

## Validity Test for Short Grit Scale (Grit - S) Duckworth on Indonesian Millennials

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### Abstract

This study aims to test the validity and reliability of Grit as a measuring device which was initially developed by Duckworth and Quinn (2009). As commonly known, Grit performs as a research variable in the field of personality psychology, and educational psychology. It is also developed to optimize employees' performance in some corporations; hence, it also encompasses the study of industrial and organizational psychology and includes some dimensions of perseverance and passion. Grit Scale has proven to be valid when it tested on military cadets in the USA; however, in order to obtain more validity, it needs to be tested again in Indonesia. Using 200 millennial in Surabaya, Indonesia, as research subjects, this research was conducted between April and July 2019. Confirmatory Factor Analysis (CFA) was performed using Analysis of Structural Moment (AMOS) and proved to be valid. Moreover, Short Grit Scale (Grit-S) was also proven to be valid and reliable with  $\chi^2 = 20.97$ ; probability value = 0.138; RMSEA = 0.045; CFI = 0.972; GFI = 0.976; and AGFI = 0.941. While the composite reliability set was 0.82. Hence, it is concluded that Short Grit Scale is valid and reliable to be tested on Indonesian millennial.

Keywords: Grit-S, perseverance, passion, millennial

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### Introduction

As a concept, Grit is developed under the field of Positive Psychology. It refers to positive personal quality and includes perseverance and passion to achieve long-term objectives (Duckworth & Gross, 2014). A longitudinal study on military cadets in the USA found that they recorded high grit scale; hence, they will potentially achieve more accomplishment in their lives. Grit also indicates that high performance is generated by high grit scale (Duckworth & Quinn, 2009).

Other studies suggest that grit personality traits are variables which cause a person to develop either positive or negative performance (Duckworth & Quinn, 2009). Grit personality includes perseverance and passion in achieving long-term goals of which someone will consistently fight for (Duckworth, 2016; Duckworth, Peterson, Mathews & Kelly, 2007: as cited in Smallets, Townsend & Stephens, 2017).

A study by Smallets et al. (2017) shows a significant relationship between high scale of grit and high performance. Hence, this research will focus on millennial employees which are assumed to like instant things, impatient, and less capable of dealing with complicated situation. They are assumed to have short grit scale. On the other hand, there are also millennial employees who are goal-oriented and earnestly strive to achieve their goals (Gallup, 2016).

Other studies are also interesting, Al Aboosi et.al (2017) conveyed the results of his research that students who were respondents in his research with higher grit levels and happiness in general would be more likely to show higher levels of academic self-efficacy, gratitude, and appreciation. This is an indication that grit of subject research and the combination of finding happiness will show good performance, especially in academics and personality values such as social skills, gratitude and also expressing appreciation for others.

Research on grit is also important to find out whether the grit scale can be used validly and reliably with millennials in Indonesia. It is hoped that research on this will further develop, so that the optimization of the work of the millennia will be better for the development of the Indonesian people in particular, and the world in general.

### *Millennials*

Spilo (2006; Kranenburg, 2014; Zhakatta et.al, 2017) stated that there are at least 4 generations which are identified as the residents of Planet Earth. Each generation has its own specific and unique characters. The first generations are pre baby boomers who were born prior to 1946. The second generation refers to baby boomers who were born between 1946 and 1962. The third generation is called Generation X who were born between 1963 and 1980. The fourth generation is identified as Generation Y or Millennial who were born between 1981 and

1994. This generation's age is currently ranging between 39 to 25 years old and majorly occupies the workforce.

Millennials or Generation Y (Profil Generasi Mileniall Indonesia, Kementerian Pemberdayaan Perempuan dan Perlindungan Anak, 2018) in Indonesia are currently accounted for more than 40% of total population. Hence, human resources within an organization are dominated by millennials who have different characters with the previous generations (Gallup, 2016). Bhebhe and Karedza (2017) identified that millennials' domination as a workforce require more understanding about their characters. Taylor (2017) stated that millennials are characterized with dependency on internet connection, loving freedom (as in having certain dislikes for rigid regulations), loving flexibility (including in working hours or labor rules), highly creative, and loving some changes. In some researches about work performance, understanding these characters are essential, because they are totally different from previous generations and digital aspect predominates the characters.

Gallup (2016) listed some characters of millennial employees. One of the characters is those employees genuinely do not work merely for being paid regular salary and obtain job satisfaction, but more for achieving their goals and doing meaningful works. They will be more motivated with development, so they need a supervisor who acts as a coach, not a boss who often orders and control them around.

