Personality Factors Affecting Athlete Performance in Baseball and Softball: Identification and Instrument Development

Weni Endahing Warni[1], Urip Purwono[2]
[1]*Airlangga University, Indonesia*
[2]*Universitas Padjadjaran, Indonesia*

Abstract: **Aside from physical and technical factors, personality plays an important role in athlete's achievement and performance. Despite its importance, study in this area, especially in the area of Baseball and Softball is very limited. In Indonesia personality research related to Athlete's performance and achievement in Baseball and Softball has never been reported. This study is aimed at filling this gap. The objectives are two folds. Grounded in traits and types approach to personality, the first objective of the study was to identify personality dimensions critical to athlete's performance in baseball and softball. Further, this study also addressed the need for a well-grounded, reliable, and valid tools to assess these personality dimensions by developing a self-report instrument. We first conduct a series of interview and focused group discussion with coaches and elite athletes to identify dimensions important to athletes' performances in baseball and softball fields. We found 13 personality dimensions identified as critical to athletes' performances in baseball and softball, namely (1) Practical intelligence, (2) Concentration, (3) Emotional Stability, (4) Self Confidence, (5) Ability to Control Anxiety, (6) Adjustment, (7) Self-Discipline, (8) Commitments, (9) Openness, (10) Motivation, (11) Ambition for Achievement, (12) Teamwork, and (13) Leadership. These results were validated by a panel of experts through an invited workshop. To assess these these dimensions, we develop Athlete Personality Questionnaire (APQ) consisting of 80 items. Rating Scale analysis using Rasch Model to the field testing data collected from 514 baseball and softball athletes shows the APQ yield scores with high reliability (Cronbach's Alpha = .96) and person reliability of .95. The item polarity indices also indicate that the instruments have items with a very good level of measurement accuracy. We also validated the instrument using Batting Average, as criterion. Employing Partial Least Square procedure, we found that eight personality dimension has a significant relationship with the criterion measures while five other dimensions did not.**

Keywords: **Personality, Test Development, Rasch, Athlete's Performance, Sport Psychology**

I. INTRODUCTION

A discussion on athlete's performance and achievement focusing only on athletes' skill and physical condition nowadays would fall short without including a topic on the psychological aspects of sport performances and achievement. It has been widely accepted that psychological factors affect athletes' performance and achievement both throughout the training session to the season's competition. For example, study in sport psychology on athletes' achievement conducted by Connaughton and Hanton (2009) concluded that psychological factors contribute the highest in determining athletes' success compared to other factors. Similar findings were reported by Jones et al. (2007) and Gould et al. (2002).

The study on the significance of psychological factors in competitive sport was dated back to 1898 when Triplett conducted his fishing rod experiment at Indiana University mimicking the practice and training situation of the "Little 500", a cycling competition named after the infamous Indy-500 Formula-1 racing. He concluded that the present of others during sport practices had a psychological impact in motivating the athlete to paddle harder because it stimulates feeling of competition (Weinberg & Gould, 2007). Tripplet's experimentation has raised interest on the study on the effect of psychological aspects in sport, an area of study that has sustainably gained more attention since then. The ever growing interest in psychological research in sport are also partly in response to the increasing need to incorporate psychological science and practices to boost athletes' performances and achievement beyond technical skill and physical condition.

Among many psychological factors, individual athlete's personality plays a central role in affecting athletes' performance and achievement. Interest in the study of personality factors in sport arises at least for three specific reasons. First, a successful athlete is one that met the best qualification, not only physically but also psychologically (see for example Brown, 2001; Greenleaf, Gould, & Dieffenbach, 2001; Orlick, 1990). Baker and Horton (2004) asserted that psychological factor was one of the primary factors affecting athlete's performance along with genetic factor and training.

Second, it is central for coaches and officials to understand the personality of each individual athlete in the team. This understanding is important for several reasons. Comprehending athlete's personality will help coach to develop individualized training program that suitable to each individual athlete. Besides, coach understanding of his/her athlete's personality will help coaches to prepare athletes for a competitive game. The understanding will also help coach to

form his/her team and to select best combination of athlete for a given competition, aside from a consideration of skills and physical condition of the athletes. A research in Indonesia that shows the importance of personality or psychological aspects in determining athletes' achievements and performances and in developing training programs was conducted by Yuwanto and Sutanto (2012). Their results showed that the understanding of athletes' personality through reading psychological reports helps coaches and officials to provide more appropriate suggestions to improve athletes' achievements.

