated with intelligence. According to Duckworth et al.'s (2007) review of the literature, studies showed that even if a person was intelligent, that intelligence was useful only if the person was persistent. Grit is also related to but distinct from the need for achievement (n Achievement: McClelland, 1961). Grit differed from achievement in that achievement was "short term intensity" and grit was "long-term stamina" (Duckworth et al's, 2007. p. 1089).

Additionally, Duckworth et al. (2007) proposed that grit is distinct from traditionally measured facets of big five conscientiousness in its emphasis on stamina. In particular, grit entails the capacity to sustain both effort and interest in projects that take months or even longer to complete. Individuals high in grit do not swerve from their goals, even in the absence of positive feedback. Grit and effort can highly motivate an individual to overcome setbacks that he or she encounters (Dweck, 2006; Robert, 2009). By framing the distinctions between these constructs as one related to the specificity of their respective focus, concepts in this domain of character strengths might be seen as complementing each other like pieces of a puzzle (e.g., Oxford, 2016).

This study reveals that the students with higher levels of grit tend to be more determined. Grittier students regarded learning as a kind of journey and valued every stage in their learning process. In sum, grit can be regarded as one of the most significant personality traits in an individual's successful education. Since one of the primary roles of education is to enable people to pursue their goals and acquire abilities (Horn, 2013), the concept of grit gains importance in the field of education.

2.2. Research on grit

In the past ten years, there have been many research studies on grit including Duckworth et al. (2007) that identified this non-cognitive construct as “perseverance and passion for long-term goals”. Duckworth et al. (2007) started to investigate why some people are more successful among the others who have the same intelligence. Duckworth et al. (2007, p. 1087) looked for a specific characteristic that distinguishes some successful people from others and found out it is “perseverance and passion for long term goals”, which they defined as ‘grit’. Then, she put forwards that the role of grit in terms of success is more significant than talent and IQ (Duckworth, 2016). Grit entails about four percent of the variance in lifespan success that absorbed researchers’ attention and then researchers found that grit is the main predictor of success. Moreover, researchers have found that grit is diverse. They found that grit is predictive of many outcomes in education, including adults’ educational attainment, Ivy League undergraduates’ grade point average, and the National Spelling Bee ranking (Duckworth et al., 2007). In addition, they identified the role of grit in predicting the retention rate of cadets in the United States Military Academy West Point, the success of employers, and overall career decision-making self-efficacy. (Duckworth et al., 2007; Mooradian et al., 2016; Vela et al., 2018). Besides the impact of grit on educational or career success, it predicts a variety of non-cognitive abilities including the big five conscientiousness component, forgiveness, and positive happiness (Arya & Lal, 2018; Duckworth et al., 2007). Eskreis-Winkler et al., (2014) conducted a study in which they explored the “grit effect” in four settings including the military, the workplace, high school, and marriage. They found that in these settings, intelligence, physical fitness, the big five personality traits, and job tenure were traditional predictors of retention, but grit was a more effective predictor of retention.

Research lends support to the idea that the big five personality traits have been identified as predictors of grit. Big five personality traits are composed of extraversion, agreeableness, conscientiousness, openness to experience, and neuroticism (Rimfeld et al., 2016). In this study, the applicability of grit to L2 learners' big five personality traits, and L2 achievement is examined. So, the relationship between grit, its big five personality traits predictors, and its L2 learning achievements are investigated.

2.3. Big five personality traits and L2 achievement

Personality refers to “the psychological qualities that contribute to an individual’s enduring and distinctive patterns of feeling, thinking, and behaviors” (Cervone & Pervin, 2015, p 7). Among various ways of classification for personality traits, the Big Five model is the most widely used and widely known. The Big Five model consists of five main personality traits: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Costa & McCrae, 1985, 2008). Although there are many lower-order personality traits, the model of the five high-order traits has received strong empirical support from many years of research (Dewaele, 2012).

Individuals have different characteristics, such as personality qualities related to specific behaviors, cognitive, and emotional patterns (Hogan et al., 1996). McCrae and Costa (1987) asserted that personality has a five-factor structure including extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience or intellect. The operationalization of these big-five personality traits includes grit tendencies. They are essential predictors of grit. McCrae and Costa (1987) used the big five personality traits as a model for exploring the relationship between personality and different academic behaviors (Poropat, 2009). Following the big five model, a descriptive framework has been pointed out for many empirical research studies on the characteristics of predicting success (Goldberg, 1993; John & Srivastava, 1999; McCrae & Costa, 1987; Tupes & Christal, 1992). Barrick and Mount (1991) in a meta-analysis showed that big five conscientiousness is more related to job performance than the other factors.

Existing research on the Big Five traits and L2 learning achievement has shown the relevance of these traits in the context of L2 learning achievement (Zafar & Meenakshi, 2012b), as discussed in the following sections.

2.3.1. Predictors of grit

2.3.1.1. Conscientiousness

Conscientious individuals tend to be responsible, well-organized, and self-disciplinary (Costa & McCrae, 1992; McCrae & Costa, 1987). Several studies have suggested that conscientiousness is positively related to L2 learning (Cao & Meng, 2020; Lee, 2001). As found in Fazeli (2011), in a sample of Iranian English language learners, conscientiousness was positively related to all the L2 learning strategy uses; in other words, learners with higher levels of conscientiousness tend to use more

strategies in language learning. Lee (2001) found that, among a group of variables, conscientiousness was the best predictor for English proficiency (i.e., reading and listening) in a sample of Korean university students. Cao and Meng (2020) showed similar findings in a sample of Chinese university English language learners. However, the findings in this area were not always consistent, as shown in Ghapanchi et al. (2011), where conscientiousness had a non-significant relationship with L2 learning proficiency.

Also, Tross et al. (2000) studied conscientiousness as a means to predict college performance and found that conscientiousness was a stronger predictor of college GPA than HSGPA. Conard (2006) examined the incremental predictive validity of Big Five personality traits for affecting college GPA while controlling for SAT scores and found that conscientiousness and SAT scores had a direct effect in predicting college GPA, but the other traits were not predictive. Consistent with this result, Nofle and Robins (2007) observed that conscientiousness was a significant and positive predictor of college GPA, even when controlling for gender, SAT scores, HSGPA, and the other four Big Five factors. Similarly, Nofle and Robins (2007) concluded that conscientiousness was a slightly stronger predictor of college GPA than SAT scores.

2.3.1.2. *Openness to Experience*

Openness to experience refers to a person's willingness of being curious, imaginative, investigative, and exploring (Costa & McCrae, 1992; McCrae & Costa, 1987). Learners with higher levels of openness tend to be more open to non-traditional experiences and challenges, and tend to have the curiosity and interest to explore new things and phenomena. Such personal tendencies could facilitate their active learning that would lead to higher levels of L2 learning achievement. Research in this area has suggested that openness to experience could be one of the more salient predictors for L2 learning achievement (Oz, 2014; Zhang et al., 2019). For instance, in a US college student sample, Jackson (2019) found that students with higher levels of openness outperformed those lower in openness. In a recent study (Zhang et al., 2019), it was shown that, in a large sample of Chinese secondary school students, openness was related to students' English language learning interests. Steele-Johnson and Leas (2013) examined whether race and gender jointly affect the influence of personality on college GPA. They found that openness accounted for unique variance in GPA for male students and interacted with race in their effects on GPA. Furthermore, openness was more strongly related to GPA for Black male students than for White male students.

2.3.1.3. *Neuroticism*

People with neuroticism tend to be anxious, worrying, nervous, and emotional (Costa & McCrae, 1992; McCrae & Costa, 1987). Research has suggested that neuroticism was related to L2 learning (Lee, 2001), mostly in a negative way (Cao & Meng, 2020; Zhang, 2013). For example, as proposed in Erfani and Mardan (2017)'s study, among the five personality traits in the Big Five model, neuroticism was the only personality trait that was negatively correlated with both language proficiency and academic success in a sample of Iranian students who studied at different English-speaking universities around the world. However, some research indicated that the relationship between neuroticism and L2 achievement was nonsignificant (Ghapanchi et al., 2011; Kirkagac & Oz, 2017).

2.3.1.4. *Extraversion*

Extraversion reflects one's characteristics of being sociable, talkative, and of love to actively participate in interpersonal and social activities (Costa & McCrae, 1992; McCrae & Costa, 1987). Research suggested that extraversion could be beneficial for L2 learning (Cao & Meng, 2020; Oz, 2014), particularly in the domain of oral communication. The reason for this may not be surprising, given that extroverted individuals tend to be more likely to take the risk in communication, and tend to have less regard for potential mistakes that they may make (Zhang, 2008). This outgoing personality usually leads to an increased amount of input and output through interpersonal communication and activities (Krashen, 1985; Zafar & Meenakshi, 2012a), hence it is beneficial for their language proficiency development by reducing their language anxiety.

The seemingly obvious relationship between extraversion and L2 language learning as described above, however, is not always supported, especially when L2 achievement is measured with methods other than speaking, such as listening and writing. For example, Nejad et al. (2012) compared introverted and extraverted L2 learners and found that there is no significant relationship between extraversion and writing ability. Similarly, Nosratinia and Kounani (2016) found that extraversion/introversion did not play a significant role in L2 learners' writing ability. Furthermore, some researchers argued that being extraverted is not necessarily linked to better L2 learning. The results of Ehrman (2008) suggested that the best language learners were more likely to have an introverted personality. Alavinia and Sameei (2012) also found that introverted L2 learners performed better in L2 listening than extroverts in a group of intermediate-ability Iranian English language learners. As discussed in Dewaele (2012), quiet and hard-working introverts could also be successful in L2 through different ways, such as enjoying personal reading instead of social activities. Furthermore, the positive or negative impact of personality on L2 learning outcomes could vary in different pedagogical situations. For example, L2 classes with more activities that require deep

reflection and memorizing the rules and vocabulary may benefit introverted L2 learners, while in classes with more activities requiring speaking and communicating, extraverts may feel more engaged and may learn better (MacIntyre & Charos, 1996).

