

## Validation of Hindi Translated Scales on Grit, Resilience and Well-being

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The primary focus of the study is to present the psychometric properties of the Hindi translated version of the Grit-Scale, Connor Davidson Resilience Scale (CD-RISC) and PERMA scale. The study was conducted in North India, where more than one-third of the population speaks Hindi. A total of 474 Hindi speaking participants (females = 202) in the age range of 17 to 60 years ( $M = 25.69$ ;  $SD = 8.10$ ) volunteered for the study. A booklet containing demographic sheet and selected scales in Hindi language was used for data collection. The Confirmatory Factor Analysis results indicated that all three scales possessed acceptable model fit indices. The correlational analysis indicated good convergent validity between all the three constructs. It was found that females possessed higher scores on well-being, grit (interest) and resilience. The results of the current study align with the earlier research studies.

**Keywords:** Grit, Resilience, Well-being, Hindi, Translation, Validation.

Globally many studies in recent decades have been documented on well-being. It has been studied with respect to Hedonia (presence of positive affect, absence of negative affect and life satisfaction) and Eudemonia (psychological well-being). Huppert & So (2013) stated that well-being would prevail when pathology was absent. However, other studies asserted that mental illness and mental health are two separate concepts although related to each other in continua (Keyes, 2002, 2005). Different researchers have conceptualized well-being as different models, for instance, Keyes (2002) conceptualized it as having different components such as emotional well-being (positive affect and life satisfaction), psychological well-being (Ryff's PWB - purpose in life, self-acceptance, environmental mastery, personal growth, autonomy and positive relations with others) and social well-being (social, social integration, social actualization, social acceptance and social coherence). Whereas Huppert and So (2013) stated that positive characteristics (emotional stability, vitality, optimism, resilience and self-esteem), positive functioning (engagement, competence,

meaning and positive relationships) and positive appraisal (comprising life satisfaction and positive emotion) comprised of well-being.

Diener, Wirtz, Tov, Kim-Prieto, Choi, et al., (2010) stated that flourishing comprised of purpose and meaning, positive relationships, engagement, social contribution, competence, self-respect, optimism and social relationships. Seligman (2011) also proposed PERMA model of well-being to be comprised of engagement, meaning and purpose, positive emotion, accomplishment and positive relationships.

Personality and well-being are closely correlated. Peterson and Seligman (2004) stated that positive psychology renewed the interest in empirically measuring perseverance and its association with well-being. Duckworth, Peterson, Matthews and Kelly (2007) introduced the construct of grit, defining it as trait-level perseverance and passion for long-term goals and it entails the capacity to sustain effort and interest in projects that take months or even longer to complete. Grit is distinct from need for achievement and individuals who are high on grit do not swerve from goals even in the absence of positive feedback.

Another positive trait, resilience is the ability to rebound and regain original shape following trauma or shock. Windle Bennett and Noyes (2011) defined resilience as the process of negotiating, managing and adapting to significant sources of stress or trauma. Assets and resources within the individual, their life and environment facilitate this capacity for adaptation and 'bouncing back' in the face of adversity. The current study aims to validate the grit, resilience and well-being scales as well as to establish the relationship between the constructs. Following review of literature helped us to explore how these positive psychology constructs have been defined and measured in recent years.

### **Grit**

Duckworth et al., (2007) concluded that talent, intelligence and personality predicted achievements in life. Perseverance was observed to be prominent determinant to attain the goal. These deliberations lead to conceptualization and definition of grit as perseverance and passion for long term goals. The first version of Grit scale consisted of 42 items, which was revised with 12 items Grit scale (Duckworth et al., 2007) followed by the shorter version of Grit – S scale with 8 items (Duckworth & Quinn, 2009). The 12-items scale has a two-factor solution with internal consistency scores as Interests  $\alpha=0.84$ , Perseverance of Effort  $\alpha=0.78$  and total scale  $\alpha = 0.85$  and model was a fair fit (CFA: CFI = 0.83, RMSEA = 0.11).

