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Padjadjaran Interest Inventory: Evaluation of Psychometric Properties

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Abstract. This research aims to evaluate the psychometric properties of a new instrument for measuring vocational interest: Padjadjaran Interest Inventory (PII). There were 2,648 participants in this study, consisting of workers, high school, and university students, with gender proportion of 1,014 (38.3%) males and 1,634 (61.7%) females. This research used descriptive statistic test, t-test, and MANOVA for gender differences, reliability coefficients and validity evidence by using confirmatory factor analysis (CFA). The results showed that PII has a good psychometric properties: it has good reliability, and valid internal structure; it is standardized by gender; and it is applicable for large groups with relative ease. PII can be used for career exploration. Limitation of this study was discussed for future research.

Keywords: career development; interest inventory; vocational interest

Career is a continuous process occurring throughout an individual's lifetime (Sharf, 2006). In deciding a future career, vocational interest is one of the important factors which helps counselors direct an individual (Betz, Harmon, & Borgen, 1996). Individual interest in certain areas in the education process impacts attention, goals, and levels of learning (Hidi, 1990). In addition, interest also affects a person's achievement in the career area (Jansen, Lüdtke, & Schroeders, 2016; Li & Yang, 2016) and a person's success in education area (Bloye, 2007).

In Indonesia, however, instruments used to measure vocational interest are still limited, i.e., Kuder Preference Record Form C (Kuder, 1948) and *The Rothwell Miller Interest Blank* (RMIB) (Miller, 1958; Rothwell, 1947). Kuder Preference Record Form C basically has four weaknesses (Kelly, 2002), i.e., the choices of activity and occupation are irrelevant to the times; it is limited in paper-based test; it is not linked to Holland's six structures (Holland, 1997), which is the theory that underlines vocational interest; and it does not show profiles of interests.

On the other hand, the RMIB test also has weaknesses in the aspect of the instrument's reliability and validity (Yudiana, 2011). In RMIB, only *scientific* interest area is reliable, four areas are quite reliable, and eight areas are unreliable. In addition, based on confirmatory factor analysis, this model is significantly different from the construct being measured. Therefore, it can be said that this measure has not been tested for validity.

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Therefore, using this instrument may lead to mismeasurement.

This situation illustrates that Indonesia lacks an interest inventory that is relevant to the present times and today's context. Paradigm shifts have caused major changes in the world of work (Kuhn, 1962). This further increases the importance of innovative approaches to career counseling (Maree & Taylor, 2016). Due to its importance in career counseling (Sharf, 2006), development of interest inventory that is relevant to the times and today's paradigm becomes important. The most recently developed interest inventory that can cover the weaknesses of Kuder Preference Form C and RMIB is Padjadjaran Interest Inventory (PII) (Yudiana, Purwono, & Wiyono, 2011).

Padjadjaran Interest Inventory (PII) is an instrument developed to measure individual's interest areas (Yudiana *et al*., 2011). Development of this interest inventory is based on The Spherical Model of Interests (Etzel, Nagy, & Tracey, 2016; Sodano & Tracey, 2008; T. J. G. Tracey & Rounds, 1997, 1992; Terence J.G. Tracey, 2002) which is an improvement of previous theories (Holland, 1973, 1985, 1997).

PII measures three aspects in 18 interest areas which are divided into eight basic interests, five high interests, and five low interests. In addition, it has been reported that PII has good psychometric property. PII has a reliability coefficient of between 0.794 – 0.934 in all dimensions and has validity evidence based on test content, response processes, and internal structure (Yudiana *et al*., 2011).

However, there are several limitations to previous studies (Yudiana *et al*., 2011). Firstly, the norming used in PII was last reviewed in 2011. Whereas, updating the norming of an instrument is vital in order that the instrument remains reliable and valid (Suwartono, 2016). Secondly, the number of participants involved in the norming was limited to 550 individuals. Thirdly, there has never been any report on score differences between male and female, whereas gender plays a role in career choices that make norming be differentiated between genders (Elena, 2014; Lawson, Lee, Crouter, & Mchale, 2018; Volodina & Nagy, 2016). Fourthly, the age range of career stages used in this norming was limited between 17 and 19 years old, which falls into only one career stage, namely exploration (Super, 1990). Based on these, this research is an improvement of previous researches to respond to those limitations.

This research aims to determine the reliability of PII and collect its internal validity evidence with larger target participants, not only in terms of age range but also career stages of the participants, i.e., from exploration to higher level (Super, 1990). In addition, it aims to view the comparison of scores between male and female.