2.3.1.5. Agreeableness

Agreeable individuals tend to be soft-hearted, helpful, sympathetic, friendly, and caring for others (Costa & McCrae, 1992; McCrae & Costa, 1987). Generally, people who are kind and agreeable are more likely to have pleasant contact with the target L2 communities and groups (MacIntyre & Charos, 1996). Research suggested that a more positive attitude towards the L2 community and a higher degree of intercultural contact could enhance motivation in L2 learning (Al Qahtani, 2015; Au, 1988; Gardner, 1985). Shirdel and Naeini (2018) showed that there was a significant relationship between agreeableness and foreign language achievement among college English language students in Iran. Similar results were found in Oz (2014), which suggested that agreeableness was a significant contributor in promoting students' willingness to communicate in L2 in a sample of Turkish college student.

Generally, the theoretical justifications of conscientiousness, openness to experience, extraversion, and agreeableness connection to components of language learning and L2 achievement are more than the theoretical justifications of neuroticism.

Previous research studies have shown that L2 achievement was linked to higher levels of conscientiousness (Chamorro-Premuzic & Furnham, 2003), extroversion (Matthews, 1997), openness to experience (Busato et al., 1999), agreeableness (Vermetten et al., 2001) and lower level of neuroticism (Entwistle, 1988). Also, research studies that have correlated grit with the personality dimensions specified in the big five model show similar results, but there are some differences. In one of the research studies, Duckworth et al. (2007) found that grit and conscientiousness have a strong correlation ($r = 0.77, p < 0.001$) followed by neuroticism ($r = -0.38, p < 0.001$), agreeableness ($r = 0.24, p < 0.001$), extraversion ($r = 0.22, p < 0.001$) and openness to experience ($r = 0.14, p < 0.001$). In another study, Lin and Chang (2017) explored the connections between personality dimensions and grit in high school students. Similarly, the results of the latter study also showed that conscientiousness is the superior predictor of grit ($\beta = 0.44, p < 0.001$) followed by neuroticism ($\beta = -0.17, p < 0.001$), openness to experience ($\beta = 0.13, p < 0.001$) and agreeableness ($\beta = 0.11, p < 0.001$). Furthermore, the results of these research studies indicated that extraversion did not have a predictive effect on grit. Based on these research studies, it is reasonable to assume that grit may be linked to increased levels of conscientiousness, extroversion, openness to experience, agreeableness, and decreased extent of neuroticism in the L2 learning context. In our model, we will test whether the big five personality factors predict grit in the L2 learning context.

Several research studies have been conducted on exploring the influences of grit on different educational settings and L2 achievement. However, little research has been conducted to investigate whether students who belong to different types of big five personality traits might differ in their L2 achievement and it is the principal goal of this research study. Studying the association between grit, big five personality and L2 achievement can provide valuable information about the types of grit profiles may be associated with adaptive L2 achievement. The results may have an impact on the design of grit interventions for students with different grit profiles.

3. Design of the study

This study adopted a quantitative approach to find answers to the questions. Questionnaire data from 384 EFL learners comprising students of various academic majors who attend General English (GE) courses, assessed their grit and a set of five hypothesized predictors. Using multivariate analysis of variance (ANOVA), we examined links among the five predictor variables, grit profiles, and L2 achievement (GPA).

Besides, consistent with our review of the theoretical and empirical work on grit, we examined predictors and tested links between constructs through structural equation modeling (SEM).

To avoid the type of confirmation bias common in SEM, we also tested several competing models. Specifically, we tested the fit of the model when each of the hypothesized predictors (e.g., conscientiousness, neuroticism, agreement, extraversion, and openness to experiencing) is successively used as the mediator instead of grit to examine how well each model accounts for the data.

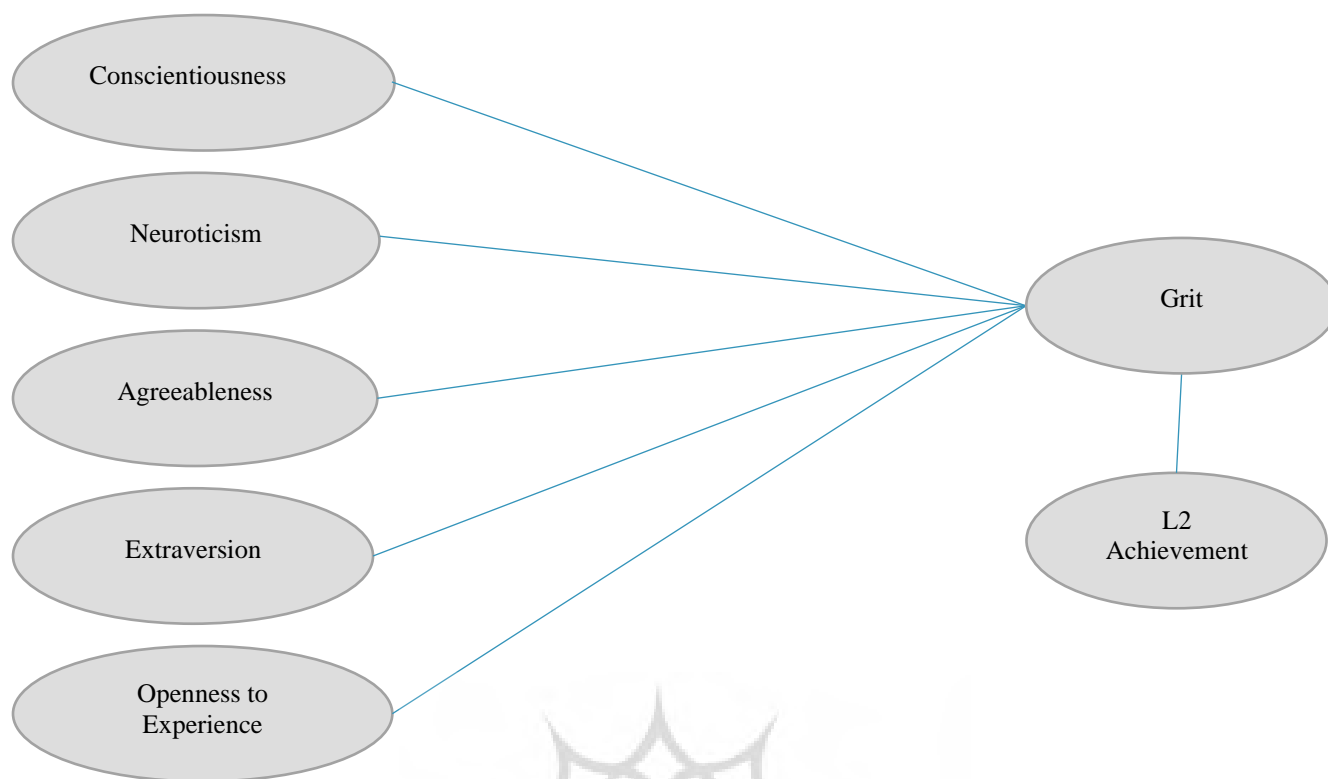


Figure 1. Hypothesized Conceptual framework of the study

In this study, to choose the standard methods and framework, one investigates whether grit exists as a researchable construct in the field of language learning and whether it influences L2 achievement. The following questions are investigated:

1. What is the relationship between the big five personality traits (extraversion, agreeableness, conscientiousness, openness to experience, and neuroticism) and grit?
2. How do grit and big five personality traits predict L2 achievement?

Structural equation modeling (SEM) is a variable-based method that allows us to test our questions.

4. Method

4.1. Participants

The current research was conducted at the Faculty of Humanities at Yazd University. Using quota sampling, the participants were 384 EFL students (60.4% male, 39.6% female) comprising students of various academic majors who attended General English (GE) courses that were designed to help students make rapid progress in English, and focus on the four key language skills – reading, writing, listening and speaking – with lots of additional work on vocabulary, grammar and pronunciation. The participants of this study comprised students of different ages from 19 to 24. As can be seen in figure 1, the highest frequency is related to the 20-year-old age group (40.6%) and the lowest frequency is related to the 22-year-old age group (2.9%). Language proficiency was identified by Students self-assessment as beginner (0.29%), lower-intermediate (0.53%), intermediate (2.3%), upper-intermediate (13.8%), and advanced (7%). All participants' mother tongue was Persian.