Further, validation results indicated that more educated people were higher in grit than less educated adults of equal age. The older individuals have more grit level than the younger participants. The grit scale showed significant correlations with personality and intelligence. Duckworth and Quinn (2009) reported the shorter form of Grit scale and established its psychometric properties in six studies. The 8-items grit scale was developed with internal consistency of  $\alpha = 0.73$  to 0.83. The grit scale suggested a good fit model with RMSEA = 0.061 and CFI=0.95.

Grit has been assessed for different population groups such as teachers (Duckworth,

Quinn & Seligman, 2009), spellers (Duckworth, Kirby, Tsukayama, Berstein & Ericsson 2011) etc. Duckworth, et al., (2009) demonstrated that in teacher's grit, life satisfaction, and optimistic explanatory style predicted performance as measured by the academic gains of students.

In another study, Duckworth et al., (2011) reinforced that grittier spellers spent more time in deliberate practice sessions, which contributed to their enhanced performance. Self-control is more tightly coupled with everyday success, whereas grit is more tightly coupled with exceptional achievements that often take decades or even an entire lifetime to accomplish (Duckworth & Gross, 2014).

Von Culin, Tsukayama & Duckworth (2014) reported that the pursuit of engagement and meaning, as opposed to pleasure, comprise motivational correlates of grit whereas the desire for meaning and purpose in life seems to contribute to both facets of grit. The drive towards engagement and flow seems to facilitate sustained effort over time, whereas the drive towards immediate pleasure seems to undermine sustained, focused interests over time.

### **Well-being**

In the current study, Seligman's (2011) model of well-being was validated. Seligman theorized well-being as having five components Positive emotions, Engagement, Relationships, Meaning in life, and Accomplishments (PERMA, Seligman, 2011), based on the theoretical grounds that these are what individuals chose freely, "for their own sake". The PERMA-Profilier was created in the absence of a brief, validated instrument that specifically measures all five PERMA domains.

Seligman's (2011) multidimensional PERMA model of flourishing has been used in various studies. For instance, Kern, Waters, Adler and White (2014) conducted a pilot evaluation of employee well-being. The model exhibited acceptable fit to the data (RMSEA= .07, 90% confidence interval [CI] = .06, .09], SRMR = .08, CFI = .87, TLI = .86). A final model was a good fit (RMSEA = .06 [90% CI = .05, .06], SRMR =

.06, CFI = .93, TLI = .92). In another study, Kern Waters, Adler and White (2015) demonstrated a moderate fit to the six-factor PERMA solution for Australian school boys. Coffey, Wray-Lake, Mashek, and Branand (2016) validated the PERMA model with a broader sample including all five PERMA indicators. The cross-sectional model at sophomore level gave a good model fit with four-factors. The final fit for sophomore year model was good ( $\chi^2/d.f. = 1.49$ ; CFI = .95; TLI = .93; RMSEA = .06). A longitudinal factor model was used to test the rank-order stability of PERMA across sophomore, junior, and senior years. Model fit was good,  $\chi^2 (43) = 67.34$ ,  $p = .01$ ; CFI = .97; TLI = .95; RMSEA = .06 for the longitudinal model.

### **Resilience**

Connor and Davidson (2003) developed the 25-items resilience scale with a five-factor structure: personal competence, instincts, positive acceptance, control and spiritual influences. The original five-factor solution of CDRISC-25 had wide applications in psychiatric and psychological interventions, and even in educational practices to nurture children with high resilience.

