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Research Paper

Relationship between GRIT and Cognitive Flexibility: A Study to Understand Linguistic Advantages

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ABSTRACT

The purpose of the study was to systematically examine the network of relations among GRIT, Cognitive Flexibility, and the role of linguistic ability (Bilingual and Multilingual) among language enthusiasts. Over the years, language has been extensively studied whilst focusing on the social, environmental, and cognitive factors which contribute to the language acquisition process but concluding on an individual's ability only with these factors does not suffice. The past researches unveil that a successful acquisition and mastery of a new language is said to be complex and a multidimensional process that is highly dependent on learners' effort. The notion of Grit and its relation with language acquisition gains immediate relevance, as Grit is a combination of perseverance and passion for long-term goals and has been identified as an important predictor of success across a different population in various areas (Duckworth,2013). The data consisted of 80 individuals and the questionnaire was administered with the help of an online portal via self-report assessments and was assessed and analyzed accordingly with appropriate tools. The results indicated that there is no significant difference in Grit and Cognitive Flexibility concerning gender or linguistic ability. The study also further found a significant moderate correlation between Grit and Cognitive Flexibility.

Keywords: *GRIT, Cognitive Flexibility, Linguistic ability, Bilingualism, and Multilingualism*

Language

The role of language has been extremely significant in our lives. Currently, the majority of individuals in the globe engage in the use of more than one language on a daily basis. The concept of bilingualism and multilingualism evolved from the existence of numerous languages all over the world. Both are widely studied in the field of psycholinguistics, with a focus on acquisition and dynamic interaction among many languages.

Moreover, as a result of identified differences in cognitive functioning between monolinguals and multilingual individuals, several studies have revealed the numerous benefits of being multilingual. According to researchers, these benefits arise because

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multilingual individuals have a more developed executive control system, which makes switching between languages easier (Kaitlin Goodrich, 2018). Therefore, it is clear that language influences, not just socio-cultural characteristics but also an individual's personality and a variety of cognitive capacities.

Multilingualism continues to gain popularity around the world, owing to the existence of nearly 200 countries. It is also thought to be a prevalent phenomenon, according to Ethnologue, due to the presence of around 7000 languages in the globe today (Eberhard, David M., Gary F. Simons, and Charles D. Fennig, 2020).

Grit

It has been observed that some individuals learn a new language more quickly and successfully than others; so, what could be the reason? Who has the best chance of succeeding in acquiring a language effectively? It can be understood that while cognitive factors play a vital role in language acquisition, relying just on a person's capabilities is insufficient. Therefore, it's critical to understand what other factors contribute to the seamless acquisition of a new language.

Angela L. Duckworth, a psychologist at the University of Pennsylvania, investigated "Why is it that some people achieve more than others of equal intelligence?" and discovered the answer in a personality trait known as grit. Then the term "Grit" was coined to describe this personality trait, which refers to "perseverance and passion to achieve long-term goals." Duckworth concluded that grit is a powerful predictor of success and the ability to achieve one's goals.

Ducksworth discovered that grittier students have higher grade point averages, higher levels of educational attainment, and greater success in scholastic competitions in multiple different research (Duckworth et al., 2007; Duckworth and Quinn, 2009; Cross, 2014). Grit has been positively linked to students' motivation for language acquisition as well as their ability to achieve long-term goals (Teimouri, Y., Plonsky, Y., & Tabandeh, F, 2020). Furthermore, it has had a positive impact on the student's growth mindset, resulting in high grit scores in their overall academic performance.(Natalia Hromova, 2018).

Grit has a positive effect on foreign language performance (FLP) and improved foreign language enjoyment (FLE), according to a study's findings. Grit's impact on FLP and FLE also resulted in a favorable classroom environment.(Hongjun Wei et al, 2019). Another study that looked into the impact of grit in Japanese language acquisition found a positive correlation between grit scores and performance in a student-centered reading course. Although, grit scores were not related to the performance in the introductory language course and in the intermediate course (Takuhiro Yamashita, 2018). While, one of the studies gave another perspective to this, which stated to have shown no relation in case of Grit and language acquisition in association with academic success (Havva Kurt Taspinar, 2018).