Method

Participants

In this research, a total of 2,648 participants were obtained from several sources of data collection, namely 1,279 participants (49%) from *Biro Pelayanan dan Inovasi Psikologi* (BPIP) of Universitas Padjadjaran, 676 participants (25.5%) from *Tim dan Pelayanan dan Bimbingan Konseling* (TPBK) of Faculty of Psychology, Universitas Padjadjaran, 617 participants (23.3%) from research data collection in Faculty of Psychology, Universitas Padjadjaran, and 76 participants (2.9%) from a psychological

bureau in Bogor. Demographic characteristics of participants are shown in Table 1.

Table 1.
Demographic data of participants

Demographic Data	n, %, value
Gender	
Male (n, %)	1,014 (38.3 %)
Female (n, %)	1,634 (61.7 %)
Status	
High School Student (n, %)	1,297 (49 %)
University Student	995 (37.6 %)
Worker (n, %)	356 (13.4 %)
Age	
Range	13 – 56
Mean	20.38
Standard Deviation	7.83

Instrument

The instrument used in this research was the Padjadjaran Interest Inventory (PII) (Yudiana *et al*., 2011). PII consists of two item formats, i.e., activity with two types of response options: preference and competence belief, and occupation. There are 144 items for each item format, of both activity and occupation. Inactivity item format, participants were asked to scale twice; the first is their preferences for the activity (1 = strongly dislike and 7 = strongly like) and the second is their competence belief to do the activity (1 = unable to do and 7 very competent). On the other hand, in occupational item format, participants were asked to scale their occupational preferences (1= strongly dislike and 7 = strongly like). The format choices are based on *Personal Globe Inventory (*PGI) test (Tracey, 2002) that measure the same concept. PII describes 18 interest areas in three item formats thus, there are total 54 score scales reported by PII. Each scale is measured by eight items. Eighteen interest areas are explained in further detail in Table 2.

Analysis

Descriptive statistics (mean, standard deviation, skewness, and kurtosis) for 54 interest area scales were calculated to describe details of samples in this research. The t-test for independent samples was used to determine the differences in interest area scales by gender. For testing overall gender differences in interest areas, multivariate analysis of variance (MANOVA) was used. The technique used to determine the reliability of 54 interest area scales was Cronbach's alpha based on reliability coefficient obtained by calculating the standard error of measurement (Kaplan & Sacuzzo, 2005).

The validity evidence in this research was based on internal structure. Validity evidence based on internal structure refers to dimensionality or underlying factors measured in an instrument (Sireci & Sukin, 2013). The *confirmatory factor analysis* (CFA) was used to achieve this validity. In this research, the hypothesized model is that every interest area is measured by two item formats, i.e., activity and occupation, and each item format is measured by eight items. Considering that, inactivity item format, there are two types of response options, i.e., preference and competence belief, the hypothesis of a measurement model for each interest area is tested by second-order factor analysis, which is shown in detail in figure 1.

There were eighteen CFA tests describing eight interest areas. Indicators for the goodness of fit in determining model fit are CFI, GFI, NFI and NNFI (McDonald & Ho, 2002). The fitness criteria are that RMSEA value of less than 0.08 indicates reasonable fit, and less than 0.05 indicates a very good fit. Then, values of CFI, GFI, and NFT of more than 0.90 is considered as satisfactory model fit. On the

other hand, NNFI value is no less than 0.80 (Hooper, Coughan, & Mullen, 2008).

Table 2.
Description of interest area

No	Name	Measured Area	Code
1	*Social Facilitating*	focuses on working with others	*SosF*
2	*Managing*	focuses on liking for various aspects of running a business	*Man*
3	*Business Detail*	focuses on detail and office activities in business	*BusDe*
4	*Data Processing*	focuses on managing detail of information and technical problems	*DatPr*
5	*Mechanical*	focus on liking to understand and work on machinery	*Mec*
6	*Natura/ Outdoors*	focuses on liking to work outdoors	*NatOut*
7	*Artistic*	focuses on creative and expressive activities	*Art*
8	*Helping*	focuses on helping others in a variety of manners	*Help*
9	*Social Sciences*	focuses on psychological and medical helping	*SosSc*
10	*Influence*	focuses on leading and directing others	*Inf*
11	*Business Systems*	focuses on applying knowledge to running businesses	*BusSys*
12	*Financial Analysis*	focuses on helping others with financial issues	*FinAn*
13	*Science*	focuses on general interest in science	*Scie*
14	*Quality Control*	focuses on checking details	*QuaC*
15	*Manual Work*	focuses on working with hands or simple machines	*ManWo*
16	*Personal Service*	focuses on working with people in everyday transactions	*PerSer*
17	*Construction & Repair*	focuses on working with machinery to repair and build	*ConsRep*
18	*Basic Services*	focuses on selling products and services	*BasSer*
		Information	