Initial work suggests that the CD-RISC is a promising measure for use with adult psychiatric and normal population (Connor and Davidson 2003). Since the development of CD-RISC-25 scale the factor solution of the scale had been documented differently in different studies. Few studies have demonstrated five-factor solution, (Baek, Lee, Joo, Lee, & Choi, 2010; Jowkar, Friborg & Hjemdal 2010, Jung et al., 2012, Murtaza, Sultan, Ahmed & Mustafa (2016). On the other hand, a four-factor solution (Campbell-Sills & Stein, 2007; Singh & Yu, 2010; Jung et al., 2012) and a three-factor solution (Manzano-Garcia & Calvo, 2013; Yu & Zhang, 2007; Xie, Peng, Zuo, & Li, 2016) were also reported for the CDRISC-25 scale. The scale has been validated in different countries such as India (Singh & Yu, 2010), Iran (Jowkar et al., 2010), Pakistan (Murtaza, et al., 2016), China (Yu & Zhang, 2007; Xie et al., 2016), Brazil (Solano et al., 2016), Portugal (Solano et al., 2016), Spain

(Notario-Pacheco, Solera-Martínez, Serrano-Parra, Bartolomé-Gutiérrez, García-Campayo, Martínez-Vizcaíno, 2011) etc.

Selected positive psychology scales in this study have been translated into Hindi and their psychometric properties were established. India is a diverse and multi-lingual country, where about 41% of population speaks Hindi. Thus, viewing the multi-lingual nature of India and the lack of evidence for psychometric properties of Hindi translated scales, the current study had two-fold aims (a) to validate the factor structure of grit, resilience and well-being of Hindi translated scales and (b) to explore the relationship between the constructs.

### **Method**

**Participants:** Four hundred and seventy-four participants (Age range = 18 to 50 years, MAge=25.68 years and SD=8.10) took part in this study. All of them were recruited from urban and semi-urban locations in North India. Of these participants, 53% were males and 47% females. Majority of the participants (83%) were unmarried. All participants were well-versed with Hindi.

**Measures:** A booklet was prepared that consisted of demographic details and translated Hindi versions of the Connor Davidson Resilience Scale, Grit scale and scale based on PERMA model.

**Connor-Davidson Resilience Scale (Connor & Davidson, 2003):** The CD-RISC is a 25-items scale that measures the ability to cope with stress and adversity. Respondents rate items on a scale from 1 ("not true at all") to 5 ("always true"). Two factor solutions were reported in this study: Alpha reliability of four-factor solution (based on previous four-factor solution of English version in Indian setting, Singh & Yu, 2010) were for Hardiness = .69, Optimism = .76, Resourcefulness = .75 and for Purpose = .72. Whereas alpha reliability of original five-factor solutions were obtained for factor 1 = .84, factor 2 = .64, factor 3 = .77, factor 4 = .57 and factor 5 = .59.

**PERMA Profiler (Butler & Kern, 2016):** The 16-item PERMA-P has three items representing each of the five PERMA components, and one

item representing 'overall well-being'. The general well-being question serves as a comparison with other population-based surveys. Each item is scored on an 11-point Likert scale, anchored by 0 (never) to 10 (always), while experiences are assessed via a range of different response scales. Research team advocates a 'dashboard' approach to reporting results whereby the three scores of each component are averaged to produce a single component score ranging from 0-10 (higher scores indicate greater well-being) and the five component scores are reported as a dashboard of PERMA scores. In the current study, the scale possessed good internal consistency ( $\alpha = .75$  to  $.89$ ).

Grit – S scale (Duckworth & Quinn, 2009): It is a two-factor scale with 8 items. The scoring is done on a 5-point Likert ranging from very much like me to not like me at all. Four items describe the tendency toward sustained effort for long-term goals, and four other items describe abiding, focused interests (as opposed to frequently changing goals) over time. The observed internal reliability was  $\alpha = .82$  for the overall grit scale, and  $\alpha = .70$  and  $.83$  for the effort and interest subscales respectively (Duckworth & Quinn, 2009). The scale had internal consistency of  $\alpha = 0.73$  to  $0.83$  in the present study.