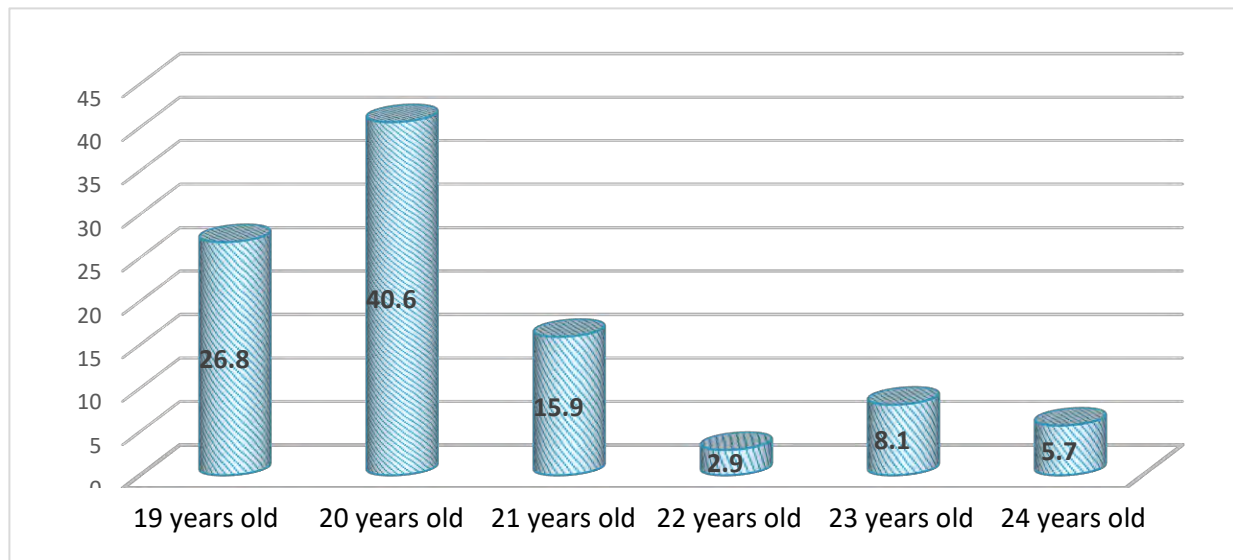


Figure 2. Distribution of the Participants According to Age Status

4.2. Instrumentation

The participants completed the grit questionnaire and big five inventory.

4.2.1. Grit questionnaire

The present study used the L2 short grit scale developed by Duckworth and Quinn (2009) to measure participants' passion and perseverance for long-term goals. The items were rated on a five-point Likert scale from 1 (Not like me at all) to 5 (Very much like me). The 8-item grit scale has two 4-item subscales, namely perseverance of effort and consistency of interest which is presented in Appendix I. The Cronbach's alpha reliability coefficients of the perseverance and consistency subscales were 0.827 and 0.909, respectively.

4.2.2. Big five inventory

According to John and Srivastava (1999) the BFI consists of 44 short items, rated on a 5-point scale from strongly disagree to strongly agree which is presented in Appendix II. The BFI items are assigned to five measurement scales: Extraversion (E; 8 items), Agreeableness (A; 9 items), Conscientiousness (C; 9 items), Neuroticism (N; 8 items), and Openness to experience (O; 10 items).

4.3. Data collection procedure

The data collection method was based on questionnaire. The short-term grit scale developed by Duckworth and Quinn (2009) was used to assess our participants' level of grit (i.e., perseverance and passion for long-term goals). Besides, all participants were asked to fill big five inventory (BFI; John & Srivastava, 1999), which is a 44-item questionnaire widely used to measure the big five personality factors of individuals. Participants rated items such as "I see myself as someone talkative" on a 5-point Likert scale with options ranging from (1= disagree strongly) to (5 = agree strongly).

It is worth mentioning that the whole data collection procedure happened in January 2020 before the Covid-19 pandemic crisis in Iran. Therefore, the paper and pencil version of all the instruments was used to collect the data from the students of Yazd University.

Since translation may jeopardize the reliability and validity of the instruments, a procedure called translation-back translation is performed to minimize this threat. Two non-affiliated researchers familiar with questionnaire construction translated the questionnaires into the participants' L1 and these questionnaires were back-translated for consistency. Cronbach's α was used to evaluate internal consistency. The Reliability of the scales is shown in Table 3.1. Following ethics approval, written consent forms from faculties in the universities and verbal participant assent were applied. They were told that their participation was entirely voluntary. The participants were assured about the confidentiality of their responses. The

participants were asked to answer the Grit Scale and big five inventory and at the end of the semester, their L2 test scores as measures of their L2 learning achievement were collected.

At the end of the semester, participants' final grades were obtained to assess their L2 achievement. They took a test that included reading comprehension, grammar, vocabulary, and pronunciation. In the Iranian educational system, scores range from 0 to 20 and the highest score is 20. If they get a minimum grade of 10, they will pass the course. Course grades are frequently used in L2 research (see Brown, Plonsky, & Teimouri, 2018 for a review).

4.4. Data analysis

ANOVA was conducted to determine whether or not these clusters significantly differed on the perseverance of effort and consistency of interests. The hypothesized predictors were selected for determining cluster membership (i.e., conscientiousness, neuroticism, agreement, extraversion, and openness to experiencing), while grit served as the criterion variable.

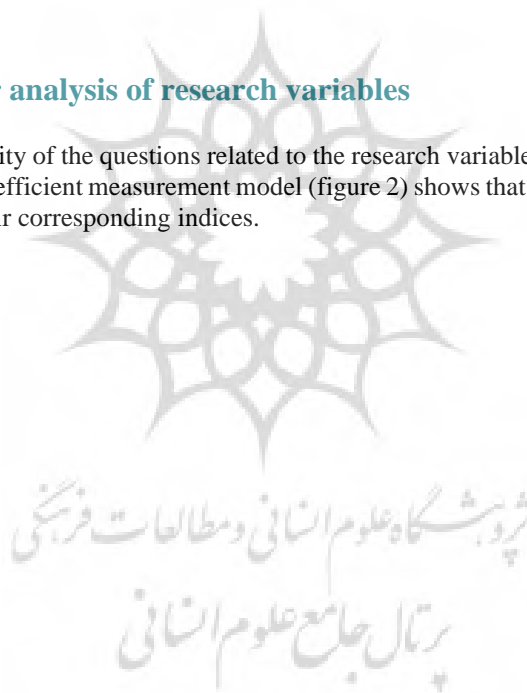
Consistent with our review of the theoretical and empirical work on grit, we examined predictors and tested links between constructs through structural equation modeling (SEM). Confirmatory factor analysis was used to indicate the validity of the questions related to the research variables. According to CFA, there was a significant correlation between the relevant latent variables and their corresponding indices. Specifically, we tested the fit of the model when each of the hypothesized predictors (e.g., conscientiousness, neuroticism, agreement, extraversion, and openness to experiencing) is successively used as the mediator instead of grit to examine how well each model accounts for the data.

More details on data analyses and the descriptive and inferential statistics are provided in the following chapter.

5. Results

5.1. Confirmatory factor analysis of research variables

In this part of the research, the validity of the questions related to the research variables has been evaluated using confirmatory factor analysis. The standardized coefficient measurement model (figure 2) shows that there is a significant correlation between the relevant latent variables and their corresponding indices.



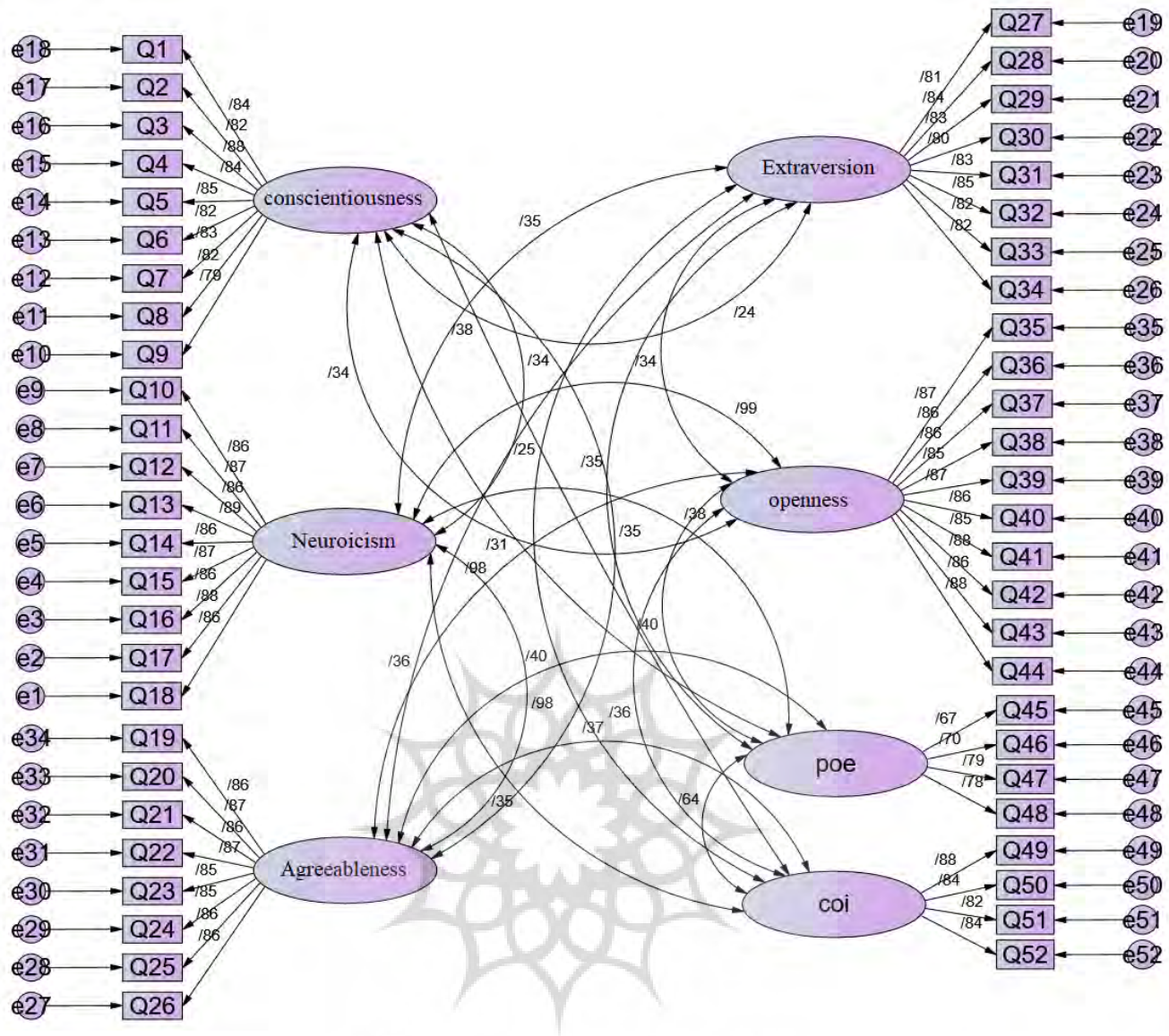


Figure 3. Standardized factor load coefficients of confirmatory factor analysis

5.2. Standardized factor loading

As can be seen in Table 1, the standardized factor loading for all questions is greater than 0.4. The construct reliability (CR) between items and corresponding latent variables is greater than 1.96. Also, their significance level is less than 0.05. Then, it can be said that the validity of the measurement structures of the relevant variables is confirmed at a significance level of 0.05. Therefore, there is no need to change or remove the question in the research model and questionnaire.

