Effect of Items Direction (Positive or Negative) on the Factorial Construction and Criterion related Validity in Likert Scale

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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 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 researchers too positive a picture of whatever attitude they are measuring.

An approach commonly employed to lessen the acquiescent response bias is the inclusion of negatively worded items in a questionnaire/ scale. Questionnaires with a mix of positive and negatively worded statements force attentive respondents to disagree with some statements. Underneath the assumption that negative and positive items are essentially equivalent and by reverse scoring the negative items, the resulting composite score should have reduced acquiescence bias. More recently, however, there is evidence that the strategy of including a mix of positively and negatively worded items creates more problems than it solves. Such problems include lowering the internal reliability, distorting the factor structure/ construction and problems of criterion related validity (Lewis and Sauro, 2009).

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.

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 is where a correlation exists between the scores on a tool and the scores on other existing tools which are accepted as valid. (Al-thebaity, 1998). A test is valid when it does not test anything else rather than the purpose it has been designed for. When a test is designed to test the mathematical skill of a pupil/student, it should really test that skill and does not test or evaluate other additional skills like linguistic competency or mathematical speed. Otherwise the test would be considered as invalid, (Abu-zeinah, 1998).

The concept of construct validity was introduced by Cronbach and Meehl (1955). A construct is built in the minds of psychologists and does not exist in any concrete way, but it does exist in a theoretical way as an idea. Constructs are things like intelligence, anxiety, depression or thinking. In establishing concurrent validity, scores on an instrument correlate with scores on another (criterion) measure of the same construct or a highly related construct that is measured concurrently in the same subjects.(Kimberlin and Winterstein, 2008)

RESEARCH OBJECTIVES

1. To examine the effect of (independent variable) items direction (positive or negative) on the factorial construction related validity (dependent variable) in Likert scale.

2. To examine the effect of (independent variable) items direction (positive or negative) on the criterion related validity (dependent variable) in Likert scale.

RESEARCH HYPOTHESES

1. There is no effect of items direction (positive or negative) on the factorial construction related validity in Likert scale.

2. There is no effect of items direction (positive or negative) on the criterion related Validity in Likert scale.

RESEARCH METHOD

To achieve the above mentioned objectivities of study, the researcher used descriptive survey method. As it is common approach used in the field of social and human sciences. Descriptive research 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 generalizations which can help in understanding the current situation and improving it, (Alian, 2001, P: 47).

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 Tool Used

An attitude scale developed by (SobheiHamdan Abu Jalalah& Mohammed JehadGamel, 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.

a- Ensuring 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)

b- 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 Cronbachwas 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

- Alpha Cronbach Coefficient

- Factor Analysis

- Fisher Equation, to estimate the differences between the validity coefficients

RESULTS AND INTERPRETATION

1. First Objective

- To examine the effect of items direction (positive or negative) on the factorial construction related validity in Likert scale.

To answer the objective above, the researcher used factor analysis for each form (positive, negative, half- positive, half- negative and random [positive & negative]) and the result was as following:

Table 1 Factorial Construction

Items Direction	Number of Factors	Cumulative %
Positive	9	74.89
Negative	8	76.32
Half positive and Half-negative	9	73.99

Random [positive & negative]	8	70.94

Table no. {1} showed that there are differences in the number of factors calculated by factor analysis andthe null hypothesis, "there is no effect of items direction (positive or negative) on the factorial construction related validity in Likert scale" was rejected.

Table 2 Positive Form Factor Analysis

Component	Total	% of Variance	Cumulative %
1	6.341	23.483	23.48
2	3.279	12.143	35.63
3	2.398	8.883	44.51
4	2.089	7.737	52.27
5	1.518	5.623	57.87
6	1.322	4.898	62.77
7	1.166	4.319	67.09
8	1.077	3.990	71.08
9	1.029	3.811	74.89

The table 2 above shows that there are 9 factors of positive form of items and they contributed 74.88% of cumulative.

Table 3 Negative Form Factor Analysis

Component	Total	% of Variance	Cumulative %
1	8.514	31.534	31.534
2	2.638	9.771	41.305
3	2.211	8.189	49.493
4	1.817	6.731	56.224
5	1.678	6.214	62.438
6	1.462	5.414	67.853
7	1.185	4.388	72.241
8	1.101	4.079	76.320

The table 3 above shows that there are 8 factors of negative form of items and they contributed 76.32% of cumulative.

Table 4 Half Positive and Half Negative Form Factor Analysis

Component	Total	% of Variance	Cumulative %
1	4.993	18.492	18.492

2	3.189	11.811	30.303
3	2.474	9.163	39.466
4	2.248	8.325	47.791
5	1.946	7.206	54.997
6	1.542	5.711	60.707
7	1.338	4.957	65.665
8	1.175	4.351	70.015
9	1.072	3.971	73.986

The table 4 above shows that there are 9 factors of half positive and half negative form of items and they contributed 73.98% of cumulative.

Table 5 Random [Positive & Negative] Form Factor Analysis

Component	Total	% of Variance	Cumulative %
1	5.265	19.501	19.501
2	3.066	11.354	30.855
3	2.488	9.216	40.071
4	2.191	8.116	48.187
5	1.886	6.986	55.172
6	1.591	5.892	61.064
7	1.493	5.531	66.595
8	1.174	4.347	70.942

The table 4 above shows that there are 8 factors of random positive and negative form of items and they contributed 76.32% of cumulative.

2. Second Objective

- To examine the effect of items direction (positive or negative) on the criterion related validity in Likert scale.

Table 6 Criterion Related Validity Coefficient

Items Direction	Criterion related Validity Coefficient
Positive	0.54
Negative	0.68
Half positive and Half- negative	0.61
Random [positive & negative]	0.66

Table no. {6} showed that there are differences between the validity coefficients, but we need to use the Fisher equation to know whether this difference is statistically significant or not.

Table 7 Fisher Coefficient

Comparison	Calculated (f)	F table	Sig
Positive * Negative	**1.24**	**1.96**	Not
Positive * Half positive and Half negative	**0.26**	**1.96**	Not
Positive * Random [positive & negative]	**1.11**	**1.96**	Not
Negative * Half positive and Half negative	**0.62**	**1.96**	Not
Negtive * Random [positive & negative]	**0.18**	**1.96**	Not
Half positive and Half negative * Random [positive & negative]	**0.46**	**1.96**	Not

Tablet (7) revealed that fisher values are not significant and the validity coefficient calculated by used the Pearson correlation coefficient are 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, "there is no effect of items direction (positive or negative) on the criterion related validity in Likert scale" was accepted.

CONCLUSION

It is thus concluded that analysis revealed that the selected items direction (positive or negative) have effect on the factorial construction and criterion related validity in Likert scale. The investigator has drawn some conclusions which are being presented below:-

1. It can be concluded that there are difference in the number of factors calculated from factor analysis and showed that there is effect of items direction (positive or negative) on the factorial construction related validity in Likert scale.

2. It can be concluded that the criterion related validity 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 criterion related validity in Likert scale.

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Summary

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The study was conducted to know the effect of items direction (positive or negative) on the factorial construction and criterion related validity in Likert scale. The descriptive survey research method was used for the study and the sample consisted of 510 undergraduate students selected by used random sampling technique. A scale developed by SobheiHamdan& Mohammed Jehad (2007) was used by the investigator to access attitude of students towards undergraduate study. The finding of the study revealed that: (1) there is effect of items direction (positive or negative) on the factorial construction related validity in Likert scale; and (2) criterion related validity 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 criterion related validity in Likert scale.

Keywords: Items direction, factorial construction, criterion validity, likert scale