



Contents lists available at ScienceDirect

## New Ideas in Psychology

journal homepage: <http://www.elsevier.com/locate/newideapsych>

# Passion, grit and mindset in the ages 14 to 77: Exploring relationship and gender differences

Hermundur Sigmundsson<sup>a,b,\*</sup><sup>a</sup> Department of Psychology, Norwegian University of Science and Technology, Trondheim, Norway<sup>b</sup> Reykjavik University, Reykjavik, Iceland

## ARTICLE INFO

## Keywords:

Passion  
Grit  
Mindset  
Lifespan perspective  
Achievement  
Performance  
Experts

## ABSTRACT

This study aims to investigate the relationship between passion, grit and mindset across the life span. The sample consisted of 917 participants between 14 to 77 years old. The eight item Passion Scale was used to assess passion, and the Grit-S scale to assess grit. Mindset was measured with the Theories of Intelligence Scale (TIS). The scale has 8-items.

The results showed that for the group as a whole there was a significant relationship between passion and grit ( $r = .325$ ); passion and mindset ( $r = .166$ ) and grit and mindset ( $r = .167$ ).

For the female group ( $N = 502$ ) the correlation was significant for the three factors: between passion and grit ( $r = .311$ ), for passion and mindset ( $r = .195$ ), and grit and mindset ( $r = .170$ ). For the male group ( $N = 415$ ) the correlation between the factors was also significant: for passion and grit ( $r = .362$ ), for passion and mindset ( $r = .161$ ), and grit and mindset ( $r = .163$ ).

For the youngest age groups (14–19, 20–36, 37–53) the correlation between passion and grit was significant: 14–19:  $r = .588$ ; 20–36:  $r = .317$ ; 37–53:  $r = .491$ . For the two oldest age groups the correlation was not significant. For passion and mindset the correlation was significant for the two youngest age group only. 14–19:  $r = .226$ ; 20–36:  $r = .161$ . For grit and mindset there was significant correlation for age group 2 only. 20–36:  $r = .195$ .

These findings might be potentially important for better understanding of the relationship between these constructs positively related to learning, achievement, well-being and life satisfaction.

## 1. Introduction

Research indicates that the factors passion, grit and mindset are important for achievement (Vallerand, 2010; Duckworth, 2016; Dweck et al., 2017; Sigmundsson et al., 2020b,c). In addition, Ericsson and Pool (2016) argue that deliberate practice over a long period and a good mentor, with knowledge in the area, are of great importance for becoming an expert (Sigmundsson et al., 2020a) (see Fig. 1). Moreover, the flow theory (Csikszentmihalyi, 1975) underline the importance of flow for learning and mastery.

Passion and flow are concepts which are attracting an increasing amount of interest in the research community. The importance of passion, or great interest in some areas, has become an important research question (Sigmundsson et al., 2020a; Vallerand et al., 2003). 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 (Jachimowicz et al., 2018). Vallerand (2008) have argued that passion represents an important source of motivational energy underlying good performance and can contribute to one's happiness and self-growth. Earlier, Rousseau and Vallerand (2008) found that harmonious passion positively predicted positive indices of psychological adjustment (meaning in life, life satisfaction and vitality).

Further research has indicated a high passion in football players at an elite level and a high relationship between players' passion for achievement and trainers ranking of the level of football competence (Sigmundsson et al., 2020c). If we consider the 'route' to achievement as an arrow, the direction of the arrow represents the passion toward an area/theme/skill, while the dimension or size of the arrow represents the power or level of grit. How important are passions in your selection of what you spend your time on? For example, Hans Christian Anderson developed a great passion or great interest in the area of theater and

\* Department of Psychology, Norwegian University of Science and Technology, Trondheim, Norway.

E-mail address: [Hermundur.sigmundsson@ntnu.no](mailto:Hermundur.sigmundsson@ntnu.no).

<https://doi.org/10.1016/j.newideapsych.2020.100815>

Received 11 May 2020; Accepted 19 June 2020

Available online 26 August 2020

0732-118X/© 2020 The Author. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

drama. He was able to gain full concentration when approaching his favorite activities, which we refer to as “the flow experience” (Sigmundsson & Haga, 2020). “The flow experience” is an intense mental focus or concentration when involved in an activity, which is characterized by feelings of pleasure/reward from the activity itself. It is described as the result of a dynamic balance between skills and challenges, hence associated with learning (Csikszentmihalyi, 1975).

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 (Duckworth et al., 2007). Grit has a high correlation with conscientiousness ( $r = 0.77$ ) (Duckworth et al., 2007) and with self-discipline ( $r = 0.92$ ) (Schmidt et al. (2018). Duckworth et al. (2007) presume that grit is distinct from these constructs in its emphasis on stamina. Further, grit has shown association with happiness. Grittier individuals were more likely to seek happiness through engagement than less gritty individuals (Von Culin et al., 2014). Grit can be seen in relation to holding a “growth mindset” (Duckworth, 2016). Possessing a growth mindset stands for believing in the development of skills by practice (Dweck, 2000). Thus, mindsets can be understood as people’s beliefs about the nature of human attributes, such as intelligence or personality (Dweck, 2012, p. 615). When a person focuses on developing their intelligence, it implies it is a dynamic quality cultivated by effort. In contrast, people with a “fixed mindset” assume they are born with a certain amount of talent or intelligence, which they cannot change (Dweck, 2000). Having a specific mindset may influence a person’s approach to learning and challenge, and therefore have an effect on goals, effort, and reaction to setbacks (Dweck, 2000). Consequently, mindset may be related to both motivation, and achievement in general. According to Dweck (2016) individuals with a growth mindset tend to worry less about what other think about them and spend more time and energy into learning. Studies have shown a significant difference between females and males

