

Measuring Bullying Among Students Using the Randomized Response Technique

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Abstract: Due to its sensitive nature, bullying is difficult to study empirically. The prevalence and the frequency of bullying are difficult to estimate using standard survey techniques due to the tendency of respondents to hide information in such settings. This behavior is known as social desirability, that is, the desire to make a favorable impression on others, and poses a significant threat to the validity of self-reports. Since the 1960s a variety of questioning methods have been devised to ensure respondents' anonymity and to reduce the incidence of evasive answers and the over/underreporting of socially undesirable acts. These methods are generally known as indirect questioning techniques (IQTs) and they obey the principle that no direct question is posed to survey participants. Therefore, their privacy is protected because the responses remain confidential to the respondents and, consequently, their true status remains uncertain and undisclosed to both the interviewer and the researcher. This paper describes a survey asking sensitive qualitative questions about bullying, conducted using one of the IQT, concretely, randomized response technique (RRT). This work tests the efficacy of RRT in establishing higher rates of truthful self-reporting when compared to traditional survey techniques.

Keywords: Bullying, Social desirability, Indirect questioning techniques, Randomized response techniques

Introduction

Since the decade of the 70s when the first empirical studies were carried out by Dan Olweus in Scandinavia, much attention has been addressed to this phenomenon first in Europe, soon afterwards in Japan, Australia and Northern America, but only recently in Latin America (Del Barrio et al., 2008).

Bullying has received scientific attention from different theoretical and methodological approaches in which some element of the phenomenon is focused (Kowalski, Giumetti, Schroeder y Lattanner, 2014). Despite this, there is some unanimity in its conceptual delimitation. Thus, it is assumed that bullying is a phenomenon of intentional aggression of one or some over another or others in a repeated and sustained manner, in which there is an imbalance of power between the aggressor and the victim (Olweus, 1993), definition in which three fundamental criteria stand out: (1) intentionality, (2) reiteration and (3) imbalance of power. In this regard, Ortega (1998, 2010) included the ethical dimension (4), in the sense of considering bullying as a behavior of moral transgression, insofar as both the aggressor and the direct observers of the phenomenon recognize it as an immoral and unjust behavior. On the other hand, it would be necessary to include besides physical and verbal bullying the two most easily recognizable prototypes, psychological and relational bullying (Furlong et al., 2005; Olweus, 1993). It is also necessary to analyze the bullying carried out through the Internet and, in general, the digital devices so widely used by adolescents and young people and that it is recognized as cyberbullying (Casas, Del Rey y Ortega-Ruiz, 2013; Slonje, Smith y Frisén, 2013; Tokunaga, 2010).

Very often the interest and concern are a result of the existence of severe incidents with a clear impact on the media, as for example suicides of adolescents, either declaring or not their inability to get away from the nightmare that his/her life at school had become. But research is also conducted as a consequence of the difficulties experienced by teachers in their daily school life. The need for improving the moral and emotional

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atmosphere leads to the acknowledgement of the relevance of considering peer bullying and social exclusion as obstacles for an efficient and inclusive school. So, bullying is widely recognized as being a problem, not only for those individuals involved, but also for the organization within which it occurs and the wider community.

The second day of May is the World Day Against Bullying, a serious problem that affects millions of primary school and secondary school students worldwide and causes at least 200 deaths directly every year. This initiative was born in 2013 after the presentation of the Bullying Without Borders NGO, was approved by UNESCO in order to help raise awareness of this problem.

Since 2014, Observatory for Spain of the International Bullying Without Borders NGO together with the Multidisciplinary Team of Bullying Without Borders, formed by doctors, psychiatrists, psychologists, educational psychologists, educators, lawyers, journalists and parents of children and adolescents who have suffered bullying, carries out the National Bullying or Bullying Report in Spain. According to the report, the national statistics of bullying or school bullying notified 1004 victims in 2015, 1229 in 2016 and 1475 occurrences in 2017. The Communities of Murcia, Madrid, Catalonia and Andalusia are at the forefront with a number of serious cases of bullying, followed by the Balearic Islands and the Valencian Community. (ONG Bullying Sin Fronteras, 2018)

The age of the victims is decreasing, in 2016 the average age of the victim was reduced, currently it is 10.9 years, compared to the average age of 11.6 that was recorded between 2013 and 2015. In addition, cases of harassment at early ages have increased very significantly since assaults on children under seven years of age represent more than 14% of cases. On the other hand, the average age of the bullies is 11 years - it has also been reduced since last year in almost a year.