Millennial employees are not fond of annual evaluation/review and prefer ongoing evaluation through communication which enables them to gain instant feedbacks constantly. They prefer to texting, tweeting, skyping in real time and continuously; hence, annual evaluation is ineffective for them. Further, millennial employees are reluctant to mend their weaknesses, yet they prefer to developing their strengths. For them, working is not simply about work, but it is also their lives; hence, work-life balance and personal well-being at work are significantly crucial for them (Gallup, 2016)

Other characters encompass high level of confidence, consistently connected to internet, and highly open to change (Pew Research Center–Taylor & Ketter, 2010). On one hand, this condition can accelerate their performances. On the other hand, it potentially becomes

counterproductive due to possible of clash of values between millennial and other employees from previous generations. As the number of millennial employees continues to increase in various organizations, speculation and concern about how their characters might influence other members of organizations keep being voiced, particularly from the previous generations (Myers & Sadaghiani, 2010).

#### *Grit Scale among Millennial Employees*

Based on this background, it is important to know whether the Grit Scale can be generally used for millennials especially in Indonesia and whether that short scale Grit can be proven to be reliable and valid.

The Short Grit Scale (Grit-S) has a 2-factor structure from the original Grit Scale (Duckworth, Peterson, Matthews, & Kelly, 2007) with 4 fewer items and improves its psychometric properties. Duckworth provides some evidence for Grit-S's internal consistency, retesting stability, consensual validity with informant report versions, and predictive validity.

In adult respondents, Grit-S is associated with lower educational attainment and career change. Meanwhile, among adolescent respondents, Grit-S longitudinally predicts GPA and inversely proportional to how many hours the duration of subjects watching television, which concludes that teens who have high Grit, will watch television shorter, but have high achievements. Research on cadets at the US Military Academy at West Point, Grit-S also resulted in the conclusion that Grit was able to predict their future achievements.

Meanwhile, some streams of studies stated that millennials are perturbing (Rodriguez, Boyer, Fleming, Cohen, 2019), yet some others concluded their optimized potentials are more important to develop in order to improve organizational performance (Myers & Sadaghiani, 2010). Therefore, adapting Grit Scale does considered necessary in order to provide earlier understand about millennial, so their long-term performance can be predicted. Grit scale was proven to be valid to test military cadets in the USA (Duckworth & Quinn, 2009), yet it has not been employed to test millennial in Indonesia.

## Method

### *Respondents*

The research subjects used to test this scale were millennial who were registered as both employees and part-time students at one of higher education institutes in Surabaya, Indonesia. The sampling was taken using simple random sampling by giving equal opportunities to the population to be selected as a sample (Lavrakas, 2008). The number of research subjects were 200 respondents, consisting of 70 women and 130 men. We guaranteed that they filled the questionnaire willingly and without coercion; hence, the filling process was assuredly objective.

### *Measurement*

The adaptation of questionnaire items was conducted based on the statement from Epstein et al. (2015). They posited that in order to ensure equivalence between adapted and original questionnaire items, an adaptation was needed so that their characters and functions remained analogous. Based on ITC (International Test Commission) Guidelines for Adaption Test (2016), the adaptation process went on as follows: Pre-condition--Forward Translation--Early Synthesis based on the translation--Synthesis --Backward Translation--Backward Translation version of Synthesis--Expert review. After expert review, the Grit Scale Manuscript was ready to be finalized--Test on 200 Subjects.

The original scales from Duckworth and Quinn (2007) were listed as follows; to measure *perseverance* for items number 1 to 4. “*New ideas and projects sometimes distract me from previous ones. Setbacks don’t discourage me*”. “*I have been obsessed with a certain idea or project for a short time but later lost interest*”. “*I am a hard worker*”. To measure *passion* for items number 5 to 8; “*I often set a goal but later choose to pursue a different one*”. “*I have difficulty maintaining my focus on projects that take more than a few months to complete*”. “*I finish whatever I begin*”. “*I am diligent*”.

### *Data Analyses*

We employed second-order CFA model to test Grit items in which Grit was explained by two dimensions: perseverance and passion. We used AMOS programme series 18 version.

## Results

### Goodness of Fit (GoF) for second-order CFA of Grit variables

GoF test for CFA model resulted in good model fit. Model 1 was the original, while Model 2 was the modified version.

