3rd Global Conference on Business and Social Science-2015, GCBSS-2015, 16-17 December 2015, Kuala Lumpur, Malaysia

Dillman's Graphic Language and Negative Worded Statement in Work Related Attitude Measurement

Nurnazirah Jamadin[a]* & Fauziah Noordin[b]

[a]Universiti Teknologi MARA (UiTM), Kota Samarahan 1, 94300, Sarawak, Malaysia
[b] Universiti Teknologi MARA (UiTM), Shah Alam, 40450, Selangor Darul Ehsan, Malaysia

Abstract

In the study of social science research, there are innumerable of well-established measurement instruments that include a blend of positive and negative worded statements. The purpose of this study is to seek alternative remedy on negative worded statement by using the Dillman's questionnaire principles. A model of Allen and Meyer (1991) were used with two different designs were distributed to two types of samples in present study. The findings reveal that there are differences in the qualities of responds between two samples. Interestingly, by improving the overall features of questionnaire, the respondents' motivation and attention to the questionnaire are improved.

Keywords: graphic languages, and negative worded statement

1.0 Introduction

Questionnaire is one of the important elements in survey research. The quality of survey results depends heavily on the quality of respondents' responses. Moreover, the quality of the responses depends on the designs of the questionnaire (Krosnick and Presser, 2010). The design should be looked at from various positions not only on the text and wording but the layout of the questions as well. The questionnaires carry several objectives such as ability of the respondents to answer the specific set of questions, motivating the respondents to give their responses, and ability to minimize response error (Malhotra, 2010). Thus, in designing the questions, the researchers often include several

---

* Corresponding author. Tel.: +60135786687
  E-mail address: nurnazirah293@gmail.com, nurnazirah293@yahoo.com

positive and negative statements. The inclusion of negative statements intended to overcome several causes to common method biases in survey questionnaire that has been discussed widely by academic scholars (for example Podsakoff, MacKenzie, Lee, and Podsakoff, 2003). In order to reduce the errors, a questionnaire should be designed according to the "best practices" (Krosnick and Presser, 2010).Nevertheless there is limited literature available to discuss in details about the issue of negative worded statements in measuring instruments. In addition, limited techniques have been proposed by past studies in handling the issue of negative worded statements. Hence, the aim of this study is to investigate the respondents' responses specifically on the negative worded statement by improving the designs of questionnaire using Dillman's techniques.

Past studies with regard to this issue have tested several approaches to negative statements but were still unable to prove the exact way in handling the issue of negative worded statements properly. It is the aim of this paper to test Dillman's method in order to improve the use of negative statements in measuring instruments of survey research and discuss its implication to the research.

2.0 Literature Review

2.1 Graphic Language Method

The understanding on graphic language method in the theory of self-administered questionnaires is very limited. Mostly, the discussion in the literature on the self-administered questionnaires has concentrated on the aspect of wording and language rather than the appearance of the questionnaire (Jenkins and Dillman, 1995). By realizing the importance of the layout and the appearance of the questionnaire, Jenkins and Dillman (1995) developed the idea of improving the self-administered questionnaire on two major aspects that is the verbal and non-verbal language of questionnaire. The discussion of this paper will give much focus on the non-verbal aspects. Fundamentally, Jenkins and Dillman (1995) describe the verbal language as wording and information of a set of questions in the questionnaire. While the non-verbal language refers to the graphic component or the elements of visualisation that are important enough to make the respondents engage to the questionnaire. They believe that the graphic non-verbal language should not be neglected because the appearances of the questionnaire have cognitive and affective effect on the efforts and motivation of the respondents to responds. One should clearly understand that the graphic language took in many forms and does not limit to text, picture, graph, symbol and so on. What they meant by graphic elements in the paper based questionnaire are to the use of colour, shapes, brightness, or a theme to the questionnaires. All of these elements are important to secure the respondents attention as they go through the questions. Furthermore, the visual aspect of self-administered questionnaires play significant role in improving survey response.