Table 1. Standardized factor loading between indices and latent variables

Questions	r	CR	sig	Cronbach's alpha
Q1	0.836	18.695	***	0.952
Q2	0.818	18.166	***	
Q3	0.878	20.038	***	
Q4	0.835	18.679	***	

	Questions	r	CR	sig	Cronbach's alpha
	Q5	0.854	19.254	***	
	Q6	0.819	18.183	***	
	Q7	0.827	18.445	***	
	Q8	0.818	18.174	***	
	Q9	0.790	-	-	
neuroticism	Q10	0.681	23.153	***	0.964
	Q11	0.869	23.575	***	
	Q12	0.856	22.889	***	
	Q13	0.885	24.444	***	
	Q14	0.859	23.022	***	
	Q15	0.873	23.788	***	
	Q16	0.860	23.107	***	
	Q17	0.878	24.030	***	
	Q18	0.861	-	-	
agreeableness	Q19	0.858	23.113	***	0.958
	Q20	0.867	23.555	***	
	Q21	0.859	23.137	***	
	Q22	0.869	23.681	***	
	Q23	0.853	22.845	***	
	Q24	0.853	22.840	***	
	Q25	0.857	23.047	***	
	Q26	0.863	-	-	
extraversion	Q27	0.815	-	-	0.944
	Q28	0.838	19.556	***	
	Q29	0.826	19.118	***	
	Q30	0.800	18.255	***	
	Q31	0.827	19.176	***	
	Q32	0.846	19.824	***	
	Q33	0.820	18.918	***	
	Q34	0.820	18.944	***	
openness to experience	Q35	0.871	-	-	0.967
	Q36	0.858	23.597	***	
	Q37	0.862	23.822	***	
	Q38	0.854	23.381	***	
	Q39	0.871	24.305	***	
	Q40	0.862	23.795	***	

	Questions	r	CR	sig	Cronbach's alpha
	Q41	0.854	23.329	***	
	Q42	0.876	24.600	***	
	Q43	0.859	23.636	***	
	Q44	0.884	25.103	***	
POE	Q45	0.673	-	-	0.827
	Q46	0.703	11.715	***	
	Q47	0.785	12.746	***	
	Q48	0.782	12.714	***	
COI	Q49	0.884	-	-	0.909
	Q50	0.839	21.401	***	
	Q51	0.819	20.554	***	
	Q52	0.843	21.600	***	

The measurement model showed good fit $\chi^2/df = 2.795$ that is less than 3, GFI= 0.81, RMSEA= 0.072, IFI= 0.91, CFI= 0.91. All factor loadings were significant and greater than .70. The skewness and Kurtosis coefficient of all variables are between +2 and -2, indicating that the observed covariance terms fit well with the estimated covariance terms. The construct reliability (CR) of variables in this model is more than 1.96. Also, Cronbach's alpha coefficient of all variables is more than 0.7. Table 2 also shows that the model had acceptable discriminant validity (see Hair, Black, Babin, & Anderson, 2010). The basic results of this model are shown in figure3. According to this model, it is clear that among the five predictors of conscientiousness, neuroticism, agreeableness, extraversion, and openness to experiencing; conscientiousness has the highest coefficient (0.26) and neuroticism has the lowest one (-0.10).

Table 2. Reliability of Constructs and Their Inter-correlations in the Measurement Model

	Cronbach's α	CR	1	2	3	4	5	6
Conscientiousness	0.952	5.130						
Neuroticism	0.964	-1.034	0.328					
Agreeableness	0.958	4.958	0.335	0.942				
Extroversion	0.944	2.930	0.231	0.333	0.340			
Openness to experience	0.967	2.826	0.329	0.953	0.948	0.322		
Grit	0.887	26.832	0.380	0.380	0.401	0.309	0.394	

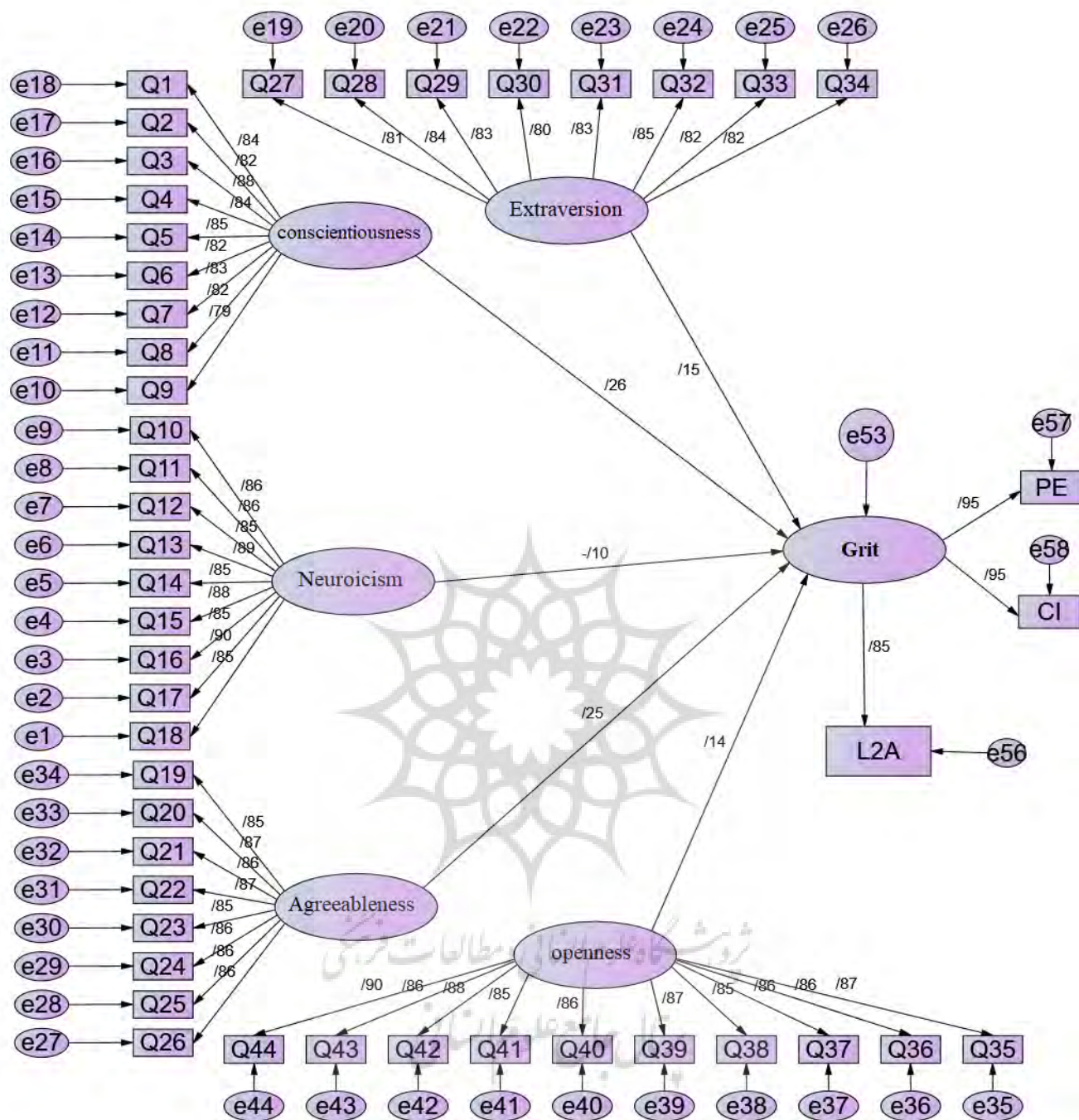


Figure 4. Research model in standardized path coefficient mode

5.3. SEM models

Six different SEM models were tested to investigate the relations among grit, big five personality traits, and L2 achievement. In the first model, the unique role of grit in L2 achievement was examined. To avoid the confirmation bias that is common in SEM, we examined five competing models (Hiver & Al-Hoorie, 2020). We examined the fit of the model when each of the assumed predictor variables (e.g., conscientiousness, agreeableness, extraversion, neuroticism, and openness to experiencing) was used as the mediator instead of grit to examine the way each model accounts for the data and then to indicate the best fit model.

5.3.1. Grit as a predictor of L2 achievement

The first model tested the role of grit as a predictor of L2 achievement (Model A). The Goodness of fit indices indicated that the model fitted the data adequately (Table 3). Model A in Figure 4 showed a good fit $\chi^2/df = 2.795$, $CFI = 0.91$, $RMSEA = 0.072$.