While studies in the area of personality in the context of competitive sports has increasingly gained more attention elsewhere, only a limited number of studies has been reported in Indonesia. Among this limited number of study, Gunarsa (1989) reported that personality factors affecting athletes' performance include (1) motivation, (2) emotion, and (3) cognition. Along this line, Hartanti, Pambudi, Zainal, & Lasmono (2004) found that intelligence, interest, intrinsic motivation, self-confidence, ambition, and high need for achievement characterized elite athletes. These notions are consistent with the hypotheses uttered by Amrun (2017) who listed nine psychological skills every individual athlete should possess to drive his/her performance. These skills include attitude motivation, goals and commitment, people skill, positive self-talk, mental imagery, dealing effectively with anxiety, dealing effectively with emotions, and concentration.

Personality studies conducted in the area of specific sports indicated that to be successful in different sports require different personalities to fit the sport's characteristics. In table tennis, Utama (2010) discovered that psychological factor determining whether an individual athlete will be able to reach his/her best performance include intelligence, motivation, special aptitude, willingness, attention, anxiety, emotional stability, aggressively, braveness, self-confidence, and fighting spirit. Research in swimming has identified that achievement motivation and self-confidence have a positive effect on athletes' achievement (Supriyanto, 2012). In the area of archery, Suryanto (2010) reported six important traits affecting junior athlete's performances including (1) Motivation, (2) Communication, (3) Cooperation, (4) Adaptation, (5) Initiative, and (6) Confidence.

Furthermore, Dimyati (2010) list psychological characteristics of successful athletes in archery, tae-kwon-do, *pencak silat* (Indonesian martial arts), soccer, athletics, volley ball and *takraw*,andsoccer he noted during the Students Education and Training Canter program (PLPP). Soccer athletes require higher motivation, confidence and mental preparation compared to other sports. Tae-kwon-do athletes require high anxiety control and concentration while volley ball athletes demand high teamwork.

This study concentrates in the sport of baseball and softball. Our interest in these sport arises for three different reasons. First, baseball and softball have increasingly gained popularity at least in the last 20 years. Softball was first competed in Indonesia at the National Sports Competition (PON) in 1969, while baseball in 2004. The popularity of softball and baseball increased unexpectedly after the sport was played in the 2004 competition. The steady increasing interest to these sports was indicated by the increasing number of young athletes playing the sport and the increasing number of competition across different age groups. However, this increasing interest does not drive achievement. Many targeted achievements of the national team were missed and team performance is not yet getting much better. We suspect that these low performance and achievement of the national team is related more to psychological factors than technical and physical factors.

The second reason is that baseball and softball have a unique characteristic. The game is played by individuals in a team where everyone has a specific designated role with regard to his/her not only at the time of "fielding" (defending) but also at the time of hitting (offend). This unique characteristic of the sports has made the performance of the team relied heavily on the performance of the individual players, thus also affected by the psychological aspect of the individual player.

Despite the growing interest and the increase popularity of the sports, psychological research targeted to investigate "the psychology of the athlete" in these two sports is very limited. With regard to personality research, no report on the study relating athlete's personality to his/her and team performance and achievement conducted in Indonesia was found. This study was aimed at filling this gap. The objectives of the study were two folds. First is to identify personality dimensions that were associated with the success of baseball's and softball's athletes. The second objective of this study is to develop psychometric instrument specifically designed to be used by athletes assessing the dimensions. We hypothesize that there are unique personality dimensions related to athlete's performance and achievement in baseball and softball.

The second objective of the study was to develop instrument to assess these dimension. We believe the availability of the instrument would be beneficial to sport psychologist who, most of the time, in order to assess athlete's personality, have to use general comprehensive objective personality assessment that are not only un-efficient but also consist of items that are not specifically developed to fit in the context of sport, especially softballs and baseballs. In this regard, the objective of this study was in the same path with the study reported by Wheaton (1998) when he developed *Psychological Skills Inventory of Sport* assessing athlete's 6 *psychological skills* including *achievement*, motivation, goal setting, anxiety control, maintenance of self-confidence and concentration, and mental exercise.

II. METHODS

This study was conducted in two stages. First, to identify personality dimensions affecting athlete's performance and achievement, we started the study by interviewing baseball and softball athletes. We conducted the interview individually with prior appointment. Each interview last for about 1 hour opened by a leading question, "What makes you perform well and reach a high achievement in baseball/softball". The question, then was followed by inquiries to get a clearer understanding of the participants' views, particularly in term of dimensions mentioned in his/her answer. This interview was then followed by Focused Group Discussion (FGD) and invited seminar of experts in sport psychology to clarify and discussed the results. Finally, prioritization of the identified dimensions was conducted through limited discussion with certified national coaches of Women Softball Team and the 2017 National Asia Cup Team.

In developing the instrument, we closely adhere to the steps described in the Standard for Educational and Psychological Testing (AERA, APA, & NCME, 2014) and steps explicated by Crocker and Algina (2008) which include developing the purpose and the construct to be measured, developing test specification, developing the item, piloting the measures, field testing, revision, assembling the test, and validating the result.