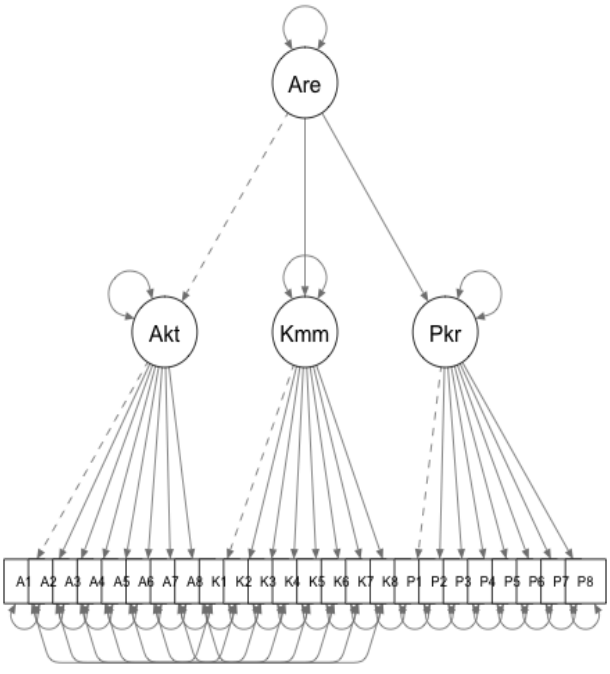

Figure 1. Measurement Model for Every Interest Area

Descriptive statistical analysis was conducted by using *Statistical Product and Service Solution* (SPSS) *22.0 for Windows*. On the other hand, the reliability was tested using *the psych package* (Revelle, 2017) in R and CFA programming using *lavaan package* on R programming (Rosseel, 2012).

Procedure

Data collection was conducted in the BPIP and Psychological Bureau in Bogor, based on the data collection process in the psychological test for the purpose of recruitment and employee selection between 2011 to 2017. PII was used as one of the instruments in the psychological test. The same procedure was used in data from TPBK, namely deriving from a psychological test for the mapping of student potential in the Faculty of Psychology, Universitas Padjadjaran between 2013 to 2017. On the other hand, data from the research was sourced from eight high schools in Bandung. Administration Process was conducted according to the manual (Yudiana *et al*., 2011) by final-year students of Psychology who already had test method subject.

Result

Descriptive Statistics

This section elaborates mean score, standard deviation, skewness and kurtosis of PII instrument, as shown in Table 3. The minimum score of each area in PII is 8 and the maximum score is 56. In Activity item format, *ManWo* had the lowest mean (20.04) and *Help* had the highest mean (38.82). In Competence item format, *ManWo* had the lowest mean (18.89) and *Help* had the highest mean (34.49). In Occupational item format, *ManWo* had the lowest mean (17.30) and *Man* had the highest mean (35.23). In all three item formats, there isn't any skewness greater than 2 or less than -2. The same applies for kurtosis, there isn't any area of the three item formats greater than 2 or less than -2. This shows the normality of data (Field, 2009).

Reliability

Cronbach's alpha was used in 18 interest areas stated in Table 4. It can be seen that estimated reliability for all interest areas is relatively high with rvalue > 0.70, with the lowest score is *Man* area in Occupation item format (0.81) and the highest score is *BusDe* (0.92) in Activity item form. It shows that contents in item formats are homogeneous.

Validity evidence based on the internal structure

Validity evidence by second-order confirmatory factor analysis (CFA) showed that the data fit the hypothesized model. This is based on Table 5, showing indices of the goodness of fit. In more detail, RMSEA falls within a range of 0.05 - 0.08. Almost all values for CFI, GFI, NFI, and NNFI are > 0.90, except that in *DatPr* and *SosSc* the GFI values are 0.88.

Table 3.
Descriptive statistics of interest scale in PII (n=2,648)