regarding the factor passion, but not for the factors grit and mindset (Sigmundsson et al., 2020b). Studies focusing on young adults (mean age 21.23 and 22.01) have indicated that passion and grit have a significant moderate correlation ( $r = 0.39$  and  $r = 0.43$ ). The relationship between passion and mindset ( $r = .260$ ) and grit and mindset ( $r = 0.274$ ) are lower (Sigmundsson et al., 2020,b). When looking at the relationship between the factors we also find difference between females and males. Males have a high correlation between passion - grit ( $r = .500$ ), but not so high for passion - mindset ( $r = .260$ ), and grit - mindset ( $r = .215$ ). Females have a relationship which is quite similar between the three factors i.e. passion - grit ( $r = .382$ ); passion - mindset ( $r = .299$ ) and grit - mindset ( $r = .356$ ). However, what there is not much knowledge about, or focus on, in the literature is the relationship between these factors over the lifespan. Therefore, the main aim of this study was to obtain more information about this issue by carrying out cross-sectional data collection with participants in the age span 14 to 77 years. It was decided to have five age groups namely: 14–19, 20–36, 37–53, 54–69, and 70–77. In summary, we addressed the following question: What is relationship between passion, grit and mindset across the lifespan?

2. Method

917 participants between 14 and 77 years completed an assessment of passion, grit and mindset. Adolescents from 14 to 19 years ( $N = 141$ ) were randomly recruited from mainstream secondary schools and high schools. The entire sample reflected the population of adolescents attending schools in these areas and included adolescents from a wide range of socio-economic backgrounds. The adults from 20 to 77 years ( $N = 776$ ) were randomly selected from a university student population (tested at a university campus in a group setting in normal school hours), sports clubs (football players, female and males on different levels) and

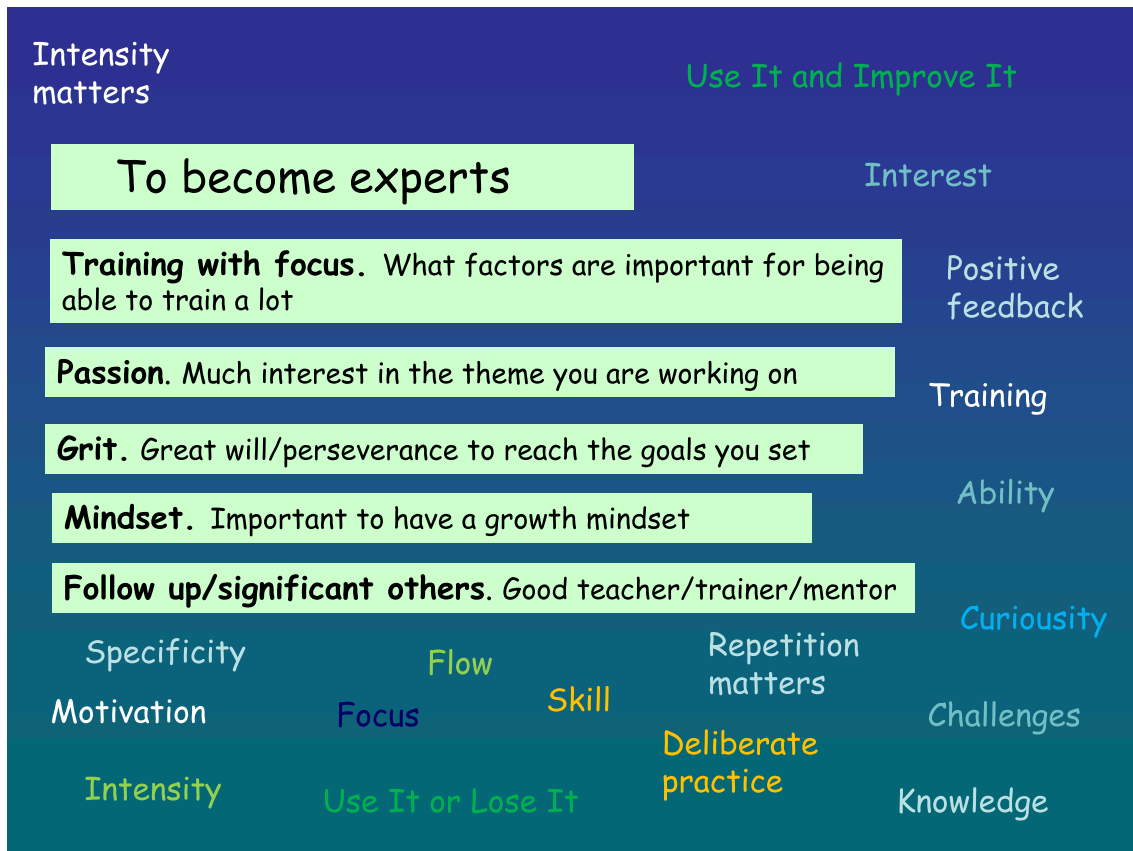


Fig. 1. Different factors of importance for achievement or becoming an experts.

group of visitors to a public building (tested individually). The participants were divided into age-groups based on chronological age. The where five age-groups, namely: 14–19, 20–36, 37–53, 54–69, and 70–77. The average age in the whole group was 26.36 (SD = 12.29). The average age of the female group (N = 502) was 26.54 (SD = 12.23), and the male group (N = 415) was 26.15 (SD = 12.38). The information registered about the participants was anonymous (age and gender). Recruitment was conducted among randomly selected adolescents and adults in Norway.

