

The Validation of the Sierra Kappa Scale (SKS)

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Abstract: This article discusses concept and measurement of Sierra Kappa Scale (SKS) in an Indonesian context. SKS designed to measure morale manifested into behaviour, feelings, adaptability, and sensitivity of the work carried. The study used survey method and data analysis based upon the framework of modern psychometrics approach. In this study Rasch Model was used to measure the psychometrics properties of the 25 items of SKS. Initial set of items was administered to employees in government and private institutions (N=443). The results of this study showed that the SKS supported the suitability of solid invariance, and robustness of the scale. Unfortunately, only 21 items have ideal measurement estimates. The internal consistency and psychometrics properties, was also appropriate. The article concludes by discussing research and practical implications of the scale in human works context. This instrument has a very high quality of validity and reliability to be applied in a measure of the spirit at work.

1 INTRODUCTION

Human resources play a significant part and is looked at as the major driving factor in shaping one's success in working. To draw the individual resources required by the agency in order to provide positive contribution to all the activities of the institution in achieving its objectives, every employee proposed to have high morale so that will build up high work productivity.

Spirit is a very important thing to be noticed by the management if they want every employee can contribute positively to the achievement of agency goals (Locke and Latham, 1990). An employee has a high spirit tend to see work positively. Encourage the spirit of the employees should be done to encourage the achievement of good and effective performance so that leaders have satisfaction with the performance of employees (Brahmasari and Suprayetno, 2009). The facts are: leaders should also understand their own values and goals in order to express themselves accurately and openly (Anderson and Stockton, 2001); A wide range of people brings different challenges and advantages in terms of ideas, creativities, styles, and innovations into the workplace (Chuang, 2013). Needed a way to direct

the power and potential of a person to work to achieve goals that have been specified.

The drive of a person to work is different from others so that human behavior tends to vary. The spirit of work is formed from the attitude of employees in the face of work situations in the company. Spirit is a part of motivation where the condition or energy that moves the employees are directed or directed to achieve corporate organization goals. The mental attitude of employees who are pro and positive to the work situation that strengthens the spirit of work to achieve maximum performance (Mangkunegara, 2005).

Good performance is the basis for determining the effectiveness of the activities, especially the operational effectiveness, the organization and employees based on predetermined targets, standards and criteria. Good performance also refers to the ability of an enterprise to achieve such objectives as high profit, quality product, large market share, good financial results, and survival at pre-determined time using relevant strategy for action (Obiwuru et al., 2011)

Besides, Goncalves (2013) said that reward power can be used to punish (passive coercion), when rewards are withheld in response to poor

performance. The purpose to determine the level of employee morale for leadership can do coaching and formulate an effective and efficient work program. It means also able to maintain and improve morale, passion and passion of work, because the work in accordance with the capacity of the employees themselves. Furthermore, morale also spur competition in achieving in a company or institution through healthy competition between individual/team work.

Spirit involves in it the direction or purpose of behaviour, the power of response, and the persistence of behaviour. In addition, the term includes a number of concepts of encouragement, necessity, incentive, reward, reinforcement, goal setting, and expectancy (Campbell, 2002). Basically, humans always want things that are okay, so the driving force or mover to work depends on the expectations that will be obtained if the hope comes true then someone will tend to increase morale.

The spirit of work is a condition in which employees need a full appreciation of their work, get a comfortable atmosphere in the job, safety in work, good salary, interesting jobs and wise discipline of each leader (Riyadi, 2011). One of the factors that affect work productivity is the lack of employee morale where one of them is a matter of lack of work spirit on an agency leader. The spirit of work is a condition or state in an agency that wants to increase profits greater than before, therefore the spirit of work plays an important role in obtaining maximum productivity (Agusta, 2013; Susanty and Baskoro, 2013) because the purpose of the spirit of work is to give morale to every employee in order to perform their duties effectively and efficiently.

Every human being has a need that the emergence of the spirit depends on the interests of the individual. Abraham Harold Maslow put forward the "Hierarchy of needs theory" to answer about the level of human need. After all, the individual as an employee cannot escape from his needs. The needs are; physiological needs, sense of security, love and belonging, self-esteem, and self-actualization (Sudrajat, 2008; Sri Mendari, 2013).

Instruments for measuring spirit of work have been widely developed, among others by Kinjerski in 2006 and 2013 (Kinjerski and Skrypnek, 2006; Kinjerski, 2013). Unfortunately, there is not much information that can be found related to the spirit of work that is more specific.