The test specification was developed by deriving indicators of each of the dimension based on its description and definition.Indicators of each of the traits were elicited through discussions and interviews with national baseball and softball athletes and coaches. Pilot testing of the items were conducted to pre-select and revise the items for field testing. The field testing data was analysedusing Rasch's Rating Scale Analysisas included in the Winstep application [27]. Misfit items were discarded from the overall test and consequently were not included in the subsequent field testing.

Prior to the field testing, subject matter experts were asked to review the selected items with regards to its relevance, importance, and clarity to the definition of each of the dimensions.Finally, the items were assembled in non-systematic and interspersed order so that item assessing each dimension were spread out throughout the instrument.

A total number of 527 athletes participated in the study. Listwise deletion resulted in 514 athletes consisted of 363 men and 151 women. Table 1 shows a gender by national-provincial status of the athletes.At the initial stage of the study, 12 athletes participated in the interview. All of the athletes belong to the national softball and baseball team, consisting of seven (man) and five (woman) national baseball players. The invited expert seminar and the Focused Group Discussion was participated by a total of 11 academicians and practitioners in the area of sport psychology and the eight members of the National Athletes' Selection Committee of the Indonesia's Gold Medal Program. Finally, five certified national coaches of National Women Softball Team and the 2017 Indonesia's National Asia Cup Team was participated in the prioritization of the identified dimensions. Subsequently, a pilot study of the pre-reviewed items was conducted involving 68 baseball and softball players.

Table 1. Demographic Data and Characteristics of Participants

Gender	Male	363
	Female	151
Province	Jawa Barat	166
	Lampung	35
	Yogyakarta	32
	Kalimantan Timur	64
	Sulawesi Selatan	10
	Kalimantan Tengah	2
	Bali	33
	Banten	48
	DKI Jakarta	43
	Papua	20
	Sumatera Utara	2
	Jawa Timur	53
	Sulawesi Tenggara	2
	Riau	4
Sport	Baseball	363
	Softball	151
Match Level	National	437
	International	77
Age Category	Junior (under 21)	315
	Senior (above 21)	199
Experience	Less than 2 years	62
	2-5 years	216
	More than 5 years	236

Participants were recruited during the national baseball and softball events from February to May 2016. The events include: (1) softball and baseball Junior Championship (Jakarta, February 2016), (2) Gorgeous Cup 2016: Indonesian Women's National Championship (Bandung, February 2016, (3) UGM Cup 2016: Indonesia's National University Championship Yogyakarta, March 2016), (4) Mayor League Softball Championship 2016 (Surabaya, May 2016), and (5) the 19th Indonesian National Sports Week (PON) Baseball Championship 2016 (Bandung, January 2016). In addition, data was collected by sending instruments to regions that carried out Regional Training Canters in preparation of the Indonesian National Sports Week (PON) 2016. Employing this method, we were able to recruit participant from DKI Jakarta, East Borneo, Bali, Yogyakarta, West Java, West Papua and East Java.

III. RESULTS

Personality Dimensions

Through thematic analysisofthe interview data, we were able to identify 13personality dimensions contribute to athlete's performance and achievement. The dimensionincludes (1) Practical intelligence, (2) Concentration, (3) Emotional Stability, (4) Self Confidence, (5) Ability to Control Anxiety, (6) Adjustment, (7) Self-Discipline, (8) Commitments, (9) Openness, (10) Motivation, (11) Ambition for Achievement, (12) Teamwork, and (13) Leadership. Conceptual definition of each of these dimensions are depicted in the Table 3.

This result was further validated through FGDs and Experts Seminar. Table 4. shows the relative importance of these personality dimension as ranked by the national coaches. The rankingwas consistent with the athlete's perspective elicited during the interview and it isalso in agreement with the opinionof Sport Psychology experts in the aforementioned seminar.

Table 2. Personality Dimensions Contributing toBaseball andSoftball Achievement andPerformance

