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### Psychometric Properties of the Polish Version of the Short Grit Scale

**Abstract:** *This study aimed to verify the psychometric properties of the Polish version of the Grit-S questionnaire. Grit is understood here as the perseverance and passion for long-term goals, and it encompasses two dimensions: Consistency of Interest and Perseverance of Effort. The sample comprised  $N = 270$  participants aged 18–34 ( $M_{age} = 20.79$ ). We performed confirmatory factor analyses to verify the dimensional structure of grit, multi-group confirmatory factor analysis to compare the structure across gender, and correlation analysis to examine external validity (exploring the correlations between grit, procrastination, and well-being). Findings showed satisfactory parameters for Grit-S including: reliability, structural and external validity, and measurement invariance across gender groups. The results support the possibility of using the Grit-S questionnaire in research exploring the predictors of success.*

**Key words:** *grit, consistency of interest, perseverance of effort, success, measurement invariance*

The main area of interest in positive psychology is happiness (cf. Diener, 2000). Thus, factors that can lead to or maintain happiness are also an important issue in this relatively young, but rapidly developing area of contemporary psychology. Positive psychology includes characteristics such as character strengths, experiencing positive emotions, or being successful. The popularity of the last notion can be evidenced by the number of scientific papers about success – more than 2 million results can be found in the EBSCO database (28.08.2016). Therefore, developing reliable tools for measuring the constructs connected with happiness, success in life, etc. is really important in contemporary psychological research and is the main aim of this study.

The most frequently indicated predictors of life success or failure include: intelligence, personality traits, environmental impacts, habits and attitudes, education level, aspirations, and academic performance (Crede & Kuncel, 2008; Roberts, Cuncel, Shiner, Caspi, & Goldberg, 2007; Sewel, Haller, & Portes, 1969; Siekańska, 2004). However, there is one more trait that can be considered as

a key to success, and importantly, this trait is a predictor of success regardless of life situation, character of occupation, etc. Duckworth, Peterson, Matthews, and Kelly (2007) called this characteristic grit and defined it as “the perseverance and passion for long-term goals” (p. 1087) and the “tendency to pursue long-term goals with sustained zeal and hard work” (Von Culin, Tsukayama, & Duckworth, 2014, p. 1).

Grit consists of two independent factors: Consistency of Interest and Perseverance of Effort. The former can be described as the tendency to adopt a specific direction and the ability to concentrate one’s activities around the selected area. The latter can be understood as the ability for long-term work, even in the face of adversity or setbacks. Consistency of Interest is a better predictor for the number of job changes, while Perseverance of Effort predicts school grades, committing to non-obligatory activities, and the hours spent on watching TV (Duckworth & Quinn, 2009).

Given that grit is an important component of succeeding in life, and is linked to many positive outcomes, it is worth examining in psychological research. For that

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reason, the main aim of this study is to create the Polish version of a questionnaire designed for measuring grit and examining its psychometric properties.

### **Grit and Other Constructs – Similarities and Differences**

Grit can predict success in the areas commonly considered to be difficult and requiring hard work (Duckworth et al., 2007; Duckworth & Quinn, 2009). Individuals with a high level of grit also have the ability to pursue long-term goals, even when their efforts to achieve these goals are not fruitful or even do not bring about the expected results at first. Such people do not give up, even despite setbacks and obstacles (Duckworth et al., 2007).

Maddi et al. (2013) stated that, within grit, there are elements of courage, however they are described differently from hardiness. The authors claimed that both features – Perseverance of Effort and Consistency of Interest – are associated with courage, because they imply effective coping with stressful situations and actively dealing with adversities. The hardiness construct combines three interrelated attitudes: commitment, control, and challenge. Commitment denotes the tendency to be involved with people and events, even if things are going wrong. Control describes when an individual tries to influence the results, rather than remain passive. Challenge includes the belief that stressful events are an opportunity to grow and gain wisdom, rather than retreat and avoid difficulties or uncertainties. Thanks to these attributes of hardiness, stressful circumstances could be turned from potential failures into growth opportunities (Maddi, 2002; Maddi, Khoshaba, Harvey, Fazel, & Resurreccion, 2011). Therefore, this entails learning from the current situation and attempting to make decisions about change, when it seems favourable. In contrast, courage in grit manifests as continuously (lasting for years) staying with one's chosen direction, without making any changes in one's choice, despite adversities and defeats (Maddi et al., 2013).

