FACILITATING DATA SHARING IN THE BEHAVIOURAL SCIENCES

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ABSTRACT

In most scientific fields, significant improvements have been made in terms of data sharing among scientists and researchers. Although there are clear benefits to data sharing, there is at least one field where this norm has yet to be developed: the behavioural sciences. In this paper, we propose an innovative methodology as a means to change existing norms within the behavioural sciences and move towards increased data sharing. Based on recent advances in social psychology, we theorize that a Survey Research Instrument that takes into account basic psychological processes can be effective in promoting data sharing norms.

Keywords: Data Sharing, Behavioural Sciences, Survey Research

1 INTRODUCTION

True science thrives best in glass houses, where everyone can look in. —Max Perutz (1989)

Rapid advances in technology are leading to the availability of exponentially increasing amounts of collected data. In Canada, it is estimated that Government departments, agencies and Crown corporations such as Health Canada, Natural Resources Canada, Environment Canada, Justice Canada, Statistics Canada, and Human Resources and Social Development Canada (HRDC) spend over $1 billion annually on collecting research data (SSHRC, 2002). In addition, the academic community also collects a considerable amount of research data; the Social Sciences and Humanities Research Council (SSHRC) estimates that their funded researchers create, on average, 400 datasets each year (SSHRC, 2002). Considering that the SSHRC supports only a fraction of the Canadian social sciences and humanities research community, it is probable that there are between 1,200 and 1,600 datasets produced each year by academic scientists in this field alone. Accounting for all data produced by natural scientists, health scientists, and research engineers, it is estimated that some 4,000 to 5,000 datasets are produced annually in Canada only (SSHRC, 2002).

Considering that scientific advancement builds on data, the increasing amount of information is essential to expanding the scientific knowledge of a field. The accumulation of datasets brings about a pressing need to effectively manage this pool of information in order to allow scientists to fully benefit from the generated knowledge (Arzberger, Schroeder, Beaulieu, Bowker, Casey, Laaksonen, et al., 2004; Uhlir & Schröder, 2007). For instance, organisations such as the Committee on Data for Science and Technology (CODATA), an interdisciplinary body of the International Council for Science (ICSU), have been created to promote and improve data management around the globe.

Efforts have been made towards data sharing in many fields. However, there are still important developments to be made, particularly in the behavioural sciences. While national statistical agencies such as Statistics Canada (Statistics Canada, 2002) and the National Center for Health Statistics (NCHS, 2002) share their data with behavioural science researchers through Research Data Centers (de Wolf, 2003), academic scientists in the same field are not accustomed to sharing their own data (Wicherts, Borsboom, Kats, & Molenaar, 2006). In fact, because research in the behavioural sciences involves human participants, concerns towards protecting the participants’ privacy and confidentiality have complicated advances towards data sharing among academic researchers. In addition, the absence of technical, institutional, and cultural frameworks obstructs the development of data sharing norms among academic researchers (Data’s Shameful Neglect, 2009). It is clear that norms concerning research data sharing are lacking in this field of research (A fair share, 2006; Data’s Shameful Neglect, 2009; Track I-C-4 to
This phenomenon of the lack of popularity of data sharing among academic researchers in behavioural sciences will be the focus of our paper. We consider the behavioural sciences as inclusive of psychology, cognitive sciences, education, and any other disciplines that investigate human or animal behaviours through empirical studies (Kline, 2009).

In this paper, we posit that it is possible and crucial for academic researchers in the behavioural sciences to advance towards increased data sharing. We will analyze the challenges of sharing data in the behavioural sciences. Specifically, we will argue that attitudes and norms represent one of the major barriers to data sharing in the behavioural sciences. Furthermore, based on research in social psychology on norms and social influence (e.g., Bloom, McBride, Pollak, Schwartz-Bloom, & Lipkus, 2006; Carducci, Deuser, Bauer, Large, & Ramaekers, 1989; Taylor & de la Sablonnière, 2012; see also de la Sablonnière, Taylor, & Sadykova, 2009), we will elaborate on how data sharing can be achieved in the behavioural sciences using a Survey Research Instrument. Thus, the main goal of this paper is to present an innovative way of promoting research data sharing.