No	Trait	Athlete's Description	Indicator
A	Intelligence	Ability to comprehend, understand, and adapt in a competitive situation resulting in the ability to make correct, quick, and accurate decisions.	1. Ability to comprehend, understand, and adapt to various situation. 2. Ability to make a correct, quick, and accurate decision.
B	Concentration	The ability to focus attention, feelings and energy so that the individual is not easily distracted by external and internal stimuli during training and competition.	1. Focusing thoughts, attention, feelings, and energy to one thing. 2. Not easily distracted by external or internal stimuli during training and games.
C	Emotional Stability	Ability to manage and control emotions effectively, and to direct emotions to improve achievements so that it is not easily fluctuatedin response toexternal stimulationand resulted in the forms of appropriate expression of emotions, adequate control emotional reaction, and adaptability to the environment.	1. Ability to express emotions appropriately 2. Ability to control emotions 3. Ability tostrike a balance between one's need and other's expectation
D	Self Confidence	Assurance of one's abilities and the courage to take challenges, obstacles and risks over each competitions while recognizingone's strengths and weaknesses.	1. Confident with one's ability. 2. The courage to take on challenges/obstacles/ risks. 3. Recognize one's strengths and weaknesses.
E	Anxiety Control	The ability to manage/control mental pressures as a result of perceived threat originated from targetedachievement, people, incidents or objects.	1. Ability to manage pressure 2. Ability to overcome pressure resulted from people, incidents, and objects as well as targeted achievement perceived as threats.
F	Adjustment	An individual characteristic that includes mental response and behavior, in anattempt to successfully fulfil one's needs, reduce tension, resolve conflicts, and handle frustration in order to find an acceptable balancebetween the individual personal demands and other's expectations.	1. Ability to resolve conflictsoccurring between himself/herself and the environment.
G	Self-Discipline	Effortful control to obey rules and regulation; understanding and awareness to adhere to norms, responsibility to adopt value system, support rules and regulation, and fostering a sense of pride for being able to control one self.	1. Abilityto obey rules 2. Obedience 3. Responsible 4. Self-control
H	Commitment	Persistency and obedience to seriously adhere to rules for a rather long period of time; responsibility to guard self and other; fully dedicated to the team, even at a difficult time to reach targeted achievement. Keeping one's promise.	1. Keep promises 2. Do tasks/obligations to reach targeted achievement
I	Openness	The ability to accept critiques, suggestions and feedback from others, especially coaches and fellow team members, and utilize it for self-development, evaluate skills, manage emotion, and direct oneself to achieve a higher goal and achievements.	1. Ability to accept critique, suggestions and feedback for self-development. 2. Ability to evaluate oneself 3. Ability to lead other to achieve ahigher goals and achievement

No	Trait	Athlete's Description	Indicator
J	Motivation	Internal state or processes that drive behavior toward a victory; clear steps in developing sports achievement indicated by diligence, hard work, maintain order, and discipline throughout the training,and is not dependant to others	1. Internal state that drives oneself to reachindividual or team's goals 2. Tangible effort towardself-development 3. Diligent, hardworking and independent
K	Ambition for Achievement	Strong drive to compete, reach a given target and achievement, fully oriented toward winning indicated by diligence, effort and focus to achieve success and defeat opponents.	1. Encouragement for competition 2. Encouragement to achieve targets and victory 3. Diligence in training 4. Effort to defeat opponents.
L	Teamwork	The ability to communicate and interact effectively with other team members (coach, athlete, manager) to reach deep mutual understanding on team's identity, philosophy, individual roles and goals to be achieved.	1. Able to communicate effectively 2. Able to interact with other team members.
M	Leadership	The ability to influence, guide, encourage, inspire, direct and control both during practice training and competition to reach the team's success.	1. Influence 2. Guide 3. Encourage 4. Inspire 5. Direct 6. Control

Table 3. Relative Importance of the Dimensions toBaseball andSoftball Performance and Achievement

Code*	Trait	SN	HJ	ZN	EF	RA	Score	Ranking
G	Discipline	3	6	3	2	1	15	1
A	Intelligence	4	1	13	1	4	23	2
D	Self Confidence	5	3	5	3	7	23	2
B	Concentration	6	2	6	4	8	26	3
H	Commitment	1	7	1	5	12	26	3
J	Motivation	2	8	11	7	3	31	4
L	Teamwork	7	11	2	7	6	33	5
C	Emotional Stability	8	4	10	12	2	36	6
K	Ambition of Achievement	10	9	7	6	5	37	7
F	Self-Adjustment	12	5	9	9	10	45	8
I	Openness/ Communication	11	10	4	11	9	45	8
M	Leadership	13	12	8	8	13	54	9
E	Anxiety Control	9	13	12	10	11	55	10

*Based on the initial code in the item pool

Subject Matter Expert Review.

The objectives of the next step of the study was to developed instrument assessing the 13 personality dimensions identified in the earlier study.To facilitate item writing, we developed test specification based on indicators of each of the dimensions as depicted in Table 3. Acontent review was conducted by subject matter expert prior to the field testing.

Nine subject matter experts were asked to rate each of the items to investigate the validity of the content of the test. Among various procedures, we used oneinvolving empirical data that isby calculatingthe content validity index (CVI) and content validity ratio (CVR). We employed this procedure for the following reasons:

1. CVI is the most widely reported approach to study content validity of items included in an instrument. The index can be computed using the Item-CVI (I-CVI) and the Scale-level-CVI (S-CVI). I-CVI is computed as the number of experts giving a rating of "*very relevant*" for each item divided by the total number of experts. Values were range from 0 to 1.When the I-CVI > 0.79, the item is considered relevant. When the number fall between 0.70 to 0.79, the item is considered needs revision.When the

value is below 0.70 the item is considered to beremoved from the test.