Grit can also be seen as similar to another important predictor of being successful: the intelligence quotient (e.g., Bergman, Corovic, Ferrer-Wreder, & Modig, 2014; Gottfredson, 1997; Stolarski, Zajenkowski, & Misenberg, 2013). Duckworth et al. (2007) suggest that, like intelligence quotient, grit can predict achievements in the areas generally considered as tough. The research conducted by Duckworth et al. (2007) showed that among students with high grades, there were individuals with a high level of grit rather than a high level of intelligence. As an explanation for this outcome, Moutafi, Furham, and Paltiel (2005) proposed a higher need for compensating for a deficiency in intelligence level through hard work and great obstinacy.

The general description of grit can also bring to mind the definition of another variable, commonly treated as an important predictor of succeeding in life – conscientiousness from the Big Five Model (McCrae & Costa, 2005). Conscientiousness and grit share some common aspects, however, according to Duckworth et al.

(2007), these variables should be investigated as separate distinct traits. The main characteristic feature of grit is, in fact, the ability to maintain effort when pursuing long-term goals, requiring a long-term commitment, even in the face of failures or adverse circumstances. Thus, grit is connected to diligence within long-term interests. Conscientiousness, in turn, represents the effort invested in various unconnected activities.

Grit can also be similar to self-control, defined as the ability to maintain self-discipline and avoid impulsive behaviours (Tangney, Baumeister, & Boone, 2004). Duckworth et al. (2007) pointed to the fact that high self-control is connected to the ability to focus on a particular task and the ability to avoid the impacts of various factors and temptations distracting one's attention from the particular task. However, it does not mean that an individual characterised by a high level of self-control will never change his or her career path because of the lack of success. Grit is connected especially with striving for the selected aim and purpose, even if this happens after several years. Moreover, the individual with a high level of grit is able to focus on his or her current task as carefully as a person with high self-control (Duckworth et al., 2007).

In summary, grit is an independent construct, distinct from the commonly studied and measured variables such as intelligence quotient, self-control, or conscientiousness. Therefore, the development of the Polish version of the questionnaire designed for measuring grit is important and is the main aim of this research. Grit has grown in popularity – currently there are various adaptations (Chinese, French, German, Japanese), and also a version for children. Thanks to this Polish version, it will be possible to compare results with other countries.

### **The Universality of Grit**

The construct of grit is universal – it applies to all areas of human activity and it is expressed in general functioning in various life situations (Eskreis-Winkler, Duckworth, Shulman, & Beal, 2014). Individuals with a high level of grit are characterised by a high tendency to choose activities requiring long-term engagement. They are also more willing to perform heavier work than other people (Duckworth, Kirby, Tsukayama, Berstein, & Ericsson, 2011). Because their choices are concentrated around the activities requiring effort and perseverance, they acquire new skills while pursuing the achievement of various goals. It can have an impact on their effectiveness (Duckworth et al., 2007; Duckworth & Quinn, 2009). Grit is also related to the ability to ignore or resist short-term temptations; instead, individuals are focused on achieving long-term goals (Von Culin et al., 2014).

The universality of the grit construct means that its influences can be visible in everyday life. Grit is significantly related to satisfaction with one's actual life situation (Duckworth, Quinn, & Seligman, 2009). Pupils characterised by a high level of grit are more likely to complete high school. Moreover, males with high grit are more likely to remain married than get a divorce or

a separation (Eskreis-Winkler et al., 2014). Finally, teachers with high grit achieve better results in their profession, which is also linked with the school progress made by their students (Duckworth et al., 2009). The universality of grit makes this construct very important to examine in the area of positive psychology.

### Grit and Gender

Men and women differ in terms of the factors that are important for succeeding. For example, Nyberg, Hanson, Leineweber, and Johansson (2015) proved that for women a more important predictor of success is high procedural justice, while for men a more important predictor is using an “open” coping strategy (which includes behaviours aimed at finding a solution or expressing feelings, in contrast to a covert coping strategy, which is based on being passive and avoiding confrontation). Moreover, using this strategy, males also have better chances to increase their salary. However, among the women, to get a salary raise, it was also necessary to finish post-graduate studies and have higher motivation at work. Another interesting study was conducted among German medicine students (Evers & Sieverding, 2014). The grades obtained during the studies were significant predictors of future salary, but only in the male subsample. Moreover, the total length of career gaps was correlated with the number of children, but in the female subsample this relation was positive, while in males – negative.

Since grit is an important predictor of success (Duckworth & Quinn, 2009), like the other predictors (such as these indicated above) its level could differ among gender groups. As previous research has shown (Christensen & Knezek, 2014), the differences were seen in the Consistency of Interest factor – which appeared to be significantly higher for women.

The results confirming gender differences in the relationships between grit and success, make it very important to prove measurement invariance across gender groups, when designing the questionnaire to measure grit. That is another important aim of this study.