The way information is presented in the questionnaires has either positive or negative effect on the perception of respondents. The mental perception in turn will influence the respondents to answer questions. Besides, Jenkins and Dillman (1995) further explain that the graphic language acts as a "channel" of communication that draws the attention of respondents. Poor channel communication would result in unfavourable respondents' action. Scientifically, the respondents will extract meaning and cues from the way information are displayed on a page. There are several processes that are involved when the respondents process the data in questionnaire. Tourangeau (1984) has developed a model of cognitive process involved in self-administered questionnaires. Firstly, the respondents would observe and receive the questions in all languages, verbally and non-verbally. Then, the respondents would comprehend all languages. Next, the respondent would try to search memories or recall for relevant information. The information would then be integrated and transmitted to mind or cognizance in form of one judgement. The judgement would be translated into action or response by marking the answer. Thus, by creating a good impression at the initial stage of first gaze prior to answering the questions is imperative.

To date, there has been little attention on the study and discussion of graphic language of self-administered questionnaire. Due to the scarcity of the studies in this area, there is limited guideline that could guide the design of the questionnaires. The existing books and articles on research methodology have discussed this topic in general but do not provide a specific and clear example of the graphic non-verbal language as introduced by Jenkins and Dillman (1995) and Dillman, Smyth, and Christian (2009).

In order to have a clear understanding on the graphic language of self-administered questionnaires, Jenkins and Dillman (1995) introduced a "Navigational Guide Principle" for self-administered questionnaires. The principles

highlighted the use of visual elements of brightness, colour, shape, and location or layout in consistent manner. Furthermore, the questionnaires should be designed by using several different elements in order to have a good outcome on response rates. The principles included in the navigational guide involves the use of question number, contrast technique, gestalt grouping laws, questions should be listed vertically while the response scale should be place horizontally, use multiple colour to have positive effect, and a self-administered questionnaire should not over use lines or matrix. Those principles as introduced by Jenkins and Dillman (1975) and Dillman et. al, (2009) will be beneficial if researchers are able to utilize their creativity skills in designing questionnaires.

2.2 Negative Worded Statements

In questionnaire designs, the positive and negative statements are often combined in the set of questions. Conventionally, the inclusion of negative statements in survey instruments intended to prevent response bias that has effect on validity of research findings (Sonderen, Sandermen and Coyne, 2013) and produce error (Colosi, 2005). Likewise, it is also intended to interrupt response (Roszkowski and Soven, 2010) in addition to reduce the problem of acquiescence, affirmation or agreement bias made by respondents (De Vellis, 1991; Colosi, 2005). Acquiescence refers to a situation whereby there is a tendency of respondents to agree with items irrespective of the content (De Vellis, 1991). The respondents tend to give extreme answer either agree or disagree to all statements (Sonderen, et. al, 2013). However as the mixing statements were included together in the questionnaires, it seems that the inclusion of the negative statements are producing more response error (Colosi, 2005).

The response bias styles of respondents sometimes are quite a troublesome. Roszkowski and Soven (2010) observe that the respondents may exert carelessness when they felt it is an obligation to fill in the questionnaires. As a result, the respondents would apply less cognitive effort to answer the questions. Another factor that may cause the respondents' carelessness in answering the questions could be due to work-related exhaustion (Merritt, 2012). The respondents who are fatigue behave negatively on the negative statements. They are likely to misinterpret the meaning of the questions and assume that all statement presents are in similar direction (Schmitt and Stults, 1985). Consequently, the findings of the study may become ambiguous due to lack of motivation and less willingness to answer the questions (Roszkowski and Soven, 2010).

The respondents were also found as inattentive or simply not paying attention to the questions (Sonderen et al, 2013). As a result, the respondents missed the intended meaning and lack of effort to understand the questions. This situation occurs when the answer scales available are in a long form.

Another response bias style is respondents' confusion. This situation occurs due to intellectual ability of the respondents. When the respondents perceived the questions or statements as complex, the respondents may simply guess the answer without fully understand the actual meaning of the question. According to DeVelllis (1991), this would happen if the respondents are young and less educated. Hence, the response bias style as shown by the respondents would actually become potential problems to the researchers.

There are several negative implications as a result of poor response style due to the negative items. The response style error would lead to poor statistical results. The correlation of inter item and internal consistency are found to be negative (Roszkowski and Soven, 2010). This is due to the fact the score of positive and negative are imbalance when compared to positive and negative items (Colosi, 2005; Roszkowski and Soven, 2010). Furthermore, the data might be invalid and inaccurate when the respondents are inattentive to the questions and thus lead to inaccurate results (Schmitt and Stults, 1985).