2 ATTITUDES AND NORMS: A BARRIER TO DATA SHARING IN THE BEHAVIOURAL SCIENCES

Although there are clear benefits to data sharing (see Arzberger et al., 2004; OECD, 2007), there are also important challenges. Such challenges are observed in various fields; however, they seem to be more pronounced in the behavioural sciences, where the practice of data sharing is rare and often problematic. Several organizations and authors have expressed concerns over this phenomenon in recent years (Azar, 1999; Data’s Shameful Neglect, 2009; de Wolf, 2003; Johnson, 2001; Johnson & Sabourin, 2001). For instance, in 2002, CODATA stated in one report that "The behavioural sciences have not had a tradition of data sharing" (Track I-C-4 to CODATA, 2002). Similarly, in 2006, the editorial board of the journal Nature stated that “In psychology, there is little tradition of making the data on which researchers base their statistical analyses freely available to others after publication” (A fair share, 2006, p. 653).

Illustrations of this “non-sharing” norm are commonplace in the field. For example, in 2008, the Report on Data produced by the Canadian National Committee for CODATA revealed that in the behavioural sciences few Canadian public datasets are readily available for researchers or to the public. Of the 133 datasets available for use, only eight of them are from the behavioural sciences (CNC/CODATA, 2008). The most widely used dataset available to behavioural scientists in Canada is the World Value Survey, which presents and evaluates the values that are predominant in societies around the world. This survey has been repeatedly distributed internationally. On the World Value Survey website, data and results from surveys that have been distributed in Canada as well as in other countries are available to anyone who wishes to access them1. However, such datasets represent the exception rather than the norm in the behavioural sciences. Rarely do individual scientists post their data on the Internet to make them accessible to other researchers.

Moreover, behavioural scientists seem very reluctant to share their data for reanalysis (Craig & Reese, 1973; Wicherts et al., 2006; Wolins, 1962). For instance, Wicherts et al. (2006) demonstrated this trend when they were blocked from obtaining data reported in 141 empirical articles published by the American Psychological Association (APA). Indeed, 73% of the authors did not share their data despite having signed the APA Certification of Compliance containing the APA Ethical Principles, which oblige sharing data for reanalysis (Wicherts et al., 2006). Specifically, this principle states that “After research results are published, psychologists do not withhold the data on which their conclusions are based from other competent professionals who seek to verify the substantive claims through reanalysis and who intend to use such data only for that purpose, provided that the confidentiality of the participants can be protected (…)” (American Psychological Association, 2001, p.396).

The 26% response rate obtained by Wicherts and colleagues (2006) did not differ significantly from the 24% response rate reported over 40 years ago by Wolins (1962). As a result of Wicherts’ report (2006), the APA’s editors and publishers have worked on accelerating the discussion in order to require the deposition of data (A fair share, 2006). The limited availability of datasets and the response rates obtained by Wicherts and Wolins illustrate the

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1 It is possible that other datasets have been made accessible, but these are not easily accessible nor yet reported.
grave reluctance of behavioural scientists to share their data and the extent to which the existing attitudes and norms lead to problematic data sharing in the behavioural sciences.

The “non-sharing” tradition in the behavioural sciences has been reinforced, in part, by the fact that most studies involve human participants. Indeed, many researchers may oppose data sharing in order to avoid jeopardizing the privacy and the confidentiality of their participants (A fair share, 2006). Before collecting data, all researchers conducting a study involving human participants must seek the approval of an ethics committee for their project. Once a project is approved, scientists generally include a consent form specifying that only the researcher and his/her assistants will have access to the data, and that data shall not be used or disclosed for purposes other than those for which it was collected. As a result of these procedures, concerns about privacy and confidentiality have been very prominent in the behavioural sciences, and have consequently obstructed progress towards increased data sharing. Therefore, the emphasis on privacy and confidentiality has taken priority over data sharing. These values have evidently penetrated the ethics committees that approve scientists’ research projects, and this seems to be a strong incentive for scientists’ reluctance to share their data.