### The Measurement of Grit

Grit consists of two components: Consistency of Interest and Perseverance of Effort. The theoretical model proposed by Duckworth et al. (2007) assumes that Consistency of Interest and Perseverance of Effort are independent of each other. This two-dimensional model of grit was previously confirmed using a 12-item self-report questionnaire (Grit-O; Duckworth et al., 2007), which in further research was shortened to eight items, maintaining good psychometric properties – the final version is called Grit-S (Duckworth & Quinn, 2009). Both versions of the questionnaires were designed as self-report tools, including some reversed items, using a Likert-type response scale. Authors examined four samples, including  $N = 2840$  participants. Theoretically, all participants had to work hard to achieve their results (they were e.g. cadets at the United

States Military Academy, West Point). The factorial validity of Grit-S was verified with confirmatory factor analysis (CFA), however, the two factors appeared to be correlated (Duckworth & Quinn, 2009). The reliability was satisfactory: the coefficients ranged from .73 to .79 for Consistency of Interest and from .60 to .78 for Perseverance of Effort (depending on gender, age, and educational status).

The two-dimensional structure of the Grit-S scale was also verified in a sample of Latin-American adolescents (Hatchimonji, 2016). Although, the structure was verified, the reliability estimates were unacceptably low (Perseverance of Effort  $\alpha = .64$ ; and Consistency of Interest  $\alpha = .52$ ). The structure of Grit-S scale was also confirmed in a sample of young adults from collectivistic cultures; however, the reliability of the measure was still questionable (Datu, Valdez, & King, 2015). In both studies, one of the items (i.e., item 2: “Setbacks don’t discourage me”) loaded more strongly on the Consistency of Interest factor instead of its corresponding factor Perseverance of Effort (Datu et al., 2015; Harchimonji, 2016).

### Justification of Present Research

We think that grit is a construct with great research potential, as well as wide practical application. As already indicated, this construct predicts achievements more accurately than other well-known and widely-used variables, like intelligence or conscientiousness (Duckworth et al., 2007; Duckworth & Quinn, 2009). A valuable aspect of grit, deserving special attention, and not included in other characteristics or dispositions, is the endurance in continuing activities aimed at long-term consequences (Perseverance of Effort), that cannot be achieved using only short-term effort. Such activities require many sacrifices and focusing one’s attention for a long time.

A construct that can describe this kind of sustained effort to realise an individual’s aims and targets has never been applied in Polish psychology. Thus, the process of adapting the short version of the Grit Scale (Duckworth & Quinn, 2009) to Polish is definitely important and would help to extend the current knowledge of the predictors of success.

### Method

#### Procedure

##### *Procedure for data collection*

At the beginning of our work, we contacted the first author of the questionnaire, who agreed with the process of Polish adaptation. Second, in a larger group of researchers, we translated the items of the questionnaire. Next, we asked two fluent English speakers to prepare back-translations. In the last step, we conducted a study aimed at verifying the psychometric characteristics of the scale. The current research is the first attempt to validate the Grit-S questionnaire in a Polish sample, by focusing on: reliability, structural and external validity, and measurement invariance across gender groups.

### Procedure for data analysis

To examine the psychometric properties of the Short Grit Scale, we conducted the following steps: (1) examining the reliability of Grit-S; (2) examining the structural validity of grit, using CFA; (3) examining the external validity of Grit-S, using a correlation analysis of grit and external criteria: well-being and procrastination; (4) establishing measurement invariance across gender groups.

### Participants

This research was conducted with a group of  $N = 270$  Polish adults aged 18–34 ( $M_{\text{age}} = 20.79$ ). In this study, participants were also asked to provide information about their age and gender. Women accounted for 52.4% of the whole group. Five people did not indicate their gender. All adults were volunteers, most of them were students from public colleges in Warsaw. Five researchers conducted this study – all of them were trained and knew the aim of the study. The data were collected in 2014.

### Measures

#### Short Grit Scale (Grit-S; Duckworth & Quinn, 2009)

The Grit-S is a relatively short questionnaire (8 items) which includes two scales: Consistency of Interest and Perseverance of Effort. It contains both: direct items (e.g., “I finish whatever I begin” from the Perseverance of Effort scale) and reversed items (e.g., “I often set a goal but later choose to pursue a different one” from the Consistency of Interest scale). It uses a 5-point Likert scale (ranging from *very much like me* to *not like me at all*). The descriptive statistics of the measure and reliability estimates are presented in Table 1. The full list of Polish items is presented in the Appendix.

The data for Consistency of Interest and Perseverance of Effort were normally distributed, since the values of both Skewness and Kurtosis did not exceed 1. Reliability estimates of both scales were acceptable.