Model A

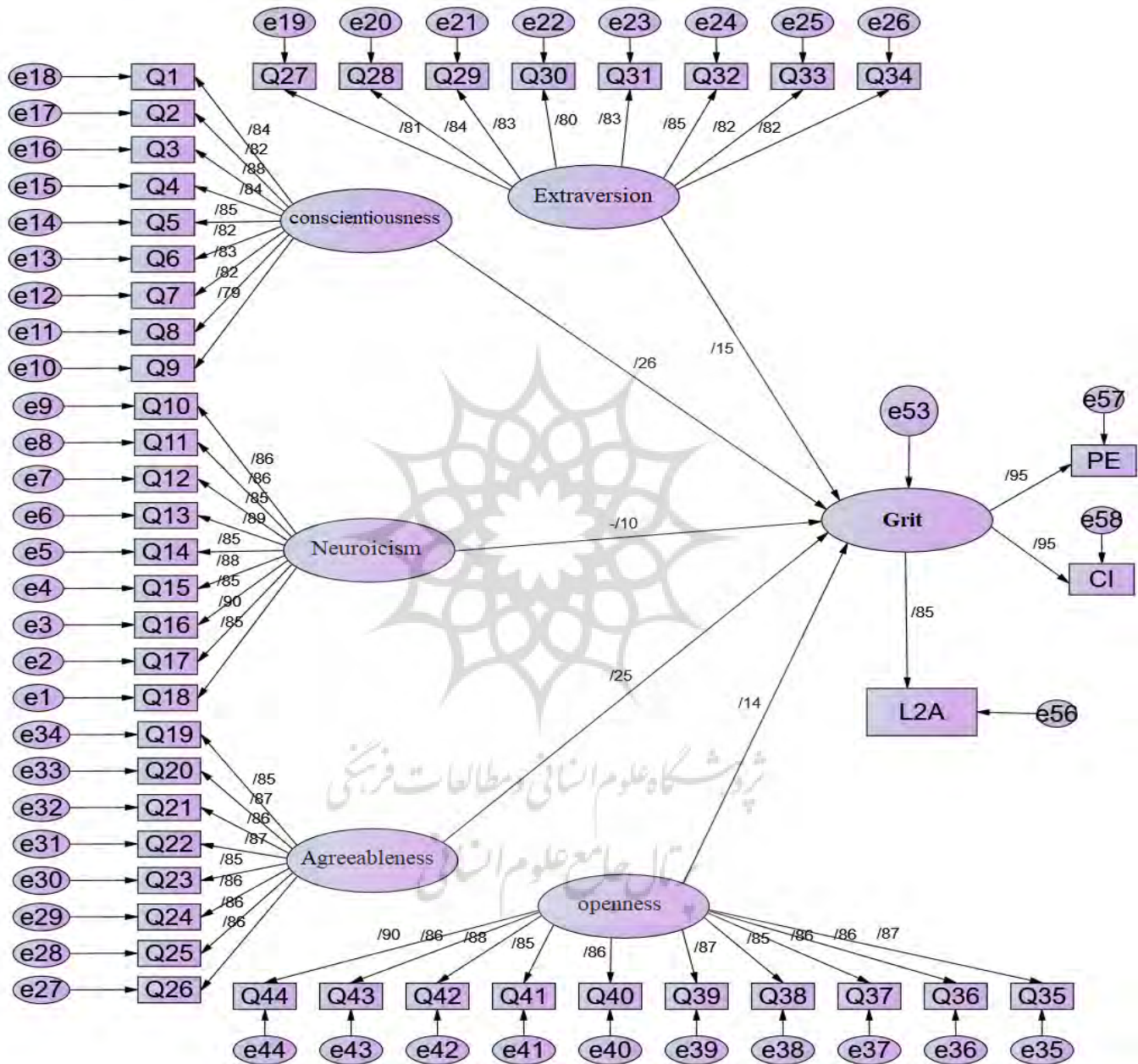


Figure 5. Grit as a Predictor of L2 Achievement with Standardized Coefficients

5.4. Competing models

Through five competing models, the simultaneous role of the big five personality factors and grit in predicting L2 achievement was examined. As Table 3 indicates, the goodness of fit indices for Model A is the better fit. The AIC and BIC values are basic

fit indices, in a way that lower values indicate better fit (Klein & Kotov, 2016). It can be seen from Table 3 that smaller values of AIC and BIC are identified for Model A. Both goodness-of-fit indices, AIC and BIC values show that Model A is the best model. Therefore, this model is reported to test the relationship between grit, big five personality traits, and L2 achievement. Competing models figures can be seen in Appendix B.

Table 3. Model Fit for Each of the Competing Models Tested

	x2/df	CFI	GFI	IFI	RMSEA	AIC	BIC
Grit	2.795	0.91	0.81	0.91	0.072	3279.888	3671.002
Conscientiousness	3.415	0.87	0.77	0.87	0.081	3712.200	4103.313
Extroversion	3.436	0.87	0.77	0.87	0.080	3734.056	4125.170
Openness to Experience	2.701	0.91	0.81	0.91	0.073	3771.608	4162.722
Agreeableness	2.864	0.90	0.82	0.90	0.074	3836.063	4227.177
Neuroticism	3.685	0.85	0.76	0.85	0.084	3996.573	4371.884

Note: AIC= Akaike Information Criterion, BIC= Bayesian Information Criterion, CFI= Bentler's Comparative Fit Index, RMSEA= Root Mean Square Error of Approximation.

The results showed that, except for neuroticism, all hypothesized predictors (i.e., conscientiousness, agreement, extraversion, and openness to experiencing) predicted grit highly significantly. Also, grit predicted L2 achievement.

6. Discussion

According to our SEM results, three variables are important predictors of grit: conscientiousness, extraversion, and openness to experience or intellect. This suggests that learners are mostly dependable, responsible, and able to set their goals and then persist to meet them. Highly intelligent people have a positive attitude toward challenges and setbacks in language learning (Barrick & Mount, 1991) as opposed to those who are mainly narrow-minded (McCrae & Costa, 1987). As we expected, our results illustrated that achievement striving, positive emotions, and wide interests have a positive impact on learners' grit, and this may be because these factors involve compliance and cooperativeness that enable individuals to be imperturbable in learning. (McCrae & Costa, 1987). Learners with relatively lower effort and interest in their L2 learning processes are less likely to be gritty individuals and then less accomplish their L2 learning goals. Besides, our SEM results confirm a part of Duckworth et al.'s (2007), Lin and Chang's (2017) research studies in which conscientiousness is the superior predictor of grit. It is followed by neuroticism, agreeableness, extroversion, and openness to experience in the former; and neuroticism, openness to experience, agreeableness, no predictive effect of extraversion on grit in the latter. In this study conscientiousness followed by extroversion, openness to experience, agreeableness, and no predictive effect of neuroticism. Also, according to this study grit is highly correlated with conscientiousness (Crede et al., 2017; Cao & Meng, 2020; Lee, 2001; Fazeli, 2011).

About tested competing models, the model where grit was a predictor illustrated a better fit than those where the other five variables were predictors: Grit either significantly predicts L2 achievement or completely mediates the impact of other big five factors on L2 achievement. It is aligned with the research on grit that found out the extreme stamina and effort as a good predictor of success in life such as academic achievement through life, graduation from high school, and job maintenance (Eskreis-Winkler et al., 2014; Akin and Arslan, 2014). While not explicitly aligned with research on grit, Khajavy, MacIntyre, Hariri's (2020) study on the relation between grit components and L2 achievement found no significant relation either in correlations or in SEM analyses. Our results suggest that among the big-five factors, conscientiousness is more related to grit especially effort and persistence (Chamorro-Premuzic & Furnham, 2003). Also, our results confirm Geisler-Brenstein

et al.'s study (1996); asserted that there is a direct and positive relationship between conscientiousness and systematic learning and one way that enables learners to be successful in language learning is through the facilitation of grit.

Creating and maintaining conscientiousness can be accomplished by controlling, regulating, and directing the impulses which are not inherently bad. People see impulsive individuals as brilliant, fun-to-be-with, and natural. High conscientiousness has many benefits. Conscientious individuals keep away from trouble and accomplish high levels of success through definite planning and persistence. Also, people regard them as intelligent and reliable. (Kotchoubey, 2018)

As for neuroticism, contrary to previous research indicating its importance in motivation and effort (Norem and Cantor, 1986) it did not function as an essential positive predictor of grit. Although it is understood as a defensive force, has a negative effect rather than a positive (Matthews and Zeidner, 2004).

7. Conclusion

Conventional predictors of academic performance, including gender, race, ACT/SAT scores, and HSGPA, have been widely used to predict student academic performance (Komarraju et al., 2013). Yet research has begun to study specific personality traits, like grit, as predictors of academic performance in college in combination with traditional cognitive measures (Duckworth et al., 2007; Strayhorn, 2014). Unlike the extensive empirical research on the use of traditional cognitive ability measures to understand academic performance, personality factors, like grit, have not been empirically studied in the literature.

The primary purpose of this study was to examine whether personality traits and grit, predict EFL learners' academic performance. In addition, the moderating effect of grit in the relation of learners' big five personality traits was examined. These questions were explored using SEM. The results of this study suggest four important conclusions.

First, both POE and COI are essential elements of L2 achievement. This implies that, in the context of L2 learning, learners should be trained to improve in perseverance and consistency. Second, according to our expectation, the grit profile characterized by high perseverance and low consistency did show a robust buffering role against learners' success. This may indicate that the profile, highlighting low consistency only, might not have a strong effect on a learner's high academic performance. Third, neuroticism did not predict grit, and this might be because of the lack of effective cognitive skills (Eysenck, 1967) or surface learning instead of meaningful learning (Entwistle, 1988). Fourth, results suggest that one way for learners' achievement is through the facilitation of grit within the framework of the big five personality traits. It can be inferred that grit, even when big five traits were added may predict higher performance and grades.