More than half of the aggressors in the face-to-face harassment are male, compared to cyberbullying where the profile is female, this gender difference between the attacks is due to the foundations to "the physical violence of males compared to the other ways they seek the girls to hurt". In the case of cyberbullying, both foundations highlight the problem that causes bullying to occur outside the school environment and continuously, as the victims lose their privacy space, their home, where they feel protected.

The psychological problems derived from harassment are the same, even if it is face-to-face or virtual. Sadness, anxiety and fear continue to be consequences that persist in victims for longer than harassment lasts. In addition, in 8.4% of cases, almost one in ten, the victim has self-harmed and has even come to think or attempt suicide in his despair. (El Español, 2017).

In social research, we very often gather information relating to highly sensitive issues, as is the case of bullying. In these situations using the direct method of interview (asking questions directly to the respondents, DQ), the respondents provide often untrue response or even refuse to respond because of the social stigma and or fear. Such systematic response errors lead to social-desirability bias in prevalence estimates of the sensitive behaviors of interest, underestimating socially undesirable activities. To overcome these problems, indirect questioning techniques, such as the randomized response technique (Warner, 1965) may be used to collect more reliable data, protect respondents' confidentiality and avoid unacceptable rate of nonresponse. In the RRT, respondents use a randomization device (decks of cards, coloured numbered balls, dice, coins, spinners, random number generators, etc.) to generate a probabilistic relationship between their answers and the true values of the sensitive characteristic. The rationale of the RRT is that the respondents are less inhibited when the confidentiality of their responses is guaranteed. This goal is achieved because all responses are given according to the outcome of the randomization procedure, which is unknown to both the interviewer and the researcher and, hence, respondents' privacy is preserved.

The RRT has been applied in surveys covering a variety of sensitive topics like racism (Ostapczuk et al., 2009, Krumpal, 2012), drug use (Kerkvliet, 1994, Dietz et al., 2013, Goodstadt and Gruson, 1975, Striegel et al., 2006), abortion or delinquency (Fox and Tracy, 1986, Holbrook and Krosnick, 2010, Lara et al., 2006, Kuha and Jackson, 2014), AIDS (Arnab and Singh, 2010) or academic cheating (Fox and Meijer, 2008).

Standard RR methods are used primarily in surveys which require a binary response to a sensitive question, and seek to estimate the proportion of people presenting a given (sensitive) characteristic, for example, some authors who developed these models are Horvitz et al. (1967), Greenberg et al. (1969), Boruch (1972), Devore (1977), Kuk (1990), Mangat and Singh (1990),... Techniques also exist for quantitative variables, but these are not used as commonly, for example, Eriksson (1973), Eichhorn and Hayre (1983), Bar-Lev, Bobovitch and Boukai (2004), Diana and Perri (2010). In our study, conducted in Spain we took into account qualitative variables, and the purpose of this study was to explore the use of RRT for estimating the proportion related to bullying in Spanish students and to compare this value with the value obtained by direct question.

Method

Participants and Sampling Method

The sample for this survey included students from university of Granada. A stratified sample of students enrolled in different faculties were selected such that degree programs and year of degree were represented in proportion to their total numbers of students. The students were contacted in class and randomly assigned to one of the two survey modes: the RR technique (subsample 1) and direct responding (subsample 2). All questionnaires were administered during the class time break. All students were invited to participate in a study and provided informed consent by signed. The classroom setting facilitated cooperation, no objection to the survey was raised and no empty questionnaires were returned.

Sample Size Determination

From some efficiency and time constraints, we firstly decide to contact 500 students by direct questioning (DQ). The size of the RRT group was increased at a ratio of 1.5 to 1 (DQ) due to the lower statistical power of RRT than the DQ.

