Passion, grit and mindset in young adults: Exploring the relationship and gender differences

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ABSTRACT

The main aim of the study was to explore the associations between passion, grit and mindset in a group of young Icelandic adults. The sample consisted of 146 participants. The eight item Passion Scale was used to assess passion, and the Grit-S scale was used to assess grit. Mindset was measured with the Theories of Intelligence Scale (TIS). The scale has 8-items.

The results show significant difference between female and male in the passion factor only, in favor of males. In addition the results indicated a significant correlation between all factors for the group as a whole; passion and grit, r = .435; passion and mindset, r = .260; grit and mindset, r = .274. The results for the gender separate indicate a same pattern for the females, significant correlation between all the factors; passion – grit, r = .382, passion-mindset, r = . 299 and grit-mindset, r = .356. For the males the pattern was different. Significant correlation was between passion-grit, r = .500 and for passion-mindset r =.260. For grit-mindset there was not significant correlation r = .215. The results indicate gender differences in associations between passion, grit and mindset.

1. Introduction

A person who has special skills or knowledge in an area is often called an expert (Ericsson, Prietula, & Cokely, 2007). In order to gain special competence in an area, whether it is practical skills, sport skills or knowledge, there is no doubt that practice and experience are of great importance (Thelen & Smith, 1994). Ericsson et al. (2007) have pointed out that experts are always "made, not born". They further argue that to become an expert, regardless of area, you need deliberate practice over many years, the so-called ten-year rule, or approximately 10.000 h of training (Ericsson & Charness, 1994; Ericsson et al., 2007; Sala & Gobet, 2017; Sigmundsson, Trana, Polman, & Haga, 2017a). Some factors may be of great importance to be able to practice as much as needed to become an expert. Factors such as passion (Vallerand, 2010), grit (Duckworth, 2016), growth mindset (Dweck, 2017) and significant others such as a mentor, trainer and teacher (Ericsson et al., 2007).

For an overview of this relationship, see Fig. 1 (Sigmundsson, Haga, & Hermundsdottir, 2020).

1.1. Passion

Passion is possibly one explanation for why some individuals offer much time, effort and hard work towards achievement in an area/theme/skill (Sigmundsson et al., 2020). Passion is defined as a strong desire or enthusiasm for something (Oxford University Press, 2019), or a strong feeling toward a very important value/preference that motivates intentions and behaviors to express that value/preference (Jachimowics et al., 2018). It might be argued that passion is "something" that drives us towards a goal or achievement and is strongly related to the individual's involvement, commitment and effort. Passion can be a motivation behind an action and enthusiasm towards an object, activity, concept or person. Passion may be considered as domain-specific, that is, one can have passion for work or hobbies (Bonneville-Roussy, Lavigne, & Vallerand, 2011). As suggested by Duckworth, Kirby, Tsukayama, Berstein, and Ericsson (2011), passion contributes to the necessary focus that is needed for the individual to achieve his or her goals (Duckworth et al., 2011).

1.2. Grit

Why are some people capable to achieve more than others? Several positive qualities may play a role, such as cognitive ability, physical attractiveness, creativity, emotional intelligence, self-confidence, charisma and vigor (Duckworth, Peterson, Matthews, & Kelly, 2007, p. 1087). Although general cognitive abilities have been an important predictor of success, the same general mental ability (IQ) will not predict the differences in accomplishment, expertise, or success in a field (Duckworth et al., 2007). Several psychologists have questioned the intellect, and proposed perseverance and persistence for being as important (Duckworth et al., 2007). The term grit is defined as endurance and passion for long-term goals and is characterized by exertion or diligence and contributes to the maintenance of effort and interest despite the failure of progress. Moreover, gritty people are known for their mindset aimed at long-term and performance-oriented goals (Duckworth et al., 2007). Grit seems to be a construction that combines both aspects of conscience and self-discipline, suggesting that grit can be integrated into the hierarchical structure of the property conscientiousness (Schmidt, Nagy, Fleckenstein, Möller, & Retelsdorf, 2018). Kannangara et al. (2018) found that individuals with high grit scores had significantly higher levels of self-control and mental well-being, as well as being more resilient and more likely to have a growth-oriented mindset. The study showed that age was associated with the concept of self-control, and females scored higher on grit compared to men. Within "academic field", grit is related to productivity, commitment, motivation, performance, number of hours to study, learnings strategies and goal orientation (Kannangara et al., 2018, p. 2).