Procedure: At the outset, the original English scales were translated into Hindi by a bilingual expert. The Hindi translations of the three scales were then evaluated by the authors to check for adequacy of the translation. Modifications were made wherever the Hindi translations were not found to adequately capture the intended meaning. Furthermore, a bilingual expert independently back translated these scales from Hindi to English. The back translations were again reviewed by the authors and matched to the original scales. At this stage, all the items were found to aptly represent the content of the original English scales. The finalized scales were used for data collection.

### Results

The data were computed using SPSS- 16 and LISREL 8.8. The data were screened for missing values. The missing values which were under 5% were replaced with a series mean. The

items were screened for minimum, maximum values and range.

### Validation of GRIT-S

About 13% of participants' data were deleted to attain normality for the scale. There were 412 participants' data which were validated by Confirmatory factor analysis (CFA). The mean of the items ranged from 2.66- 2.89. Skewness ( $-0.01$  to  $0.20$ ) and kurtosis ( $-0.29$  to  $-1.11$ ) were found to be within the acceptable range. Further, if alpha items deleted values of the items ranged from 0.53 to 0.75 and the corrected item total correlation ranged from .29 to 0.56 was acceptable.

Confirmatory factor analysis: CFA using LISREL 8.8 was performed on the data for the GRIT S. CFA yielded values of  $\chi^2/d.f. = 5.01$ , RMSEA = 0.13, CFI = 0.83, GFI = 0.92, and AGFI = 0.85. All these indices were found to be just acceptable per the proposed benchmarks as shown in Table 1 (see figure 1 for the CFA structure).

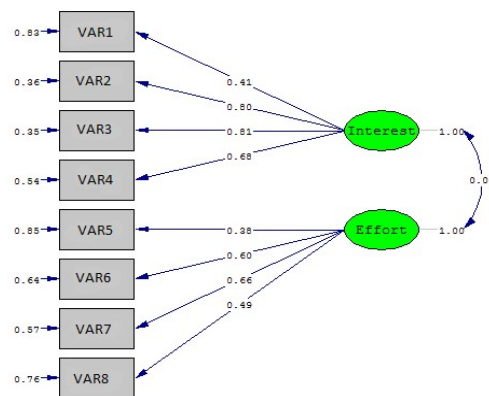


Figure 1: CFA of Grit-S scale

### Validation of PERMA

The mean of the items ranged from 6.47 to 7.13. Skewness ( $-0.46$  to  $-0.65$ ) and kurtosis ( $-0.07$  to  $0.50$ ) were found to be within the acceptable range. Further, if alpha item deleted values of the items ranged from 0.95 to 0.96 and the corrected item total correlation ranged from 0.47 to 0.82 was also acceptable.

Confirmatory factor analysis: CFA using LISREL 8.8 was also performed on the data for

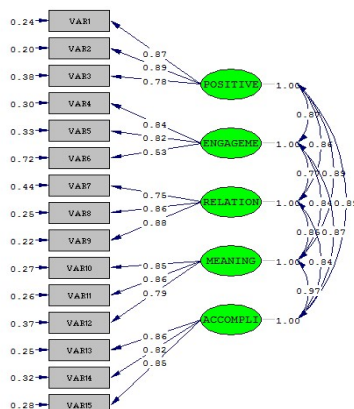
**Table 1: Results of CFA Along with Acceptable Values of Reported Indices**

Measures of Goodness of Fit	Acceptable level	GRIT-S (n=412)	PERMA-scale (n=474)	CDRISC* (5-factor solution) (n= 474)	CDRISC* (4-factor solution) (n= 474)
$\chi^2$ (d.f.)	<5 (Geuens & PeIsmacker, 2002)	5.01	4.92	3.05	3.11
RMSEA	<0.10 (MacCallum, Browne, Sugawara, 1996)	0.129	0.091	0.066	0.068
CFI	$\geq 0.95$ (Hu and Bentler, 1999)	0.83	0.98	0.96	0.96
GFI	> 0.90 (Tabachnick & Fidell, 2007)	0.92	0.90	0.88	0.87
AGFI	> 0.90 (Tabachnick & Fidell, 2007)	0.85	0.85	0.85	0.85