Area	Item format											
	Activity				Competence				Occupation			
	M	SD	Skew	Kurtosis	M	SD	Skew	Kurtosis	M	SD	Skew	Kurtosis
SosF	31.59	9.38	-0.01	-0.32	31.77	8.88	-0.05	-0.04	30.34	8.82	-0.21	-0.24
Man	36.40	8.57	-0.30	0.16	34.35	8.37	-0.19	0.12	35.23	9.12	-0.44	0.15
BusDe	32.07	10.65	-0.07	-0.37	30.98	9.69	-0.04	-0.20	30.47	10.49	-0.09	-0.45
DatPr	30.11	9.80	0.07	-0.52	26.29	8.49	0.34	-0.14	29.06	10.51	-0.06	-0.53
Mec	26.58	11.77	0.31	-0.71	20.54	9.41	0.76	0.14	28.33	12.02	0.10	-0.74
Nat	32.92	10.75	-0.12	-0.53	28.09	9.49	0.08	-0.34	29.08	11.16	-0.02	-0.60
Art	37.26	10.13	-0.44	-0.23	30.98	9.36	-0.07	-0.28	33.27	10.55	-0.21	-0.47
Help	38.32	9.55	-0.47	-0.08	34.39	8.74	-0.16	-0.06	33.19	10.30	-0.28	-0.43
Inf	29.20	9.05	0.05	-0.29	25.74	8.67	0.25	-0.22	28.20	10.09	0.14	-0.44
BusSys	28.80	10.22	0.02	-0.38	25.19	9.49	0.16	-0.45	27.94	10.62	0.03	-0.45
FinAn	30.17	10.91	-0.04	-0.49	26.70	10.03	0.15	-0.38	26.93	10.53	0.10	-0.46
Scie	33.04	9.56	-0.24	-0.20	27.48	8.85	0.00	-0.34	27.68	10.64	-0.07	-0.64
SosSc	34.58	11.38	-0.28	-0.60	28.19	10.32	0.08	-0.54	33.66	11.56	-0.35	-0.64
QuaC	27.06	9.06	0.13	-0.31	24.68	8.33	0.23	-0.25	22.12	9.19	0.35	-0.50
ManWo	20.04	9.73	0.65	-0.30	18.89	8.66	0.76	0.08	17.30	8.95	0.84	-0.03
PerSer	33.88	10.21	-0.18	-0.40	30.03	8.98	0.02	-0.26	26.02	9.49	0.14	-0.51
ConsRep	24.69	10.04	0.39	-0.37	21.42	8.94	0.59	-0.15	19.18	9.52	0.65	-0.31
BasSer	28.63	9.70	0.06	-0.32	30.09	9.19	-0.08	-0.24	24.14	9.19	0.19	-0.49

Table 4.
Reliability of interest area of PII

Interest Area	Item Format		
	Activity	Compe- tence	Occupation
SosF	0.85	0.86	0.82
Man	0.85	0.87	0.81
BusDe	0.92	0.91	0.90
DatPr	0.84	0.83	0.88
Mec	0.90	0.90	0.92
NatOut	0.88	0.88	0.91
Art	0.84	0.84	0.86
Help	0.87	0.85	0.88
Inf	0.80	0.84	0.86
BusSys	0.89	0.90	0.91
FinAn	0.91	0.91	0.92
Scie	0.80	0.84	0.88
SosSc	0.89	0.90	0.89
QuaC	0.81	0.81	0.88
ManWo	0.88	0.84	0.91
PerSer	0.83	0.81	0.84
ConsRep	0.85	0.85	0.88
BasSer	0.83	0.81	0.84

Table 5.
Goodness of fit indices

Interest Area	χ^2	df	RMSEA	CFI	GFI	NFI	NNFI
SosF	1432.62	229	0.05	0.96	0.95	0.96	0.96
Man	1536.43	235	0.05	0.96	0.95	0.95	0.95
BusDe	1449.26	241	0.04	0.97	0.95	0.97	0.97
DatPr	3373.98	221	0.07	0.93	0.88	0.92	0.91
Mec	2920.77	229	0.07	0.95	0.91	0.94	0.94
NatOut	2151.77	232	0.06	0.96	0.93	0.95	0.95
Art	2769.70	219	0.07	0.93	0.90	0.93	0.92
Help	2339.10	229	0.06	0.94	0.93	0.94	0.93
Inf	2499.25	233	0.06	0.94	0.91	0.93	0.93
BusSys	2183.27	237	0.06	0.96	0.92	0.95	0.95
FinAn	2062.76	237	0.05	0.96	0.92	0.96	0.96
Scie	1877.29	218	0.05	0.96	0.94	0.95	0.95
SosSc	3010.73	224	0.07	0.94	0.88	0.94	0.93
QuaC	2176.44	237	0.06	0.94	0.93	0.94	0.94
ManWo	2587.79	227	0.06	0.94	0.92	0.94	0.93
PerSer	1869.82	224	0.05	0.95	0.94	0.94	0.94
ConsRep	2363.66	226	0.06	0.95	0.92	0.94	0.94
BasSer	1642.05	228	0.05	0.96	0.95	0.95	0.95

Table 6.
Summary of factor loading, *Average Variance Extracted (AVE)* and construct reliability