Alternatively, it was revealed that the effect of grit is dominated by the effect of perseverance across students at both the high and low ends of the cognitive ability distribution (Audrey Light & Peter Nencka, 2017).

Cognitive Flexibility

The term "cognition" refers to the mental processes involved in gaining knowledge and comprehension. It has long been recognised that in order to learn a new language, people

must engage their cognitive abilities. These abilities enable the acquisition, storage, and processing of information. But, aside from acquisition, storage, and retrieval, is there more to learn about the relationship between cognition and language? Is it possible that learning a new language has an impact on our mental processes?

To understand the switch between two languages and the cognitive process involved in the same, there is a substantial amount of research demonstrating a link between cognitive flexibility and bilingualism. Cognitive flexibility is the human ability to adapt cognitive processing strategies to face new and unexpected conditions in the environment (Cañas, Quesada, Antolí and Fajardo, 2003). Task switching and cognitive shifting are the two basic functions. The ability to move action and attention from one task to another is referred to as task switching, whereas cognitive shifting refers to a conscious shift in focus. Both of these elements are necessary for adapting to new situations or environments (Cheyanne Perry, 2019).

Cognitive flexibility is considered as being significantly higher, particularly when one can communicate in multiple languages (Kozulin, 1999). Cognitive flexibility is thought to help people adapt to stressful situations or information and improve their decision-making abilities.

It has been found to lower the severity, length, and impact of cognitive alterations that occur after a stressful incident. (Lauren E. Chaby, Klevis Karavidha, Michael J. Lisieski, Shane A. Perrine, and Israel Liberzon, 2019).

Higher grit scores were associated with a positive relationship with self-discipline and self-efficacy, as well as increasing students' academic progress (Buzzetto-Hollywood, Quinn, Wang and Hill, 2019). A study found that the Grit component was able to predict behaviors related to establishing plans to work toward accomplishing the goal in a unique way. The executive functioning was also noted in the study, which had an important part in predicting preventative behaviors that ensured the goal was not jeopardized (Tamara Michelle Rosner, 2016). Higher grit ratings were associated with improved academic achievement among teenagers, as well as higher mental processes used to achieve their goals and academic success (Jonathan M. Cosgrove, Yen T. Chen and Darla M. Castelli, 2018).

On numerous occasions, benefits in the domain of cognitive flexibility have been connected to language acquisition (Ellen Bialystok, Fergus Craik and Gigi Luk, 2008). According to one recent study, the process of learning a language causes changes in an individual's brain structure, which was further underlined by looking at changes in cortical thickness and grey matter volume in response to short-term vocabulary learning (Jennifer Legaulta, Shin-Yi Fanga, Yu-Ju Lanb, Ping Li, 2018).

METHODOLOGY

Objectives

1. To compare the difference in grit across different genders.
2. To compare the difference in grit among multilingual and bilingual individuals.
3. To compare the difference in cognitive flexibility across different genders.
4. To compare the difference in cognitive flexibility among multilingual and bilingual individuals.
5. To examine the relationship between grit and cognitive flexibility among individuals, who identify as bilingual or multilingual.

Hypothesis

1. There would be no significant difference in cognitive flexibility across different genders.
2. There would be no significant difference in cognitive flexibility among multilingual and bilingual individuals.
3. There would be no significant difference in grit across different genders.
4. There would be no significant difference in grit among multilingual and bilingual individuals.
5. There would be no significant relationship between grit and cognitive flexibility among individuals, who identify as bilingual or multilingual.