Compared to the most positive factors for learners (conscientiousness, extraversion, openness to experience, agreeableness), neuroticism may not be as prominent here. Our research results delineate that L2 learners who possess these constructs have an elaborate high L2A despite a certain degree of neuroticism. Generally, the theoretical justifications of conscientiousness, openness to experience, extraversion, and agreeableness connection to components of language learning and L2 achievement are more than the theoretical justifications of neuroticism (McCrae & Costa, 1987). Despite the concentration on preventing or decreasing the negative constructs such as anxiety, hostility, depression, and impulsiveness that accompany L2 learning, it's better to build up positive indicators (Oxford, 2016). Repositioning success in this way will be more effective because these positive indicators have successfully strengthened the learners' L2 learning process and then help them successfully cope with and overcome daily stress and frustration. Given the point, that grit focuses on positive dealing with problems this may also make grit amenable to intervention at once. Our findings delineate that both POE and COI as two factors of grit have the potential to influence the key outcomes for instructed L2 learners.

Overall, this study shed light on L2 achievement by emphasizing the personality traits of grit. Furthermore, we focus on the individual level of grit, irrespective of variable level.

So, educational authorities should explore the ways through which they can incorporate elements of grit into students' educational environment. As this study shows, by exploring the characteristics of gritty students through the big five personality traits, educators can help their students enhance their grit and become better achievers. Consequently, high achievers demonstrate higher L2 achievement (Duckworth, et al., 2007; Dweck, Wolton & Cohen, 2014). However, personality traits of grit have a key role to become a more successful language learner (Changlek & Palanukulworg, 2015). Given the point, if teachers employ care and control in the language classroom, grit is strongly associated with learners' success. When teachers work with students to create grit, the biggest part of the process is helping students grapple with roadblocks. From teachers, students learn how to overcome hardship, thus learning grit (Hoerr, 2013).

8. Implications of the study

Some theoretical and pedagogical implications of the present study are presented in the following subsections.

8.1. Theoretical implications

The unique contribution of this study resides in a new proposal: By adopting a cluster analysis, the current study demonstrates when taking academic exams, high perseverance of effort and low consistency of interest were related to a higher level of neuroticism and lower level of consciousness. Also, all dimensions of the big five personality traits; openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism are significant predictors of academic achievement whether negatively or positively.

The results of this study provide evidence to support that the predictions of the previously mentioned models may not be realized because the role of the participants' characteristics was not considered as an influential factor.

Therefore, the studies in grit can be reexamined to see whether they had considered participants' characteristics or not and, if not, what are its possible effects.

This study provides basic new knowledge about learners' grit and their big five personality traits in L2 learning. In addition, it helps applied linguists to understand the general limitations and variations of grit in L2 achievement. It also awakens their enthusiasm to follow the paradigm, develop research, and make the subject more accessible to a large number of students in the field.

Regarding the theory, this study is related to the existing grit literature by elaborating the relationship between grit, big five personality traits, and L2A.

8.2. Pedagogical implications

The present study suggests that learners' grit will be increased in the light of their big five personality traits. Therefore, some implications for teaching and learning can be suggested: Language teachers, curriculum designers, and material developers should consider learners' characteristics in L2 learning.

Regarding the practice, our findings affirm the significance of developing and implementing the interventions of the big five personality traits in predicting grit.

9. Limitations

The current study, like any other study, bears several limitations. The first limitation of this study is the potential for social desirability bias from the use of self-report surveys, where respondents may answer questions in a way they think is more positive. It is the nature of self-report surveys that may result in social desirability bias.

Second, This study used data from a single institution, thus limiting the generalizability of the results. The institution in which the sample for this study was obtained is a highly selective institution with stringent admissions requirements. DeBerard, Spielmanns, and Julka (2004) affirm that more selective universities in terms of the Scholastic Aptitude Test (SAT) should expect the greater achievement of their students. Therefore, a personality trait like grit may not be as meaningful in the current sample.

Third, The role of gender and the proficiency level of learners were not taken into consideration. Research shows that grit increases with age (Duckworth et al., 2007), and it would be valuable to understand how student grit levels may change through completing a college degree.

Forth, in the current study, students' L2 achievement is measured through their final-term grades. The course grade is usually used to assess L2 achievement, but it has been criticized for validity issues (see Brown et al., 2018 for a review).

10. Future research

Regarding the first limitation, researchers should continue to encourage respondents to answer truthfully on the Grit-S, as there would not be negative repercussions from their responses. To reduce the social desirability bias from the Grit-S, future research on grit should use informant-report versions of the grit survey along with the Grit-S to validate the self-reported grit scores. Duckworth and Quinn (2009) found that informants could reliably assess the grit of others ($\alpha = .83$). To ensure a more accurate grit score, faculty members or higher education administrators familiar with the students could serve as informants and complete the informant version of the Grit-S. The questions on the informant-report survey are identical to the self-report version, but the first-person pronouns are replaced with third-person pronouns.

Regarding the second limitation, further research on grit should include a more representative sample, so the results can be generalized to all college students.

Regarding the third limitation, future research can measure grit annually to see if it increases with experience and time in college.

Regarding the fourth limitation, researchers may have a more consistent measure of students' L2 achievement by using standardized foreign language achievement tests

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12. Appetencies

12.1. Appendix I

Short Grit Scale

Directions for taking the Grit Scale: Please respond to the following 8 items. Be honest – there are no right or wrong answers!

1. New ideas and projects sometimes distract me from previous ones. *

- ☐ Very much like me
- ☐ Mostly like me
- ☐ Somewhat like me
- ☐ Not much like me
- ☐ Not like me at all

2. Setbacks don't discourage me.

- ☐ Very much like me
- ☐ Mostly like me
- ☐ Somewhat like me
- ☐ Not much like me
- ☐ Not like me at all

3. I have been obsessed with a certain idea or project for a short time but later lost interest.*

- ☐ Very much like me
- ☐ Mostly like me
- ☐ Somewhat like me
- ☐ Not much like me
- ☐ Not like me at all

4. I am a hard worker.

- ☐ Very much like me
- ☐ Mostly like me
- ☐ Somewhat like me
- ☐ Not much like me
- ☐ Not like me at all

5. I often set a goal but later choose to pursue a different one. *

- ☐ Very much like me
- ☐ Mostly like me
- ☐ Somewhat like me
- ☐ Not much like me
- ☐ Not like me at all

6. I have difficulty maintaining my focus on projects that take more than a few months to complete. *

- ☐ Very much like me
- ☐ Mostly like me
- ☐ Somewhat like me
- ☐ Not much like me

- ☐ Not like me at all

7. I finish whatever I begin.

- ☐ Very much like me
☐ Mostly like me
☐ Somewhat like me
☐ Not much like me
☐ Not like me at all

8. I am diligent.

- ☐ Very much like me
☐ Mostly like me
☐ Somewhat like me
☐ Not much like me
☐ Not like me at all

12.2. Appendix II

The Big Five Inventory (BFI)

Here are a number of characteristics that may or may not apply to you. For example, do you agree that you are someone who likes to spend time with others? Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement.

Disagree Disagree Neither agree Agree Agree strongly a little nor disagree a little Strongly
 1 2 3 4 5

I see Myself as Someone Who...

- | | |
|--|--|
| ___ 1. Is talkative | ___ 23. Tends to be lazy |
| ___ 2. Tends to find fault with others | ___ 24. Is emotionally stable, not easily upset |
| ___ 3. Does a thorough job | ___ 25. Is inventive |
| ___ 4. Is depressed, blue | ___ 26. Has an assertive personality |
| ___ 5. Is original, comes up with new ideas | ___ 27. Can be cold and aloof |
| ___ 6. Is reserved | ___ 28. Perseveres until the task is finished |
| ___ 7. Is helpful and unselfish with others | ___ 29. Can be moody |
| ___ 8. Can be somewhat careless | ___ 30. Values artistic, aesthetic experiences |
| ___ 9. Is relaxed, handles stress well | ___ 31. Is sometimes shy, inhibited |
| ___ 10. Is curious about many different things | ___ 32. Is considerate and kind to almost everyone |

- | | |
|--------------------------------------|--|
| ___11. Is full of energy | ___33. Does things efficiently |
| ___12. Starts quarrels with others | ___34. Remains calm in tense situations |
| ___13. Is a reliable worker | ___35. Prefers work that is routine |
| ___14. Can be tense | ___36. Is outgoing, sociable |
| ___15. Is ingenious, a deep thinker | ___37. Is sometimes rude to others |
| ___16. Generates a lot of enthusiasm | ___38. Makes plans and follows through with them |
| ___17. Has a forgiving nature | ___39. Gets nervous easily |
| ___18. Tends to be disorganized | ___40. Likes to reflect, play with ideas |
| ___19. Worries a lot | ___41. Has few artistic interests |
| ___20. Has an active imagination | ___42. Likes to cooperate with others |
| ___21. Tends to be quiet | ___43. Is easily distracted |
| ___22. Is generally trusting | ___44. Is sophisticated in art, music, or literature |