### 3. Measurements

#### 3.1. Demographics

The participants indicated their age, gender and educational level.

#### 3.2. Passion

The passion scale (Sigmundsson et al., 2020a) was used to assess the participants' level of passion. The participants rated eight items, using the scale of 1 = not like me at all to 5 = very much like me. 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 an 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 with Cronbach's alpha value .86. Passion also showed a good test-retest reliability. ICCs between test and retest total scores was 0.92 (N = 21, mean age 23. 67, SD = 2.41). Construct validity: the Pearson correlation coefficient between total scores on the Passion and Grit S Scale was 39 for adults, mean age 21.23 (SD = 3.45) (N = 107) (Sigmundsson et al., 2020a).

#### 3.3. Grit

Grit S: short grit scale (Duckworth & Quinn, 2009; Norwegian version (Sending, 2014) was used to assess the participants' level of grit. The 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 'I finish whatever I begin'. The maximum score on this scale is 5 (extremely gritty), and the lowest score 1 (not at all gritty). Grit-S showed good internal consistency several times,  $\alpha = 0.82$  and  $\alpha = 0.84$  (Duckworth & Quinn, 2009, p. 170). The study provided evidence for the predictive validity, consensual validity, and test-retest stability of the Grit-S.

#### 3.4. Mindset

A Norwegian version of Dweck (1999) Theories of Intelligence scale (TIS) was used to assess the 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

**Table 1**  
The eight Passion for achievement Scale Questions.

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 in relation to the five age-groups and gender.

Age	14–19 (N = 141)	20–36 (N = 660)	37–53 (N = 57)	54–69 (N = 38)	70–77 (N = 21)	
Groups	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	
Age (year)	17.82 (1.60)	23.23 (3.44)	44.75 (5.11)	60.97 (4.63)	73.14 (2.39)	
Passion	Group	4.18 (.61)	3.97 (.62)	3.70 (.67)	3.74 (.65)	3.96 (.70)
	Female	3.96 (.61)	3.86 (.62)	3.65 (.68)	3.71 (.72)	3.79 (.86)
	Male	4.41 (.54)	4.10 (.59)	3.80 (.41)	3.76 (.60)	3.95 (.52)
Grit	Group	3.56 (.565)	3.36 (.59)	3.62 (.48)	3.74 (.46)	3.78 (.49)
	Female	3.43 (.52)	3.40 (.57)	3.57 (.51)	3.77 (.52)	3.89 (.54)
	Male	3.69 (.59)	3.33 (.61)	3.73 (.41)	3.70 (.41)	3.67 (.43)
Mindset	Group	4.34 (.86)	4.18 (.95)	4.43 (.90)	3.82 (.92)	3.38 (.87)
	Female	4.39 (.86)	4.19 (.87)	4.61 (.90)	4.03 (.77)	3.40 (.94)
	Male	4.30 (.87)	4.18 (1.04)	4.07 (.83)	3.61 (1.03)	3.36 (.83)

Group: group as a whole.

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 obtain 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 ( $\alpha = 0.85$ ) and test-retest reliability at 2-weeks ( $r = 0.80$ ). The scale also shows good construct validity, with scores predicting meaningful relationship with several variables (Dweck et al., 1995). The Norwegian version of TIS is also shown to be reliable, with Cronbach's  $\alpha$  of 0.86 for entity items and 0.88 for the incremental items (Bråten & Strømsø, 2004).

#### 3.5. Procedure

The study was performed in accordance with the Declaration of Helsinki. Passive consent from the participants was confirmed to be

**Table 3**

Intercorrelations (Pearsons) between passion, grit and mindset (growth) in group as a whole (N = 917).

	Passion	Grit	Mindset (growth)
Passion	1	.325**	.166**
Grit		1	.167**
			1
Mindset (growth)			1

\*\*correlation is significant at the 0.01 level (2-tailed).



Fig. 2. Correlations between passion and grit for females ( $r = .311$ ) and males ( $r = .362$ ).