Variables

1. Cognitive flexibility
2. Gender
3. Grit
4. Linguistic Ability: Bilingualism and Multilingualism.

Operational definitions

1. **Linguistic Ability:** It refers to the ability or the capacity of individuals to understand and express themselves, both in written and oral form in a particular language.
2. **Bilingualism:** It has been defined as the ability to access or use more than one language as a means of communication (Hamers and Blanc, 1983).
3. **Multilingualism:** Multilingualism refers to the ability of an individual or a particular community to be able to communicate effectively (read, write and speak) in more than two or three languages. And according to the European Commission (2007) Multilingualism is defined as "the ability of societies, institutions, groups and individuals to engage, on a regular basis, with more than one language in their day-to-day lives".
4. **Grit:** Grit was defined as "perseverance and passion for long-term goals"(Duckworth et al., 2007).
5. **Cognitive Flexibility:** Cognitive Flexibility is the human ability to adapt cognitive processing strategies to face new and unexpected conditions in the environment (Cañas, Quesada, Antolí and Fajardo, 2003).

Research Design

The study has incorporated quasi experimental between group design to find out the relationship between the variables and the differences between the group.

Sample

A total sample size of N= 80 participants, was obtained through a snowball sampling method using an online questionnaire which were through Google forms.

Tools for Assessment

1. **Social demographic form:** A form was created which consists of social demographic details of the participants who volunteered for the study. It includes participant's name, age, educational level and annual income along with the questions with regard to the number of languages known and its specifics.

2. **Grit scale:** The questionnaire is a self-report scale which was developed by Angela Duckworth (2007). It includes a 5 point Likert scale and consists of 12 items evaluating grit personality traits and the Cronbach alpha of 0.85.
3. **Cognitive flexibility scale:** It includes a 6 point Likert scale which consists of 12 items and is a self-report scale measuring the aspects of cognitive flexibility; it is developed by Martin and Rubin (1995). The scale has a Cronbach alpha of 0.83.

Procedure

The sample was approached and briefed about the study's objectives. The participants were also made aware of the fact that they can withdraw from the test at any given point. The informed consent from the participants, who meet the criteria for the study were taken and were considered as the part of the study.

After the completion of the background questionnaire, the GRIT and the Cognitive flexibility scales were administered. The instructions were given with respect to each scale to the participants, while informing that the doubts regarding the questionnaire and clarification would be encouraged. The questionnaires were administered with the help of Google forms.

1. GRIT Scale

The questionnaire consists of 12 items with 5 response options – Very much like me, Mostly like me, Some-what like me, Not much like me and Not like me at all. The participant must select the option that best describes him/her. Before starting the questionnaire, the participants were given the following instructions – 'Please respond to the following 12 items. Be honest – there are no right or wrong answers!' The responses for each item were noted and scored according to the norms and scoring key.

2. Cognitive Flexibility Scale

The Cognitive flexibility scale includes 12 items with 6 response options for each items – Strongly disagree, Disagree, Disagree a little, Agree a little, Agree and Strongly Agree. The participant was instructed to select the option that suits him/her the best. The following instructions were provided to the participants – 'The following statements deal with your beliefs and feelings about your own behavior. Read each statement and respond by selecting the option that best represents your agreement with each statement.' Later, the responses were scored according to the scoring key and were interpreted.

The participants were requested to attempt all the items/ questions and also were informed that there is no time limit but were to complete the questionnaire as fast as possible. The responses of the participants were evaluated according to the scoring keys of the test.

Statistical Analysis

1. Descriptive statistics – Mean and SD.
2. Inferential statistics – Mann-Whitney U and Spearman correlation test.

RESULTS

Descriptive Statistics

Presents the descriptive statistics for each variable with respect to gender and linguistic ability conditions. Grit and the Cognitive Flexibility scores were calculated for the two conditions – Gender and Linguistic ability, in the study.

Grit - Consists of the scores obtained by the sample for the 12 items Grit scale in the present study and has been represented while highlighting the two conditions.

Table 1. Represents the descriptive statistics for Grit with respect to gender and linguistic ability.

Measures	Mean	SD
Male	3.57	0.67
Female	3.42	0.63
Bilingual	3.55	0.59
Multilingual	3.45	0.71

Table 1 shows the Grit scores among the male, female, bilinguals and multilinguals from the sample. Males have scored an average of 3.57 whereas the females have got a score of 3.42. It can be understood that females have slightly low scores in the Grit scale as compared to males. Bilingual sample has scored an average of 3.55 and multilingual sample has scored an average of 3.45. As represented in table 1, it can be noted that bilingual individuals have got a higher score than multilingual individuals for the 12 items in the Grit scale.