1.3. Mindset

Mindsets is a set of beliefs in our own attributes (Dweck, 2012). Thus, mindsets can be understood as people's beliefs about the nature of human attributes, such as intelligence or personality (Dweck, 2012, p. 615). Some people have a fixed mindset and believe that human attributes are fixed and permanent qualities. In contrast, people with a growth mindset believe that human attributes are changeable and that it is possible to become significantly more intelligent through effort, practice and education. Research has shown that mindset plays a key role in terms of motivation and achievements, for example having a growth mindset has been linked to coping-oriented responses to challenges and well-being (Dweck, 1986; Dweck, Chiu, & Hong, 1995), while having a fixed mindset has been related to helplessness and vulnerability to negative feedback (Dweck, 1986; Dweck et al., 1995; Mangels, Butterfield, Lamb, Good, & Dweck, 2006). Furthermore, research has shown an association between people's mindset and resistance to academic and social challenges, where people with growth mindset tend to face challenges as an opportunity for learning, while people with a fixed mindset tends to avoid challenges. Yeager and Dweck (2012) displayed that students with a growth mindset showed higher achievement across challenging school transitions and superior completion rates in challenging math courses. Yeager et al. (2019) found that a short online growth mindset intervention improved grades among lower – achieving students.

Passion, grit and mindset have been seen to be important for development of skills and knowledge (Duckworth, 2016; Dweck, 2017; Ericsson et al., 2007; Sala & Gobet, 2017; Sigmundsson et al., 2020; Vallerand, 2010; Vallerand et al., 2003). What is not as much studied is the relationship between these significant factors. The main purpose of the article was to explore the associations between passion, grit and mindset for a group of young university students. The paper has two research questions:

1. What is the relationship between passion, grit and mindset for a group of young university students?
2. What is the relationship between passion, grit and mindset in relation to gender?

2. Method

2.1. Study design and participants

The sample consisted of 146 participants. The average age was 22.01 (standard deviation = 5.12). The average age of the female group (N =
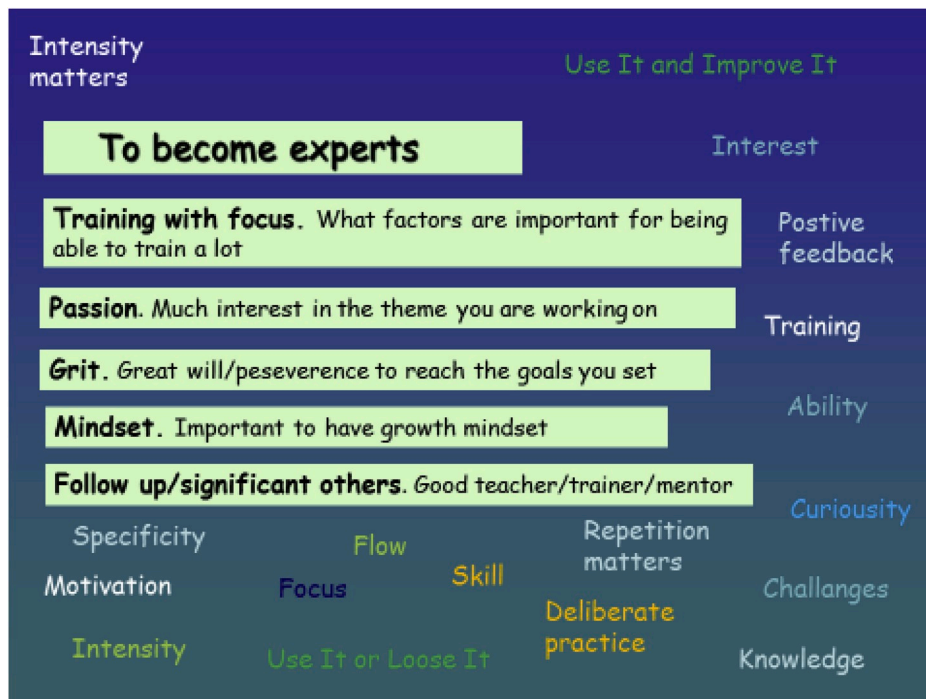

Fig. 1. Different factors of importance for achievement or becoming an experts.