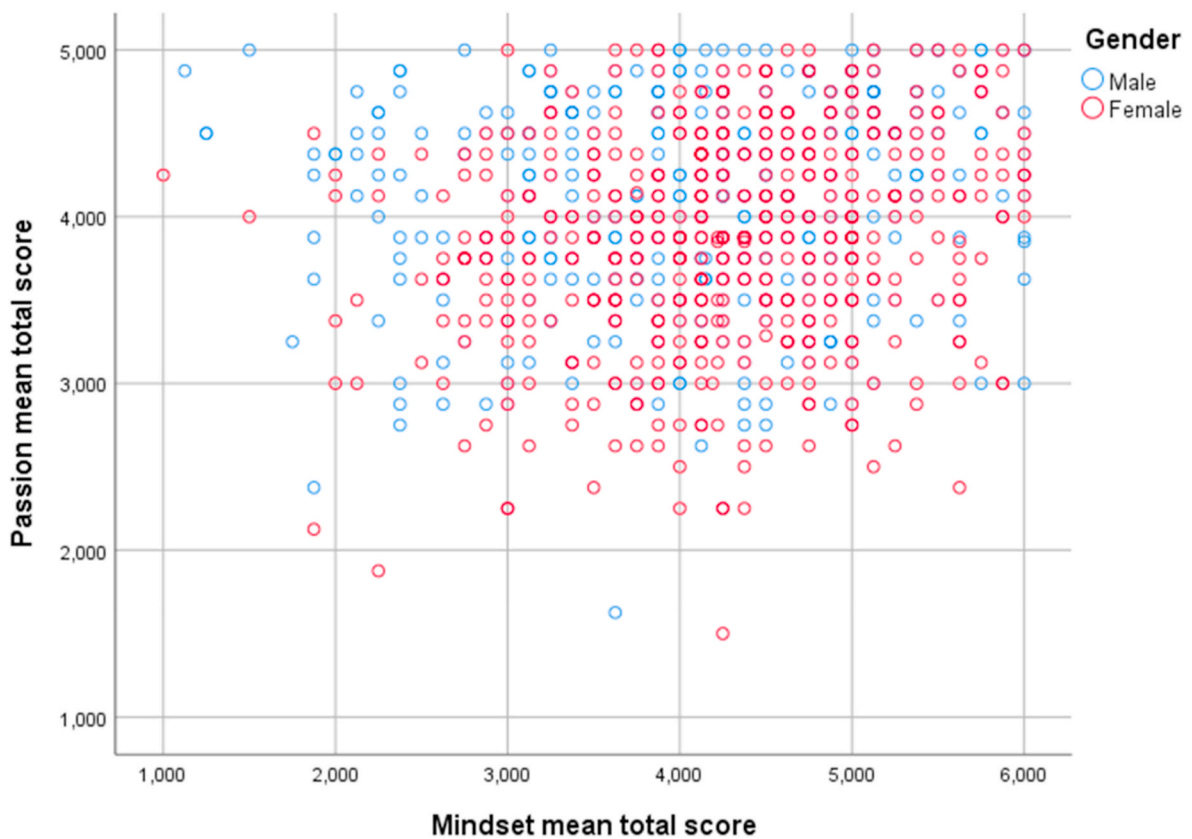


Fig. 3. Correlations between passion and mindset for females ( $r = 0.195$ ) and males ( $r = 0.161$ ).

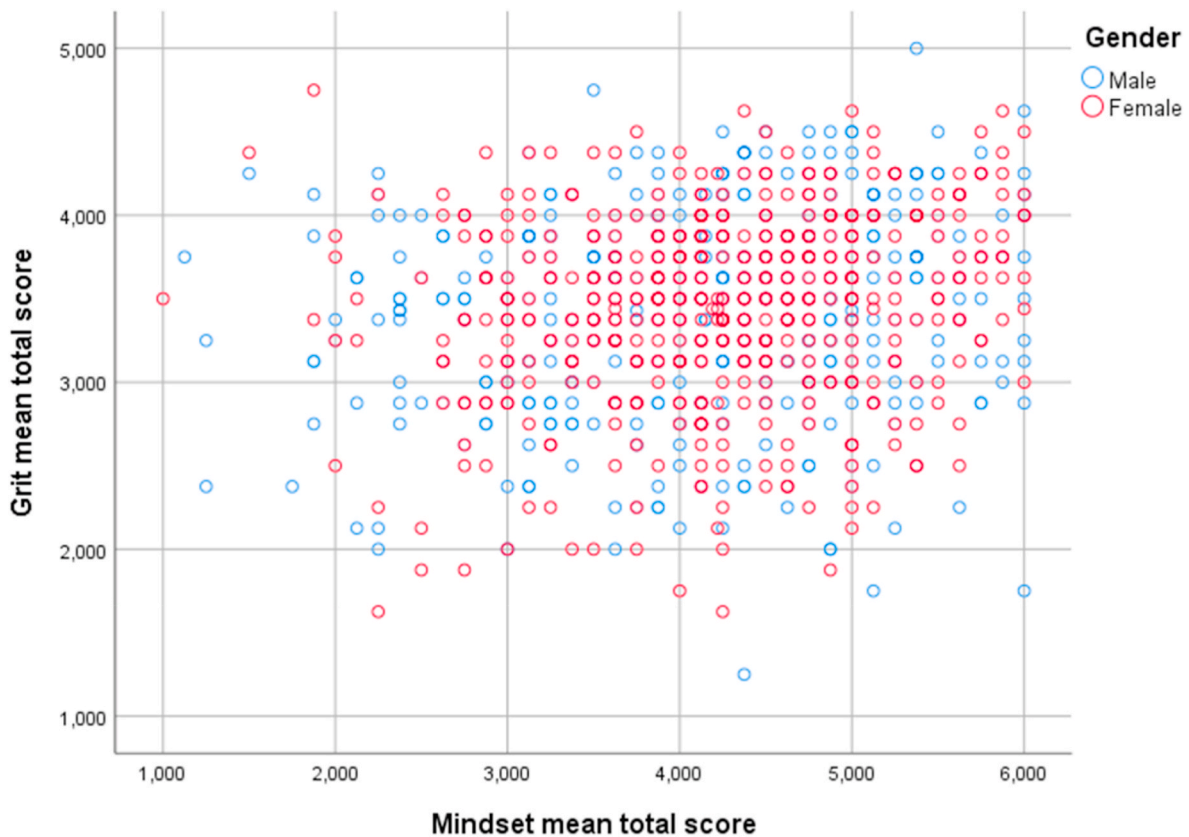


Fig. 4. Correlations between grit and mindset for females ( $r = 0.170$ ) and males ( $r = 0.163$ ).