Interest	*Factor Loading in First Stage*			*Second Stage of CFA*	
Area	**Range**	**Mean**	**Standard Deviation**	**AVE**	**Reliability Construct**
SosF	0.44 - 0.80	0.65	0.11	0.69	0.87
Man	0.41 - 0.76	0.65	0.11	0.66	0.85
BusDe	0.49 - 0.87	0.76	0.10	0.74	0.90
DatPr	0.32 - 0.88	0.65	0.20	0.76	0.90
Mec	0.55 - 0.85	0.75	0.10	0.77	0.91
NatOut	0.62 - 0.84	0.73	0.08	0.76	0.91
Art	0.31 - 0.82	0.64	0.17	0.78	0.92
Help	0.50 - 0.78	0.68	0.10	0.73	0.89
Inf	0.36 - 0.82	0.64	0.15	0.75	0.90
BusSys	0.53 - 0.83	0.75	0.09	0.78	0.91
FinAn	0.67 - 0.84	0.77	0.07	0.78	0.91
Scie	0.36 - 0.81	0.64	0.15	0.76	0.90
SosSc	0.60 - 0.79	0.73	0.08	0.79	0.92
QuaC	0.41 - 0.78	0.65	0.13	0.75	0.90
ManWo	0.46 - 0.86	0.70	0.12	0.64	0.84
PerSer	0.50 - 0.69	0.63	0.09	0.68	0.86
ConsRep	0.43 - 0.81	0.70	0.12	0.77	0.91
BasSer	0.47 - 0.75	0.63	0.10	0.69	0.87

Table 6 presents a summary of factor loading for each interest area. In almost all interest areas, there are items with a loading factor < 0.5. The number of items for the activity, competence, and occupational item formats is 16, 14, and 11, respectively (total is 41 items). Interest areas with the highest number of low-value items were *DatPr* and *Art*, with seven items each. However, the value of *Average Variance Extracted* (AVE) for each interest area in the second stage of CFA was > 0,5, with interest area with the lowest value was *ManWo* (0.64) and interest area with the highest value was *SosSc* (0.79). And, for all interest areas, the value of construct reliability was higher than the standard set, which is > 0.8.

Group difference in gender

The t-test was used to analyze differences in mean scores between male and female in each area in every item format. Overall, almost every area had significant differences between male and female, F (54, 2593) = 58.815, Wilk's $\wedge$ = 0.449, partial η^2 = 0.55. Table 7 shows the detailed results of t-test in examining the difference in mean scores of PII between male and female.

Almost all interest areas indicated significant differences of scores between male and female participants. Only in several interest areas showed no significant difference. First, for activity item format, there was no significant difference in *BusDe* t(2646) = -0,99, p ≥ 0,05; *NatOut* t(2646) = 1,07, p ≥ 0,05 , and *Inf* t(2646) = 1,49, p ≥ 0,05. Second, in Competence item format, there was no difference in *BusDe* t(2646) = 0,04, p ≥ 0,05 and *NatOut* t(2646) = 0,47, p ≥ 0,05. Last, in Occupational item format, no difference in *Man* t(2062,83) = 0,35, p ≥ 0,05, *BusDe* t(2646) = 0,28, p ≥ 0,05, *NatOut* t(2646) = 0,82, p ≥ 0,05, and *Inf* t(2056,92) = 0,23, p ≥ 0,05.