Cognitive Flexibility - The three dimensions of Cognitive Flexibility - Awareness, Willingness and Self-efficacy were calculated for the two different conditions in the study.

Table 2. Represents the descriptive statistics for Cognitive Flexibility with respect to gender and linguistic ability.

Measures	Awareness [Mean(SD)]	Willingness [Mean(SD)]	Self-efficacy [Mean(SD)]
Male	18 (2.92)	18.50 (3.36)	17.40 (3.84)
Female	16.60 (2.50)	17.10 (3.14)	17.05 (3.21)
Bilingual	16.87 (2.54)	17.02 (3.50)	16.65 (3.49)
Multilingual	17.80 (2.97)	18.60 (3.11)	17.80 (3.50)

Table 2 shows the three dimensions of Cognitive Flexibility – Awareness, Willingness and Self-efficacy among the two gender and linguistic abilities. Males have got an average score of 18, whereas females have got an average score of 16.60 in Awareness dimension. For the Willingness dimension, males have got an average score of 18.50, whereas females have got slightly lesser than male around 17.1 average score. In the Self-efficacy dimension, males have an average score of 17.4, whereas females have got a score of 17.05. It can be understood that males have got higher scores in cognitive flexibility as compared to females. With respect to lingual abilities, Bilingual individuals have got an average score of 16.87 in awareness dimension, 17.02 in willingness dimension and 16.65 score in the self-efficacy dimension of the cognitive flexibility scale. Multilingual samples have obtained an average score of 17.8 in awareness, 18.6 score in willingness and 17.8 score in the self-efficacy dimension. With the help of the figure 6, it can be understood that multilingual samples have scored higher in the cognitive ability test as compared to bilingual samples.

Inferential Statistics

Non-parametric measures similar to Pearson's correlation test and Independent sample t-test (parametric measures) were considered due to the non-normal distribution of the data. The non-parametric measures included- Mann-Whitney U test and Spearman rank correlation

test were used, in order to find differences among the two conditions (gender and linguistic ability) among the variables and to find the relationship between the variables respectively.

Table 3. Mann-Whitney U test results of two genders, linguistic ability (Bilingual and Multilingual) and variables.

Measures	Gender		Linguistic Ability	
	Grit	Cognitive Flexibility	Grit	Cognitive Flexibility
Mann-Whitney U	699.500	623.500	733.000	599.000
Wilcoxon W	1.520E3	1.444E3	1.553E3	1.419E3
Z	-1.080	-1.700	-.720	-1.936
Asymp. Sig. (2-tailed)	.280	.089	.471	.053

A Mann-Whitney U test indicated that there are no significant differences observed among male and female participants with respect to Grit and Cognitive Flexibility. For Grit scale [U = 699.5, p = .28, r = -.03], Cognitive Flexibility [U = 623.5, p = .08, r = -.00].

The test indicated that there are no significant differences observed among bilingual and multilingual participants in the measure with respect to Grit and Cognitive Flexibility. For Grit scale [U = 733.0, p = .47, r = -.05], Cognitive Flexibility [U = 599.0, p = .05, r = -.00]. The same has been represented in the table.

Table 4. Spearman rank correlation between Grit and Cognitive Flexibility.

N=80	Measure	Grit	Cognitive Flexibility
Spearman's rho	Grit	-	.533**
	Cognitive Flexibility		-

***Correlation is significant at the level 0.01 (2-tailed)*

Table 4 presents the Spearman rank correlation between the measures in total – Grit and Cognitive Flexibility. The significant correlations in the table C.3 are as follows – Grit is moderately correlated with Cognitive Flexibility [r (80) = .533, p = .00].

