

An Application of the Verbal Probability Scale for Estimating Socially Undesirable Behaviour

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Abstract

The research reported in this paper is a start to extend the application of the Verbal Probability Scale (VPS) to socially undesirable behaviours. The scale was used to collect probability scores for drinking alcohol in pregnancy. The mean VPS score for the sample was six percent expressing the likelihood to drink alcohol in pregnancy, equating to 42,765 women on a national scale. Validation through recall was inappropriate for this behaviour. Instead, validation is suggested through the generation of time series data. The estimate produced in this study will serve as a starting point for the time series data.

Introduction

To assess the success of a social marketing effort, it is essential to benchmark the issue at the start of the project. It then needs to be periodically assessed to understand the extent to which behavioural modification has occurred. One assessment is intention data, used as a proxy for the actual behaviour. Social marketers collect intentions using a variety of Likert scales. Studies that reviewed this type of scale have observed its poor predictive performance (Day *et al.* 1991; Gan *et al.* 1985; Gruber 1970; Juster 1966). These studies found an 11-point probability based scale, popularly referred to as the Juster Scale after its author, to be a more accurate measurement scheme for future behaviour. Since then, this probabilistic measurement scheme has been tested and used by consumer researchers to estimate purchase rates (Day *et al.* 1991; Brennan and Esslemont 1994), purchase levels (Seymour *et al.* 1994; Hamilton-Gibbs *et al.* 1992), demand schedules (Brennan *et al.* 1995; Brennan 1995) and switching behaviour (Garland 2002). The satisfactory results led researchers to customise the scale for use in mail (Gendall *et al.* 1991), telephone (Brennan *et al.* 1995) and Internet (Parackal & Brennan 1999) surveys.

Sharp & Riebe (2000) extended the application of the above probabilistic measurement scheme to social issues. They experimented with the Verbal Probability Scale (VPS), a variant of the probabilistic measurement scheme developed for use in telephone surveys, to estimate the uptake of employment by carers of children at home in the next year. The validation carried out showed VPS to be an accurate predictor of aggregate behaviour (uptake of paid employment).

So far, the probabilistic measurement scheme has been successfully tested and used for predicting desirable behaviour such as purchase behaviour and uptake of employment. Considering the alarming increase in undesirable behaviours (e.g. binge drinking, drink driving) in most communities, there is a need to extend its application to such behaviours. The scheme could then be used for benchmarking, monitoring, and evaluating intervention programmes implemented to reduce the behaviour. The success of this probabilistic measurement scheme with desirable behaviour impelled the authors of this paper to use it to

estimate an undesirable behaviour, namely, to drink alcohol during pregnancy. The VPS version of the scheme was included in a questionnaire designed to assess the attitude of women of childbearing age (16 to 40 years) towards drinking alcohol during pregnancy in New Zealand. The remainder of this paper provides the methodology, results and future direction of this study.

Methodology

The Verbal Probability Scale (VPS) (see Figure 1) was included in a questionnaire designed to survey women of childbearing age (16 - 40 years) in New Zealand about drinking alcohol in pregnancy (Parackal *et al.* 2006). The survey was implemented with a web-assisted telephone interviewing system (WATI). This system employed the random digit dialling technique to select sample members from across New Zealand. The sampling technique used generated 2038 valid telephone numbers, of which 1256 resulted in successful interviews (65%). The selection rule within a household was the “16-40” age group. If a household had more than one participant belonging to the age group, the last birthday rule was used to select the respondent. Each telephone number was attempted four times before being abandoned. The final sample produced was comparable to the New Zealand population in age and ethnicity, which were the key demographics for this survey (Parackal *et al.* 2006).

The VPS was applied to individuals who indicated the possibility of becoming pregnant in the future (Do you think that to the best of your knowledge there is a possibility that you would be pregnant in the future? n = 580; 51% of the sample stated “yes”). This sub sample was comparable to the New Zealand population of women in this age category in ethnicity (European 68% vs. 68.7%; Maori 15% vs. 15.8%; Pacific peoples 5.4% vs. 6.8%; Asian 11% vs. 9% - figures based on the 2001 Census administered by Statistics New Zealand) and prevalence of drinkers (82% vs. 82% figure based on Ministry of Health (2004)).