To examine the external validity of Grit-S, we used two questionnaires measuring well-being and procrastination. Procrastination can be described as representing low conscientiousness, so it is strongly negatively linked with this personality trait (Steel, 2007). Thus, instead of using the personality questionnaire, as in Duckworth and Quinn’s (2009) research, we decided only to measure procrastination, and we hypothesised that it will be strongly negatively linked to both facets of grit. Moreover, as research has shown (Duckworth et al., 2009; Vainio & Daukantaite, 2016), grit is strongly linked to psychological well-being and life satisfaction. Therefore, we used three-dimensional well-being as a second external criterion, expecting a positive correlation with both grit dimensions.

#### Mental Health Continuum-Short Form (MHC-SF, Keyes, 2013; Polish version: Karaś, Ciecuch, & Keyes, 2014)

The MHC-SF is a self-report questionnaire, consisting of 14 items reflecting various aspects of well-being: emotional (sample item: “During the past month, how often did you feel happy?”), social (“During the past month, how often did you feel that you belonged to a community [like a social group, or your neighborhood]?”), and psychological (“During the past month, how often did you feel that your life has a sense of direction or meaning to it?”). The 6-point answer scale described the frequency of experiencing various well-being symptoms in the past month (ranging from *never* to *every day*). Reliability

**Table 1. Descriptive statistics and reliability estimates of Grit-S item and scales**

	<i>M</i>	<i>SD</i>	<i>S</i>	<i>K</i>	$\alpha$
Scales:					
Consistency of Interest	2.68	0.77	0.07	-0.50	.72
Perseverance of Effort	2.37	0.72	0.26	-0.02	.69
Items:					
<i>New ideas and projects sometimes distract me from previous ones.</i>	2.41	.92	.54	.071	–
<i>Setbacks don't discourage me.</i>	3.25	1.08	-.25	-.56	–
<i>I have been obsessed with a certain idea or project for a short time but later lost interest.</i>	2.60	1.09	.33	-.67	–
<i>I am a hard worker.</i>	3.65	.98	-.66	.28	–
<i>I often set a goal but later choose to pursue a different one.</i>	2.88	1.03	.11	-.65	–
<i>I have difficulty maintaining my focus on projects that take more than a few months to complete.</i>	2.70	1.20	.19	-.94	–
<i>I finish whatever I begin.</i>	3.59	1.00	-.32	-.52	–
<i>I am diligent.</i>	3.42	1.03	-.35	-.26	–

estimates in the current study were as follow:  $\alpha = .83$  for emotional well-being;  $\alpha = .86$  for social well-being; and  $\alpha = .78$  for psychological well-being.

*Pure Procrastination Scale* (PPS, Steele, 2010, Polish adaptation prepared by Stepień and Ciecuch, 2013)

The PPS is a self-report tool, composed of 12 items designed to measure procrastination. The answer scale ranges from 1 – *completely untrue*, to 5 – *completely true*. Sample items of this questionnaire are: “I put off making decisions”, “I have to do generally delay before starting on work I have to do.” The reliability estimate of the scale is excellent:  $\alpha = .91$ .

## Analyses

### Structural Validity of Grit

To test the structural validity of grit, we used CFA in which we compared the unidimensional and two-dimensional model. Because of difficulties in meeting the assumption of multivariate normality, all of the analyses were carried out using robust maximum likelihood estimator. In assessing whether the model is well-fitted to the data, we used the following criteria: (1) Information criteria – we used three estimates: Akaike Information Criterion, Bayesian Information Criterion, and Sample Size Adjusted Bayesian Information Criterion; the model is preferable over another when the estimates of these indices have lower values (Kenny, 2015); (2)  $\chi^2$  Model – the model is well fitted to the data when the value of  $\chi^2$  is insignificant (Kline, 2009); (3) Approximate Fit Indexes – we decided to use two approximate fit indexes as recommended by Hu and Bentler (1999): the CFI accompanied with RMSEA; the model is well fitted to the data when the value of CFI is larger than .950 and the value of RMSEA is smaller than .060. For the value of RMSEA, a 90% confidence interval and probability that RMSEA is smaller than .050 are provided; the upper bound of RMSEA confidence interval should not exceed .080 and the probability value should be insignificant (Brown & Cudeck, 1993).

### External Validity

To assess the external validity of Grit-S, we examined two-tailed correlations between both factors of grit with procrastination and three domains of subjective well-being. We interpreted procrastination, as described by Steel (2010), as irrational postponing of actions or behaviour, despite the possible deterioration of an individual's situation. The postponement of long-term goals is linked with failing to resist various distractions and short-term

temptations. Grit, in turn, is related to resisting temptations and striving for long-term goals. Therefore, we also measured procrastination as an external variable which is hypothesised to be significantly negatively related with grit.