**Table 4**  
Intercorrelations (Pearsons) between passion, grit and mindset (growth) in group 1 (14-19 years-old) ( $N = 141$ ).

	Passion	Grit	Mindset (growth)
Passion	1	.588** .554** (F) .572** (M)	.226** .344** (F) .173 (M)
Grit		1	.153 .061 (F) .261* (M)
Mindset (growth)			1

\*\* correlation is significant at the 0.01 level (2-tailed).

\*correlation is significant at the 0.05 level (2-tailed).

**Table 5**  
Intercorrelations (Pearsons) between passion, grit and mindset (growth) group 2 (20-36 years-old) ( $N = 660$ ).

	Passion	Grit	Mindset (growth)
Passion	1	.317** .302** (F) .374** (M)	.161** .177** (F) .154** (M)
Grit		1	.195** .190** (F) .200** (M)
Mindset (growth)			1

\*\* correlation is significant at the 0.01 level (2-tailed).

sufficient from the Data Protection Authority, because no sensitive personal data were collected. The information registered about the participants was anonymous (only age and gender). Adolescents and university students were assessed in a group setting at the school campus (during normal school hours). The adult participants were measured in a

quiet room at the University Campus. A trained researcher explained the procedure and was present when the questionnaires were conducted.

### 3.6. Data reduction and analysis

For the statistical analysis, SPSS Version 25 for Windows was used (SPSS Inc., Chicago, IL, USA). To analyze the differences between the factors related to gender, a  $t$ -test was used and to analyze the relationship between the variables the Pearson correlation was used. Statistical significance was set at  $p < .05$ . Linear regression was used to obtain a more nuanced understanding of the relationship between passion, grit and mindset.

## 4. Results

### 4.1. Demographic differences

In terms of gender, the females had a total score on passion of 3.85 ( $SD = 0.63$ ) and males 4.12 ( $SD = 0.60$ ). The difference was significant ( $p < .001$ ). Females had a total score on Grit of 3.45 ( $SD = 0.56$ ) and

**Table 6**  
Intercorrelations (Pearsons) between passion, grit and mindset (growth) group 3 (37-53 years-old) ( $N = 57$ ).

	Passion	Grit	Mindset (growth)
Passion	1	.491** .495** (F) .451 (M)	.144 .101 (F) .387 (M)
Grit		1	.213 .391* (F) -.098 (M)
Mindset (growth)			1

\*\* correlation is significant at the 0.01 level (2-tailed).

**Table 7**

Intercorrelations (Pearsons) between passion, grit and mindset (growth) group 4 (54-69 year-old) (N = 38).

	Passion	Grit	Mindset (growth)
Passion	1	-.073 .050 (F) -.254 (M)	.045 .460* (F) -.311 (M)
Grit		1	.057 .350 (F) -.247 (M)
Mindset (growth)			1

\*correlation is significant at the 0.05 level (2-tailed).

males 3.43 (SD = 0.61), the difference was not significant. For Mindset (growth) the female had total score 4.23 (SD = 0.89) and males 4.15 (SD = 1.01), the difference not being significant (see Table 2).

For the group as a whole (N = 917), the correlation was significant between passion and grit ( $r = .325, p < .001$ ); for passion and mindset the correlation was significant ( $r = 0.166, p < .001$ ), and for grit and mindset the correlation was significant ( $r = .167, p < .001$ ). For the female group (N = 502) the correlation was significant between passion and grit ( $r = .311, p < .001$ ); for passion and mindset the correlation was significant ( $r = .195, p < .001$ ) and for grit and mindset the correlation was significant ( $r = .170, p < .001$ ). For the male group (N = 415) the correlation was significant between passion and grit ( $r = .362, p < .001$ ); for passion and mindset the correlation was significant ( $r = .161, p < .001$ ) and for grit and mindset the correlation was ( $r = .163, p < .001$ ). (see Table 3, Figs. 2-4.).

#### 4.2. Age group 1 (14-19 years-old)

For the group as a whole (N = 141) the correlation was significant between passion and grit ( $r = .588, p < .001$ ); for passion and mindset the correlation was significant ( $r = .226, p < .001$ ) and for grit and mindset the correlation was not significant ( $r = .153$ ).

For the female group (N = 70) the correlation was significant between passion and grit ( $r = .554, p < .001$ ); for passion and mindset the correlation was significant ( $r = .344, p < .001$ ) and for grit and mindset the correlation was not significant ( $r = .061$ ). For the male group (N = 71) the correlation was significant between passion and grit ( $r = .572, p < .001$ ); for passion and mindset the correlation was not significant ( $r = .173, ns$ ), and for grit and mindset the correlation was significant ( $r = .261, p < .05$ ) (see Table 4).