Although the protection of privacy and confidentiality may motivate scientists to avoid sharing data, in fact reality demonstrates otherwise. Certainly, when data is made available to others, there are critical requirements that need to be taken into consideration in order to protect the privacy of participants and maintain the confidentiality of the data (see de Wolf, 2003; OHSR, 2006). However, established methods and procedures have been developed to allow data sharing while securely protecting participant’s confidentiality (de Wolf, 2003). These methods either restrict the content of the data or the underlying conditions of the data. Furthermore, special precautions have been developed to prevent re-identifying individuals’ data using background knowledge and cross-correlations with other datasets (Narayanan & Shmatikov, 2003; Sweeney, 1997).

With careful management, datasets involving human participants can be securely made available to others. For instance, the field of neuroimaging is following the lead of biology and chemistry by moving towards research data sharing (Van Horn, Grafton, Rockmore, & Gazzaniga, 2004). Formed in 2000, the FMRI Data Center (FMRIDC) is a repository accessible to the public that contains neuroimaging data. By collecting, archiving, and making raw data in neuroimaging available to others scientists, the FMRIDC expects to facilitate progress in the understanding of cognitive processes (Van Horn et al., 2004). Similarly, PsychData, an institutional archive of primary research data in psychology, has been developed by the Institute for Psychology Information in German-speaking countries (Weichselgartner, 2008). PsychData has two main goals: to preserve and to make accessible primary data in psychology (Weichselgartner, 2008). Specifically, this institutional archive provides a stable and reliable system to preserve primary data in psychology and make these primary datasets accessible to scientists exclusively for research purposes (Weichselgartner, 2008). Unfortunately, although these institutional archives prove that it is possible to share data and maintain its confidentiality, this kind of repository is an exception rather than a norm in behavioural sciences. In fact, they are no such repositories in Canada within the field of behavioural sciences.

3 PROMOTING CONSTRUCTIVE NORMATIVE CHANGE

The present paper focuses on the major challenges that the field of behavioural sciences faces in terms of data sharing among researchers. We argue that there is a norm of “non-sharing” that is dominant among academic behavioural scientists (see also A fair share, 2006; Azar, 1999; Data’s Shameful Neglect, 2009; Johnson, 2001; Wicherts et al., 2006). Moreover, we suggest that it is possible to reverse this tendency of “non-sharing” to a norm of “sharing”. Previous research has shown that Survey Research Instruments can be used to reverse norms in numerous contexts (Bloom et al., 2006; Carducci et al., 1989; Taylor, Aitchison, Keleutak, Airo, Qumaaluk, Qimuajuq, et al., 2008), and we posit that such a Research Survey Instrument can also be used to reverse current data sharing norms. First, we discuss the omnipresence of norms. Second, we present the fundamental psychological processes that influence norms and attitudes. Finally, we describe the way attitudes and norms can be change through a Survey Research Instrument.
3.1 The omnipresence of norms

Norms contour the character of all societies and groups, from corporations to families. For instance, every society has dress codes that are often unwritten but are nevertheless understood by all society members. A guest lecturer at a conference would follow social norms by wearing a suit; however, during an evening among friends, the same person is more likely to wear jeans and a t-shirt. Thus, the omnipresence of norms dictates our behaviour and the way we think. By definition, the norms of a particular group include the rules of conduct that are dictated by that group and thus reflect the collectively approved social standards within that group (Grusec & Lytton, 1986). Norms define the appropriate behaviours in accordance with expectations within specific situations. In most cases, the norms of a particular group represent, and are intimately connected with, the behaviours and attitudes of the majority of the group members (Myers & Spencer, 2004). Attitudes refer to the favorable or unfavorable evaluation of a particularly entity (Eagly & Chaiken, 1998), and accordingly, norms also represent the negative or positive evaluation that is advocated by the majority of group members.

3.2 Fundamental psychological processes that influence norms and attitudes

Although norms are generally guided by the majority of group members, they can also be influenced by the minority. Accordingly, two important factors shape social norms and by extension individuals’ behaviours and attitudes: the majority of group members (majority influence) and the minority (minority influence). In this section, we will explain these factors more elaborately.