2. The second approach was to calculate the Content Validity Ratio (CVR). The CVRindicates the essentiality of an item. CVR ranges from 1 to −1 where a higher score indicates greater agreement among panel members. The formula for the CVR is,

$$CVR = (Ne – N/2)/(N/2)$$

where Ne is the number of panellists indicating an item as "essential" and N is the total number of panellists.

The CVR and CVI of the scale are shown in Table 5 and 6.Referring to Lawshe (1975), the CVI and CVR of all of the items were above the minimum value,at alpha= .05indicating that the items were relevant, important, and clear.The CVI of the items showed a minimum value of -.11 and with a maximum value of 1. On the other hand, the minimum value of CVRwas .72 with the maximum value of 1. With 11 expertsinvolved, the CVR exceededthe minimum value .59 indicating that all of the items met the criteria (Lawshe, 1975).

Table 4. CVR of the Items

Item Number	CVR	Notes
34	-0.11	Reviewed
85	0.11	Reviewed
2, 6, 26, 64, 73, 81, 114, 118, 120, 130	0.33	Reviewed
9, 13, 22, 44, 45, 47, 51, 61, 82, 86, 115, 124	0.56	Accepted
1, 3, 4, 7, 14, 15, 17, 18, 19, 20, 21, 23, 25, 28, 29, 31, 33, 36, 37, 41, 42, 43, 46, 48, 49, 50, 54, 59, 64, 68, 69, 71, 77, 78, 83, 87, 91, 92, 100, 102, 106, 108, 112, 116, 117, 121, 122	0.78	Accepted
5, 8, 10, 11, 12, 16, 24, 27, 30, 32, 35, 38, 39, 40, 52, 53, 55, 56, 57, 58, 60, 62, 63, 66, 67, 70, 72, 74, 75, 76, 78, 80, 84, 88, 89, 90, 93, 94, 95, 96, 97, 98, 99, 101, 103, 104, 105, 107, 109, 110, 111, 113, 119, 123, 125, 126, 127, 128, 129	1	Accepted

Table 5. CVI of the Items

Item Number	CVI	Notes
34, 85, 114	0.72	Accepted
81, 118, 121	0.78	Accepted
2, 6, 13, 26, 65, 73, 82, 86, 115, 119, 120, 124, 130	0.83	Accepted
9, 22, 44, 45, 47, 51, 61, 68, 87, 112,	0.89	Accepted
1, 3, 4, 7, 14, 15, 17, 18, 19, 20, 21, 23, 25, 28, 29, 31, 33, 36, 37, 41, 42, 43, 46, 48, 49, 50, 54, 59, 64, 69, 71, 77, 79, 83, 91, 92, 100, 102, 106, 108, 116, 117, 121, 122	0.94	Accepted
5, 8, 10, 11, 12, 16, 24, 27, 30, 32, 35, 38, 39, 40, 52, 53, 55, 56, 47, 58, 60, 62, 63, 66, 67, 70, 72, 74, 75, 76, 78, 80, 84, 88, 89, 90, 93, 94, 95, 96, 97, 98, 99, 101, 103, 104, 105, 107, 109, 110, 111, 113, 123, 125, 126, 127, 128, 129	1	Accepted

Rating Scale Rasch Analysis

Analysis of the field testing data was performed based on a Rasch's Model[14]. Rasch model belongs to the family of Item Response Theory (IRT) with only one item parameter included in the model where the D scaling was set to one(Hambleton, Swaminathan, & Rogers, 1991).We performed IRT based analysis because the IRT approach provides mathematical model at the item level so that behavior of any given item can be investigated. This behaviour of any single items is expressed in a mathematical function relating probability of success to the difficulty of the item. This function is represented in an item characteristics curve (ICC) plot (Yen, 1993). Another feature of the IRT approach important to this study areits invariance featurethat enable us to put "person ability" and "item difficulty", or in this case "item preference rate of response", in the same scale. Distribution of the item dan personparameters, then,can be plotted against each other.According to Embretson & Reise (2000), the Rasch model involves "model-based measurement in which trait level estimates depend on both the persons' responses and on the properties of the items that were administered.

While Rasch Model was originally developed to model with dichotomously scored item, we used the Rating Scale Analysis Rasch Model (Wright & Masters,1982)throughout the analysis. The estimation was performed with the help of WINSTEP computer program [14].We calculated the average of the threshold parameters as the "difficulty" of the item and the person measures and expressed them in log-odd unit (or logits). For the item "difficulty" parameter and person "ability" are placed in the same scale, the greater magnitude of the logit represents increasing item difficulty or higher

person ability. At any value of each of the personality trait, fewer subject ansering positively to the item indicates that the item is "difficult" which, in our case, related to the possession of the trait captured by the item.