2.3 Techniques in handling negative worded statements

With regard to the techniques used to handle the negative statements, basically there are two common techniques that are commonly used by researchers. Several studies have suggested that the negative worded statements should be reworded to the same direction like positive items prior to questionnaire distribution (Rozskowski and Soven, 2010, Allen and Meyer, 2003). However this situation may encourage another possible issue where the respondents might give extreme answer on the statements. Moreover, by changing into positive statements might change the originality of the intended meaning of the items.

Another conventional technique in handling the negative statements is by reverse code the answer scale. The problem with reverse coded is when the data shows imbalance or inconsistent results when the positive statement were compared to negative statements (Colosi, 2005). Thus, by transforming into the same direction into positive items and reverse codes the answer scale seems insufficient to overcome with the response style and undesirable data. Due to the complexity of the negative worded statements, this study applies several Dillman's graphic language principles as a guideline to improve the response style of the respondents.

3.0 Methods

3.1 Samples

This preliminary study was conducted using cross samples with the intention to test the negative worded statements and its questionnaire designs. Krosnick and Presser (2010) suggest a conventional pretesting of questionnaire should be administered to small number of population that is identical to target respondents in real research. Thus, this study utilizes two similar respondents that perform similar job. Sample 1 was conducted to primary school teachers as respondents. A total of 40 questionnaires were distributed, a total of 35 were returned and only 25 questionnaires were found usable. The questionnaires that were prepared to the subjects of study were in black and white form. Sample 2 was conducted at one of technical institution and the subject of this study was technical instructors. A total of 40 questionnaires were distributed and 100 percents of the questionnaires were returned. A total of 37 of the questionnaires are usable and only 3 questionnaires were rejected. The questionnaires that were prepared to these subjects of study were printed in colour where the negative items were printed in colourful forms. The usable questionnaires were then analysed in this study.

3.2 Measures and Instruments

The affective commitment scale that was developed by Allen and Meyer (1990) were used in this study. The survey instruments consist of 8 questions from overall items in organizational commitment questionnaire of Allen and Meyer (1990). This study only utilize one of the components of Organization commitment scale because the affective commitment scale consist of balance number of positive and negative worded statements as compared to the other two components. Furthermore, limited number of sample in this study also becomes limitation in analysing the data. The rating point of scales are anchored from 1 to 5 point of scale that ranging from (1) strongly disagree to (5) strongly agree. The affective commitment model was selected as it is well established model, commonly used it social science studies and it has been tested in various countries in different work setting. The data of this study were analysed using SPSS version 19.

4.0 Results and Discussion

A descriptive analysis was conducted to examine the background of the respondents in this study. The respondents from sample 1 presents 52 percents of women and 48 percents are men that mostly age of 31 years and above with a percentage of 84 percents in this study. In terms of education level, 60 percents of the respondents are degree-holders as followed by diploma-holders with a percentage of 28 percents respectively. In the aspect of teaching experience, a total of 44 percents of respondents have worked for more than 16 years as school teachers, while 36 percents of the teachers hold 6 to 15 years of teaching.

Sample 2 consist of 67.6 percents of male respondents and 32.4 percents of female. Respondents aged 31 and above with a percentage of 91 percents of this study. The education level of the respondents are mostly at secondary school level with a percentage of 40.5 and followed by diploma-holders with 35.1 percents, and only 10.8 percents hold are degree-holders. In terms of years of job experience, only 27 percents of respondents have worked for over 11 years and above in the organization, and 16 percents of the respondents have 16 years of job tenure. While the remaining of the respondents are mostly presents less than 10 years of work experience as technical instructors. The details of the demographic profiles of both samples are presented in the table below.