80) was 21.63 (standard deviation = 3.67) and the male group (N = 66) was 22.43 (standard deviation = 6.36). The only information registered about the participants were age and gender. The participants were randomly selected among university students in Iceland (a convenience sample). The participants were tested on passion scale, grit scale and mindset scale. Participants indicated their age, gender and educational level.

2.2. Measurements

2.2.1. Procedure

The study was performed in accordance with the Declaration of Helsinki. Passive consent from the participants was confirmed to be sufficient from the Icelandic Data Protection Authority, because no sensitive personal data were collected. The assessment was performed in a group setting at the University campus (during normal school hours). A trained experimenter explained the procedure and was present when the questionnaires were conducted.

2.3. Measures

2.3.1. Passion

The Passion scale (Sigmundsson et al., 2020) was used to assess participant's level of passion.. The 5-point Likert scale is one of the most common (Likert, 1932) and was used for possible comparison to other important factors related to passion. For overview of the 8-items see Table 1. The maximum score on this scale is 5 (extremely passionate) and the lowest is 1 (not at all passionate). Passion showed good internal consistency Cronbach's alpha value .86. Passion showed high test-retest reliability, with a ICCs between test and retest total scores was 0.92 (N = 21, mean age 23.67, SD = 2.41). Construct validity: Pearson correlation coefficient between total score Passion and Grit S Scale were r = .39 for adults, mean age 21.23 (SD = 3.45) (N = 107) (Sigmundsson et al., 2020).

2.3.2. Grit

Grit S; short grit scale (Duckworth & Quinn, 2009; Norwegian version, Sending, 2014) was used to assess participant's level of grit. Participants rated eight items, using a 5-point Likert scale with items rated in terms of how much the item is "true" for the respondent (1 = not like me at all and 5 = very much like me). The measure includes two subscales of four items each; Consistency of Interest (COI) and Perseverance of Effort (POE). A sample item for COI is 'I often set a goal but later choose to pursue a different one' (reverse-scored) and for POE is 'I finish whatever I begin'. Grit-S showed good internal consistency several times, α = 0.82 and α = 0.84 (Duckworth & Quinn, 2009, p. 170). The study provided evidence for the predictive validity, consensual validity, and test-retest stability of the Grit-S.

2.3.3. Mindset

A Norwegian version of Dwecks (1999) Theories of intelligence scale (TIS) was used to assess students' entity and incremental conceptions of intelligence (Bråten & Strømsø, 2004). The self-form for adults of this measure was used to ensure that the students focused on their ideas about their own intelligence (and not their ideas about people in

general). This scale consists of several subscales with items rated on a 6-point Likert-type scale, from 1 (*Strongly Agree*) to 6 (*Strongly Disagree*). The 8-item ITIS are the most commonly used in the research literature concerning mindset. The items included, differ between those associated with an entity theory (i.e., fixed mindset) and those associated with an incremental theory (i.e., growth mindset). For instance, an entity theory item can be "*You have a certain amount of intelligence and you really can't do much to change it*", whereas an incremental theory item can be "*You can always substantially change how intelligent you are*". To get a meaningful score that indicates which mindset the participant holds, the incremental scale items are reversed. As a result, when all items are summed, the higher average scores indicate a greater amount of incremental beliefs about intelligence i.e. growth mindset. The reliability data for the scale comes from Dweck et al. (1995) and is based on the 8-item scale. The scale shows good internal consistency (α = 0.85) and test-retest reliability at 2-weeks (r = .80). The scale also shows a good construct validity with scores predicting meaningful relationship with several variables (Dweck et al., 1995). The Norwegian version of TIS has also shown to be reliable, with Cronbach's α of 0.86 for entity items and 0.88 for the incremental items (Bråten & Strømsø, 2004).

2.4. Data reduction and analysis

For the statistical analysis, SPSS Version 25 for Windows was used (SPSS Inc., Chicago, IL, USA). To analyse the differences between the factors related to gender the Mann-Whitney *U* test was used. To analyse the relationship between the variables the Spearman's rho correlation was used. Significance of the difference between the correlation coefficient between genders, was analyzed by Fischer *r-to-z* transformation. Statistical significance was set at *p* < 0.05. Linear regression was used to get a more nuanced understanding of the relationship between passion, grit and mindset.

3. Results

3.1. Demographic differences

As a first step, we explored demographic differences among variables of interest.

