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Attitudinal, normative, and resource factors affecting psychologists' intentions to adopt an open data badge: An empirical analysis☆

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ABSTRACT

The purpose of this research is to investigate the attitudinal, normative, and resource factors affecting psychologists' adoption of an open data badge. The theory of planned behavior was employed to demonstrate how these factors influence behavioral intentions to adopt an open data badge. This research used a survey method to examine to what extent those attitudinal, normative, resource factors influence psychologists' behavioral intentions to adopt an open data badge, and therefore engage in data sharing behaviors. A national survey (n = 341) across the field of psychology showed that perceived benefit and perceived risk had significant positive and negative relationships with attitude toward the open data badge respectively. Furthermore, attitude toward open data badge and norm of data sharing had significant positive influences on psychologists' behavioral intentions to adopt the open data badge. Perceived effort had a significant negative relationship with the behavioral intention to adopt the open data badge, but had no effect toward attitudes surrounding the badge. However, this research found that the availability of a data repository and pressure from an open science journal did not have any significant relationship with behavioral intention to adopt the open data badge. The discussion includes implications for psychologists from both practical and theoretical perspectives. Additionally, future directions for gauging psychologists' adoption of the open data badge and increasing data sharing behaviors are discussed.

1. Introduction

Scientific data sharing has become an important aspect in advancing modern research activities. There are many reasons to encourage data sharing behaviors (King, 1995); for example, if data were available in a data repository, there would be an increase in transparency of the research method and process. Other scholars could build on the existing literature, rather than just replicating it, ultimately reducing costs and saving time involved in data collection. Data sharing would also allow researchers to confirm the findings of the original publication or to test different hypotheses. There is also potential for collaboration among scholars with similar research interests.

In 2014, the APA (American Psychological Association) journal, *Psychological Science,* introduced five significant changes to improve the way scholars report their research methods and results of a given study. One of these key changes included the promotion of open practices, which involves transparent communication from researchers about their scientific process. *Psychological Science* adopted an open data badge incentive program to acknowledge researchers' efforts to share their materials and/or data after a manuscript was set to be published. To earn these badges, researchers have to share data and/or materials digitally in an open access repository. Those who comply receive a badge on their published article for either sharing raw data, sharing materials used in the study, or both (Eich, 2014). In *Psychological Science* six months preceding the badges incentive being introduced, an average of 2.5% of articles contained open data (range: 1.5%–4.0%) for the first and second halves of 2013. After the badges system was introduced, open data sharing practices increased significantly to 22.8% (range: 12.8%–39.4%) from the first half of 2014 to the first half of 2015 (Kidwell et al., 2016).

Data sharing has been defined differently across disciplines. McCain (1995) explained data sharing in natural sciences as providing other researchers with reasonable access to their data or unique research materials that support published articles. Campbell and Bendavid (2003) defined data sharing in biological sciences as making research data or relevant materials associated with research articles either before or after publication. Kim and Stanton (2016) described data sharing in STEM disciplines as the extent in which scientists provide other

☆ Both survey data, data dictionary, and instrument have been made publicly available via Open ICPSR and can be accessed at http://doi.org/10.3886/E101720V1.

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scientists with access to their data of published articles either in a repository or upon request. For the purpose of this research, a psychologists' behavioral intention to adopt an open data badge, and therefore engage in data sharing behaviors, ought to be more clearly defined. Psychologists and social scientists are likely to engage in data sharing behaviors, either because of ethics codes (American Psychological Association, 2016) or standard social norms (Kim & Adler, 2015). For this particular context, data sharing is defined as psychologists' providing a raw dataset from a published work to a data repository in exchange for an open data badge for their publication.

This research utilizes the TPB (Theory of Planned Behavior) to better understand psychologists' behavioral intention to adopt the open data badge. The TPB is a widely known social psychology theory and was developed as a means to explain various aspects of human behavior across different situations (Ajzen, 1991; Fishbein & Ajzen, 1975). The TPB explains that an individual's behavior is influenced by his/her behavioral intention, which is determining whether an individual will adopt or engage in a behavior, is influenced by their attitude, subjective norm, and perceived behavioral control (i.e., resource) factors about a given behavior.