12.3. Model B

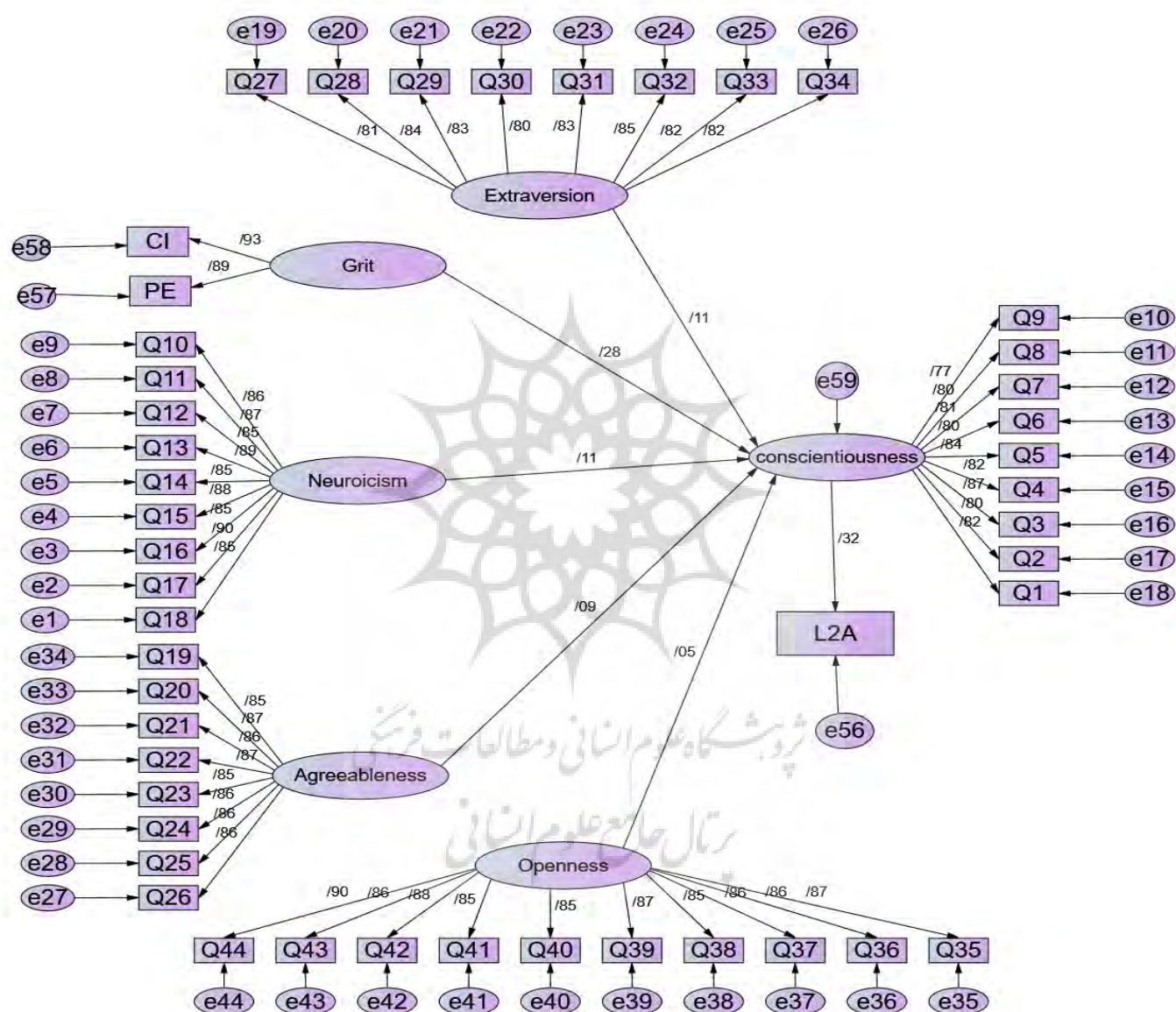


Figure 6. Research Model in the Case of Standardized Path Coefficients Mediated by Conscientiousness

12.4. Model C

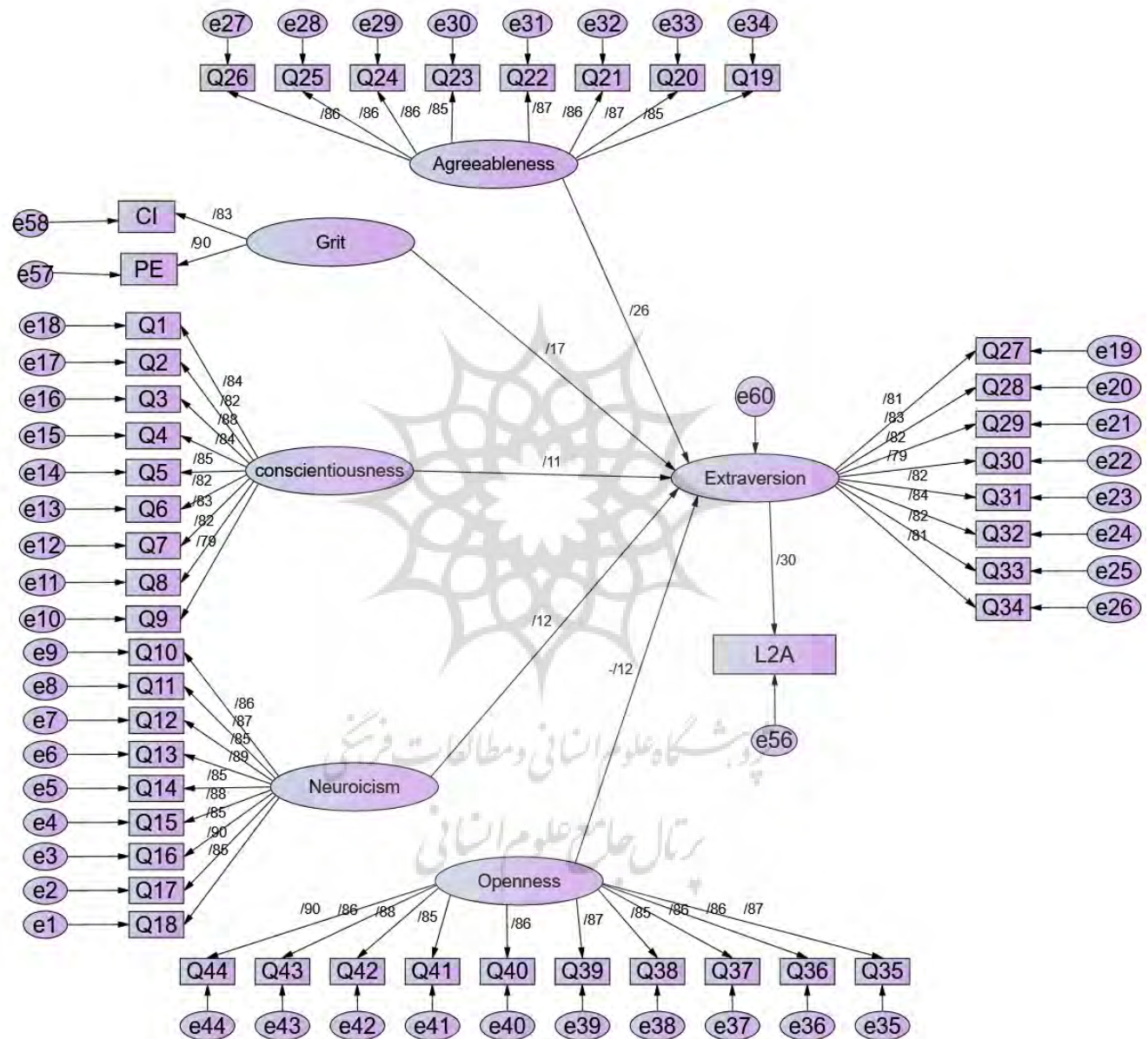


Figure 7. Research Model in the Case of Standardized Path Coefficients Mediated by Extraversion