In this study, the developed instrument is a work spirit tool that is oriented in the field of physical work. Previously, this information has been compiled referring to Blum's opinion of 1968 (Azwar, 1999). The item selection is done based on

item-total correlation to 64 items, and the best 25 items are obtained. Unfortunately, the subject documentation used in the tests, item statistics, and scalability reliability reports no longer exists. Azwar, (1999) suggested validating the Sierra Kappa Scale (SKS) because it is a scale that can be used to measure employee morale especially in the physical field. The kappa statistic is the most widely used measure for the performance of models generating presence-absence predictions (Allouche, Tsoar and Kadmon, 2006). The popularity of kappa has led to the development of many extensions, including, kappas for three or more raters, kappas for groups of raters and kappas for ordinal categories (Warrens, 2013).

2 METHODS

The study involved 443 respondents, consisting of male = 121 (27,31%), and female = 332 (72,69%). The respondent's age characteristics were spread over the 17–21 years (20.54%), 22–27 years 53.95%), 28–34 years (13.77%), 34–40 years (5.42%), 41 - 50 years (5.87%), and 51 years old (0.45%). Furthermore, the employment status of the respondents was permanent workers (46.95%), casual workers (20.54%), and contract workers (32.51%). Duration of work of the respondents is also our concern, where there are 22.57% of respondents work less than a year, 38.15% work between 1-3 years, 23.02% have worked 3-6 years, 11.51% have worked 6 - 10 years, 4.29% have worked 10 - 20 years, and 0.45% have worked for more than 20 years.

Administration of SKS is conducted from December 1, 2017 to January 13, 2018 with Survey Monkey Platform. In the data collection period founded 675 people who filled the SKS, but only 443 respondents who completed SKS well; the rest 232 leave the filling SKS in the middle of the road (not complete).

The SKS consists of 25 items with five answer options (Likert rating). The answer option is negative, i.e. item no. 1, 3, 4, 6, 7, 8, 13, 18, and 19. The rest are positive statement items. On the positive statement the weight of the ratings is given 5 for always, and 1 for never. On the contrary, on the item of weighting the negative weight rating is given 5 for never and 1 for always.

The indicators used to construct the SKS instruments include: (1) the least aggressive behaviour that leads to aggression, (2) Individuals work with a sense of happiness and other pleasant

feelings, (3) the individual can adjust to his / her colleagues well, and (4) his ego is deeply involved with his work (Azwar, 1999).

In administering SKS, we convey that the filling of the SKS is voluntary and there is no coercion or binding things on the respondents. All respondents' answers are credentials.

3 RESULTS AND DISCUSSIONS

3.1 Reliabilities and Separation Index

Reliability refers to the ability possessed by the instrument to produce meaningful information; in this case an instrument can explain how far the measurements made many times will produce convincing information (Sumintono and Widhiarso, 2014, 2015). High reliability results provide confidence that individual indicators are all consistent with their measurements (Aryani and Rosinta, 2011).

We estimate the reliability of the SKS in different ways, in addition to estimating the interaction between items and person when the SKS is administered, we also estimate the degree of reliability of the item and person independently. The reliability information referred to is presented in Table 1.

Table 1: Reliability scores generated by SKS instruments.

Aspects of Reliability	Value	Mean
Person	0.77	0.66
Item	0.99	0.00
Cronbach Alpha (KR-20) Person Raw Score "Test" Reliability = 0.81		

Table 1 indicates that overall the SKS instrument produces good reliability (0.81). Reliability at the item level in the SKS also gets an excellent score (0.99). Unfortunately, the reliability of the item is not followed by the reliability of the person (respondent), where the reliability value of the person is only in good enough category (0.77). The next estimate is to know the amount of separation index both on person and item in SKS.

Table 2: Score of separation index generated by SKS instrument.

Aspect	Magnitude of Separation Index
Person	1.83
Item	12.25

The reliability estimates in particular on the person and item in the SKS are also confirmed on the size of the separation index. Table 2 indicates that the capabilities generated by SKS items can result in 13 data groupings, or in other words the hierarchy of item difficulty is very large. Meanwhile, the person only able to produce 2 groups of respondents only, or in other words SKS is only able to recognize a typical group that has a high and low work spirit.

3.2 Estimate of Unidimensional

In contrast to factor analysis, Rasch modelling has different perspectives in identifying dimensions in measurement. The existence of dimensions is not only seen based on the interrelationship between the grains because it is very possible that the particular item is a separate dimension.