Age had a significant correlation with mean total score Passion r = −.233 (p<.01); not with mean total score Grit r = −.121 or mean total score Mindset r = −.076 (Spearman's rho correlation). In terms of gender, the females had total score Passion 4.03 (SD = 0.621) and males had 4.19 (SD = 0.596). The difference was significant (Z = −1.652, p<.05, Mann-Whitney *U* test, one-tailed). Females had total score Grit 3.53 (SD = 0.510) and males had 3.52 (SD = 0.629), the difference was not significant. For Mindset (growth) the females had total score 4.40 (SD = 0.829) and males had 4.28 (SD = 1.066), not significant (see Table 2).

3.2. Correlational analyses

To explore the associations between the variables of interest we conducted correlational analyses for the whole sample. See Table 3 for

Table 1
The eight questions in the Passion scale.

1. I have an area/theme/skill I am really passionate for
2. I would like to use much time to become good in that area/theme/skill
3. I think I could be an expert in one area/theme/skill
4. I have a passion enough to become very good in the area/theme/skill I like
5. I work hard enough to fulfill my goals
6. I have burning passion for some areas/theme/skills
7. I use lot of time on the projects I like
8. My passion is important for me

Table 2
Mean score for passion, grit and mindset for the group as a whole and for females and males.

	Group as whole (N = 146)	Female (N = 80)	Male (N = 66)	p[a]
	Mean (SD)	Mean (SD)	Mean (SD)	
Passion	4.10 (.614)	4.03 (.621)	4.19 (.596)	<.05
Grit	3.52 (.565)	3.53 (.510)	3.52 (.629)	ns.
Mindset	4.35 (.953)	4.40 (.829)	4.28 (1.066)	ns.

[a] Mann-Whitney *U* test (one-tailed).

detail. The results indicate a significant correlation (p<.01) between the variables; passion-grit (r = .435); passion-mindset (r = .260) and grit-mindset (r = .274).

Tables 4 and 5 show the results of the correlation between the variables for female and male respectively.

Female: the results indicate a significant correlation (p<.01) for the variables. Passion - grit (r = .382); Passion-Mindset (r = .299) and Grit-Mindset (r = .356).

Male: for the males the correlation was significant (p<.01) between the variables Passion and Grit (r = .500) for Passion-Mindset (r = .260, p<.05) and not significant for Grit and Mindset (r = .215). The Fischer *r*-to-*z* transformation shows no significant difference between the correlation coefficient for females and males (see Fig. 2).

3.3. Regression analyses for female and male

Female:

Passion; The linear regression analysis with passion as dependent variable, reveal that both grit (β = 0.241; p = 0.034) and mindset (β = 0.238, p = 0.037) significantly contribute to the model, explaining 15.5% of the variation in the passion variable. The R^2 (0.155) and significant F-value (7.065, p = 0.002) support medium fit in the model.

Grit: The linear regression analysis with grit as dependent variable, reveal that both passion (β = 0.237; p = 0.034) and mindset (β = 0.273, p = 0.015) significantly contribute to the model explaining 17.2% of the variation in the grit variable. The R^2 (0.172) and significant F-value (8.015, p = 0.001) support medium fit in the model.

Mindset: The linear regression analysis with mindset as dependent variable, reveal that both passion (β = 0.233; p = 0.037) and grit β = 0.274, p = 0.015) significantly contribute to the model explaining 17.1% of the variation in the mindset variable. The R^2 (0.171) and significant F-value (7.937, p = 0.001) support medium fit in the model (see Table 6).

Male:

Passion: The linear regression analysis with passion as dependent variable, reveal that grit (β = 0.540; p < 0.001) significantly explains variation in passion whereas mindset (β = 0.065, p = 0.544) do not significantly explain the variation in passion. The regression model explained 30,8% of the variation in the passion variable. The R^2 (0.308) and significant F-value (14.042, p < 0.001) support high fit in the model.

Grit: The linear regression analysis with grit as dependent variable, reveal that passion (β = 0.537; p < 0.001) significantly explain the variation in grit, while mindset (β = 0.089, p = 0.402) do not significantly explain the variation in grit. The regression model explain 31,2% of the variation in the grit variable. The R^2 (0.312) and significant F-value (14.286, p < 0.001) support high fit in the model.