Table 1: Summary of Demographic Profile and Affective Commitment Item Statistics

Particular	Sample 1	Sample 2
Demographic Characteristics *(All values are in percentage - %)*		
<u>Gender:</u>		
Male	48	67.6
Female	52	32.4
<u>Age:</u>		
21-30	16.0	18.9
31-40	32.0	45.9
41-49	32.0	35.1
50 and above	20.0	-
<u>Education Level:</u>		
SPM	8.0	40.5
STPM	4.0	8.1
Diploma	28.0	35.1
Degree / Bachelor	60.0	10.8
Others	-	5.4
<u>Years of Working Experience:</u>		
Less than 1 year	4.0	2.7
1 to 5 years	16.0	35.1
6 to 10 years	28.0	18.9
11 to 15 years	8.0	27.0
16 years and above	44.0	16.2
No of Usable Questionnaires (%)	71.2	92.5
Affective Commitment Item Statistics		
<u>Cronbach Alpha:</u>		
Total Overall Value of AC	**0.584**	**0.737**
Positive Items (AC1, AC2, AC3, AC7)	0.448	0.650
Negative Items (AC5, AC6, AC8)	0.902	0.674
(Item AC4 deleted)		
Total Overall Mean (m)	**3.40**	**3.66**
Mean for positive items	3.84	3.95
Mean for negative items	2.96	3.54

The effect of graphic design on negative worded statement were measured in the aspect of the usable rate, the reliability of positive and negative worded statements of affective commitment items, and mean value as depicted by Table 1. Firstly, by improving the graphic aspect of the questionnaires, it is found that the number of usable questionnaires is improved significantly from 71.2 percents to 91.5 percents. This indicates that the appearance and design of the questionnaires carry positive impact to the number of usable rate. This is in line with Jenkins and Dillman (1995) where they explained the visual aspect of questionnaires would significantly improve survey responses.Prior to analysing the data of these items, it should be noted that the scale of negative worded statements were reverse coded by using SPSS transform function. The analysis of internal consistency of affective commitment (AC) items was divided into two, positive and negative. The analysis should be performed separately to ensure the positive and negative items are not in the same mode (Roszkowski and Soven, 2010). The results from sample 1 indicate the positive items shows lower reliability value. Lower value is caused by AC3 and by deleting the AC3 the reliability could be improved to 0.732. However, the results from Sample 2 indicate the reliability value is good and acceptable.

On the other part, the value of negative worded statements of Sample 1 indicates highly reliable which is above 0.9. However, the Sample 2 indicates the results of negative worded statements shows acceptable value which is above 0.6. Sekaran and Bougie (2010) suggest the values of internal consistency that are above 0.6 are considered as acceptable value. The overall value of internal consistency for Sample 1 indicates nearly satisfactory. The Cronbach alpha for sample 2 is at good level. This study concludes that by improving the presentation of the items to the respondents, it could improve the value reliability of measuring instruments. Philips, Robertson and Keel (1991) suggest the element of colour is psychologically appealing to respondents mentally and emotionally. Hence, the problem such as carelessness, confusion, inattentive, and demotivated to give response to survey could be reduced. When such problems could be overcome, the value of internal consistency and total correlation could be improved (Roszkowski and Soven, 2010).

The item AC4 were deleted from both sample 1 and sample 2 because the value of Cronbach Alpha of item AC4 ruined the overall value for negative worded statement and also the overall value of affective commitment. In the revised version of organizational commitment questionnaire by (Allen, Meyer, and Smith, 2004) the item AC4 was removed in the affective commitment construct. It is best to delete item AC4 so that the overall internal consistency of affective commitment scale could be improve (Allen et. al, 2004).

Lastly, the overall mean value for sample 2 as presented in the table shows that it is slightly higher than sample 1 which is 3.66. The mean value for positive and negative items that were reverse coded was found consistent. However, the mean value for sample 1 shows there is slightly inconsistency which can be seen from the mean value of negative items. Similar results of this study are in line with Colosi (2005) where his findings on positive and negative items are found inconsistent even though the negative items were adjusted before analysing the data.

5.0 Conclusion and Recommendations

Based on the discussion of the findings above, this study found that by improving the presentation and graphic of survey questionnaires, the number of usable questionnaires and survey responses were improved. In comparing sample 1 and sample 2, the results from sample 2 shows better statistical values that cover the number of usable questionnaires, the responses on positive and negative worded statements, internal consistency and mean value. The value of reliability and mean value that can be seen from sample 2 is better than sample 1. Past studies argue that lower education level of respondents may harm the survey responses (Roszkowski and Soven , 2010; Merrit, 2012). However, the findings of these studies contradicted with the findings of the present study where the respondents from sample 2 who mostly have lower education level have responded better than those from sample 1. Therefore, as in line with Jenkins and Dillman (1995) this study observes that a problem of poor quality responses and number of usable questionnaires could be reduced if the graphic language of questionnaires could be improved.