#### 4.3. Age group 2 (20-36 years-old)

For the group as a whole (N = 660) the correlation was significant between passion and grit ( $r = .317, p < .01$ ); for passion and mindset the correlation was significant ( $r = .161, p < .01$ ) and for grit and mindset the correlation was significant ( $r = .195, p < .01$ ). For the female group (N = 363) the correlation was significant between passion and grit ( $r = .302, p < .01$ ); for passion and mindset the correlation was significant ( $r = .177, p < .01$ ) and for grit and mindset the correlation was significant ( $r = .190, p < .01$ ). For the male group (N = 297) the correlation was

**Table 8**

Intercorrelations (Pearsons) between passion, grit and mindset (growth) group 5 (70-77 years-old) (N = 21).

	Passion	Grit	Mindset (growth)
Passion	1	-.019 .134 (F) -.281 (M)	.031 .203 (F) -.315 (M)
Grit		1	.011 -.029 (F) .058 (M)
Mindset (growth)			1

significant between passion and grit ( $r = .374, p < .01$ ); for passion and mindset the correlation was significant ( $r = .154, p < .01$ ) and for grit and mindset the correlation was significant ( $r = .200, p < .01$ ) (see Table 5).

#### 4.4. Age group 3 (37-53 years-old)

For the group as a whole (N = 57) the correlation was significant between passion and grit ( $r = .491, p < .01$ ); for passion and mindset the correlation was not significant ( $r = .144$ ), and for grit and mindset the correlation was not significant ( $r = .213$ ). For the female group (N = 39) the correlation was significant between passion and grit ( $r = .495, p < .01$ ), for passion and mindset the correlation was not significant ( $r = 0.101$ ) and for grit and mindset the correlation was significant ( $r = .391, p < .05$ ). For the male group (N = 18) the correlation was not significant between passion and grit ( $r = .451$ ); for passion and mindset the correlation was not significant ( $r = .387$ ), and for grit and mindset the correlation was not significant ( $r = -.098$ ) (see Table 6).

#### 4.5. Age group 4 (54-69 years-old)

For the group as a whole (N = 38) the correlation was not significant between passion and grit ( $r = -.073$ ); for passion and mindset the correlation was not significant ( $r = .045$ ), and for grit and mindset the correlation was not significant ( $r = .057$ ). For the female group (N = 19) the correlation was not significant between passion and grit 0.050; for passion and mindset the correlation was significant ( $r = .460, p < .05$ ), and for grit and mindset the correlation was not significant ( $r = .350$ ). For the male group (N = 19) the correlation was not significant between passion and grit ( $r = -.254$ ); for passion and mindset the correlation was not significant ( $r = -.311$ ), and for grit and mindset the correlation was not significant ( $r = -.247$ ) (see Table 7).

#### 4.6. Age group 5 (70-77 years-old)

For the group as a whole (N = 21) the correlation was not significant between passion and grit ( $r = -.019$ ); for passion and mindset the correlation was not significant ( $r = .031$ ), and for grit and mindset the correlation was not significant ( $r = .011$ ). For the female group (N = 11) the correlation was not significant between passion and grit ( $r = .134$ ); for passion and mindset the correlation was not significant ( $r = 0.203$ ), and for grit and mindset the correlation was not significant ( $r = -.029$ ). For the male group (N = 10) the correlation was not significant between passion and grit ( $r = -.281$ ); for passion and mindset the correlation was not significant ( $r = -.315$ ), and for grit and mindset the correlation was not significant ( $r = .058$ ) (see Table 8).

#### 4.7. Regression analyses for the group as a whole

Passion: The linear regression analysis with passion as dependent variable reveals that both grit ( $\beta = 0.306, p < .01$ ) and mindset ( $\beta = 0.115, p < .01$ ) significantly contribute to the model, explaining 11.8% of the variation in the passion variable. The  $R^2$  (0.118) and significant F-value (61.393,  $p < .01$ ) support medium fit in the model.

Grit: The linear regression analysis with grit as dependent variable, reveal that both passion ( $\beta = 0.306, p < .01$ ) and mindset ( $\beta = 0.116, p < .01$ ) significantly contribute to the model, explaining 11.9% of the variation in the grit variable. The  $R^2$  (0.119) and significant F-value (61.473,  $p < .01$ ) support medium fit in the model. Mindset: The linear regression analysis with mindset as dependent variable reveals that both passion ( $\beta = 0.233, p < .01$ ) and grit ( $\beta = 0.274, p < .01$ ) significantly contribute to the model, explaining 4.2% of the variation in the mindset variable. The  $R^2$  (0.042) and significant F-value (19.917,  $p < .01$ ) support medium fit in the model (see Table 9).

**Table 9**

The linear regression analysis for the variables passion, grit and mindset for the whole group (N = 917).

	Passion		Grit		Mindset	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Passion						
Grit	,325***	,306***	,325***	,306***	,322***	,233***
Mindset		,115***		,116***		,274***
<i>Model summary</i>						
R	,325	,344	,325	,344	,166	,204
R <sup>2</sup>	,106	,118	,106	,119	,028	,042
Adjusted R <sup>2</sup>	,105	,116	,105	,117	,027	,040
Durbin-Watson						
F	107,950***	61,393***	107,950***	61,473***	25,960***	19,917***

a. \*\*\*p &lt; .01.

b. The coefficients reported are the standardized beta coefficients.

