Paper-11

Effect of Items Direction (Positive or Negative) on the Reliability in Likert scale

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Abstract

In this paper an attempt was made to analyze the effect of items direction (positive or negative) on the Alpha Cronbach reliability coefficient and the Split Half reliability coefficient in Likert scale. The descriptive survey research method was used for the study and sample of 510 undergraduate students were selected by used random sampling technique. A scale developed by Sobhei Hamdan & Mohammed Jehad (2007) was used by the investigator to access attitude of students towards undergraduate study. The findings of the study revealed that: (1) there is no effect of items direction (positive, negative, half positive & half negative and randomly) on the Alpha Cronbach reliability coefficients in Likert scale, and (2) the results also indicated that there is no effect of items direction (positive, negative, half positive & half negative and randomly) on the Spilt Half reliability coefficients in Likert scale.

Keywords- Effect, Items direction, Reliability, Likert Scale.

Introduction-

Developers of attitudinal questionnaires/ scales (of which questionnaires that compute satisfaction with usability are one type) are trained to consider questionnaire response styles such as extreme response bias and acquiescence bias. In acquiescence bias, respondents tend to agree with all or almost all

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statements in a questionnaire (Lewis and Sauro, 2009). The acute response bias is the inclination to mark the extremes of rating scales rather than points near the middle of the scale. To the amount that these biases exist, the affected responses do not provide a true measure of an attitude. Acquiescence bias is of particular apprehension because it leads to an upward error in measurement, giving.

The validity and reliability are the basic concepts in the educational measurement, because the validity and reliability represent the most important elements and conditions that must be measured in measurement tools to be used. It relates to the interpretation of scores from psychometric instruments (e.g., symptom scales, questionnaires, education tests, and observer ratings) used in research.

Reliability concept also plays a major role in psychological measurement. Cronbach (2004) believes that reliability as the correlation of an instrument with itself. Allam (2000) indicated that 'the Reliability refers to the reproducibility or consistency of scores from one assessment to another". Koji (2009) defend the reliability as a concept describing the extent to which the precision of the assessment results is stable and coherent, regardless of where, when and by whom the measurement was carried out. Since the Likert scale famous and is used frequently used in educational research. The researcher wanted to evaluate the "The effect of items direction (positive or negative) on the reliability in Likert scale".

Review of Related Literature-

Nunnally (1978) suggested that positively-worded items in Likert scales can be transformed into negatively-worded items and their scores can be reversed symmetrically afterwards. This practice continues even today, although it has been known that negatively-worded items introduce problems in multiple-item scales. Negatively-worded items often form a separate factor, independent of

the main factor, and change the dimensionality of the construct (Herche and Engelland, 1996; Mook et al., 1991; Tomas and Oliver, 1999). Factors based on negatively-worded items have strong method effects and exhibit longitudinal invariance (Motl and DiStefano, 2002; Horan et al. 2003). Negatively worded items tend to lower the reliability of multi item scales as measured by Cronbach's alpha by as much as 20% (Schriesheim et al. 1991; Barnette, 2000), and confound measures in cross-cultural research, hampering measurement invariance (Wong et al. 2003). All of the above contribute to the positive-negative asymmetry, which is reviewed in the following section.

Positivity and negativity are not symmetrical: negative information weights more than positive information (Anderson, 1965; Rodin, 1978) and positive and negative affective states have low correlation (Diener and Emmons, 1984; Watson et al., 1988). Cacioppo and Berntson (1994) advanced the concept of bivariate evaluative space, where positivity and negativity are distinct entities that can coexist independently. Cacioppo et al. (1999) summarized that the underlying cognitive processes are bivariate (i.e., positivity and negativity are different concepts), but the limiting physical conditions make them appear as bipolar (i.e., positivity and negativity are true opposites).