Since the results of previous studies have shown positive relationships between grit and satisfaction with life (Duckworth et al., 2009), which can be an important aspect of well-being (Diener, 1984), the second external criterion that we used to validate Grit-S questionnaire was well-being. In the present research we adopted Keyes' (2002) understanding of well-being. Keyes (2002) tried to connect the two philosophical schools of thought: hedonic and eudaimonic and proposed treating well-being not only as feeling good, but also functioning well psychologically and socially. Moreover, he pointed out that well-being is an important aspect of mental health. Thus, he distinguished three important facets (symptoms) of well-being: emotional, psychological, and social.

### Measurement Invariance

To test the measurement invariance across gender, we conducted multi-group confirmatory factor analysis (MGCFA). Basically, there are three levels of measurement invariance – configural (which informs whether compared groups understand the questionnaire in the same manner), metric (which informs whether the factor loadings are equal across compared groups), and scalar (which informs whether the intercept values are equal in the analysed groups). In assessing model fit, the configural model should meet the standard cut-off values for CFA (i.e., CFI > .950 and RMSEA < .06); for the groups with small sample size ( $N \leq 300$ ) and/or with unequal sample size of compared groups, the difference between the metric model and the configural model should not exceed .005 for CFI and .010 for RMSEA; and the difference between the scalar model and the metric model should also not exceed .005 for CFI and .010 for RMSEA (Chen, 2007). When these criteria are met, the groups are invariant and their latent mean scores may be meaningfully compared.

## Results

### Structural Validity of Grit

We compared two structural models of grit – unidimensional model, in which all items loaded on a single latent factor, and two-dimensional model, in which four items were loaded onto Consistency of Interest factor, and the remaining four items on Perseverance of Effort factor. The results of both CFA are presented in Table 2.

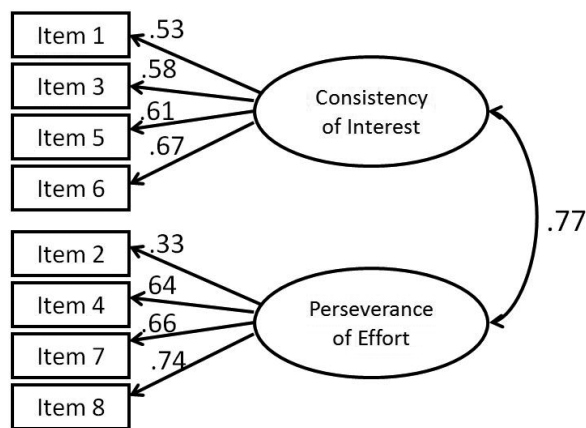
**Table 2. Information criteria and model fit indices of different models of grit**

Model	AIC	BIC	SSABIC	$\chi^2_{(df)}$	<i>p</i>	RMSEA	90%CI	<i>p</i>	CFI
Unidimensional	5825.88	5911.70	5835.61	43.37 <sub>(20)</sub>	.002	.067	[.039–.094]	.146	.934
Two-dimensional	<b>5806.56</b>	<b>5895.96</b>	<b>5816.69</b>	26.33 <sub>(19)</sub>	<b>.121</b>	<b>.038</b>	[.000–.071]	.689	<b>.979</b>

*Note.* Values suggesting better fit of the model were bolded. AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion; SSABIC = Sample Size Adjusted Bayesian Information Criterion; RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fit Index.

Although the unidimensional model seems to fit well with the data according to CFI and RMSEA, the upper-confidence interval of RMSEA was beyond the acceptable value. Moreover, the  $\chi^2$  also supports the rejection of the unidimensional model. All of the information criteria achieved lower values for the two-dimensional model; the  $\chi^2$  statistic was insignificant, thus supporting that the model is well-fitted, RMSEA and its confidence interval were within the boundaries of good model fit, and the CFI value was excellent. These criteria indicate that the two-dimensional model of grit in the Polish sample is preferable over the unidimensional model. The standardised factor loadings of the two-dimensional model are presented in Figure 1.

**Figure 1. Two-dimensional model of the Polish version of the Short Grit Scale**



**External Validity**

The correlation estimates of Grit-S with external measures can be seen in Table 3 and they confirm the external validity of Grit-S: both Consistency of Interest

and Perseverance of Effort were positively linked to each symptom of well-being, and negatively linked with procrastination. Moreover, the strongest correlations for both aspects of grit were with procrastination and psychological well-being.

**Measurement Invariance across Gender**

In the MGCFA across gender, we analysed the two-dimensional model distinguished in previous analyses. Table 4 presents a comparison of models tested in MGCFA.