To perform dimensionality analysis on SKS is used Principal Component Analysis (PCA). This is equivalent to factor analysis which one of the objectives is to evaluate whether the developed instrument measures what should be measured (Validity) and estimates the diversity in an instrument. The PCA test results in the SKS are presented in Table 3.

Table 3: Standardized residuals variance (in eigenvalue units).

	Observed	Expected
Total raw variance in Observations	100.0%	100.0%
Raw variance explained by measures	39.8%	41.0%
Raw variance explained by persons	8.9%	9.1%
Raw Variance explained by items	31.0%	31.9%
Raw unexplained variance (total)	60.2%	59.0%
Unexplained variance in 1st contrast	9.7%	16.2%
Unexplained variance in 2nd contrast	5.9%	9.7%
Unexplained variance in 3rd contrast	5.1%	8.5%
Unexplained variance in 4th contrast	4.0%	6.6%
Unexplained variance in 5 th contrast	3.6%	6.0%

Based on the data in Table 3 it was found that the variance that can be measured by SKS is 39.8%. This indicates that the unidimensional requirements

of the SKS have been met (> 20%). Furthermore, the raw variance measure is divided into 8.9% person, and item 31.0%.

Although unidimensional requirements have been achieved, there is still a considerable gap between Raw variance explained by measures and the total raw unexplained variance. This indicates that the quality of respondents is good (honest and serious) when the SKS is administered.

3.3 Partial Credit Model (PCM)

Another test property measurement problem is the need for verification process on the answer choice of validated instrument. The amended verification is to ascertain whether the choice of answers given in the SKS is confusing to the respondent or not. To estimate used the Partial Credit Model (PCM) as presented in Table 4.

Table 4: Category Structure, Model="R".

Label	Statement	Observed Average	Andrich Threshold
1	Strong Disagree	-0.56	None
2	Disagree	-0.24	-1.14
3	Neutral	0.26	-0.95
4	Agree	0.94	0.41
5	Strong Agree	1.44	1.67

There are two indicators to test whether the respondent is confused or not, namely by observing the value of Observed Average and Andrich Threshold. In Table 4 it is known that both the Observed Average and Andrich Threshold values both show a monotonic increase in value; from the smallest logit to label 1 to the largest logit for label 5. This indicates that there is no confusion in the respondent self when administering the SKS. In other words, the choice of answers available on the SKS is correct and no revisions are necessary.

The information shown in Table 4 can also be confirmed through Figure 1, where most of the answer options available in the SKS provide equitable information.

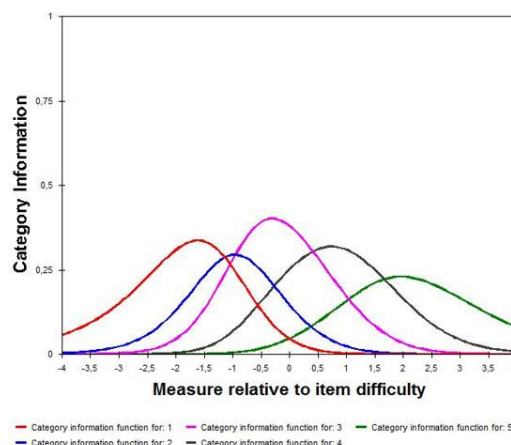


Figure 1: Category information and maximum information curve for a well-behaved polytomous item.

3.4 Person Fit and Person Measure

Person fit is the measure used to identify whether there are respondents or persons who fill the SKS provide the appropriate pattern (expected) or not. The criteria used to check the fit person are: (a) Acceptable Mean Outfit Value (MNSQ) = 0.5 (Sumintono and Widhiarso, 2014, 2015; Bond and Christine M. Fox, 2015; Rangka, 2017).

Based on 443 respondents who fill the SKS known there are 68 respondents categorized misfit, i.e. respondents who do not give unnatural answers or in other words the respondents are not serious when filling SKS. Thus, only 375 respondents who take SKS seriously.

Furthermore, based on individual measure estimation, it is known that respondent No 009 is respondent who has a very high morale (2.14 logit). On the other hand, respondents no 194 were respondents who had the lowest morale (-1.51 logit).