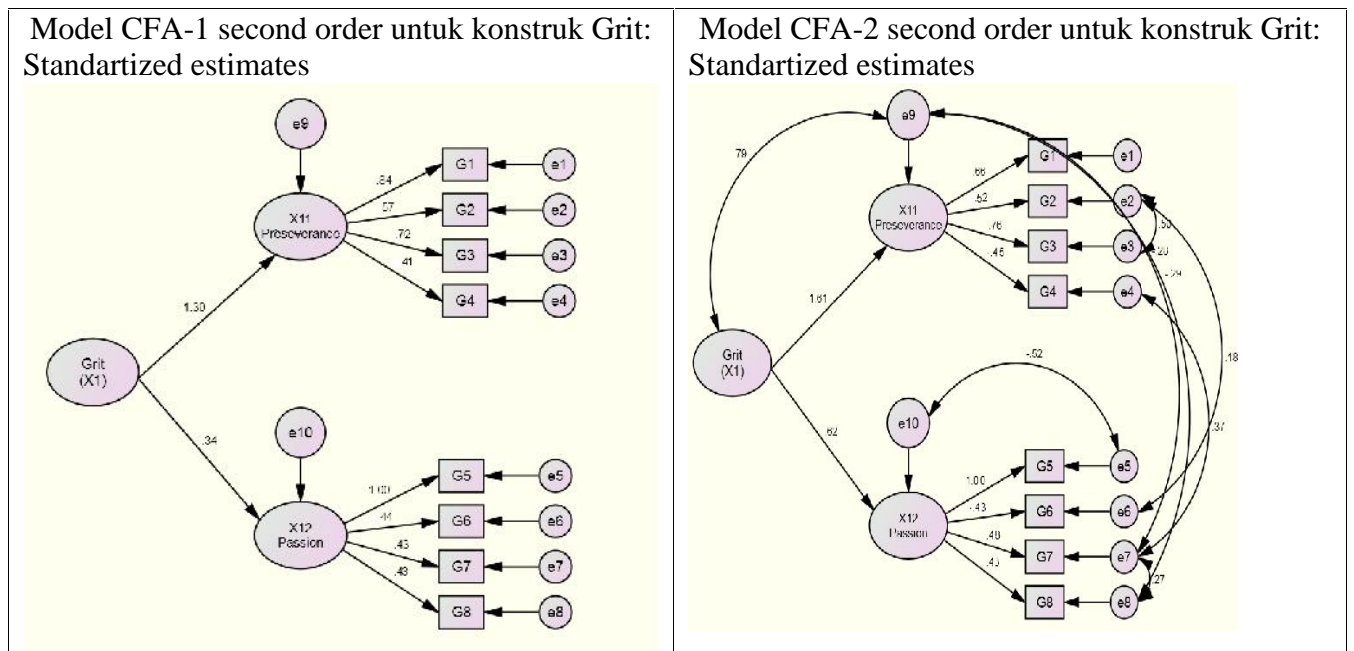


Figure 1. Model CFA 1 and CFA 2

Reference for modification was obtained from modification indexes which provide fixed parameter value for error variables of  $e_1$ ,  $e_5$ , and  $e_9$ . Those error variables were previously recorded at negative values and connected the covariance between error questionnaire items (See: Appendix). The full results of GoF indexes for each Model are presented in the table below:

Table 1  
Comparison of GoF indexes based on second-order CFA: Model 1 and Model 2

Variable	Items	$\chi^2$	Prob.	RMSEA	CFI	GFI	AGFI
Grit	Model 1	125.65	0.000	0,63	0.502	0.865	0.757
	Model 2	20.97	0.138	0.045	0.972	0.976	0.941

Based on GoF indexes for two CFA models above, we can see that Model 1 obtained less than stellar value compared to Model 2. Model 2 fulfilled all criteria of model fit, namely smaller Chi-square ( $\chi^2$ ), less than 0.08 RMSEA, and less than and equal to 0.90 of CFI, GFI, AGFI. Hence, the authors concluded that Model 2 was the fit second-order CFA-2 model for Grit variable. It means that the framework established under second-order CFA-2 model fits the existing data.

*Validity and Reliability Test for Grit Constructs*

Based on GoF test results, we concluded that second-order CFA-2 model was fit; hence, the validity and reliability test shall refer to the results. The validity test was conducted by checking factor loading values and relationship significance of each questionnaire item; while in order to examine construct reliability, Composite Reliability (CR) was tested. The detail results are displayed in the table below:

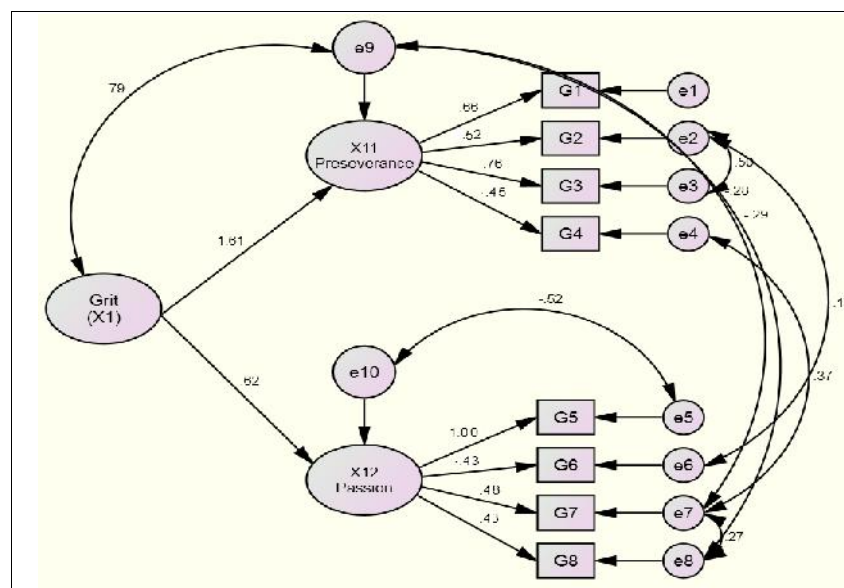


Figure 2. Second-order Model CFA-2 Model for Grit construct

Table 2  
The Results of Validity and Reliability Tests for Second-order CFA-2 Model of Grit Variables

No.	Reliability	Validity Test							Reliability Test		
		Standardized (Loading Factor)	Estimates	Unstandardized Estimates (Regression Coefficient)			Results	Composite Reliability			
		Value	Remarks	Value	P-value	Remarks		Value	Remarks		
1	X12_Passion	<--	Grit_(X1)	0.621	Significant	0.792	0.000	Significant	Valid	0.82	Reliable
2	X11_Preseverance	<--	Grit_(X1)	1.610	Significant	1	<i>Fixed parameter</i>	Significant	Valid		
3	G1	<--	X11_Perseverance	0.660	Convergent	1	<i>Fixed parameter</i>	Significant	Valid		
4	G2	<--	X11_Perseverance	0.515	Convergent	0.781	0.000	Significant	Valid		
5	G3	<--	X11_Perseverance	0.762	Convergent	1.156	0.000	Significant	Valid		
6	G4	<--	X11_Perseverance	0.453	Convergent	0.687	0.000	Significant	Valid		
7	G5	<--	X12_Passion	1.000	Convergent	0.82	<i>Fixed parameter</i>	Significant	Valid		
8	G6	<--	X12_Passion	0.428	Convergent	0.649	0.000	Significant	Valid		
9	G7	<--	X12_Passion	0.479	Convergent	0.727	0.000	Significant	Valid		
10	G8	<--	X12_Passion	0.430	Convergent	0.652	0.000	Significant	Valid		



Based on the table above, we conclude that standardized estimates (factor loading) values for each questionnaire item for Grit dimensions recorded some values within convergent validity's lower limit ( $\geq 0.4$ ), namely for G1, G2, G3, G4, G5, G6, G7, and G8. Furthermore, for Unstandardized estimates (regression coefficient), G1, G2, G3, G4, G5, G6, G7, dan G8 were significantly influential because those items recorded p-value below 0.05 significant value.

We can also conclude that valid items for *perseverance* were G1, G2, G3, and G4; while for *passion*, they were G5, G6, G7, and G8. Next, these valid items shall be employed to measure perseverance and passion for Grit variable. The table below illustrates the valid and invalid questionnaire item for Grit constructs.

Table 3  
*Valid and Invalid Questionnaire Items for Each Dimension of Grit*

Construct	Dimensions	Valid Items	Invalid Items
Grit	Perseverance	G1, G2, G3, G4	-
	Passion	G5, G6, G7, G8	-

For reliability test, Composite Reliability (CR) was recorded at 0.82, larger than 0.6 as the minimum value. Hence, Grid constructs can be deemed reliable. Pictures below depict the results of second order CFA-1 and second order CFA-2 for Grit construct. The complete output of AMOS can be found in Appendix at the sub-section of Grit sub-variable.

## Discussion

The research findings showed that short grit scale is valid and reliable to test for Indonesian millennials. The perseverance sub-construct is measured by four items (i.e., G1, G2, G3, G4) with factor loadings from 0.45 to 0.76. Similarly, the sub-construct of passion is comprised of four items (i.e., G5, G6, G7, G8) with factor loadings from 0.43 to 1.00. The short grit scale (Grit-S), which achieved composite reliability (CR) value of 0.82, is proven to be reliable because it exceeded the minimal CR value of 0.60.