\*As per original 5-factor solution\*\*As per Indian study- 4-factor solution

the PERMA model. CFA yielded values of  $\chi^2$ / (d.f.) = 4.92, RMSEA= 0.091, CFI = 0.98, GFI = 0.90, and AGFI = 0.85. All these indices were found to be as per the proposed benchmarks as shown in Table 1 (see figure 2 for the CFA structure).

range. Further, if alpha item deleted values of the items ranged from 0.91 to 0.92 and the corrected item total correlation ranged from 0.39 to 0.66 was also acceptable.



**Figure 2: CFA structure of PERMA Validation of CD-RISC**

The mean of the items ranged from 3.44 to 4.00. Skewness (-0.75 to -0.21) and kurtosis (0 to -0.70) were found to be within the acceptable

Confirmatory factor analysis: CFA using LISREL 8.8 was also performed on the data for the CDRISC-25. A five-factor and four-factor solutions were tested. The five-factor CFA yielded of  $\chi^2$ / (d.f.) = 3.05, RMSEA= 0.066, CFI = 0.98, GFI = 0.90, and AGFI = 0.85 whereas the four-factor solution yielded values of  $\chi^2$ / (d.f.) = 3.11, RMSEA= 0.068, CFI = 0.96, GFI = 0.87, and AGFI = 0.85. All these indices were found to be as per the proposed benchmarks as shown in Table 1 (see figure 3 for the CFA structure of five-factor structure and figure 4 for four-factor structure). Thus, the construct validity indicates that Hindi version of CD-RISC is valid for four and five factors solutions. Hence in future, researchers can choose the most suitable model as per their choice.

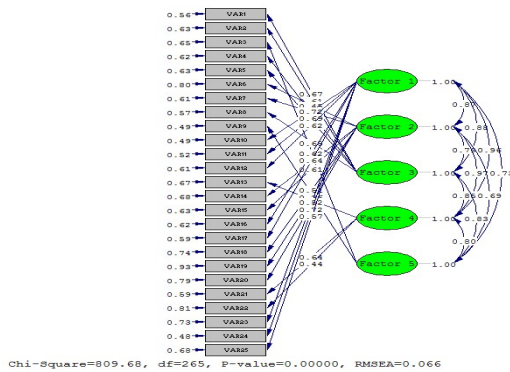


Figure 3: Five-factor structure of CD-RISC

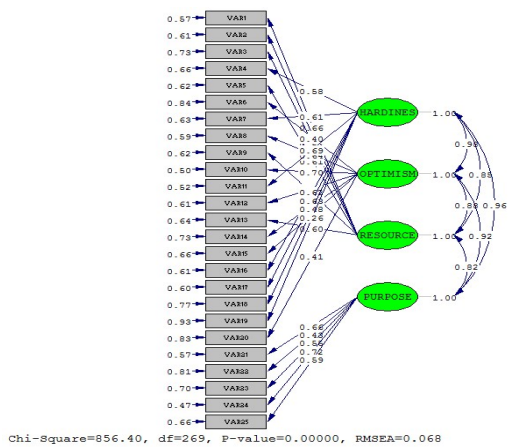


Figure 4: Four-factor structure of CD-RISC

### Correlation between Well-being, Resilience and Grit

The correlation results indicated associations between well-being, resilience and grit scales. As hypothesized well-being, grit and resilience are positively correlated with each other, correlational analysis accorded with the hypothesis. However, some of the constructs' factors were not correlated with each other (refer to table 2 for detailed results).

### Gender differences for Resilience, Grit and Well-being

Table 3 indicates the differences for males and females on resilience, grit and well-being. Females were more resilient, possessed better well-being and higher on focused interests (grittier) than males. However, Grit and another factor of grit – 'effort' were insignificant variables for gender differences (refer to table 3 for details).