The biases associated with the processing of positive information were called the positivity bias (Markus and Zajonc, 1985), and the biases associated with the processing of negative information were called the negativity bias. The positivity bias is a cognitive process referring to humans' readiness to generate positive content (Peeters and Czapinski, 1990). One aspect of the bias is its linguistic expression. There are more positive than negative words in vocabularies, people ascribe more positive descriptions to a target, and it is common to have unfavorable terms defined as opposites of favorable terms (Adams-Webber, 1997; Benjafield, 1985; Matlin and Stang, 1978; Van Dijk et al., 2003). The positivity bias is an a priori hypothesis about reality; people

approach or search for events expecting to find positivity (Peeters, 1971; Markus and Zajonc, 1985). This internal drive is called the unconditional optimism (Czapinski, 1985). A unique aspect of the positivity bias is that it has a strong subjective component, which if reduced, eliminates the bias (Aderman, 1969).

The negativity bias can be summarized in four ways: (1) negative evaluations are stronger than equivalent positive evaluations, (2) negative intensity increases faster than positive intensity when approaching corresponding events, (3) the combination of positive and negative stimuli results in a more negative result than their algebraic sum, and (4) negative events lead to more complex cognitive processes (Rozin and Royzman, 2001). Some unique findings in positive-negative asymmetry are worth mentioning. Positive events are with higher frequency, but less urgent (Rozin and Royzman, 2001). The processing of information under negative mood is more systematic and accurate than under positive mood. Negative events provoke more causal attribution than positive events (Bohner et al., 1988). Processing positive information is more subjective, while processing negative information is more objective, analytical, and complex (Peeters and Czapinski, 1990). Considering the positive-negative asymmetry, it is obvious that the Likert and semantic-differential scales are different representations of the measured concepts. The Likert scale captures the presence or absence of a concept, and it does not necessarily assume that every concept has a corresponding opposite. On the other hand, the semantic-differential scale assumes that a concept always is restricted by two symmetrical opposite characteristics.

Objectives of the Study-

1. To examine the effect of items direction (positive or negative) on the Alpha Cronbach reliability coefficient in Likert scale.

2. To examine the effect of items direction (positive or negative) on the Split Half reliability coefficient in Likert scale.

Hypotheses of the Study-

1. There is no effect of items direction (positive or negative) on the Alpha Cronbach reliability coefficient in Likert scale.

2. There is no effect of items direction (positive or negative) on the Split Half reliability coefficient in Likert scale.

Research Method and Sample-

To achieve the above mentioned objectives, the researcher used the descriptive survey method. Regarding the descriptive survey methodology, as a common approach used in the field of social and human sciences, it observes and records carefully a certain phenomenon or problem during certain periods of time with the purpose of exploring such problem in terms of content and characteristics to reach certain conclusions and yet generalizations which can help in understanding the current situation and improving it (Alian, 2001).

Research Sample-

The random sampling technique was used for selecting (510) undergraduate students from the College of Education at King Saudi University, Riyadh, Saudi Arabia, in the academic year (2012- 2013).

Research Tools Used-

An attitude scale developed by (Sobhei Hamdan Abu Jalalah& Mohammed Jehad Gamel, 2007) was used to know the attitude of students towards Undergraduate study and another scale of academic adjustment prepared by them has been used as criterion.

Validity of the Tool-

There are many definitions for validity, (Pallant, 2011) defines the validity as "the degree to which it measures what it is supposed to measure. Unfortunately,

there is no one clear-cut indicator of a scale's validity". To ensure and test the validity of the tool the researcher used the criterion related validity.

Criterion-related validity covers correlations of the tool with another criterion tool, which is accepted as valid (A'llam, 2006). In other words, criterion-related validity refers to the accuracy of, a measure or procedure by comparing it with another measure or procedure that has been demonstrated to be valid (Pierangelo and Giuliani, 2008).

The validity of this tool has been evaluated by using criterion related validity and for that Pearson correlation coefficient was used. The validity coefficient was (0.61)

Ensuring reliability of the tool-

Cronbach (2004) believes that reliability as the correlation of an instrument with itself. To evaluate the reliability of research tool Alpha Cronbach was used. It was calculated as (0.82).