Compared to the original scale by Duckworth & Quinn (2007), the current Grit-S scale was developed and validated using a more efficient measurement model which comprised of two

dimensions: perseverance and passion. Confirmatory Factor Analysis was employed to test the measurement model of Grit-S using the second-order structural model.

Based on the estimate table result, the loading factors of each item on the Grit variable are still within the valid lower limit with convergence above or equal to 0.4. Those items included G1, G2, G3, G4, G5, G6, G7, and G8. Furthermore, based on the non-standard estimation values (regression coefficient values), G1, G2, G3, G4, G5, G7, and G8 recorded significant results. This is because these items recorded p-value below 0.05, indicating a significant effect. The valid questionnaire items in the Grit for the perseverance dimension were G1, G2, G3, and G4. While for Passion dimension, the valid items were G5, G6, G7 and G8. Furthermore, these items shall be employed in the measurement of dimensions and arousal in the Grit construct/variable.

As discussed above, this study also only examined the short scale of Grit and did not conduct any tests with more completed GRIT scales. Therefore, future research can employ the long Grit scale. In addition, this study did not incorporate variables like performance, happiness, and many others. Therefore, even though the findings are still applicable and valid, more complete tests are needed.

The current study was confirmed by Duckworth and Quinn study (2007) which found similar result. The results of confirmatory factor analysis also supported the two-factor structure of the Grit-S version of the Grit-S self-report version in which desire and perseverance are still recorded as second-level latent factors. The two factors from Duckworth and Quinn's (2007) research showed adequate internal consistency and were highly interrelated.

The current study also verified previous study conducted by Tyumeneva et. al (2014) which studied 3383 15-year-olds Russian students. Tyumeneva et. al (2014) employed IRT analysis to test the Grit Scale and found two dimensions. Thus, as evidenced by the previous studies, the Grit scale showed good validity and reliability in the USA, Russia, and Indonesia.

Nevertheless, this study also has some limitations. First, the respondents of current study has not represented the diversity of Indonesia millennials which encompasses their ethnicity, religion, and cultural backgrounds. This means that further research needs to involve more diverse

Indonesian millennials in order to capture more accurate backgrounds. In addition, it is also questionable if this scale is appropriate to be employed to more diverse variables. Future research can look more closely into variables like ethnicity, gender, educational background, and the origins of parents with certain professions. To conclude, it is uncertain whether the two dimensions of perseverance and passion can also be applied for different research subjects in Indonesia; thus, it still needs further research. Nevertheless, if a future research is carried out on millennials, this short grit scale is appropriate and applicable in Indonesia.

## Conclusion

Based on the results of data analysis above, we can conclude that grit scale is reliable and valid to test the Grit of Indonesian millennial. This research has a novelty and excellence by taking millennial generation respondents in Indonesia. But it needs further examine for researchers. The diversity of Indonesia's ethnicity, gender and personal values, is likely to be interesting for further study. We suggest although the Grit scale has been proven valid and reliable, but it still needs to be developed further in accordance with the diversity of local culture in Indonesia.

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<https://doi.org/10.9790/5933-08010390108>

## Appendix

### *Original Grit Scale*

#### Short Grit Scale

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

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

Scoring: 1. For questions 2, 4, 7 and 8 assign the following points: 5 = Very much like me 4 = Mostly like me 3 = Somewhat like me 2 = Not much like me 1 = Not like me at all

2. For questions 1, 3, 5 and 6 assign the following points: 1 = Very much like me 2 = Mostly like me 3 = Somewhat like me 4 = Not much like me 5 = Not like me at all

Add up all the points and divide by 8. The maximum score on this scale is 5 (extremely gritty), and the lowest score on this scale is 1 (not at all gritty).

**Grit Scale citation**

Duckworth, A.L., & Quinn, P.D. (2009). Development and validation of the Short Grit Scale (GritS). *Journal of Personality Assessment*, 91, 166-174. <http://www.sas.upenn.edu/~duckwort/images/Duckworth%20and%20Quinn.pdf>

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**Appendix of The Grit Scale Translation**

This translation went through some discussions with expert and academic teams.

Statements	EA	A	N	D	ED
<b>Short Grit Scales</b>					
1. New ideas and projects sometimes distract me from the previous ones.					
2. Setbacks don't discourage me.					
3. I am obsessed with a certain idea or project within a short time, yet lose interest short after.					
4. I am a hard worker.					
5. I often set a goal, yet later choose to pursue a different one.					
6. I have difficulty in maintaining my focus on projects that take more than a few months to complete.					
7. I finish what I started.					
8. I am diligent.					

EA extremely agree  
 A agree  
 N no opinion  
 D disagree  
 ED extremely disagree