12.5. Model D

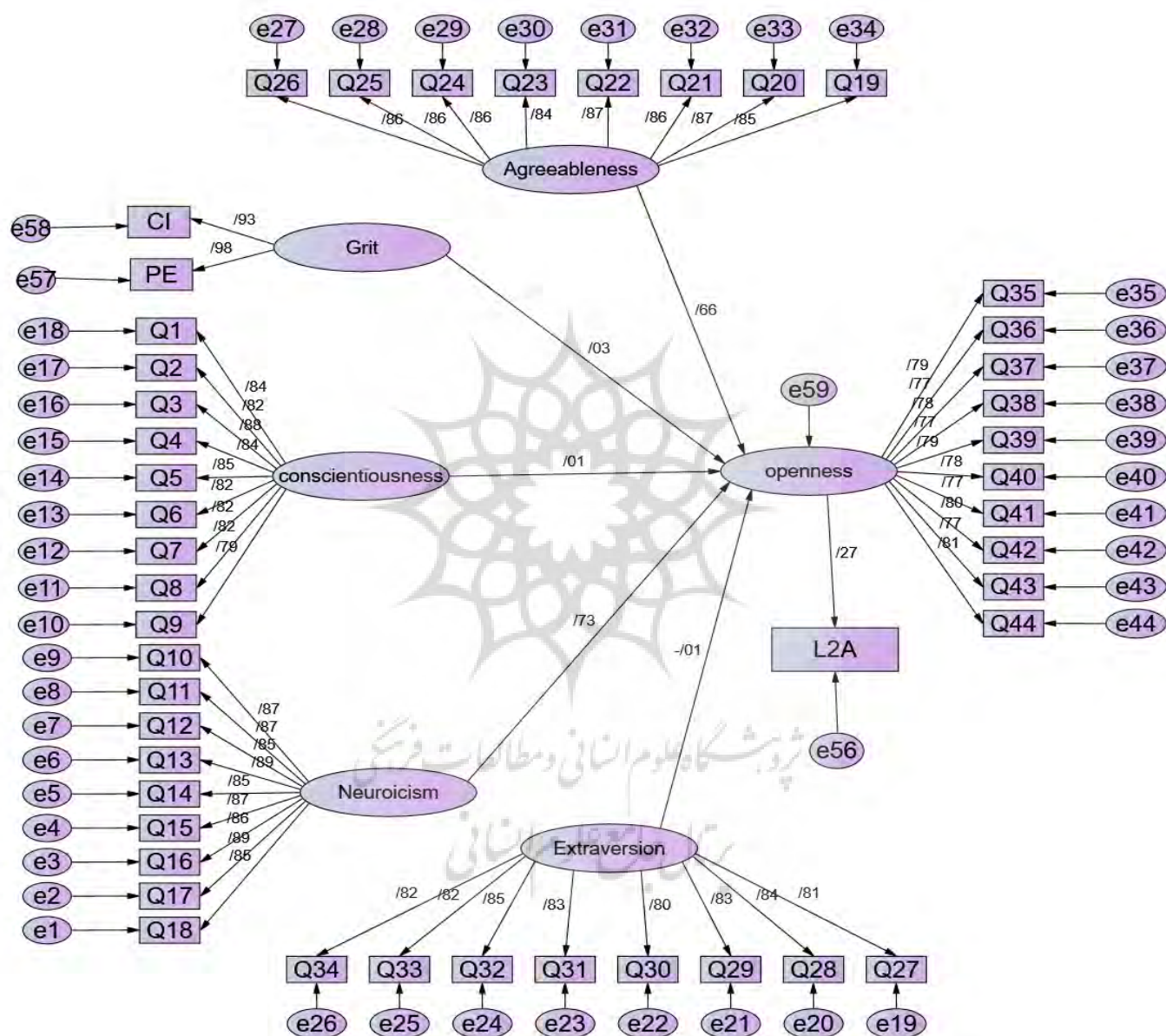


Figure 8. Research Model in the Case of Standardized Path Coefficients Mediated by Openness to Experience

12.6. Model E

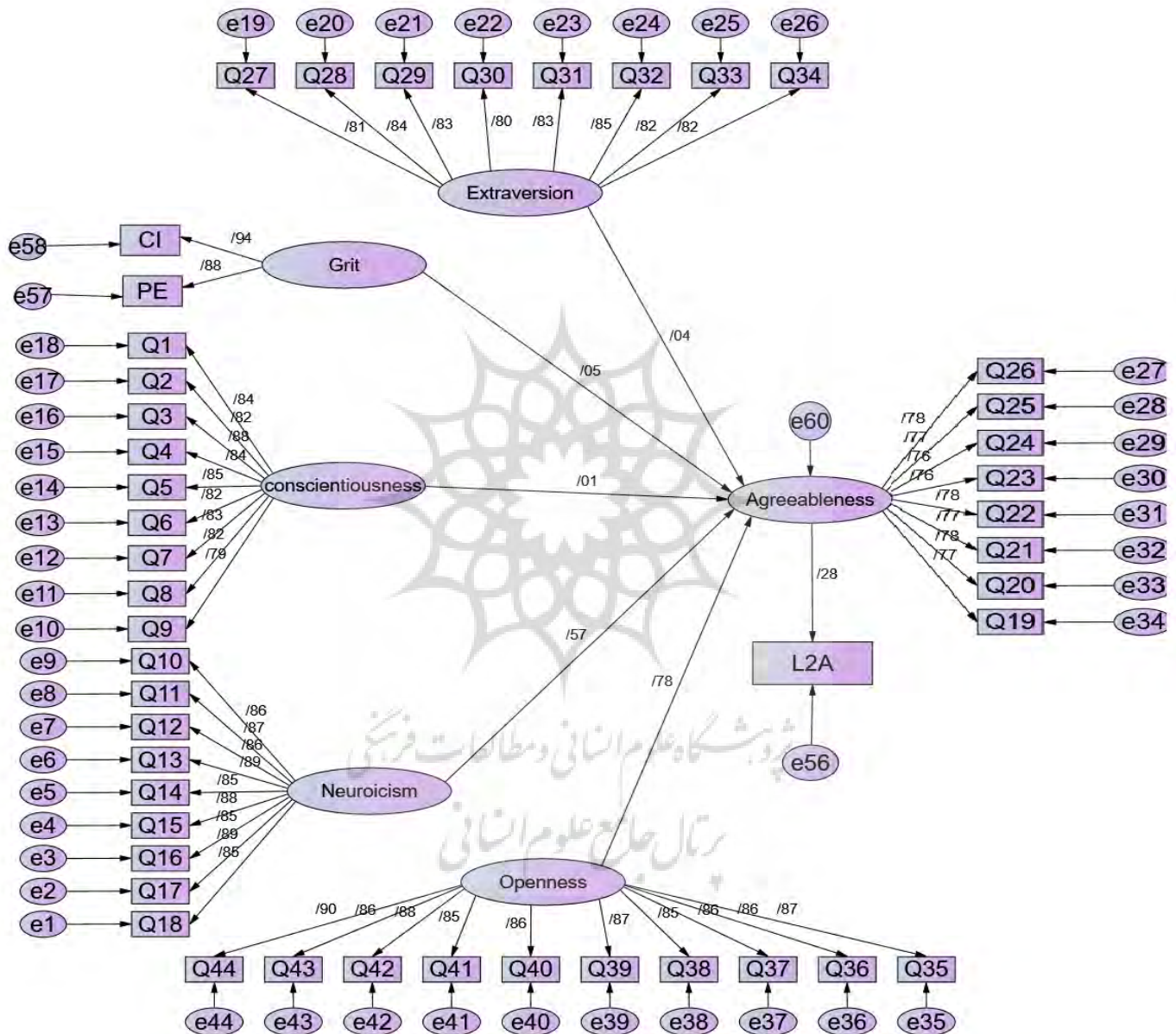


Figure 9. Research Model in the Case of Standardized Path Coefficients Mediated by Agreeableness

12.7. Model F

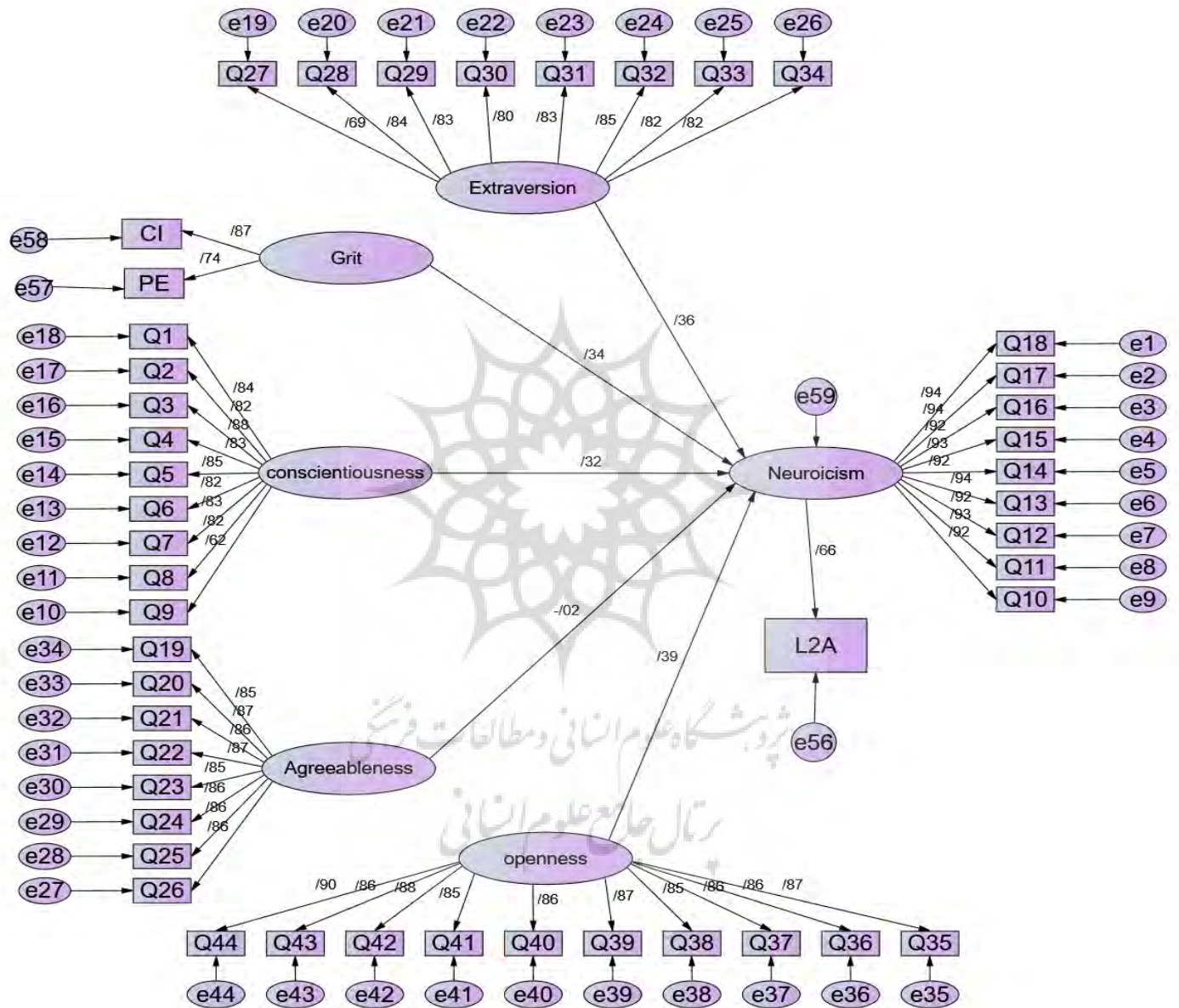


Figure 10. Research Model in the Case of Standardized Path Coefficients Mediated by Neuroticism