Mindset: The linear regression analysis with mindset as dependent variable, reveal that neither passion (β = 0.091; p = 0.544) nor grit (β = 0.125, p = 0.402) significantly can explain the variation in mindset. The regression model explain 3.6% of the variation in the mindset variable. The R^2 (0.036) and significant F-value (1,189, p = 0.311) support low fit in the model (see Table 7).

The variance inflation factor (VIF) values suggest no problems with multicollinearity in the data as the values are all below 10 - values exceeding 10 may indicate multicollinearity (Pallant, 2016). When it comes to independent errors, Durbin-Watsons values below 1 or

Table 3
Intercorrelations (Spearman's) between passion, grit and mindset (growth) (*N* = 146).

	Passion	Grit	Mindset (growth)
Passion	1	.435[a]	.260[a]
Grit		1	.274[a]
Mindset (growth)			1

[a] Correlation is significant at the 0.01 level (2-tailed).

Table 4
Female. Intercorrelations (Spearman's) between passion, grit and mindset (growth) (*N* = 80).

	Passion	Grit	Mindset (growth)
Passion	1	.382[a]	.299[a]
Grit		1	.356[a]
Mindset (growth)			1

[a] Correlation is significant at the 0.01 level (2-tailed).

Table 5
Male. Intercorrelations (Spearman's) between passion, grit and mindset (growth) (*N* = 66).

	Passion	Grit	Mindset (growth)
Passion	1	.500[b]	.260[a]
Grit		1	.215
Mindset (growth)			1

[a] Correlation is significant at the 0.05 level (2-tailed).
[b] Correlation is significant at the 0.01 level (2-tailed).

exceeding 3 may because of concern indicating dependent errors in the data (Field, 2018), however, the tests show no cause of concern for this in the dataset.

4. Discussion

The main aim of the paper was to explore the relationship between Passion, Grit and Mindset and the gender differences. In this study, the three scales were administered to 146 young adults, 80 females and 66 males. Research have indicated that these three factors have been seen to be significant for development of skills and knowledge (Duckworth, 2016; Dweck, 2017; Ericsson et al., 2007; Sala & Gobet, 2017; Sigmundsson et al., 2020). However, the relationship between these specific factors have not been much studied. The main finding of the study was a significant relationship between the three variables. The highest relationship was between passion and grit (r = .435). It relation to achievement these factors may be intertwined. If we look at the 'route' to achievement as an arrow, passion can be seen as a factor that gives direction to an important area you want to become good at while grit controls the strength and size of the arrow - or the effort you put in (Sigmundsson et al., 2020). Duckworth's research has shown the importance of grit for performance (Duckworth, 2016). In this respect growth mindset might be an important factor to develop grit (Dweck, 2017). This view may be supported by our finding that both the relationship between passion and mindset and grit and mindset was significant (r = .260 and r = .274). So, for individual achievement these three factors may be essential (Sigmundsson et al., 2020).