The fit of the model was assessed by investigating the information-weighted fit statistic (INFIT), the outlier-sensitive fit statistic (OUTFIT). According to McCreary et al. (2013), the Infit explainsthe unexpected responses to items near the person's ability levelwhile the outfit indicates difference between observed and expectwinsteped responses regardless of how faraway the item endorsability is from the person's ability.

and the Point Measure Correlation. The summary of the statistics is depicted in the following Table 6.

As suggested by Sumintono & Widhiarso (2015) the fit items are those that has have INFIT value below the MNSQ + ZSTD, which, as shown in Table 6, is 1.27. The OUTFITcrtiterions we applied were .5 < MNSQ < 1.5 and -2.0 < ZSTD < +2.0. While the range of the Points Measure Correlation we took as criterion was .05 < Point Measure Correlation < .85. In addition, as the OUTFIT ZSTD will is not too sensitive to detect misft item for N > 500 (Boone, Staver, & Yale, 2014; Sumintono & Widhiarso, 2015), we pay attention mostly to OUTFIT MNSQ and Point Measure Correlation as the criterions. The summary results of the Rating Scale Rasch Analysis are shown in Table 6 and 7.

Table 6. Summary of the Rasch's Item Statistics

	Total Score	Count	Measure	Model Error	Infit		Outfit	
					MNSQ	ZSTD	MNSQ	ZSTD
Mean	1564.8	509.8	.00	.08	.99	-.5	1.02	-.2
S.D	164.6	11.9	.82	.01	.28	4.0	.30	4.3
Max.	1807.0	514.0	1.94	.09	2.36	9.9	2.48	9.9
Min	1090.0	444.0	-1.41	.06	.62	-6.8	.62	-6.7
Real RMSE .08		True SD	.81	Separation	10.31	Item	Reliability	.99
Model RMSE .08		True SD	.81	Separation	10.77	Item	Reliability	.99

Table 7. Summary Statistics of Rasch's Rating Scale Model

	Average Logit	Separation	Reliability	α-Cronbach
Person	1.29	4.24	0.95	0.96
Item	0.00	10.31	0.99	

As shown in Table 7, the *Cronbach's Alpha* of the measure was 0.96. Considering that internal consistency is a lower estimate of reliability [16], this high internal consistency indicates that the measure had a (classical) high reliability.

The results show that the vast majority of the items fit with the model except for items B9 (19),

C1 (21), D6 (36), E4 (44), E8 (48), E10 (50), and F7 (57).
We decided to not include these items on the final form of the measure.

Item and Person Separation

We used separation value as indicant of the overall quality of the scale. The greater the value, the better the overall quality of the instrument. The analysis resulted in a separation value of 4.81. Rounding it off to 5, it indicates that the scale wascapable to separate persons into 5 different groups. The item separation value was 10.77, rounded it off to the nearest integer it indicates that there are 11 levels of "difficulties" of the items. According to Fisher (2007), separation index value higher than 3.0 shows a good reliability which also implies that there is variety and accuracy in the sampling of the respondents. Furthermore, it also shows that there are 11 levels of item difficulties which implythat the instrument was able to separaterespondents from low levels of ability to high levels of ability (Sumintono & Widhiarso, 2015).

Unidimensionality

The unidimensionality of questions was determined using PCA method.Linacre (2006) suggested criteria used for determining unidimensionality includes the amount of variance explained by measures was > 20%, the unexplained variance of the eigenvalue for the first contrast (size) was < 3.0, and unexplainedvariance explained by firstcontrast was< 5%.

On the unidimensionality, the raw variance value obtained was 29% indicating that the minimum accepted value of unidimensionality of 20% is fulfilled. The unexplained variance valueswere below 10% (*unexplained variance* 4.6%, 3.8%, 2.7%, 2.1%, and 1.9%). These supported the unidimensional nature of the measures.

Item Rating Categories

Rasch Analysis model also provides verification on the scale uses in the instrument. We developed the instrument using a 4 points likert-like scale, ranging from Strongly Disagree to Strongly Agree. Results of the analysis shows that the observation average (OBSVD AVRGE) was ranging from logit 0.39 for the option with score value of 1 (Strongly Disagree), .33 for score values of 2 (Disagree), 1.18 forthe score value of 3 (Agree), and 2.19 for score value of 4 (Strongly Agree). Thenominal decrease of the logits between option 1 to option two, and discernible increase from option 1 and 2 to option 3 and to option 4 verify the use of the four points rating scale. A note can be made that participants may have some hesitation in choosing option 1.

Another criterion we used is the Andrich Threshold. The value of the threshold indicates whether the polytomous value used is appropriate or not. The Andrich Threshold obtained ranged from NONE to negative value (-0.192) and subsequentlyto positive values(+2.42) validated the use of the four points scalesof the instrument.