3.2.1 The Majority Influence

When a majority of group members adhere to a norm, they exert significant impact over other group members. This is what theorists have labelled the ‘majority influence’. This phenomenon is illustrated by the powerful impact of peer pressure. Group members tend to comply with the majority because they fear the negative consequences of non-compliance, such as social disapproval. Indeed, ignoring social norms can result in becoming unpopular within the group or being excluded from the group. Thus, motivated by the fear of being negatively evaluated or rejected, individuals often prefer to change their attitudes and comply with the existing social norms. Accordingly, the majority influence works by coercion. The classic social psychology experiment initiated by Asch (1951) is a profound illustration of the power of norms. Asch (1951) demonstrated that a majority of participants (who were accomplices of the experimenter) can influence an individual to comply even if this majority is clearly wrong. Specifically, when asked to compare lines in terms of their lengths, all the confederates firmly stated that two lines were of the same length when in fact they were objectively clearly different. Instead of giving the obviously correct answer, participants tended to conform to the rest of the group by responding in the same way as the majority, despite the fact that majority was clearly wrong.

Ample studies in the behavioural sciences have demonstrate that social norms substantially influence individuals’ behaviour in diverse domains such as recycling (Schultz, 1999), littering (Cialdini, Reno, & Kallgren, 1990; Kallgren, Reno, & Cialdini, 2000), drug use (McMillan & Conner, 2003), and safe sex behaviour (Reinecke, Schmidt, & Ajzen, 2006; White, Terry, & Hogg, 1994). These studies suggest that individuals tend to use social norms as guidelines to identify appropriate behaviours to adopt (Cialdini & Goldstein, 2004). For instance, Goldstein and his colleagues have empirically demonstrated how social norms could be used to increase hotel guests’ participation in an environmental conservation program (Goldstein, Cialdini, & Griskevicius, 2008). By relating to hotel guests that the majority of guests had reused their towels during their stay, the researchers significantly increased individuals’ tendency to reuse their towels, compared to when a standard protection environmental message was related.

Considering these psychological features of social norms, it is hardly surprising that progress towards data sharing among behavioural scientists is slow. Since the majority of researchers do not share their data, behavioural scientists comply with this “non-sharing” norm and thus reinforce it at the same time. In order to move towards increased data sharing in the behavioural sciences, we argue that it is necessary to use another factor that has been found to impact social norms: the minority influence.
3.2.2 The Minority Influence

Because only a minority of behavioural scientists adheres to the data “sharing” norm, it is illogical to expect the majority influence to be useful in moving towards data sharing in the behavioural sciences. Fortunately, research in social psychology has also demonstrated that it is possible for a minority to exert significant impact over the majority. For example, a recent study demonstrated that if a minority of group members consistently affirmed that a series of slides are green while they were objectively blue, it influenced both the public and private responses of the majority within the group (Moscovici & Personnaz, 2001). This study showed that in order to be influential and persuasive the minority must be self-assured and consistent in their position. Even if individuals initially doubt the value of the minority’s responses, if the minority persists and appears committed and certain of their responses, the majority is more likely to consider that these responses contain some truth. This encourages the majority to engage in a validation process, whereby the majority searches for reasons to validate the minority’s position. The validation process contrasts the coercion process that is employed by the majority in an effort to influence the minority. It is through this validation process that norms and attitudes can be significantly changed by the minority.

Considering that only a minority of scientists in the behavioural sciences openly shares their data, the minority influence might be a viable first step to reverse the existing norm to a data “sharing” one. Indeed, studies on minority influence suggest that a norm of “sharing” can be strongly promoted by the minority of scientists who adhere to this norm. In order to achieve this, the minority must clearly define the norm that they want to promote among behavioural scientists and be self-assured and consistent in their position. For instance, data sharing norms can be influenced during workshops where scientists can be exposed to successful examples of data sharing in their field and the benefits of data sharing can be effectively affirmed. By spreading doubt about the existing norm that avoids sharing data, concrete examples of successful data sharing might lead the majority of scientists to advocate the position of the minority.