### Discussion

The current paper aimed to validate scales of positive psychology namely; grit, PERMA and resilience. Grit-S (Duckworth & Quinn, 2009) an eight-item scale, Connor-Davidson Resilience Scale (Connor & Davidson, 2003) a 25-item scale that measures the ability to cope with stress and adversity and Seligman's PERMA model (Butler & Kern, 2016) a 16-item scale that has three items representing each of the five PERMA components, and one item

Table 2: Correlation between Well-being, Resilience and Grit

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hardiness	.69														
Optimism	.75**	.76													
Resource	.65**	.69**	.75												
Purpose	.71**	.69**	.60**	.72											
Resilience	.90**	.91**	.83**	.84**	.74										
Positive Emotions	.46**	.44**	.50**	.43**	.52**	.88									
Engagement	.46**	.47**	.51**	.45**	.54**	.70**	.75								
Relationship	.37**	.39**	.55**	.35**	.47**	.76**	.64**	.87							
Meaning	.49**	.51**	.55**	.45**	.57**	.79**	.68**	.74**	.86						
Accomplishment	.51**	.51**	.56**	.45**	.57**	.79**	.72**	.74**	.84**	.88					
General Well - Being	.41**	.39**	.46**	.36**	.46**	.75**	.58**	.68**	.73**	.71**	-				
Perma	.51**	.52**	.60**	.48**	.60**	.91**	.84**	.88**	.91**	.92**	.78**	.89			
Interest	.09	.15**	.16**	.11	.15**	.15**	.19**	.16**	.22**	.18**	.20**	.20**	.73		
Effort	.14**	.16**	.27**	.13*	.20**	.20**	.26**	.24**	.22**	.26**	.24**	.26**	.59**	.83	
Grit	.11	.07	.21**	.09	.13*	.13*	.17**	.12*	.10	.17**	.12*	.17**	.05	.77**	.79

Note: N= 412 \*\*p<0.01, \*p<0.05. Numbers in Italics indicate Cronbach Alpha.

**Table 3: Gender Differences in Grit, Resilience and Well-being**

	Males		Females		t
	Mean	Std. Deviation	Mean	Std. Deviation	
Hardiness	24.76	4.63	26.72	4.20	4.74**
Optimism	28.35	5.01	30.23	4.88	4.07**
Resource	18.54	3.43	20.19	3.25	5.29**
Purpose	17.95	3.33	19.20	3.50	3.95**
Resilience (Total)	89.60	14.39	96.33	13.69	5.14**
Positive	18.65	5.82	21.09	5.22	4.71**
Engagement	19.69	5.45	22.11	5.02	4.96**
Relation	19.08	6.39	21.51	5.88	4.23**
Meaning	19.18	5.58	21.93	5.31	5.42**
Accomplishment	19.48	5.85	22.37	5.43	5.48**
General well-being	6.63	2.12	7.33	2.17	3.50**
PERMA (Total)	96.07	25.99	109.01	23.38	5.59**
Interest	12.61	2.91	13.82	2.96	3.62**
Effort	13.24	2.49	12.92	2.21	1.23
Grit (Total)	25.86	3.46	26.73	3.88	2.10

Note: \*\*p<0.01

representing 'overall well-being' were employed in the current study. Since 41.2% of population in North India speaks Hindi Language (Census, 2011), each of the scale was translated into Hindi and tested Hindi translated version of the scales.