Procedure and Measure

The questionnaire is the same in two subsamples. This questionnaire began with some academic questions followed by a set of basic demographic questions and then a sensitive question referring to bullying. This screening test is a broad and comprehensive assessment designed to help researchers in the study of bullying.

In our case the sensitive selected question was: *Have you ever suffered bullying?*. In subsample 1 (using RR technique), for the sensitive question, the interviewer explained how the survey was being conducted, and gave an example of its use. The response was randomized using a generalization of the model proposed by Horvitz, Shah & Simmons, (1967) and extended by Greenberg, Abul-Ela, Simmons & Horvitz (1969). The randomizing device used was the app “Randomizers” with “Coin Flipper” option, which had previously been installed on the student’s phone (Play Store, 2015). Figure 1 shows the app. The application is very simple to use, for the sensitive question the user touches the screen and a side of the coin is shown. If it is a face side, the sensitive question should be answered, if it is a tail side, the innocuous questions should be given. Figure 2 shows the procedure of response for the subsample 1.



Figure 1. App “Randomizers”

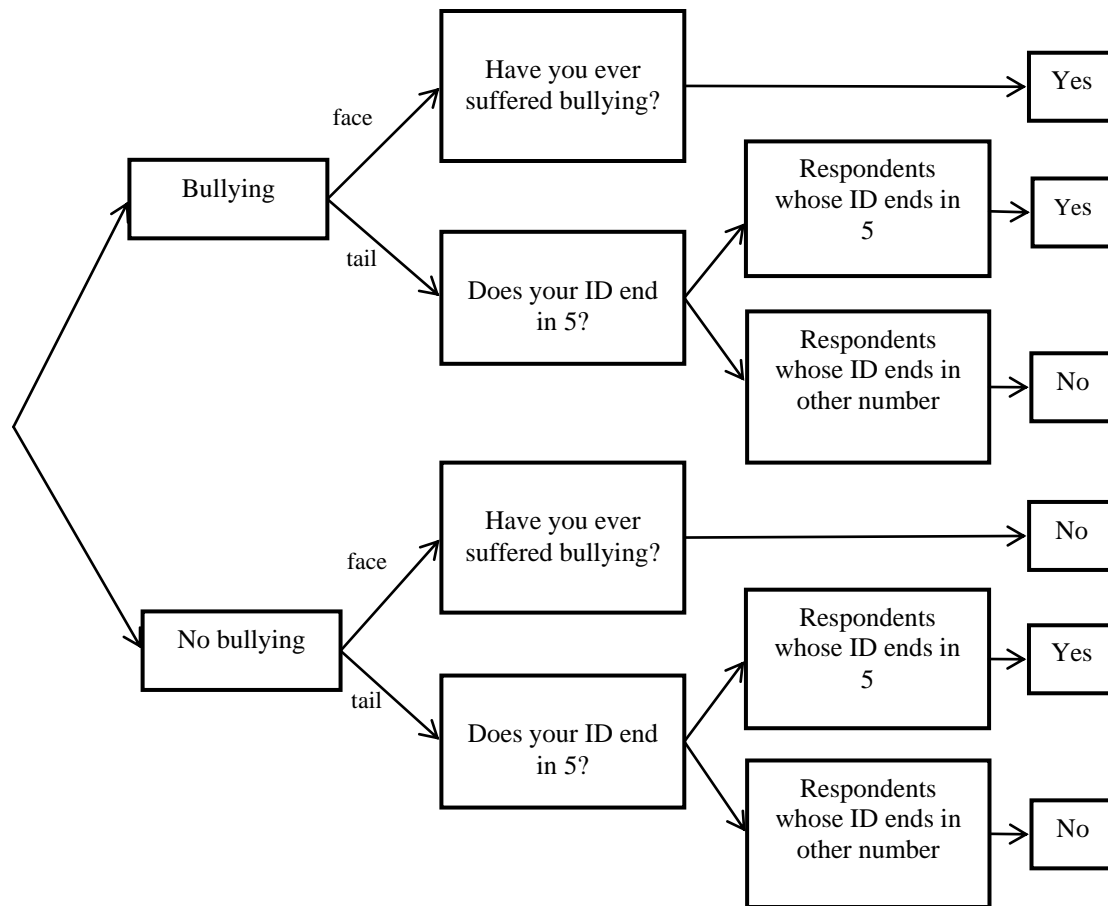


Figure 2. Response procedure of the respondent

The teacher explained that this technique preserved the students' anonymity with the aim not to provoke mistrust in them and all students completed the full questionnaire. On the contrary, in subsample 2 (using direct question), not all the respondents completed all the survey (the total nonresponse rate was 8%). The data collection and the field work were conducted by the research group FQM365 of the Andalusian Research Plan. The interviews were carried out during 2015, in Spain. Data were obtained from 754 students using RRT and from 492 using DQ.

Statistical Analysis

Inference in survey sampling is used to estimate the parameters of interest. The design weights were computed from a stratified clustered random design and modified for adjusting the bias of coverage. All statistical analyses were performed using the sampling weights. The Horvitz-Thompson estimator (Singh, 2003) was used to estimate the mean values for the direct questions. In RR the Horvitz technique was used to estimate the mean values of interest variable. All statistical analyses were performed using R software. We used some standard packages for estimation in survey sampling (Sampling; Tillé and Matei, 2015) and a specific package for handling RR data obtained from complex surveys (RRTCS; Rueda, Cobo and Arcos, 2015. Specifically, in this package we used the Horvitz() function).

Results and Discussion