3.3 Survey Research Instrument

Concrete tools have been developed to bolster the minority influence. Based on previous research that explored norm changing strategies (Bloom et al., 2006; Carducci et al., 1989; Taylor & de la Sablonnière, 2012), we argue that the Survey Research Instrument is an effective tool to promote constructive normative change in the context of data sharing. Specifically, the Survey Research Instrument can be used to replace the existing “non-sharing” norm with a data sharing norm, which the majority of behavioural scientists and researchers will support. Survey Research Instruments are constructed on the basis of one of the fundamental psychological processes that influence shifts in attitudes and norms: the foot-in-the-door principle (Dillard, 1991; Freedman & Fraser, 1966; Janssen, Fennis, Pruyn, & Vohs, 2007).

3.3.1 How the foot-in-the-door principle can change attitudes and norms

The foot-in-the-door principle suggests that individuals who first agree to minor requests (to which anyone would agree) are likely to later comply with a major request, which corresponds to the target request. Thus, the purpose of this procedure is to ultimately secure individuals’ agreement to a request that requires a greater involvement than the first request. One of the best illustrations of the foot-in-the-door principle comes from the seminal experiment conducted by Freedman and Fraser (1966). The researchers presented themselves as safety-drive volunteers and asked participants if they would agree to install a large sign that said “drive carefully” in their front yard. While some participants were only asked to comply with this major request, other participants were first asked to install a small sign in their window indicating the importance of being a safe driver. Less than 20% of participants agreed to install the large sign as a first request, whereas 76% of those who first accepted the minor request for a small sign agreed to install the large sign in their front yard two weeks later.

The foot-in-the-door principle can be explained in part by the theory of self-perception (Bem, 1972). According to this theory, individuals often have an unclear idea of their attitudes and are frequently unaware of the reasons for their behaviour. To compensate for this lack of clarity, individuals tend to infer their attitudes by examining their own behaviour (Bem, 1972). When confronted with the foot-in-the-door principle, individuals are thus not entirely
aware of why they agreed to the initial minor request with which anyone would agree (Burger, 1999). When the larger request is presented, however, individuals are led to examine their attitudes regarding the cause of the request. For example, the participants in Freedman and Fraser’s study would have asked themselves if safe driving is a cause that they truly support. Considering that the small request provides individuals with the opportunity to behaviourally display their attitudes towards this cause, they are led to believe that they actually support this cause because they did so recently (Burger, 1999). Consequently, having agreed to the first request, individuals are likely to comply with the second one in order to maintain the consistency of their behaviours across time.

Since many academic scientists in the behavioural sciences are not yet informed about the benefits of data sharing and its increasing popularity among funding organizations, they may not have a clear idea of their attitudes towards data sharing. Accordingly, if researchers first agree to the minor request of completing a questionnaire on data sharing, when later faced with requests to share their data, they are likely to examine their attitudes regarding data sharing more thoroughly (see also Bloom et al., 2006; Carducci et al., 1989). Scientists who have an unclear idea of their attitudes towards data sharing can thus be influenced to examine data sharing more positively and ultimately change their data sharing behaviours.

A great deal of research has effectively shown the effect of the foot-in-the-door principle on a variety of behaviours, such as making donations (Bell, Cholerton, Fraczek, & Smith, 1994; Schwarzwald, Bizman, & Raz, 1983), joining a smoking cessation program (Bloom et al., 2006), or becoming an organ donor (Carducci & Deuser, 1984; Carducci; et al., 1989 see also Brug, Van Vught, Van Den Borne, Brouwers, & Van Hooff, 2000). For example, Carducci and his colleagues demonstrated that individuals who were asked to complete a questionnaire on organ donation were significantly more willing to become organ donors two week later than individuals who were not requested to complete the questionnaire (Carducci & Deuser, 1984; Carducci et al., 1989).

Furthermore, numerous studies suggest that the foot-in-the-door principle used in conjunction with the Survey Research Instrument increases individuals’ willingness to comply with a latter request by activating examination of attitudes (Bloom et al., 2006; Carducci & Deuser, 1984; Carducci et al., 1989). For example, studies have shown that surveying individuals about politics prior to an election increases their tendency to vote on Election Day (Granberg & Holmberg, 1992; Greenwald, Carnot, Beach, & Young, 1987). Even short surveys that simply ask whether individuals plan on voting have been found to increase the voting rate (Granberg & Holmberg, 1992). This effect was particularly significant among individuals who had little interest in politics (Granberg & Holmberg, 1992). Participating in a survey on voting is likely to stimulate individuals to think about politics, which in turn increases their likelihood to vote (Granberg & Holmberg, 1992; Krosnick, Visser, & Harder, 2010). In the specific context of data sharing, although many researchers might never even think about data sharing, completing a survey on this topic is likely to encourage scientists to examine their attitudes regarding this issue, and this is likely to increase their willingness to comply with a request on data sharing later on.