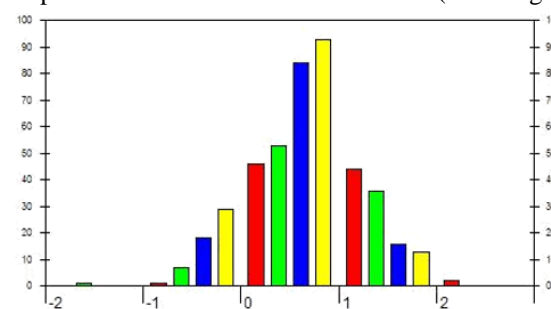


Figure 2: Person measure distribution bar.

In general, overall employee morale is above average. This is evidenced in Figure 2 where the person measure distribution bar is more likely to the right.

3.5 Item Fit and Item Measure

Item Fit and Item Measure are a core part of the SKS validation process. In this section we evaluate which items are in the appropriate SKS to measure employee morale. The criteria for estimating the Item Fit and Item Measure items used (MNSQ Outfit, ZSTD, and Pt Measure Corr.) are similar to those used in Person Fit and Person Measure (See 3.4 section on this article).

Table 5: Item misfit based on outfit MNSQ and outfit ZSTD values.

No	Item	Outfit MNSQ	Outfit ZSTD
8	I feel that friends in my workplace cannot be invited to work together	2.55	9.9
7	Before work, my mind was hard to focus on work	1.93	9.9
13	With the rewards I get right now I feel no need to work any better	1.82	9.9
18	I do not believe that I can work any better	1.78	9.7

Based on Table 5 above, it is known that 4 items from 25 items of SKS are misfit and outlier items. The items in question cannot be used in the measurement because they cannot produce meaningful information to measure employment morale. This is confirmed from the range of Outfit MNSQ and Outfit ZSTD values that exceed the specified criterion of measurement criteria.

To illustrate how the misfit conditions in the SKS instrument items can be seen in Figure 3. Ideally, the dotted line will follow the pattern on the straight line of the normal curve. Dotted lines that stray away from straight line patterns indicate there is a particular problem.

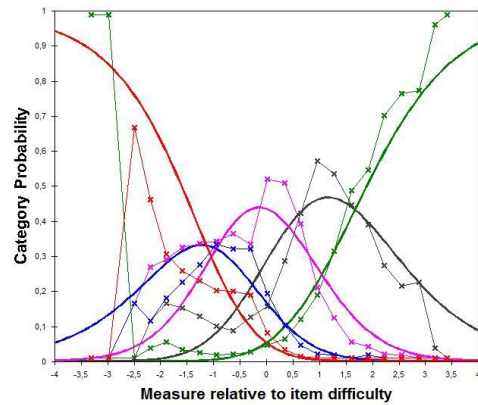


Figure 3: Data-based relative frequencies of categories in each interval along the latent variable.

Further, item measure is an estimate for determining items that have a certain degree of complexity in the SKS. The most difficult item to be approved by all respondents is item No. 24, "I get irritable when my work is not done"; and the easiest to approve is item no 5 "There is a sense of satisfaction in my heart if the work I do is done on time".

3.6 Test Information Function

Estimated test information function aims to determine the amount of information that can be produced by the SKS instrument.

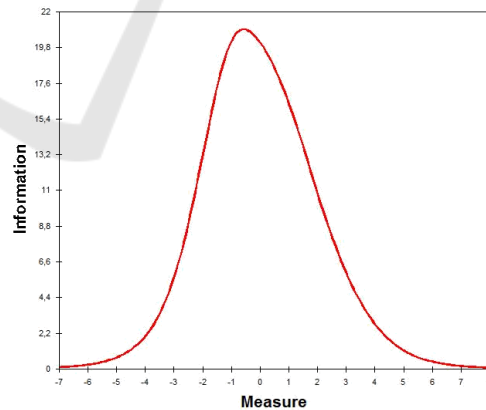


Figure 4: Distribution of test information function of SKS.

In Figure 4 it is known that the SKS instrument only works optimally on the respondents who have a moderate spirit of work.

4 CONCLUSIONS

Estimation and measurement of properties contained in the SKS shows that in general the SKS is an instrument that meets the requirements to measure the spirit of work in the work. To get maximum measurement result from SKS, SKS users need to eliminate 4 items from SKS, namely item No. 8, 7, 13, and 18 because of misfit indicated. Thus, there are only 21 items that meet the maximum measurement requirements.

Furthermore, it is necessary to consider the preparedness and seriousness aspect of the respondents in administering the SKS. The respondents need to be given sufficient information related to the SKS before the respondents do the filling SKS.

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