Apart from that, well design self-administered questionnaires promote motivation and attention of the respondents to give accurate responses (Jenkins and Dillman, 1995). The problem of carelessness, inattentive and confusion as discussed in the literature could be overcome where the cognitive effort in processing the information by respondents also could be handled in effective way by utilizing the Dillman' graphical language method in self-administered questionnaires. For future research, it is suggested more studies are needed that specifically focus on the graphic design of questionnaires on the survey items. Past studies have given so much focus on the number of return questionnaires

(for example Philips, et al. 1991; Etter, Cucherat and Perneger, 2002; and Brennan and Charbonneau, 2005) rather than the quality of survey responses.

Another aspect that is also critically important is the quality of response survey because the findings would enable future researchers to improve the number of usable questionnaires and reduce the number of rejection. An important remark of this study is that costs should not become a constraint to produce quality self-administered questionnaires. The findings of the present study have indicated that the cost of producing well designed questionnaires is at minimal level as compared to the cost of unusable questionnaires. Apart from that, due to the limitation of the number of respondents in this study, the future research should include higher number of respondents so that a clear generalization could be made on this area. There are many aspects that need to be discovered on the linkage between graphic languages on survey items.

References

Allen, N. J., & Meyer, J. P. (1990). The measurement and antecedents of affective, continuance and normative commitment to the organization. Journal of occupational psychology, 63(1), 1-18.

Brennan, M., & Charbonneau, J. (2005). The colour purple: the effect of questionnaire colour on mail survey response rates. Marketing Bulletin, 16(5), 1-7.

Colosi, R. (2005). Negatively worded questions cause respondent confusion. Proceedings of the Survey Research Methods Section, American Statistical Association (2005), 2896-2903.

DeVellis, R. (1991). Scale development. Theory and Applications. Applied Social Research Methods Series, Vol.26, Sage Publications

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). Internet, Mail, and Mixed-Mode Surveys: the Tailored Design Method, Hoboken.

Etter, J. F., Cucherat, M., & Perneger, T. V. (2002). Questionnaire Color and Response Rates to Mailed Surveys A Randomized trial and a Meta-Analysis.Evaluation & the health professions, 25(2), 185-199.

Jenkins, C. R., & Dillman, D. A. (1995). Towards a theory of self-administered questionnaire design. Bureau of the Census.

Krosnick, J. A., & Presser, S. (2010). Question and questionnaire design. Handbook of survey research, 2, 263-314.

Malhotra, N. K. (2010). Marketing research: An Applied Orientation, Sixth edition, Upper Saddle River, NJ: Pearson Education Prentice Hall

Merritt, S. M. (2012). The two-factor solution to Allen and Meyer's (1990) affective commitment scale: Effects of negatively worded items. Journal of Business and Psychology, 27(4), 421-436.

Phipps, P. A., Robertson, K. W., & Keel, K. G. (1991). Does Questionnaire Color Affect Survey Response Rates?. In Proceedings of the Survey Research Methods Section, American Statistical Association (pp. 484-488).

Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., & Podsakoff, N. P. (2003). Common method biases in behavioral research: a critical review of the literature and recommended remedies. Journal of applied psychology, 88(5), 879.

Roszkowski, M. J., & Soven, M. (2010). Shifting gears: Consequences of including two negatively worded items in the middle of a positively worded questionnaire. Assessment & Evaluation in Higher Education, 35(1), 113-130.

Schmitt, N., & Stults, D. M. (1985). Factors defined by negatively keyed items: The result of careless respondents?. Applied Psychological Measurement, 9(4), 367-373.

Sekaran, U., & Bougie, R. (2010). Research methods for business: A skill building approach. Wiley.

Tourangeau, R. (1984). Cognitive sciences and survey methods. Cognitive aspects of survey methodology: Building a bridge between disciplines, 73-100.

Van Sonderen, E., Sanderman, R., & Coyne, J. C. (2013). Ineffectiveness of Reverse Wording of Questionnaire Items: Let's Learn from Cows in the Rain.PloS one，*8*(7), e68967.