The base model was invariant at the metric level – the  $\Delta$ RMSEA and  $\Delta$ CFI exceeded recommendations for scalar invariance. We identified that only one item (item number 2: “Setbacks don’t discourage me”) was responsible for this decrease in fit indices; thus we freed its intercept and established partial scalar invariance. Owing to establishing partial scalar invariance, latent mean scores of grit factors may be meaningfully compared across gender; however, the results for the Perseverance of Effort factor should be interpreted with more caution due to the free intercept within the factor. Results are presented in Table 5.

We examined gender differences using *t*-Student’s test. Significant differences were found only in Consistency of Interest, with men having a slightly higher latent mean score than women.

**Discussion**

The current research aimed to verify the psychometric properties of Grit-S, the questionnaire designed for measuring two aspects of grit: Consistency of Interest and Perseverance of Effort. Evidence from this study confirms the acceptable reliability of this scale (as a relatively short tool including both straight and reversed items) and the validity of this construct. Moreover, we examined the structure of Grit-S. Unidimensional structure, including only a general grit score, did not fit well with the data;

**Table 3. Correlations between two factor of grit and external measures – procrastination and well-being**

	Procrastination	Emotional well-being	Psychological well-being	Social well-being
Consistency of Interest	-.56*	.24*	.34*	.17*
Perseverance of Effort	-.61*	.22*	.34*	.18*

\* *p* < .001

**Table 4. Model fit indices of analyzed MGCFA models**

Model	$\chi^2$ (df)	<i>p</i>	RMSEA	CFI
Configural	49.57 <sub>(38)</sub>	.099	.048	.969
Metric	54.92 <sub>(44)</sub>	.125	.044	.971
Scalar	71.38 <sub>(50)</sub>	.025	.057	.943
Partial scalar	60.34 <sub>(49)</sub>	.128	.042	.970

Note. RMSEA = Root Mean Square Error of Approximation; CFI = Comparative Fix Index.

**Table 5. Differences in latent mean scores of grit factor in men and women**

Latent Factor	Latent mean	<i>t</i>	<i>p</i>
Consistency of Interest	.18	2.30	.021
Perseverance of Effort	.08	1.57	.116

Note. Score above zero means higher level in males.

the two-dimensional structure did have a good fit, which confirms that grit should be treated as two dimensions: Consistency of Interest and Perseverance of Effort.

We also confirmed the external validity of the questionnaire: both aspects of grit were negatively correlated with procrastination, as expected, since grit should be associated with a tendency to maintain activities (and not postpone the performed duties) and conscientiousness. Moreover, both aspects of the examined construct were significantly positively correlated with well-being; especially psychological well-being (good psychological functioning, described as self-acceptance, personal growth, purpose in life, autonomy, environmental mastery, and positive relations) appeared to be strongly related with grit. The connection between grit and well-being, which is an important aspect of human mental health (Keyes, 2002), should also be examined in future research. In particular, longitudinal associations between these characteristics could be further investigated to verify the direction of this relationship.

Furthermore, our findings confirmed the partial scalar measurement invariance across gender groups. This is an important finding, since, as previous research has shown (cf. Evars & Sieverding, 2014; Nyberg et al., 2015), gender is a significant moderator of the possible outcomes of grit. We did not establish full scalar invariance, because of the one problematic item; however, this item also appears to be problematic in other studies investigating the structure of Grit-S scale in different cultures (Datu et al., 2015; Hatchimonji, 2016). Thus, future research should consider the modification of this item to avoid the double negation.

The essence of grit includes passion and interests. This means that intelligence or high socioeconomic status are not necessary to be a successful person. This observation is especially important for poverty-stricken areas, where children have access to worse education and they often come from uneducated families, which could be a reason why they are stigmatised as children who are not able to achieve anything in their lives.

Grit is also a construct with wide research potential. Duckworth and Gross (2014) noticed that prospective longitudinal studies beginning in childhood are key to understanding how people set their goals and motivate themselves to work more and better, ignoring failures and obstacles. Grit, like other personality traits, presents certain dynamics in its development over time. Research has shown that personality traits undergo certain changes before the age of 30, but they stabilise over time, which means that life events have less influence on these traits. According to some researchers, the structure of someone's personality is fully shaped around the age of 30, but others think it happens around the age of 50 (Caspi, Roberts, & Shiner, 2005). Under the influence of certain meaningful or even traumatic life events, the intensity of the grit trait may vary even in adults (Eskreis-Winkler et al., 2014).