Final Version of the Instrument

Overall, the analyses above indicate that of all the 130 items 114 items were valid and the remaining 16 items were not valid to be included in the measure. The items that were not valid are items B9, C1, D6, E4, E8, E10, F7, I7, I9, J1, J8, J10, K1, K3, K8, and L9. We decided to discard these items and not included them in the final form of the instrument. The following Table 8 shows the final item distribution of the measures.

Table 8. Item Distribution of the Final Measures

No	Trait Code	Dimension/ Trait	Items Included	Items Discarded
1	A	Intelligence	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	-
2	B	Concentration	11, 12, 13, 14, 15, 16, 17, 18, 20	B9 (19),
3	C	Emotion Stability	22, 23, 24, 25, 26, 27, 28, 29, 30	C1 (21)
4	D	Self Confidence	31, 32, 33, 34, 35, 37, 38, 39, 40	D6 (36)
5	E	Anxiety Control	41, 42, 43, 45, 46, 47, 49	E4 (44), E8 (48), E10 (50)
6	F	Self-Adjustment	51, 52, 53, 54, 55, 56, 58, 59, 60	F7 (57)
7	G	Discipline	61, 62, 63, 64, 65, 66, 67, 68, 69, 70	-
8	H	Commitment	71, 72, 73, 74, 75, 76, 77, 78, 79, 80	-
9	I	Openness	82, 83, 84, 85, 86, 87, 88, 90	I1 (81), I9 (89)
10	J	Motivation	91, 92, 93, 94, 95, 96, 97, 98, 99, 100	J1(91), J8(98), J10 (100)
11	K	Ambition of Achievement	102, 104, 105, 106, 107, 109, 110	K1 (101), K3 (103), K8 (108)
12	L	Teamwork	111, 112, 113, 114, 115, 116, 117, 118, 120	L9 (119)
13	M	Leadership	121, 122, 123, 124, 125, 126, 127, 128, 129, 130	-

Validity

The most important step in developing a measure is the validation steps. We used internationally common statisticsused in Baseball and Softball to reflectathlete's performance as the criterion. The statisticswere"Run Bat In" (RBI), "Hit" (Hit), "Batting Average" (BA), and "Slugging Average" (SA). These indicants of athlete's performance werethe one officially used internationally. The calculation was performed with the help of 'fix it' application. The scores collected include:

a. Run Batted In (RBI).A run batted in (RBI) is a statistic in baseball and softball that credits a batter for making a play that allows a run to be scored (except in certain situations such as when an error is made on the play). For example, if the batter bats a base hit, then another player on a higher base can head home to score a run, and the batter gets credited with batting in that run.
b. Hit.Hit is a statistic credited to a batter when the batter safely reaches first base after hitting the ball into fair territory, without the benefit of an error or a fielder's choice
c. Batting Average.A measure of a batter's performance obtained by dividing the total of base hits by the number of times at bat, not including walks, sacrifices, times hit by a pitch, or times interfered with by the catcher.
d. SluggingAverage.Slugging Average is a measure of the batting productivity of a hitter. Unlike batting average, slugging percentage gives more weight to extra-base hits such as doubles and home runs, relative to singles.

We correlated the individual true scores on the overall athlete personality test with athlete'sperformance achievement recordemploying PLS-SEM analysis based on R. The

personality test results are correlated with the performance statisticsof the athletes.

Of the total number of 514 participants, only 201 athletes that have individual record in the National Database. Therefore,we only include 201 partcipants responses in the analysis. The following Table 9 shows the results of the analysis.

Table 9.Personality Traits that Contribute in Performance

Dimension/ Trait	Hit	Bav	RBI	Slug
Intelligence (A)	√	√	√	
Concentration (B)	√		√	√
Emotional Stability (C)				√
Self Confidence (D)	√	√	√	
Anxiety Control (E)	√	√	√	√
Self-Adjustment (F)	√	√	√	
Discipline(G)	√	√		√
Commitment (H)	√	√	√	√
Openness (I)				√
Motivation (J)				√
Ambition for Achievement (K)	√	√	√	
Teamwork (L)		√		√
Leadership(M)		√	√	

As shown in Table 9, all the measures correlated with at lest one of the criterion measures. Two measures which are Anxiety Control and Commitment correlated with all of the criterion measures. Six measures, which are Intelligence, Concentration, Self Confidence, Self Adjustment, Discipline, and Ambition for Achievement correlated with tyhree of the criterion measures. While comprehensive explanation of these correlation is beyond the scope of this paper, these results provide evindences of the validity of the measures.

IV. CONCLUSION

This study identified13 personality dimensions affecting athletes' performance in Baseball and Softball, which are Intelligence, Concentration, Emotional Stability, Self Confidence, Anxiety Control, Self-Adjustment, Discipline, Commitment, Openness, Motivation, Ambition of Achievement, Teamwork, Leadership. An initial 130 items were formerly included in the item pool. Based on the content review and item statistics obtained using Rating Scale Rasch Model, at the final assembly 114 items were included in the final form of the test. Validation based on relationship with external criterion resulted in that all the dimension was related to at least one of the external criterion of (1) Batting Average, (2) Hit, (3) Run Bat In/ RBI, and (4) Slugging Average.