Table 7.
Mean of group differences in each interest area

Area	Activity Item Format				Competence Item Format				Occupation Item Format			
	Male	Female	t	d	Male	Female	t	d	Male	Female	t	d
SosF	30.29 (9.43)	32.39 (9.26)	-5.63	0.32	31.05 (9.02)	32.22 (8.77)	-3.30	0.19	27.98 (8.82)	31.81 (8.49)	-11.02	0.63
Man	36.89 (8.81)	36.10 (8.40)	2.32*	-0.13	35.10 (8.79)	33.88 (8.06)	3.60	-0.21	35.31 (9.41)	35.18 (8.93)	0.35	-0.02
BusDe	31.81 (10.71)	32.23 (10.60)	-0.99	0.06	30.99 (9.95)	30.98 (9.53)	0.04	0.00	30.43 (10.45)	30.49 (10.52)	-0.15	0.01
DatPr	34.73 (9.54)	27.25 (8.83)	20.57	-1.15	30.00 (8.99)	23.99 (7.28)	17.96	-1.04	32.54 (10.39)	26.90 (9.99)	13.90	-0.78
Mec	33.07 (11.35)	22.56 (10.12)	24.15	-1.38	24.85 (10.09)	17.86 (7.85)	18.80	-1.09	32.14 (12.25)	25.96 (11.25)	13.03	-0.74
NatOut	33.21 (10.73)	32.75 (10.76)	1.07	-0.06	28.20 (9.56)	28.02 (9.46)	0.47	-0.03	29.14 (11.26)	29.04 (11.10)	0.22	-0.01
Art	34.40 (10.54)	39.03 (9.45)	-11.44	0.65	29.62 (9.77)	31.83 (9.00)	-5.81	0.33	32.27 (10.86)	33.89 (10.30)	-3.86	0.22
Help	34.80 (9.20)	40.50 (9.10)	-15.60	0.88	32.16 (8.81)	35.78 (8.41)	-10.55	0.59	28.89 (9.77)	35.86 (9.70)	-17.93	1.01
Inf	29.53 (9.25)	28.99 (8.92)	1.49	-0.08	26.44 (9.00)	25.30 (8.44)	3.23	-0.18	28.50 (10.43)	28.01 (9.87)	1.21	-0.07
BusSys	30.01 (10.38)	28.05 (10.06)	4.83	-0.27	26.15 (9.71)	24.59 (9.31)	4.12	-0.23	30.07 (10.88)	26.62 (10.24)	8.10	-0.46
FinAn	31.25 (11.06)	29.50 (10.76)	4.02	-0.23	27.62 (10.26)	26.12 (9.85)	3.74	-0.21	28.03 (10.88)	26.25 (10.25)	4.18	-0.24
Scie	32.28 (9.88)	33.52 (9.33)	-3.23	0.18	27.01 (9.20)	27.76 (8.61)	-2.11*	0.12	28.32 (10.81)	27.27 (10.52)	2.47*	-0.14
SosSc	29.90 (10.83)	37.49 (10.73)	-17.64	1.00	25.20 (10.05)	30.04 (10.06)	-12.03	0.68	28.85 (11.13)	36.64 (10.80)	-17.85	1.01
QuaC	29.15 (9.43)	25.77 (8.57)	9.27	-0.53	26.77 (8.67)	23.38 (7.83)	10.13	-0.58	23.87 (9.75)	21.04 (8.65)	7.58	-0.43
ManWo	23.13 (10.00)	18.13 (9.04)	12.97	-0.74	22.63 (9.06)	16.56 (7.53)	17.83	-1.03	20.01 (9.50)	15.62 (8.15)	12.19	-0.70
PerSer	28.69 (9.69)	37.11 (9.13)	-22.52	1.26	27.26 (8.88)	31.75 (8.60)	-12.89	0.73	24.86 (9.65)	26.74 (9.32)	-5.00	0.28
ConsRep	28.58 (10.24)	22.28 (9.12)	16.03	-0.92	25.68 (9.25)	18.77 (7.63)	19.94	-1.15	22.86 (9.85)	16.90 (8.56)	15.88	-0.91
BasSer	27.17 (9.91)	29.53 (9.46)	-6.13	0.34	29.03 (9.17)	30.75 (9.14)	-4.70	0.27	22.36 (9.32)	25.24 (8.93)	-7.85	0.45

Explanation: ** significant with $\alpha < 0.01$ and * significant with $\alpha < 0.05$

By considering gender difference, in Activity item format, females were higher in *SocF, Art, Help, Scie, SoSc, PerSer,* and *BasSer*; while males were higher in *Man, DatPr, Mec, BusSys, FinAn, QuaC, ManWo,* and *ConsRep*. In Competence item format, females were higher in *SosF, Art, Help, Scie, SoSc,* and *PerSer*; whilst males were higher in *Man, DatPr, Mec, BusSys, FinAn, QuaC, ManWo,* and *ConsRep*. In Occupational item format, females were higher in *SosF, Art, Help, SosSc, PerSer,* and *BasSer*; whilst males were higher in *DatPr, Mec, BusSys, FinAn, Scie, QuaC, ManWo,* and *ConsRep.*

Discussion

This research aims to evaluate the psychometric properties of PII. The results show that PII had a good psychometric property. Therefore, it is expected that PII can be utilized and can contribute to the process of measuring interest that is relevant to the context in Indonesia. In addition, it is expected that PII can be used for purposes such as career counseling or the search for vocational interest itself. Results of descriptive statistics indicate that several interest areas had a higher value than other areas. This is indeed in line with the estimation that vocational interests are not evenly distributed (Maree & Taylor, 2016; Tracey, 2002). Moreover, based on *the spherical model of interest*, interests are divided into basic interests, high prestige interests and low prestige interests which certainly explain why several areas are more preferred than others (Tracey, 2002).

Estimated reliability value of all item formats and interest areas in PII also show relatively high value. Similar results were also indicated in other researches based on a spherical model of interest (Etzel *et al*., 2016; Long, Adams, & Tracey, 2005; Šverko, 2008). Thus, items in each interest area together consistently measured the same construct. It still, however, requires further research on the reliability evidence by repeated tests to determine the stability of measurement.

Other result shows good evidence on the internal structure of PII. In the analysis using secondary confirmatory factor analysis, almost all model fit indices met the standard set (Hooper *et al*., 2008), meaning that the data fit the hypothesized model. Therefore, this can assist in providing evidence that the score resulted from PII can be used as a basis for interpreting the score produced. However, it still requires further examination on items with factor loading not meeting the standard.