4 MOVING TOWARDS DATA SHARING IN THE BEHAVIOURAL SCIENCES

Past research on the foot-in-the-door principle demonstrates that a Survey Research Instrument can be used to promote change in behaviour, and ultimately change norms. The method by which the Survey Research Instrument can be used to reverse the existing norm of “non-sharing” involves several crucial details that will be described in this section. First, we will present the way in which the Survey Research Instrument must be designed in order to effectively promote “sharing” norms. Second, we will propose a detailed program that could be implemented in the behavioural sciences to address this issue. Specifically, we will argue that it is important for the Survey Research Instrument to reach a particular number of behavioural scientists as this is crucial to reverse the existing norm of “non-sharing” to a “sharing” one. To do so, we propose that workshops on research data management and data sharing be set up and made available for researchers and academics.

4.1 Concrete steps to design the Survey Research Instrument

The ultimate aim of the Survey Research Instrument is to encourage participants to subconsciously examine their attitudes towards existing norms, and thus designing this Survey Research Instrument has a unique set of requirements. Accordingly, in order to build such a Survey Research Instrument that promotes constructive normative change with respect to data sharing, we must consider processes that social psychologists have reported to
influence norms. Specifically, we must consider the foot-in-the-door principle (Dillard, 1991; Freedman & Fraser, 1966; Janssen et al., 2007) as well as other advances in the behavioural sciences (e.g., Taylor & de la Sablonnière, 2012; see also Cadurcci et al., 1989), to carefully design questions with two particular characteristics. First, the questions must focus on the new “sharing” data norm that we want to promote; and second, the questions must be designed in a way that would encourage every participant to be willing to engage in the new “sharing” data norm. Therefore, unlike other surveys that serve the purpose of answering particular research questions through the analysis of participants’ responses, our questions will be designed to encourage participants to provide predetermined target answers.

Based on the foot-in-the-door principle, which posits that it is possible to secure individuals’ agreement to a major request by first asking them to agree to a minor request, it is unreasonable to initially request scientists to share their data. Because this would be a major request, it is likely to be refused. Rather, we could first design some minor requests that nobody will reasonably refuse. These minor requests will form the basis of the Survey Research Instrument. For instance, participants could be asked first if they would be willing to work with data collected by other colleagues; it is very unlikely that researchers would refuse to use such data. The questions will be progressively more engaging towards data sharing. For instance, because writing grant proposals is a common undertaking of most researchers, participants could then be asked if they would be willing to add a paragraph in their proposals on how they plan to manage and share their data (considering that grant agencies are increasingly favouring such practices). And finally, a major request would involve, for instance, asking participants how likely they would be to share their data with unknown colleagues and the public. An example of such a Survey Research Instrument is included in the appendix.

By first making minor requests and then more major ones, the Survey Research Instrument is designed differently from “traditional” surveys. Instead of simply gathering data, as “traditional” surveys are designed to do, the goal of the Survey Research Instrument is twofold. Firstly, the Survey Research Instrument is design to influence scientists’ willingness to engage in data sharing (Bloom et al., 2006; Carducci et al., 1989; Taylor & de la Sablonnière, 2012). As suggested by the foot-in-the-door principle, individuals often infer their attitudes from their own past behaviours. Accordingly, once scientists have agreed to small requests on data sharing in answering the Survey Research Instrument, they will be more likely to be willing to eventually take on a major request, such as depositing their raw data in an available and approved data repository. When this major request is presented to them, researchers may re-examine their attitudes towards data sharing and base their analysis on the answers they previously provided when responding to the minor requests of the Survey Research Instrument (see Bloom et al., 2006; Carducci et al., 1989).