The overall context of the questionnaire related to alcohol consumption. The questions related to respondents’ opinions and behaviours pertaining to alcohol consumption. The VPS was placed immediately after questions about alcohol consumption behaviour in the past 12 months.

<p>I would like to find out what your chances are for drinking alcohol at any time in your future pregnancy? Please give your answer on a scale of “0” to “10”. I will explain the scale to you –</p> <p style="padding-left: 40px;">If you are certain or practically certain that you will have some alcohol in your next pregnancy you will choose “ten”. If you think there is absolutely no chance of you having any alcohol then the best answer would be “zero”. If you are not sure, then please choose an answer as close to “zero” or “ten” as you think it should be. i.e. if the possibility is high but you are not very certain then please choose a number closer to 10 or if the possibility is low, but you are not very certain then please choose a number closer to 0.</p> <p>Now, taking everything into consideration what are the chances of you having some alcohol at any time in your next pregnancy?</p>
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Figure 1 Verbal Probability Scale

Results

Those who indicated “zero probability” or “absolutely no chance to drink alcohol in pregnancy” amounted to 77%. The remaining 23% were spread across the rest of the scale (scale points 1 to 10). The distribution exhibited a small blip at the midpoint (point 5), a typical feature observed in the distributions of high involvement consumer durables (Parackal & Brennan 1999; Gan *et al.* 1991).

The mean VPS score for the sample was 0.061. Being a probabilistic measurement, the mean score can be interpreted as the proportion of the sample that would exhibit the behaviour (Day *et al.* 1991). This translated to 42,765 women (six percent of 712,755 women aged 16-40 (Statistics New Zealand, 2006)) who indicated that they were likely to drink alcohol during their next pregnancy.

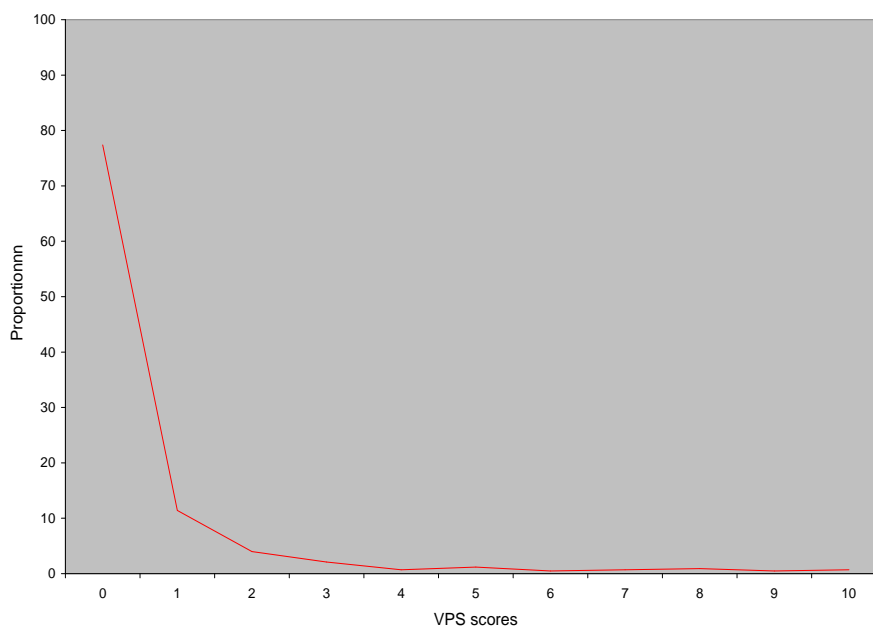


Figure 2. Inverse J-shape distribution of the VPS

Discussion

The six percent estimated in this study is the proportion of women who have made a pre-meditated decision to drink alcohol in their next pregnancy. This estimate does not include women who might drink unintentionally before realising that they are pregnant or have unplanned pregnancies. All the same, the possibility of at least around 42,500 births with some injury caused by exposure to alcohol in New Zealand is alarming. The above estimate must, however, be treated with caution until it is validated. This needs to be the next phase of development for this application of the VPS.