The difference in interest preferences between gender is indeed in accordance with previous researches (Tracey, 2002; Elena, 2014; Lawson *et al*., 2018; Volodina & Nagy, 2016). Male participants had more of a preference on activities, felt more capable and also had more of a preference on occupations in *Man, DatPr, Mec, BusSys, FinAn, QuaC, ManWo,* and *ConsRep*. Male participants also had more of a preference on occupations in *Sci,* but not in *Man.* Meanwhile, female participants had more of a preference on activities, felt more capable, and had more of a preference on occupations in *SosF, Art, Help, Scie, SocSc, PerSer,* and *BaSer*; but felt less capable in *BaSer* and had less preference on occupations in *Scie*. The significant difference of scores in those interest areas serves as a basis in the norming of PII which is differentiated between male and female, and so a value of the norm will be equivalent.

Although the empirical results indicate good reliability value and validity evidence of PII, there are several limitations in this research that require consideration. First,

despite that the sample size was quite large and varied by age, gender and employment status, they were geographically limited as most of the data was only from one region, namely West Java and a small section of Jakarta. The l`arge sample size that represents Indonesia is essential, considering that Indonesia varies in terms of ethnicity in each region. In addition, the sample size for the employed status was relatively limited, and therefore this could be expanded.

The second limitation is related to validity evidence. This research still focused on validity evidence based on internal structure. PII resulted significantly higher scores compared to other existing interest and personality instruments. Therefore, further research regarding relationship between scores obtained and similar instruments is required. This can help facilitate the interpretation of scores resulted from PII.

The third limitation is related to the considerable number of items and the existence of relatively low factor loading items. Development of PII with a more briefer format without compromising quality of the result is essential for the time efficiency of data collection. Research on this briefer format corresponds with the researches on existing interest inventories (Tracey, 2010). Item response theory approach can be used to rule out the low factor loading items.

Conclusion

PII is a new interest inventory that can help identify individual interest in future career direction. The advantages of this instrument are that it doesn't only measure individual vocational interest, but also individual competence belief to perform the career choice. This certainly could assist individuals with unclear career choices. PII has good psychometric properties, both in terms of consistency and the measurement fit with the construct being used. In addition, this research finds that there are gender differences in interest preferences that the norming by gender becomes important. This research also proves that PII can be used for individuals within Super's career stage of exploration (Super, 1990). Therefore, PII can help individuals in career choices and assist the process of career counseling in order to make the right career choice.

Recommendation

Further research on the psychometric property should be directed in the expansion of sample in relation to norms in Indonesia, predicted validity and other instruments, and the development of PII with a briefer format using item response theory. In addition, due to the advancement of technology, development of web-based PII should be considered as it faces a generation intensely engaging with technology. Therefore, PII can have promising development in measuring vocational interests.

References

Betz, N. E., Harmon, L. W., & Borgen, F. H. (1996). The relationships of self-efficacy for the Holland themes to gender, occupational group membership, and vocational interests. *Journal of Counseling Psychology*, *43*(1), 90.

Bloye, J. E. (2007). *Vocational interest and other non-cognitive factor as predictors of academic performance in high school*. Thesis: University of Johannesburg

Elena, M. A. (2014). The role of gender in the formation of vocational interests and career orientation in adolescence.

Procedia - Social and Behavioral Sciences, *127*, 240–244. doi: 10.1016/j.sbspro.2014.03.248

Etzel, J. M., Nagy, G., & Tracey, T. J. G. (2016). The Spherical Model of Vocational Interests in Germany. *Journal of Career Assessment*, *24*(4), 701–717. doi: 10.1177/1069072715616122

Field, A. (2009). *Discovering statistics using SPSS*. London: Sage publications.

Hidi, S. (1990). Interest and its contribution as a mental resource for learning. *Review of Educational Research*, *60*(4), 549–571.

Hidi, S., & Renninger, K. A. (2006). The four-phase model of interest development. *Educational Psychologist*, *41*(2), 111–127.

Holland, J. L. (1973). *Making vocational choices: A theory of careers*. New Jersey: Prentice Hall.

Holland, J. L. (1985). *Making vocational choices: A theory of personality and work environments* (2nd ed.). New Jersey: Prentice Hall.

Holland, J. L. (1997). *Making vocational choices: A theory of vocational personalities and work environments* (3rd ed.). Odessa: Psychological Assessment Resources.

Hooper, D., Coughan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Journal of Business and Research Methods*, *6*(1), 53–60.

Jansen, M., Lüdtke, O., & Schroeders, U. (2016). Evidence for a positive relation between interest and achievement: Examining between-person and within-person variation in five domains. *Contemporary Educational Psychology*, *46*, 116–127. doi: 10.1016/j.cedpsych.2016.05.004

Kaplan, R. M., & Sacuzzo, D. M. (2005). *Psychological testing: Principles, applications, and issues*. USA: Thomson & Wardsworth.