Research process-

Moreover, the researcher prepared different copies of the research tool (an attitude scale to know students attitude towards Undergraduate study) according to the items' direction dissimilarity (positive, negative, half- positive, half-negative and random (positive & negative).

Statistical methods -

The data was subjected to statistical treatment by using:

- Alpha Cronbach coefficient
- Split half coefficient(Spearman Brown)
- Feldt Equation to estimate the differences between the reliability coefficients.

Results and Interpretation-

In order to achieve the above objectives formulated in the present study, the data has been analyzed and interpreted as under:

Table 1: Showing the Effect of Items Direction (Positive or Negative) on the Alpha Cronbach Reliability Coefficient in Likert Scale.

Items Direction	Alpha Cronbach Coefficient
Positive	0.86
Negative	0.91
Half positive and half- negative	0.77
Random (positive & negative)	0.78

The perusal of table 1 shows that there are differences between Alpha Cronbach Coefficients with respect to the direction of items [positive, negative, half positive and half negative, and random (positive & negative)]. Furthermore, we can use the felted equation to know whether the differences are statistically significant or not.

Table 2: Feldt Coefficient

Comparison	Calculated F	F table	Sig
Positive /Negative	1.56	4	Not
Positive /Half	0.608	3.15	Not
Positive/Random	0.636	3.15	Not
Negative/ Half	0.39	3.23	Not
Negative /Random	0.409	3.15	Not
Half/ Random	1.05	3.15	Not

The perusal of table 2 revealed that Feldt values are not significant and the reliability coefficient which has resulted from the use of Alpha Cronbach coefficient is not affected even when the items' directions for Likert's type differ [positive, negative, half- positive, half- negative and random [positive & negative)]. Thus the hypothesis which reads as "There is no effect of items

direction (positive or negative) on the Alpha Cronbach reliability coefficient in Likert scale" is accepted.

Table 3: Showing the Effect of Items Direction (Positive or Negative) on the Split half Reliability Coefficient in Likert Scale.

Items Direction	Spearman-Brown Coefficient
Positive	.736
Negative	.662
Half positive and half- negative	.789
Random (positive & negative)	.772

The perusal of table 3 showed that there are differences between the Spearman-Brown reliability coefficients with respect to the direction of items (positive, negative, half positive and half negative and random [positive & negative]). Furthermore can use the felted equation to know whether the differences are statistically significant or not.

Table 4 Feldt coefficient

Comparison	Calculated (f)	F table	Sig
Positive /Negative	1.89	4	Not
Positive /Half	0.56	3.15	Not
Positive/Random	0.66	3.15	Not
Negative/ Half	0.47	3.23	Not
Negative /Random	0.38	3.15	Not
Half/ Random	0.53	3.15	Not

The perusal of tablet 4 revealed that Feldt values are not significant and the reliability coefficient which has resulted from the use of the Spearman-Brown Coefficient is not affected even when the items' directions for Likert's type differ (positive, negative, half- positive, half- negative and random [positive &

negative]). Thus the hypothesis which reads as "there is no effect of items direction [positive or negative]) on the Split Half reliability coefficient in the Likert scale" is accepted.

Conclusion-

It is thus concluded that analysis revealed that the selected items direction (positive or negative) have no effect on the Alpha Cronbach reliability coefficients and Spearman-Brown reliability coefficients in Likert scale. The investigator has drawn some conclusions which are being presented below:-

1. It can be concluded that the Alpha Cronbach reliability is not affected even when the items' directions for Likert's type differ [positive, negative, half positive, half- negative and random (positive & negative)] and there is no effect of items direction (positive or negative) on the Alpha Cronbach reliability coefficients in Likert scale.

2. It can be concluded that the Spearman-Brown reliability is not affected even when the items' directions for Likert's type differ [positive, negative, half positive, half- negative and random (positive & negative)] and there is no effect of items direction (positive or negative) on the Spearman-Brown reliability coefficients in Likert scale.

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