ACKNOWLEDGEMENT

The researchers acknowledge the baseball and softball coaches, athletes, and officials for their contribution towards this study to make it become a reality.

REFERENCES

[1]. Amrun, I. T. (2017). *Adversary Mental Profile: Profil Mental Pemenang.* Penerbit: Lembaga Psikologi Terapan Universitas Indonesia Jakarta.
[2]. Baker, J., & Horton, S. (2004). A Riview Primary and Secondary Influences on Sport Expertise. *High Ability Studies*, Vol. 15, No. 2, December. Carfax Publishing: Taylor & Francis Group.
[3]. Boone, W.J., Staver, J. R., & Yale, M. S. (2014). *Rasch Analysis In The Human Sciences*. Dordrecht : Springer.
[4]. Crocker, L., & Algina, J. (2008). *Introduction to Classical and Modern Test Theory*. Mason, OH: Cengage.
[5]. Dieffenbach, K. & Moffett, A. (2001). The Development of Psychological Talent in U.S. Olympic Champions. *Thesis.*
[6]. Dimyati. (2010). Psychological Characteristics of Athletes at Students Education and Training Centre. *Anima Indonesian Psychological Journal, Vol. 25, No. 3, 172-180.*
[7]. Embretson, S. E., & Reise, S. (2000). *Item Response Theory for Psychologists*. Mahwah, NJ: Erlbaum.
[8]. Gould, D., Dieffenbach, K., & Moffett, A. (2001). The Developmental of Psychological Talent in US Olympic Champions. *Final Grand Report Executive Summary*. University of North Carolina at Greesboro: Applied Sport Psychology Laboratory Department if Exercise & Sport Science.
[9]. Gunarsa, S. D. (1989). *Psikologi Olahraga*. Jakarta: Gunung Mulia.
[10]. Hambleton, R.K., Swaminathan, H., & Rogers, H.J. (1991). *Fundamental of Item Response Theory*. Newburry Park, CA: Sage Publications.
[11]. Hartanti, Y. L., Pambudi, I., Zainal, T., & Lasmono, H. K. (2004). Aspek Psikologis dan Pencapaian Prestasi Atlet Nasional Indonesia. *Anima Indonesian Psychological Journal, Vol. 20, No. 1, 40-54.*
[12]. Linacre, J. M. (2006). Data variance explained by measures. *Rasch Measurement Transactions, 20,* 1045– 1047.
[13]. Linacre, J. M. (2012). *A User's Guide to Winsteps* [User's manual and software]. http://www.winsteps.com/winsteps.htm.

[14]. Linacre, J. M. (2016). *Winsteps: Rasch measurement computer program User's Guide*. Beaverton, Oregon: Winsteps.com.
[15]. McCreary, L. L., Conrad, K. M., Conrad, K. J., Scott, C. K., Funk, R. R., & Dennis, M. L. (2013). Using the Rasch measurement model in psychometric analysis of the family effectiveness measure. *Nursing Research, 62*(3), 149-159.
[16]. Nunnally, J.C. (1981). *Psychometric Theory*. Second Edition. New Delhi: Tata McGraw-Hill Publishing Company Limited.
[17]. Sumintono, B & Widhiarso, W. (2015). *Aplikasi Model Rasch Untuk Penelitian Ilmu-ilmu Sosial*. Edisi Revisi. Cimahi: Trim Komunikata Publishing House.
[18]. Suryanto. (2010). Identifikasi Kondisi Psikologis (Mental) Atlet Junior Cabang Olahraga Panahan Di Daerah Istimewa Yogyakarta. *FIK, 014/ PPI/ L/ 2010. Bidang Olahraga dan Kesehatan*.
[19]. Utama, B. (2010). *Aspek Psikologi Dalam Pembinaan Atlet Tenis Meja*. Yogyakarta: Universitas Negeri Yogyakarta.
[20]. Weinberg, R.S & Gould, D. (2007). *Foundation of Sport and Exercise Psychology*. United States: Human Kinetic.
[21]. Wheaton, K.A. (1998). A Psychological Skills Inventory of Sport. *Dissertation.*
[22]. Wright, B. D., & Masters, G. N. (1982). *Rating Scale Analysis: Rasch Measurement*. Chicago: Mesa Press.
[23]. Yen, W.M. (1993). Scaling Performace Assessments: Strategies for Managing Local Item Dependence. *Journal of Educational Measurement*, 30 (3), p: 187-213.
[24]. Yuwanto, L & Sutanto, N. (2012). Deskripsi Psikologis Atlet Remaja Berdasarkan Analisis Struktur EPPS. *Mind Set, Juni 2012, hal 115-122*.