Before analyzing the data for CFA, preliminary psychometric properties of the scales were analyzed which included item means, skewness, kurtosis, item total correlation and if-item deleted alpha reliability. The criterion for acceptable item means was between 2 to 4 for five-point Likert scale suggested by Jang and Roussos (2007). For skewness and kurtosis, Curran, West and Finch (1996) recommended level of skewness <2 and kurtosis <7. Moreover, item-total correlation should not be less than 0.25 (Likert, 1932). Furthermore, Kline (1998) and Cortina (1993) recommended internal consistency of 0.90 and above is excellent, 0.70-0.90 is good, 0.60-0.70 is acceptable, 0.50-0.60 is poor and below 0.50 is unacceptable. The initial psychometric properties of the selected scales were excellent as per these recommendations.

The Grit scale was constructed to test the reason behind the individual differences

that predict success. The scale was found to have good psychometric properties that were established through validating the construct validity and convergent validity. Duckworth and Quinn (2009) proposed factor solution that found moderate fit in the present study as RMSEA value was greater than 0.1 that did not support to fit the model (MacCallum, et al., 1996; Browne and Cudeck, 1993) but, other parameters were found under acceptable range (e.g. GFI > 0.90 Tabachnick & Fidell, 2007). In the current study, the internal consistency of Effort factor was poor. Hence, the future studies should re-examine the alphas and must do efforts to improve the internal consistency. Aligning with present study findings on gender differences, recently Flaming (2017) also found marginally significant gender differences for grit.

Well-being was measured with the aid of PERMA model in the current study. Seligman (2011) theorized well-being as having five components: Positive emotions, Engagement, Relationships, Meaning in life, and Accomplishments (PERMA, Seligman, 2011). Based on the theoretical grounds that these

are what individuals chose freely, “for their own sake”. Butler, & Kern(2016) proposed a PERMA-Profiler- five-dimension model that was validated in the current research.

Results indicated that PERMA profiler is a valid and reliable instrument to measure well-being. The construct validity and convergent validity was observed to be good. The results aligned with the other validation study (Kern et al., 2015; Kern, et. al., 2014;Butler, & Kern, (2016). Females possessed better well-being than males aligning with results from previous studies (Singh, Ruch & Junnarkar, 2014; Singh, Bassi, Junnarkar & Negri, 2015).

In a review study, Windle et al., (2011) observed that the Connor-Davidson Resilience Scale possessed the best psychometric ratings. Thus, in the current study, psychometric properties of Connor-Davidson Resilience Scale were studied. In a previous validation study it was observed that five-factor solutions did not confirm to Indian population but, a four-factor solution confirmed it (Singh & Yu, 2010). Hence, in the current study, a five-factor and a four-factor solutions were tested. Results indicated that both the factor solutions confirmed to the norms. Since the development of CD-RISC-25 scale the factor solution of the scale had been documented differently in different studies. Few studies have demonstrated five-factor solution (Baek et. al., 2010;Jowakar, et al., 2010; Jung et al., 2012;Murtaza et al., 2016),however, others supported a four-factor solution (Campbell-Sills & Stein, 2007; Singh & Yu, 2010; Jung et al., 2012; Solano et al., 2016). The present study reported that four- and five-factor solutions both were suitable for Hindi version of the scale, however, four-factor solution was comparatively better in option with balanced number of items in each factor and possessed higher reliability of the resilience factors. Recently Wu, Tan, &Liu (2017) also supported four-factor model as compared to original five-factor and the Chinese three-factor patterns. They reported good internal consistency, concurrent validity and consistent structure validity of the four-factor model. Females were more resilient than males. These results align with the previous studies.

Consistent to research findings, (Vinoth & Prasad, 2016) selected positive psychology constructs (i.e. resilience, well-being and grit) were found significantly correlated in the present study. In an earlier Indian study, a significant correlation between the concepts of grit, happiness and life satisfaction were observed, furthermore, positive and negative affect and grit were major predictors of happiness and life satisfaction (Singh & Jha, 2008).

The results of the current study indicated that the Hindi version of the selected scales were valid and reliable. Well-being, resilience and grit were found to be significant positively correlated. Females possessed significantly higher level of well-being, resilience and grit (consistency of interest) as compared to males.

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