If, in responding to the Survey, participants had agreed to work with data collected by other colleagues, when faced with the opportunity to re-examine their attitudes towards data sharing, they are likely to come to the conclusion that they actually support data sharing and thus be more willing to share their own data. Influencing scientists’ intention and willingness to engage in data sharing is crucial, especially if we consider that a great deal of research has demonstrated that the intention of doing a behaviour is a factor of paramount importance to predicting future behaviour (e.g., Ajzen, 1985; Reinecke et al., 2006; Smith, Terry, Manstead, Louis, Kotterman, & Wolfs, 2007). Accordingly, scientists who report that they are willing to share their data with their colleagues would be far more likely to actually share their data upon request.

In addition to increasing researchers’ willingness to share their data, the Survey Research Instrument will stimulate a discussion regarding data sharing among scientists. Indeed, organizations cannot be the only ones playing a role in the promotion of data sharing norms (Uhlir & Schröder, 2007). Rather, a dialogue regarding this important issue needs to be initiated among those who collect the data itself. As demonstrated by recent studies in the behavioural sciences (Taylor et al., 2008), as well as on well-established studies (Bloom et al., 2006; Carducci & Deuser, 1984; Carducci et al., 1989), the Survey Research Instrument could be of upmost relevance in initiating a dialogue by activating a re-examination of attitudes regarding the issue (see also Brug et al., 2000). For instance, having completed the questionnaire, scientists may engage in discussions with their colleagues to explore their attitudes towards data sharing, and this will be especially useful because of its increasing popularity among both scientific funding organizations and scientific journals.
4.2 How to reach an important number of behavioural scientists?

After having designed the Survey Research Instrument, the next step in implementing constructive normative change in the behavioural sciences is to reach a significant number of scientists. In order for the Survey Research Instrument to become an effective tool in changing norms, it must be distributed among a substantial number of behavioural scientists. Indeed, it is critical that a vast number of scientists favour data sharing before such a norm could be developed. In order to reach researchers and academics, we propose the use of workshops on data management and data sharing. CODATA and related organizations have long been involved in promoting data sharing among scientists in all fields. These workshops aim at teaching scientists how to deal with issues concerning research data management, such as data sharing, data archiving, and data accessibility. Currently, many organizations and universities offer such workshops. For instance, the Human Genome Project organizes meetings and workshops to promote collaboration and the exchange of materials (http://www.genome.gov/10001477). The National Institute on Aging (NIA) and the Behavioural and Social Research (BSR) Program have held workshops that address issues surrounding data sharing plans of studies involving human participants. Also, many universities, including the University of California, offer their researchers the opportunity to attend workshops on data management issues.

In the context of the behavioural sciences, these workshops are an important way to promote new methodologies that protect participants’ privacy and confidentiality. Indeed, as was noted by de Wolf (2003), there is an enormous pressure to educated behavioural researchers on both the benefits of sharing academic data and the protection of participants’ privacy. For example, such methods as ‘multiple imputation’ could be used to alter the data set and thus reduce the possibility of inferential disclosure (see de Wolf, 2003 for a more complete review). As academic researchers in the behavioural sciences learn how datasets involving human participants can be securely made available to others (de Wolf, 2003; Narayanan & Shmatikov, 2008; Sweeney, 1997), they are likely to become less reluctant to share their data. Furthermore, demonstrating successful examples of data sharing experiences in behavioural sciences, where the participant’s confidentiality is carefully protected, is likely to reduce scientists’ reluctance to share their data. For example, PsychDatam is a model institutional archive of primary research data in psychology developed by German-speaking countries (Weichselgartner, 2008).

These workshops certainly represent an important initial step towards reaching researchers and academics in order to make them aware of the issues and benefits of data management and data sharing (Data’s Shameful Neglect, 2009). It is crucial that these workshops reach a large number of researchers. For instance, workshops often take place in the context of international conferences and are generally well attended. Because these workshops have the potential to reach many scientists as well as young scholars, they can be combined with a Survey Research Instrument that is specifically designed to promote data sharing norms.