DISCUSSION

The purpose of the study was to systematically examine the network of relations among GRIT, Cognitive Flexibility, and the role of linguistic ability (Bilingual and Multilingual) among language enthusiasts. The original prediction stated that Grit and Cognitive Flexibility have no significant difference with respect to gender and linguistic ability. In addition, another assumption was that there is no significant relationship between Grit and Cognitive Flexibility. The results state that as predicted that gender and linguistic ability did not have an effect on Grit and Cognitive Flexibility. Nonetheless, there was a moderate correlation found between Grit and Cognitive Flexibility. With the use of the Google Forms online platform, data for the current study was collected from 80 adult participants ranging in age from 18 to over 30 years. The 12 item Grit Scale and the Cognitive Flexibility Scale were used to conduct the examinations. The information gathered was then analyzed using the Statistical Package for Social Sciences (SPSS) software's suitable statistical capabilities.

CONCLUSION

The current study interprets that there is no significant difference in Grit and Cognitive Flexibility across different genders and among individuals who identify as bilingual and

multilingual accepting the null hypothesis. Furthermore, the results indicated that there is a relationship between Grit and Cognitive Flexibility in relation with the selected sample rejecting the null hypothesis. Grit is moderately correlated with Cognitive Flexibility. As a result, more research is required, not only to gain a better knowledge of the existing relation, but also to gain insight and more information.

REFERENCES

Arifin, M., Herri, Amali, H., Elfindri, & Puteri, H. E. (2019). Personality, grit and organizational citizenship behavior at vocational higher education: The mediating role of job involvement. Journal of Social Studies Education Research.

Bialystok, E., Craik, F., & Luk, G. (2008). Cognitive Control and Lexical Access in Younger and Older Bilinguals. Journal of Experimental Psychology: Learning Memory and Cognition. http://doi.org/10.1037/0278-7393.34.4.859

Buzzetto-Hollywood, N., Quinn, K., Wang, W., & Hill, A. (2019). Grit in Online Education. Journal of Education, Society and Behavioural Science. http://doi.org/10.9734/jesbs/2019/v30i430132

Cañas, J. J., Quesada, J. F., Antolí, A., & Fajardo, I. (2003). Cognitive flexibility and adaptability to environmental changes in dynamic complex problem-solving tasks. Ergonomics. http://doi.org/10.1080/0014013031000061640

Cenoz, J. (2013). Defining multilingualism. Annual Review of Applied Linguistics. http://doi.org/10.1017/S026719051300007X

Chaby, L. E., Karavidha, K., Lisieski, M. J., Perrine, S. A., & Liberzon, I. (2019). Cognitive flexibility training improves extinction retention memory and enhances cortical dopamine with and without traumatic stress exposure. Frontiers in Behavioral Neuroscience. http://doi.org/10.3389/fnbeh.2019.00024

Cosgrove, J. M., Chen, Y. T., & Castelli, D. M. (2018). Physical Fitness, Grit, School Attendance, and Academic Performance among Adolescents. BioMed Research International. http://doi.org/10.1155/2018/9801258

Dewaele, J. M., & Wei, L. (2013). Is multilingualism linked to a higher tolerance of ambiguity? Bilingualism, 16(1), 231–240. http://doi.org/10.1017/S1366728912000570

Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short Grit Scale (Grit-S). Journal of Personality Assessment. http://doi.org/10.1080/00223890802634290

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. http://doi.org/10.1037/0022-3514.92.6.1087

Duckworth, A., & Gross, J. J. (2014). Self-Control and Grit: Related but Separable Determinants of Success. Current Directions in Psychological Science. http://doi.org/10.1177/0963721414541462

Goodrich, K. (2018). The Cognitive Benefits of Being Multilingual - Brainscape Blog. Brainscape Blog. Retrieved from https://www.brainscape.com/blog/2018/10/cognitive-benefits-multilingual/.