There is no safe amount of alcohol that can be consumed in pregnancy (Gerberding *et al.* 2004). Consequently, even the level estimated in the current study warrants intervention because of the astronomical cost of caring for individuals born with alcohol defects. For example, in 1998, the United States incurred \$4.0 billion caring for such individuals (Lupton

et al. (2004). There are no corresponding dollar figures available for other countries. Considering that most Western countries do not differ from the United States on this issue, they too may be incurring similar costs because of this preventable issue. The damage to the national economy would be severe for small countries like New Zealand. This is a further reason for developing the VPS through appropriate validation so that a standardised instrument is available for benchmarking and monitoring the issue.

The estimate arrived at in this study is not the prevalence of alcohol consumption in pregnancy in New Zealand. The prevalence reported for New Zealand in the literature ranges from 25% to 42% (Parackal 2003, McLeod *et al.* 2002, Watson & McDonald 1999 and Counsell 1994). The six percent of women in the current study includes those who have made a pre-meditated choice to consume alcohol in pregnancy. The estimate excludes women who may unintentionally consume alcohol, especially in the early stage of their pregnancy which is a serious issue by itself, and those who may have unplanned pregnancies. In addition, the prevalence is the actual behaviour collected from women who were pregnant or in their current pregnancy, whereas the estimate in this study is that of a future behaviour relating to all women in the childbearing age group (18 to 40 years). The latter would have more relevance as any preventive efforts must be directed at the entire target population. Time series data based on the VPS would be useful to monitor the issue over time. The estimate in this study will serve as the starting point for the time series. Such a time series data would also provide a definite validation for the VPS.

Establishing the VPS as a valid evaluative instrument would also benefit social marketing as it lacks standardised techniques. For example, Kotler and Zaltmann's (1971) seminal article outlined a social marketing framework comprised of collecting information, developing messages based on that information, communicating messages through mass and specialised media to the target market and monitoring the outcome. Subsequent authors adopted the framework but with considerable variations in the techniques used (e.g. Walsh *et al.* 1993; Robinson 1993; McKenzie-Mohr & Smith 1999). One area where variation is present is in the evaluation of social marketing programs. Evaluations have ranged from tracking systems designed to monitor individual members of the target population, to quantitative surveys. While these techniques did prove useful for the project they were applied to, the outcomes were not comparable with similar projects because of their differences (Walsh *et al.* 1993). If standardised techniques can be developed and used, then the evaluation of behavioural changes could be comparable. This would not only provide assessments for individual projects but would also enable comparative assessments across similar social marketing projects. Through developing the VPS, future social marketers will have a proven technique for evaluative purposes.

Future Direction

It is clear from the above discussion that validation of the VPS is imperative. The traditional validation based on recall data is not appropriate, firstly because of the social stigma attached to such undesirable behaviours, secondly, in this particular case, the behaviour was not bound with a time horizon. A pilot study to determine the time horizon for the VPS question produced comparatively small sample sizes, as very few women indicated that they planned to be pregnant within the time horizon. Consequently, in the current study, it was decided not to bind the VPS question with a time horizon. Further more, recall data may not be a satisfactory

form of validation in this case because of the biases introduced by time and memory (Rockenbauer et al 2001; Sudman and Bradburn 1973).

Reibe et al (1999) proposed an alternative method of validation for such probability data based on the response distribution. Their validation compared the distributions with the established Beta distribution based on responses to choices between two options (Ehrenberg and Uncles, 1998). Fitness of probability data with the Beta distribution was related to better predictive accuracy at the aggregate and individual levels. The authors studied 280 separate probability based data and observed that data with the inverse-J shape distribution exhibited the best fit. This may be one approach to validate the VPS for this current application.

A more stringent validation would be to repeat the study at regular intervals to generate time series data for the issue under investigation. When sufficient data points have been generated, trends would emerge. The trends would indicate the consistency of the scale's performance. The estimate produced in this study could serve as a starting point for the time series.

Conclusion

This paper reported on an application of the VPS to estimate a socially undesirable behaviour, namely, drinking alcohol in pregnancy. The scale functioned in a similar fashion to previous applications. The study raises the need to further develop the VPS through appropriate validation. Suggestions for validation include comparing the response distribution with the established Beta distribution, and generating time series data by repeating the study at regular intervals in the future. The latter is a more stringent validation achieved when a recognisable pattern becomes evident in the time series. The estimate produced in this study will serve as the starting point for the time series data.

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