5 CONCLUSION

Improving research data sharing is a concern that has become increasingly pertinent within the scientific community. Clearly, a system in which scientists share their data offers indisputable advantages over a closed, proprietary system (Arzberger et al., 2004; OECD, 2007). However, there are still several fields of scientific inquiry, such as the behavioural sciences, where achieving a reasonable level of data sharing remains a challenge. In the present paper, several concrete suggestions have been presented in order to facilitate data sharing in the behavioural sciences. We believe that a Survey Research Instrument can be an effective tool for constructive normative change in moving towards a culture of data sharing in the behavioural sciences and other research fields. While it is crucial that all domains of science move towards increased data sharing among researchers, the Survey Research Instrument must be adapted to each research context according to the specific features that define it. Indeed, individuals are more likely to adopt norms that closely match their situational circumstances (Goldstein et al., 2008). Accordingly, scientists are more likely to share their data after having responded to a Survey Research Instrument that closely matches their scientific domain or research context. Therefore, the Survey questions should mention and take into account the research context. Although the details of the survey method need to be adapted to different scientific domains, the tools and procedures described in this article can be effective in promoting constructive normative changes in diverse scientific domains. We hope that the solutions proposed in this article will open a discussion among researchers and scientists working in the sphere of CODATA and the broader research community.
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7 **APPENDIX**

**What is your opinion about data sharing?**

1. Please list the title of your current position: ______________________________

2. Please list the most appropriate discipline that describes your current affiliation:

3. What is your University affiliation? ______________________________

4. How long have you been doing research? _________________

5. How many of your own primary data files or databases are in your possession? (Please count only those for which you were either the principal investigator or are the person responsible for the data) __________________(approximately)

6. How many of your own data files or databases are longitudinal (i.e. participants were asked to answer questions more than once)? __________________(approximately)

7. How often have you conducted secondary analysis (analysed data collected by another investigator, such as Statistics Canada, etc.)?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Never | Rarely | Sometimes | Often | Very often |

8. Would you be willing to work with data collected by your colleagues?

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|----|
| Totally not willing | Not willing | Neutral | Willing | Totally willing |

9. How would you benefit from having access to the databanks of other researchers?

_____________________________
10. Have you ever been asked to share data you have collected?

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|----|
|   | Never | Rarely | Sometimes | Often | Very often |

11. Have any of the following approached you to share your data?

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|----|
|   | Never | Rarely | Sometimes | Often | Very often |
| ... qualified students | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| ... close colleagues | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| ... other students | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| ... other researchers | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

12. Have you ever shared your data?

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|----|
|   | Never | Rarely | Sometimes | Often | Very often |

13. At the moment, some scientific journals, such as the journal *Science*, require authors to deposit their data in an approved data repository. Data repository holds some data as an approved repository. However, data repositories are not allowed to share without the express permission of the depositor.

Would you be likely to deposit your data in order to publish your work?

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|----|
|   | Totally not likely | Not likely | Neutral | Likely | Totally likely |

14. At the moment, some funding organizations such as the National Institutes of Health (NIH) require that scientist applying for a grant produce a plan for data sharing. Similarly, the National Science Foundation (NSF) in United States and the Social Sciences and Humanities Research Council in Canada (SSHRC) are following the lead by expecting researchers to share the data gathered in the course of their work.

How willing are you to include a statement about data sharing in grant/scholarship applications?

|   | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|----|
|   | Totally not willing | Not willing | Neutral | Willing | Totally willing |

15. Would you be likely to support a policy statement that involved sharing research data directly linked to publication?
16. How much time do you think should be allocated to the researcher before access to data is granted to others?

17. In general, how willing are you to share your data?

18. How willing would you be to share your data with …?

19. I would be willing to share my data…

19.a. If you would be willing to share your data under certain circumstances, which one would encourage you to?
… you do not expect to reuse the data in the future for publishing purposes.

… you are added as a coauthor on the paper.

… you would be notified whenever a colleague would like to access your data.

… databanks were exclusively available to the scientific community.

… scientists are obliged to make a proposal justifying their demand to access your raw data.

… you could set a time limit (e.g., 2 years) before access to your data was granted to others

19.b. Is there any other circumstances that might lead you to share your raw data?

______________________________________________________________________________

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