The correlation between the variables in the female sample show a significant relationship between all the three variables. This was also supported by the regression analysis. This could indicate that females with higher passion also have higher grit and higher mindset. Of special interest is to see the moderate correlation (r = .356) between grit and mindset in the female sample. This is interesting because earlier research indicate high correlation between grit and conscientiousness (r = .77) (Duckworth et al., 2007). This results could also illuminate on gender differences in reading for the benefit of girls (15–16 years) in all countries participating in the Program for International Student Assessment (PISA). Girls seem to work harder over longer time and with more focus than boys (Sigmundsson et al., 2017b, 2018). These results in PISA are mainly related to reading skill. Is it possible that our results may explain differences among gender in attitude towards schools (Logan & Johnston, 2009). Girls are found to have higher reading achievement than boys i.e. enjoyment of reading, time spent reading for enjoyment, and diversity of texts read (Brozo et al., 2014). On the other hand, people with a growth mindset believe that all people, can become substantially
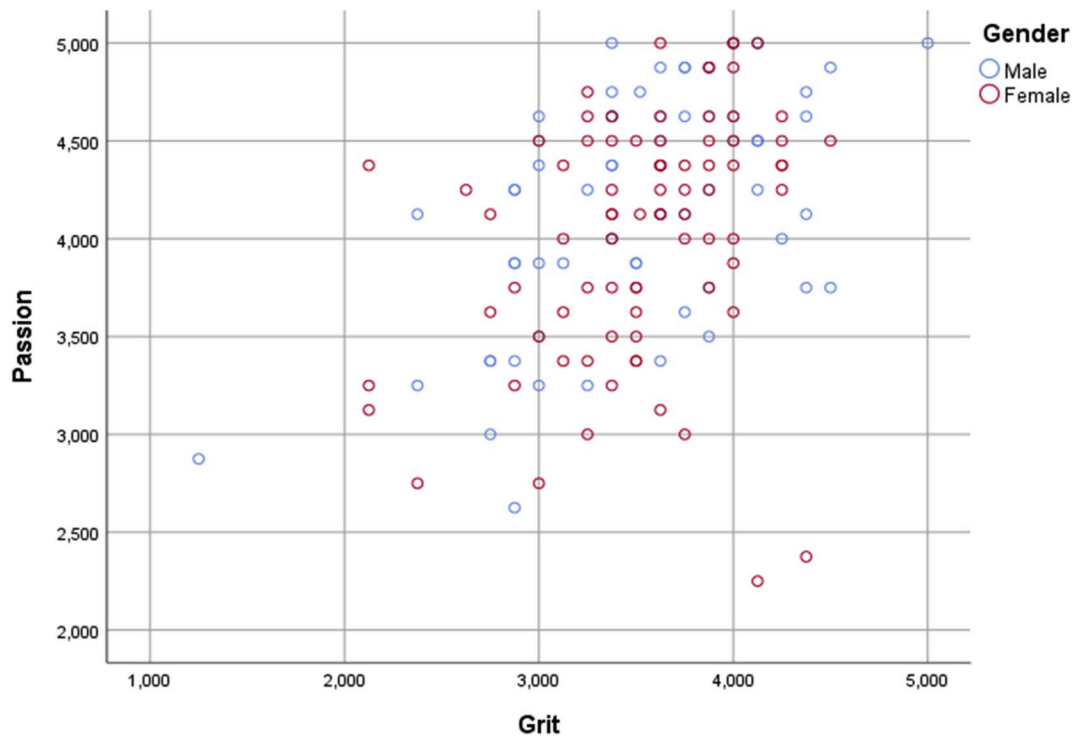
Fig. 2. Correlations between passion and grit for females (r = .382) and males (r = .500).

Table 6
The linear regression analysis for the variables passion, grit and mindset for females (N = 80).

	Passion		Grit		Mindset	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Passion			,325***	,237**	,322***	,233**
Grit	,325***	,241**				,274***
Mindset		,238**		,273***		
Model summary						
R	,325	,394	,325	,415	,322	,413
R^2	,105	,155	,105	,172	,104	,171
Adjusted R^2	,094	,133	,094	,151	,092	,149
Durbin-Watson						
F	9,187***	7,065***	9,187***	8,015***	9,042***	7,937***

a.**$p < 0.05$, ***$p < 0.01$.
b. The coefficients reported are the standardized beta coefficients.

Table 7
The linear regression analysis for the variables passion, grit and mindset for males (N = 66).

	Passion		Grit		Mindset	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Passion			,552***	,537***	,160	,091
Grit	,552***	,54***				,125
Mindset		,065		,089		
Model summary						
R	,552	,555	,552	,559	,160	,191
R^2	,304	,308	,304	,312	,025	,036
Adjusted R^2	,293	,286	,293	,290	,010	,006
Durbin-Watson						
F	27,985***	14,042***	27,985***	14,286***	1,673	1,189

a. ***$p < 0.01$.
b. The coefficients reported are the standardized beta coefficients.

more intelligent through effort and practice (Dweck, 2017). Females do also have moderate relationship between passion and grit (r = .382). In the male sample there was a high and significant correlation between passion and grit (r = .500). The males had also lower correlations