The study was conducted for all students and also separating respondents by gender. In DQ, the survey had a population of 492 individuals, of whom 42.89% were men and 57.11% were women. In RR, the study population was composed of 754 students, with 39.79% men and 60.21% women. The point estimates of the sensitive variable and the corresponding 95% confidence intervals for each technique (DQ and RR) are summarized in Table 1.

Table 1. Estimation of the patterns of bullying

Study technique	DQ (n=492)				RR (n=754)			
	Estimation	Standard deviation	Confidence Interval (95%)		Estimation	Standard deviation	Confidence Interval (95%)	
			Lower bound	Upper bound			Lower bound	Upper bound
Total	0.1281	0.0058	0.1167	0.1395	0.2983	0.0315	0.2366	0.3601
<i>Gender</i>								
Male	0.1094	0.0048	0.1000	0.1188	0.2754	0.0343	0.2081	0.3426
Female	0.1268	0.0022	0.1225	0.1311	0.2591	0.0152	0.2293	0.2889

By DQ, the estimated prevalence of students who had suffered bullying was 13%, nevertheless according to RR, it was 30%. This difference is statistically significant. If we consider the results by gender, the prevalence of bullying is higher in the case of randomized response versus direct response for both men and women, being these differences significant. Focusing on DQ, the prevalence of bullying is higher in the case of female, and this difference is significant and focusing on RR, is higher in the case of men, but the difference is not significant. While RR is arguably less prone to bias than DQ, RR is also more susceptible to sampling variability.

Conclusion

The present study describes a survey asking sensitive qualitative questions about bullying in Spanish. The RRT was able to elicit higher values of self-stigmatizing reports of bullying by increasing privacy in the data collection process. The survey included 1246 students at the University of Granada. Respondents were randomly selected to use the RR technique and to be asked directly. On comparing the results of the direct survey and those of the randomized response survey, we find that the prevalence (DQ: 13%, RR: 30% approximately) is much higher with RRT. This pattern is also obtained for men (DQ: 11%, RR: 28% approximately) and for women (DQ: 13%, RR: 26% approximately).

Thanks to these results we can conclude that men and women tend to hide that they have suffered bullying. If we look at the prevalence obtained in DQ, men have a lower prevalence than women, but if we look at the prevalence obtained in RR, men have a higher percentage than women, but since this difference is not significant, we cannot draw definite conclusions.

We propose the use of RRT for investigating bullying in order to produce an estimator with a smaller bias. We rose as this methodology would allow making more accurate estimates of self-report.

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