The main limitation of the present research is linked with the lack of questionnaires used. However, this gap will be filled in our future research. Future research could also explore longitudinal aspects of grit as a predictor of

success in various life areas. In conclusion, we believe that the results of our study confirm the validity of Grit-S and allow for using this tool in further research on positive psychology, predictors of success, and in many more areas.

## References

- Bergman, L.R., Corovic, J., Ferrer-Wreder, L., & Modig, K. (2014). High IQ in early adolescence and career success in adulthood: Findings from a Swedish longitudinal study. *Research in Human Development, 11*, 165–185. doi: 10.1080/15427609.2014.936261
- Brown, M.W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K.A. Bollen & J.S. Long (Eds.), *Testing structural equation models* (pp. 136–162). Newbury Park, CA: Sage.
- Caspi, A., Roberts, B.W., & Shiner, R. (2005). Personality development: Stability and change. *Annual Review of Psychology, 56*, 453–484. doi: 10.1146/annurev.psych.55.090902.141913
- Chen, F.F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*, 464–504. doi: 10.1080/10705510701301834
- Christensen, R., & Knezek, G. (2014). Comparative measures of grit, tenacity and perseverance. *International Journal of Learning, Teaching and Educational Research, 8*, 16–30.
- Credé, M., & Kuncel, N.R. (2008). Study habits, skills, and attitudes: The third pillar supporting collegiate academic performance. *Perspectives on Psychological Science, 3*, 425–453. doi: 10.1111/j.1745-6924.2008.00089.x
- Datu, J.A.D., Valdez, J.P.M., & King, R.B. (2015). Perseverance counts but consistency does not! Validating the Short Grit Scale in a collectivist setting. *Current Psychology, 35*, 121–130. doi: 10.1007/s12144-015-9374-2
- Diener, E. (2000). Subjective well-being. The science of happiness and a proposal for a National Index. *American Psychologist, 1*, 34–43. doi: 10.1037/0003-066X.55.1.34
- Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*, 542–575. doi: 10.1037//0003-066X.55.1.34
- Duckworth, A.L., Kirby, T.A., Tsukayama, E., Berstein, H., & Ericsson, K.A. (2011). Deliberate practice spells success: Why grittier competitors triumph at the National Spelling Bee. *Social Psychological and Personality Science, 2*, 174–181. doi: 10.1177/1948550610385872
- 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. doi: 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. doi: 10.1080/00223890802634290
- Duckworth, A.L., Quinn, P.D., & Seligman, M.E.P. (2009). Positive predictors of teacher effectiveness. *The Journal of Positive Psychology, 4*, 540–547. doi: 10.1080/17439760903157232
- Duckworth, A.L., & Gross, J.J. (2014). Self-control and grit: Related but separable determinants of success. *Current Directions in Psychological Science, 23*, 319–325. doi: 10.1177/0963721414541462
- Eskreis-Winkler, L., Duckworth, A.L., Shulman, E.P., & Beal, S. (2014). The grit effect: Predicting retention in military, the workplace, school, and marriage. *Frontiers in Personality Science and Individual Differences, 5*, 36. doi: 10.3389/fpsyg.2014.00036
- Evers, A., & Sieverding, M. (2014). Why do highly qualified women (still) earn less? Gender differences in long-term predictors of career success. *Psychology of Women Quarterly, 38*, 93–106. doi: 10.1177/0361684313498071
- Gottfredson, L.S. (1997). Why g matters: The complexity of everyday life. *Intelligence, 24*, 79–132. doi: 10.1016/S0160-2896(97)90014-3
- Hatchimonji, D.R. (2016). *Grit in Latino middle school students: Construct validity and psychometric properties of the Short Grit Scale*. A thesis submitted to the Graduate School-New Brunswick Rutgers, The State University of New Jersey.
- Hu, L., & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55. doi: 10.1080/10705519909540118