## 5. Discussion

The main aim of the paper was to explore the relationship between passion, grit and mindset across the lifespan by carrying out a cross-sectional data collection. In this round of testing reported here, the three scales were administered to 917 subjects: 502 females and 415 males in the age range from 14 to 77. Earlier research has argued that these factors have been seen to be important for achievement (Ericsson & Charness, 1994; Ericsson et al., 2007; Vallerand et al., 2003; Bonneville-Roussy et al., 2011; Duckworth et al., 2011; Duckworth, 2016; Dweck, 2012; Dweck et al., 2017; Yeager et al., 2019; Sigmundsson et al., 2020,b,c). However, the pattern of lifespan development of passion, grit and mindset has not been much studied in the literature. This is an important question to better understand how to attain an achievement and become good in one area/theme/skill. If the results for the group as a whole are looked at more closely, we see clearly that there is moderate correlation between passion and grit (.325). Males had a higher correlation than females (.362 vs. .311). The correlation for passion and mindset is small (.166). For the female and male group the correlation was similar (.195 vs. .161). Grit and mindset also have small correlation (.167). The female and male group had a similar score (.170 vs. .163). These findings were also supported by the regression analysis. In fact, the regression analysis shows that both grit and mindset had significant contribution to passion (explaining 11.8% of the model), passion and mindset had a significant contribution to grit (explaining 11.9% of the model) and passion and grit has a significant contribution to mindset (explaining 4.2% of the model). Thus it is possible to argue that for the group as a whole, these factors are intertwined.

### 5.1. Across the lifespan from 14 to 77

#### 5.1.1. Age groups: 14–19, 20–36, 37–53

The relationship between passion and grit was large in the three age groups (.588, .317, .491). This was also found for females (.554, .302, .495) and males (.572, .374, .451). This indicates that passion and grit are intertwined constructs that are both needed for high achievement (Sigmundsson et al., 2020c). Ericsson and Pool (2016) argue for the need for energy and willingness as a key element to become excellent in some area/theme/skill. In this respect Sigmundsson et al. (2017) point out that 'what is trained develops' i.e. the specificity of the learning process. On the other hand, spending time and energy towards an activity can also lead to better life satisfaction (Von Culin et al., 2014). For passion and mindset the relationship was small for the group as a whole (.226, .161, .144) and from small to moderate for females (.344, .177, .101) and males (.173, .154, .387). The relationship between grit and mindset was small for the group as a whole and from trivial to moderate for the female and male. This finding is supported and in line with the research of Sigmundsson et al. (2020a,b), where a similar relationship was found between the factors in young adults (mean age 21.23 and 22.01).

#### 5.1.2. Age groups: 54–69, 70–77

The relationship between the factors overall was trivial for the two groups. This may indicate different view of psychological traits with increasing age. It is possible to have a high score in one factor and a low one in others. An individual could have high score in passion and a low one in grit, or vice versa. Thus, when finding that passion and grit are intertwined factors this may be of value for younger age groups. However, when looking at the gender we find a different pattern. Most interesting in this respect were the moderate and small correlations between passion and mindset for females (.460, .203) and also the moderate correlation between grit and mindset (0.350) for females in the age group 54–69. This indicates that females in the age group 54–69 still have a moderate/small relationship between passion - mindset and grit - mindset. For the males, 5 of 6 correlations were negative supporting the view that a high score in one factor indicate low in another factor. These findings may show us the importance of still have some meaningful area/theme/skill you are interested in and want to engage in i.e. find and develop the direction of the arrow when becoming older (Sigmundsson et al., 2020a). Rousseau and Vallerand (2008) pointed out in this respect that older adults who remain active experience greater life satisfaction and subjective well-being (p.196).

## 6. Conclusion

The results from this paper show that, for the group as a whole, there is a moderate relationship between the factors passion and grit. There is also a small relationship, but a significant one, between passion - mindset and grit - mindset. This tendency is the same for the three age groups from the ages 14 to 53. From ages 54 to 77 this picture changes and there are overall lower correlations between the factors. These findings might be potentially important for better understanding of the relationship between these constructs positively related to learning, achievement, include affective components, revolving around intrinsic motivation, well-being and life satisfaction.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.newideapsych.2020.100815>.

## References

- Bonneville-Roussy, A., Lavigne, G. L., & Vallerand, R. J. (2011). When passion leads to excellence: The case of musicians. *Psychology of Music*, 39(1), 123–138.
- Bråten, I., & Strømso, H. I. (2004). Epistemological beliefs and implicit theories of intelligence as predictors of achievement goals. *Contemporary Educational Psychology*, 29(4), 371–388. <https://doi.org/10.1016/j.cedpsych.2003.10.001>.
- Csikszentmihalyi, M. (1975). *Beyond boredom and anxiety*. San Francisco, CA, USA: Jossey-Bass, Inc. Publishers, 1975.
- Duckworth, A. (2016). *Grit. The power of passion and perseverance*. Scribner Book Company.