Kalia, V., Fuesting, M., & Cody, M. (2019). Perseverance in solving Sudoku: role of grit and cognitive flexibility in problem solving. Journal of Cognitive Psychology, 31(3), 370–378. http://doi.org/10.1080/20445911.2019.1604527

Kalia, V., Fuesting, M., & Cody, M. (2019). Perseverance in solving Sudoku: role of grit and cognitive flexibility in problem solving. Journal of Cognitive Psychology. http://doi.org/10.1080/20445911.2019.1604527

KURT TAŞPINAR, H. (2018). GRIT: An Essential Ingredient of Success in the EFL Classroom. International Journal of Languages' Education. http://doi.org/10.18298/ijlet.3137

Lee, J. S., & Drajati, N. A. (2019). Affective variables and informal digital learning of English: Keys to willingness to communicate in a second language. Australasian Journal of Educational Technology. http://doi.org/10.14742/ajet.5177

Legault, J., Fang, S. Y., Lan, Y. J., & Li, P. (2019). Structural brain changes as a function of second language vocabulary training: Effects of learning context. Brain and Cognition, 134(September), 90–102. http://doi.org/10.1016/j.bandc.2018.09.004

Light, A., & Nencka, P. (2017). Predicting Educational Attainment: Does Grit Compensate for Low Levels of Cognitive Ability? SSRN Electronic Journal. http://doi.org/10.2139/ssrn.3044097

M, D., Simons, G., & Fennig, C. (2020). What continents have the most indigenous languages?. Ethnologue. Retrieved from https://www.ethnologue.com/guides/continents-most-indigenous-languages.

Maluch, J. T., & Kempert, S. (2019). Bilingual profiles and third language learning: the effects of the manner of learning, sequence of bilingual acquisition, and language use practices. International Journal of Bilingual Education and Bilingualism. http://doi.org/10.1080/13670050.2017.1322036

Mepham, K. D., & Martinovic, B. (2018). Multilingualism and Out-Group Acceptance: The Mediating Roles of Cognitive Flexibility and Deprovincialization. Journal of Language and Social Psychology. http://doi.org/10.1177/0261927X17706944

Nicoladis, E., Hui, D., & Wiebe, S. A. (2018). Language dominance and cognitive flexibility in French-English bilingual children. Frontier in Psychology. http://doi.org/10.3389/fpsyg.2018.01697

Perry, C. (2019). Cognitive Flexibility: An important cognitive skill - Health, Brain and Neuroscience. Health, Brain and Neuroscience. Retrieved from https://blog.cognifit.com/cognitive-flexibility/.

Robinson, M. G., & Sorace, A. (2019). The influence of collaborative language learning on cognitive control in unbalanced multilingual migrant children. European Journal of Psychology of Education. http://doi.org/10.1007/s10212-018-0377-x

Rosner, T. M. (2016). The Unique Influence of Executive Functioning and Grit on Goal-Oriented Behaviours. A Thesis Presented to the University of Waterloo in Fulfilment of the Thesis Requirement for the Degree of Master of Arts in Psychology.

Salami, O. (2019). LINGUANOMICS: what is the market potential of multilingualism? Current Issues in Language Planning, 20(4), 437–441. http://doi.org/10.1080/14664208.2019.1582948

Soh, O. K., Azman, H., & Ho, S. M. (2020). A systematic review on bilingualism and language processing from 2015-2019. 3L: Language, Linguistics, Literature, 26(1), 18–31. http://doi.org/10.17576/3L-2020-2601-02

van Veen, S., Remmers, S., Aarnoudse-Moens, C. S. H., Oosterlaan, J., van Kaam, A. H., & van Wassenaer-Leemhuis, A. G. (2019). Multilingualism was associated with lower cognitive outcomes in children who were born very and extremely preterm. Acta Paediatrica, International Journal of Paediatrics. http://doi.org/10.1111/apa.14516

Wei, H., Gao, K., & Wang, W. (2019). Understanding the relationship between grit and foreign language performance among middle school students: The roles of foreign language enjoyment and classroom environment. Frontiers in Psychology. http://doi.org/10.3389/fpsyg.2019.01508

Yamashita, T. (2018). Scholar Works @ UMass Amherst Grit and Second Languag Acquisition: Can Passion and Perseverance Predict Performance in Japanese Language Learning ?, (July).

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Conflict of Interest

The author(s) declared no conflict of interest.

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