- Karaś, D., Ciecuch, J., & Keyes, C.L.M. (2014). The Polish adaptation of the Mental Health Continuum–Short Form (MHC–SF). *Personality and Individual Differences*, *69*, 104–109. doi: 10.1016/j.paid.2014.05.011
- Kenny, D.A. (November 24, 2015). *Measuring Model Fit*. Retrieved from <http://davidakenny.net/cm/fit.htm>
- Keyes, C.L.M. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior*, *43*, 207–222. doi: 10.2307/3090197
- Keyes, C.L.M. (2013). *Atlanta: Brief Description of the Mental Health Continuum-Short Form (MHC-SF)*. Retrieved from <http://www.sociology.emory.edu/ckeyes>
- Kline, R.B. (2009). *Principles and practice of Structural Equation Modeling*. New York, NY: Guilford Press.
- Maddi, S.R. (2002). The story of hardiness: Twenty years of theorizing, research, and practice. *Consulting Psychology Journal*, *54*, 173–185. doi: 10.1037//1061-4087.54.3.175
- Maddi, S.R., Erwin, L.M., Carmody, C.L., Villarreal, B.J., White, M., & Gundersen, K.K. (2013). Relationship of hardiness, grit, and emotional intelligence to internet addiction, excessive consumer spending, and gambling. *The Journal of Positive Psychology*, *8*, 128–134. doi: 10.1080/17439760.2012.758306
- Maddi, S.R., Khoshaba, D.M., Harvey, R.H., Fazel, M., & Resurreccion, N. (2011). The personality construct of hardiness, V: Relationships with the construction of existential meaning in life. *Journal of Humanistic Psychology*, *51*, 369–388. doi: 10.1177/0022167810388941
- McCrae, R.R., & Costa, P.T. (2005). *Osobowość dorosłego człowieka [Personality in adulthood]*. Kraków: Wydawnictwo WAM.
- Moutafi, J., Furnham, A., & Paltiel, L. (2005). Can personality factors predict intelligence? *Personality and Individual Differences*, *38*, 1021–1033. doi: 10.1016/j.paid.2004.06.023
- Nyberg, A., Hanson, L.L.M., Leineweber, C., & Johansson, G. (2015). Do predictors of career success differ between Swedish women and men? Data from the Swedish Longitudinal Occupational Survey of Health (SLOSH). *PLoS ONE*, *10*, 10. doi: 10.1371/journal.pone.0140516
- Roberts, B.W., Kuncel, N.R., Shiner, R., Caspi, A., & Goldberg, L.R. (2007). The power of personality: The comparative validity of personality traits, socioeconomic status, and cognitive ability for predicting important life outcomes. *Perspectives on Psychological Science*, *2*, 313–345. doi: 10.1111/j.1745-6916.2007.00047.x
- Sewell, W.H., Haller, A.O., & Portes, A. (1969). The educational and early occupational attainment process. *American Sociological Review*, *34*, 82–92. doi: 10.2307/2092789
- Siekańska, M. (2004). Psychologiczne uwarunkowania sukcesów zawodowych [Psychological determinants of professional success]. *Przegląd Psychologiczny*, *47*, 275–290.
- Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, *133*(1), 65–94. doi: 10.1037/0033-2909.133.1.65
- Steel, P. (2010). Arousal, avoidant and decisional procrastinators: Do they exist? *Personality and Individual Differences*, *48*, 926–934. doi: 10.1016/j.paid.2010.02.025
- Stępień, M., Ciecuch, J. (2013). Polska adaptacja Pure Procrastination Scale [Polish adaptation of the Pure Procrastination Scale]. Unpublished manuscript.
- Stolarski, M., Zajenkowski, M., & Misenberg, G. (2013). National intelligence and personality: Their relationships and impact on national economic success. *Intelligence*, *41*, 94–101. doi: 10.1016/j.intell.2012.11.003
- Tangney, J.P., Baumeister, R.F., & Boone, A.L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality*, *72*, 271–322. doi: 10.1111/j.0022-3506.2004.00263.x
- Vainio, M.M., Daukantaite, D. (2016). Grit and different aspects of well-being: Direct and indirect relationships via sense of coherence and authenticity. *Journal of Happiness Studies*, *17*, 2119–2147. doi: 10.1007/s10902-015-9688-7
- 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*, 1–7. doi: 10.1080/17439760.2014.898320

## Appendix

The list of the original items from Grit-S questionnaire:

1. *New ideas and projects sometimes distract me from previous ones.*
2. *Setbacks don't discourage me.*
3. *I have been obsessed with a certain idea or project for a short time but later lost interest.*
4. *I am a hard worker.*
5. *I often set a goal but later choose to pursue a different one.*
6. *I have difficulty maintaining my focus on projects that take more than a few months to complete.*
7. *I finish whatever I begin.*
8. *I am diligent.*

Polish version:

1. *Nowe pomysły i projekty czasami odciągają moją uwagę od tych, które rozpocząłem/am wcześniej.*
2. *Niepowodzenia nie zniechęcają mnie.*
3. *Zdarza się, że nie mogę się oderwać od jakiegoś pomysłu czy zadania przez krótki czas, a potem tracę zainteresowanie nim.*
4. *Jestem pracowity/a.*
5. *Często wybieram sobie jakiś cel, ale później zmieniam go na inny.*
6. *Mam trudności ze skupieniem się na projektach, których wykonanie zajmuje więcej niż kilka miesięcy.*
7. *Zawsze kończę to, co zacząłem/am.*
8. *Jestem pilny/a.*