between grit and mindset (r = .215) and mindset and passion (r = .260) than the females. These findings were also supported by the regression analysis. In fact, the regression analysis shows that mindset has no significant contribution to neither passion nor grit. Instead, it is grit and
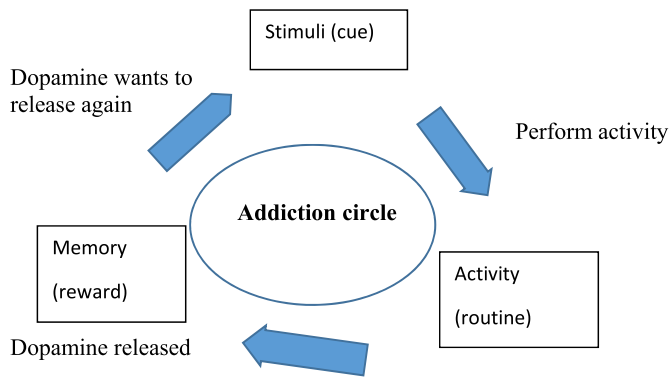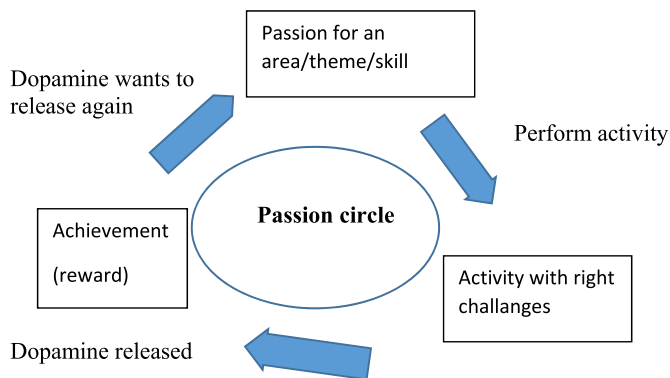
Fig. 3. Addiction circle.

Fig. 4. Passion circle.

related to the dopamine function (Tang & Dani, 2009). Studies indicate the importance of dopamine in the circle of addiction (see Fig. 3) i.e.: stimuli – perform activity – pleasurable activity – dopamine released – memory – dopamine wants to release again – stimuli (Beaulieu & Gainetdinov, 2011; Tritsch & Sabatini, 2012). Addiction and passion might be part of the same underlying mechanism more prominent for boys/males. Hence, the importance of passion and dopamine in explaining behavior can be illustrated in a similar way as the circle of addiction (see Fig. 4). In the passion circle a passion for an area/-theme/skill will have effect on the activity performed, which will create more dopamine, and have effect on the achievement or reward which will strengthen the passion for that area/theme/skill.

The main limitations of the study are the low number of participants and the age range. Further studies are now being carried out in larger samples and larger range of age.

5. Conclusion

The results from this study reveal a moderate significant correlation between the grit, mindset and passion. Also, it is interesting to note the associations between the factors are different in males compared to females. The significant gender differences found in passion might explain differences in performance in different arenas, such as females superior performance in educational settings. The differences in passion between genders could imply that a variety of different teaching strategies should be provided for in educational settings. Learning environments should strive for appropriate conditions for learning and emphasize focus on the individuals interests, strengths and resources.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.newideapsych.2020.100795.

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passion only that highly contribute to the variation of the passion and grit dependent variables respectively, with the models explaining over 30% of the variance in both cases. Of special interest is the high correlations between passion and grit in males. This could mean that males who have high passion also have high grit and vice versa. Our results also indicate significant difference in passion between the gender in favor of males (see Table 2). One could speculate if passion is a strong driving force for males. If males are going to prioritize time and effort, and show 'positive attitude' on some issues they need to have a high passion for that activity i.e. when we see grit in males it might explain passion. That a strong feeling toward a personally important value may motivate behavior towards that value. In this respect it might be argued that passion provide individuals with the focus important to achieve their goals (Duckworth, 2016). Boys underachievement in reading and lower reading engagement relative to girls in PISA (Brozo et al., 2014) may be related to the fact that we are not able to 'light the fire' or creating/developing enough passion towards reading among boys (Sigmundsson et al. 2017b). Brozo et al. (2014) argue in this respect that we need to find variety of texts related to boys individual interests. This is supported by Castles, Rastle, and Nation (2018) who argue that it is crucial to create reading interest among boys and this can be done by giving them challenging books to read.

4.1. Passion circle

The significant differences between the genders in the passion factor, and the high correlation between the passion and grit in male group may be linked to addiction behavior. Studies have indicated that males are more likely to display addictive behavior, including alcohol use and gambling compared to females (Nolen-Hoeksema & Hilt, 2006). Males were higher in sensation seeking and risk taking than females (Dalton, Klesges, Henderson, Somes, Robinson, & Johnson, 2009), which can be

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