- Duckworth, A. L., Kirby, T. A., Tsukayama, E., Berstein, H., & Anders Ericsson, K. (2011). Deliberate practice spells success: Why grittier competitors triumph at the national spelling bee. *Social Psychological and Personality Science*, 2.
- Duckworth, A. L., Peterson, C., Matthews, M. D., & Kelly, D. R. (2007). Grit: Perseverance and passion for long-term goals. *Journal of Personality and Social Psychology*, 92, 1087–1101. <https://doi.org/10.1037/0022-3514.92.6.1087>.
- Duckworth, A. L., & Quinn, P. D. (2009). Development and validation of the short grit scale (Grit-S). *Journal of Personality Assessment*, 91, 166–174. <https://doi.org/10.1080/00223890802634290>.
- Dweck, C. S. (1999). *Self-theories. Their role in motivation, personality and development*. Philadelphia: Psychology Press.
- Dweck, C. S. (2000). *Self-theories: Their role in motivation, personality, and development*. Psychology press.
- Dweck, C. S. (2012). Mindsets and human nature: Promoting change in the Middle East, the schoolyard, the racial divide, and willpower. *American Psychologist*, 67(8), 614–622. <https://doi.org/10.1037/a0029783>.
- Dweck, C. (2016). What having a “growth mindset” actually means. *Harvard Business Review*, 13, 213–226.
- Dweck, C. S., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgments and reactions: A word from two perspectives. *Psychological Inquiry*, 6(4), 267–285. [https://doi.org/10.1207/s15327965pli0604\\_1](https://doi.org/10.1207/s15327965pli0604_1).
- Dweck, C. S., Mindset. Changing the way you think to fulfil your potential. Little, Brown Book Group, Ericsson, K. A., & Charness, N. (2017). Expert performance: Its structure and acquisition. *American Psychologist*, 49, 725–747, 1994.
- Ericsson, K. A., & Charness, N. (1994). Expert performance: Its structure and acquisition. *American Psychologist*, 49, 725–747.
- Ericsson, K. A., & Pool, R. (2016). *Peak: Secrets from the new science of expertise*. New York: Houghton Mifflin Harcourt., 2016.
- Ericsson, K. A., Prietula, M. J., & Cokely, E. T. (2007). The making of an expert. *Harvard Business Review*, 115–121.
- Jachimowicz, J. M., Wihler, A., Bailey, E. R., & Galinsky, A. D. (2018). Why grit requires perseverance and passion to positively predict performance. *Proceedings of the National Academy of Sciences*, 115, 9980–9985.
- Likert, R. (1932). A Technique for the measurement of attitudes. *Archiv für Psychologie*, 140, 1–55.
- Oxford University Press. (2019), 2019 <https://en.oxforddictionaries.com/definition/passion>.
- Rousseau, F. L., & Vallerand, R. J. (2008). An examination of the relationship between passion and subjective well-being in older adults. *The International Journal of Aging and Human Development*, 66(3), 195–211. <https://doi.org/10.2190/AG.66.3.b>.
- Schmidt, F. T. C., Nagy, G., Fleckenstein, J., Möller, J., & Retelsdorf, J. (2018). Same same, but different? Relations between facets of conscientiousness and grit. In *European journal of personality*. Wiley Online Library.
- Sending, V. (2014). *Thinking success, behaving successfully (Masteravhandling)*. UIT.
- Sigmundsson, H., Clemente, F. M., & Loftesnes, J. M. (2020c). Passion, grit and mindset in football players. *New Ideas in Psychology*, 59, Article 100797.
- Sigmundsson, H., & Haga, M. (2020). In H. Sigmundsson (Ed.), *Eksperitise. Utvikling av kunnskap og ferdigheter*. Oslo: Fagbokforlaget.
- Sigmundsson, H., Haga, M., & Hermundsdottir, F. (2020a). The passion scale: Aspects of reliability and validity of a new 8-item scale assessing passion. *New Ideas in Psychology*, 56.
- Sigmundsson, H., Haga, M., & Hermundsdottir, F. (2020b). Passion, grit and mindset in young adults: Exploring the relationship and gender differences. *New Ideas in Psychology*, 59.
- Sigmundsson, H., Trana, L. M., Polman, R. C. J., & Haga, M. (2017). What is trained develops! Perspective on skill learning. *Sports 2017*, 5(2). <https://doi.org/10.3390/sports5020038>.
- Vallerand, R. J. (2008). On the psychology of passion: In search of what makes people's lives most worth living. *Canadian Psychology*, 49(1), 1–13. Retrieved from <https://search.proquest.com/docview/220814741?accountid=12870>.
- Vallerand, R. J. (2010). On passion for life activities: The Dualistic Model of Passion. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (pp. 97–193). New York, NY: Academic Press.
- Vallerand, R. C., Blanchard, C. M., Mageau, G. A., Koestner, R., Ratelle, C. F., Leonard, M., et al. (2003). Les passions de l'ame: On obsessive and harmonious passion. *Journal of Personality and Social Psychology*, 85, 756–767, 2003.
- Von Culin, K. R., Tsukayama, E., & Duckworth, A. L. (2014). Unpacking grit: Motivational correlates of perseverance and passion for long-term goals. *The Journal of Positive Psychology*, 9(4), 306–312.
- Yeager, D. S., Hanselman, P., Walton, G. M., Murray, J. S., Crosnoe, R., Muller, C., Paunesku, D., et al. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature*, 573(7774), 364–369.