Kelly, R. K. (2002). Concurrent validity of the kuder career search activity preference scales and career clusters. *Journal of Career Assessment*, *10*(1), 127–144.

Kuder, G. F. (1948). *Kuder preference record-personal*. Oxford: Science Research Associates.

Kuhn, T. (1962). *The structure of scientific revolutions*. University of Chicago Press.

Lawson, K. M., Lee, B., Crouter, A. C., & Mchale, S. M. (2018). Correlates of gendered vocational development from middle childhood to young adulthood. *Journal of Vocational Behavior*, *107*(April), 209–221. doi: 10.1016/j.jvb.2018.05.002

Li, X., & Yang, X. (2016). Effects of learning styles and interest on concentration and achievement of students in mobile learning. *Journal of Educational Computing Research*, *54*(7), 922–945. doi: 10.1177/0735633116639953

Long, L., Adams, R. S., & Tracey, T. J. G. (2005). Generalizability of interest structure to China: Application of the Personal Globe Inventory. *Journal of Vocational Behavior*, *66*(1), 66–80. doi: 10.1016/j.jvb.2003.12.004

Maree, J. G., & Taylor, N. (2016). Development of the maree career matrix: A new interest inventory. *South African Journal of Psychology*, *46*(4), 462–476. doi: 10.1177/0081246316641558

McDonald, R. P., & Ho, M.-H. R. (2002). Principles and practice in reporting structural equation analyses. *Psychological Methods*, *7*(1), 64–82.

Miller, K. M. (1958). *Manual for the Rothwell*

interest blank (Miller revision). Melbourne: Australian Council for Educational Research.

Revelle, W. (2017). *An overview of the psych package*. *R package version 1.5.8*. Evanston. Retrieved from http://personality-project.org/r/overview.pdf

Rosseel, Y. (2012). lavaan : an R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*(2), 1–21. doi: 10.18637/jss.v048.i02

Rothwell, J. W. (1947). *A ranking method of assessing vocational interest*. Melbourne: University of Melbourne.

Sharf, R. S. (2006). *Applying career development theory to counseling*. Belmont, CA Thomson: Nelson Education.

Sireci, S. G., & Sukin, T. (2013). Test validity. In K. F. Geisinger (Ed.), *APA handbook of testing and assessment in psychology* (pp. 85–100). Washington DC: American Psychological Association.

Sodano, S. M., & Tracey, T. J. G. (2008). Prestige in interest activity assessment. *Journal of Vocational Behavior*, *73*(2), 310–317. doi: 10.1016/j.jvb.2008.07.002

Super, D. E. (1990). A life-span, life-space approach to career development. Dalam: Brown & L. Brooks (Eds.), *Career choice and development: Applying contemporary theories to practice* (2nd ed., pp. 197–261). San Fransisco: Josey-Bass.

Suwartono, C. (2016). Alat tes psikologi konteks indonesia: Tantangan psikologi di era MEA. *Jurnal Psikologi Ulayat*, *3*(1), 6. doi: 10.24854/jpu12016-51

Šverko, I. (2008). Spherical model of interests in Croatia. *Journal of Vocational Behavior*, *72*(1), 14–24. doi: 10.1016/j.jvb.2007.10.001

Tracey, T. J. G. (2002). Personal globe inventory: Measurement of the spherical model of interests and competence beliefs. *Journal of Vocational Behavior*, *60*(1), 113–172. doi: 10.1006/jvbe.2001.1817

Tracey, T. J. G. (2010). Development of an abbreviated Personal Globe Inventory using item response theory: The PGI-Short. *Journal of Vocational Behavior*, *76*(1), 1–15. doi: 10.1016/j.jvb.2009.06.007

Tracey, T. J. G., & Rounds, J. (1997). *Circular structure of vocational interests*. Washington DC: American Psychological Association.

Tracey, T. J. G., & Rounds, J. B. (1992). Evaluating the RIASEC circumplex using high-point codes. *Journal of Vocational Behavior*, *41*, 295–311.

Volodina, A., & Nagy, G. (2016). Vocational choices in adolescence : The role of gender, school achievement, self-concepts, and vocational interests. *Journal of Vocational Behavior*, 95–96, 58–73. doi: 10.1016/j.jvb.2016.07.005

Yudiana, W. (2011). *Perancangan dan evaluasi instrumen pengukuran minat untuk siswa Sekolah Menengah Atas Negeri di kota Bandung*. Unpublished manuscript, Padjadjaran University.

Yudiana, W., Purwono, U., & Wiyono, S. (2011). *Technical manual padjadjaran interest iventory*. Bandung. Retrieved from https://www.researchgate.net/publication/326292604_Technical_Manual_Padjadjaran_Interest_Inventory