The attitude toward a behavior is affected by attitudinal beliefs, which refer to an individual's personal thoughts and opinions about the benefits and consequences regarding a particular behavior. Subjective norm is defined as an individual's perception of how others view a particular behavior. If performing or intending to conduct a particular behavior is widely accepted across different levels of people, s/he may be more likely to intend to perform the behavior. Lastly, perceived behavioral control (i.e., resource factor) refers to an individual's perception of being able to perform a particular behavior. This can include external behavioral control factors, such as an availability of resources to conduct a behavior, as well as internal behavioral control factors, like self-efficacy and effort expectancy.

The objective of the present study is to investigate the attitudinal, normative, and resource factors affecting psychologists' behavioral intentions to adopt an open data badge, through using a theoretical model based on TPB. By examining these factors under the lens of the TPB, we can gain a better understanding of the areas that predict behavior. Section two discusses the relevant literature to this study. Section three describes the research model and the justifications for the developed hypotheses. Section four describes the research method, including population sampling and demographics, as well as the procedures employed for data collection. In section five, the data analysis and results are presented. In section six, the study as a whole is discussed, including its practical and theoretical implications for psychologists and library professionals. This paper concludes by addressing the study's limitations and ways to build on this research through future studies.

2. Literature review

Much of the literature discussing data sharing behaviors tends to generally focus on the hard sciences, with little emphasis on psychology, specifically. Many of these studies have identified individual, normative, and resource factors as a means to explore a researcher's relationship with data sharing or data withholding behaviors. First, there are several individual factors that influence a researcher's data sharing behavior, which include perceived benefits, perceived risks, and perceived effort. Previous studies have examined the perceived benefits of data sharing, including institutional recognition (Kankanhalli, Tan, & Wei, 2005), professional recognition (Kim, 2007), additional citations (Piwowar, Day, & Fridsma, 2007), and other academic rewards (Kling & Spector, 2003). Kidwell et al. (2016) suggest that offering badges after an article has been accepted for publication for those who complied with open data and/or materials practices can be perceived as an incentive to share data. Previous literature also examined perceived risks, which can prohibit data sharing; these risks include missing out on future publication opportunities (Campbell et al., 2002; Savage & Vickers, 2009), misuse of researcher's data (Borgman, Wallis, & Enyedy, 2007; Cragin, Palmer, Carlson, & Witt, 2010), and privacy-related concerns (Borgman, 2009; Savage & Vickers, 2009). The privacy-related concerns could especially apply to research that involves human subjects (Lane & Schur, 2010; Schwartz, Pappas, & Sandlow, 2010), such as the health profession and mental health fields. Perceived efforts involved in data sharing are also examined in the literature, and a good number of studies reported that when something takes too much effort (Campbell et al., 2002; Louis et al., 2002), or there is not enough time or funding to organize the data (Tenopir et al., 2011), researchers are less likely to engage in data sharing behaviors.

Normative factors such as subjective norm and pressure by journals were found to have significant relationships with data sharing. Norms of data sharing differ across the social science disciplines (Freese, 2007). Kim and Adler (2015) found that overall, data sharing norms positively influence both attitudinal development and actual behavior among social scientists. When considering the field of psychology, examining the field's ethics code is important when determining set norms about data sharing within the profession. For example, in the American Psychological Association's (2016) code of ethics, section 8.14 states that psychologists "do not withhold the data on which their conclusions are based" and that psychologists requesting data to verify claims use data "only for the declared purpose" unless there is a "prior written agreement for all other uses of data." It is therefore expected that psychologists would be supportive of data sharing behaviors.

In addition, prior studies found that resource factors can impact the decision to engage in data sharing or data withholding behaviors. For example, when there is an availability of a data repository, researchers are more likely to contribute their data for others to use (Choudhury, 2008; Witt, 2008). Other resource factors that could impact data sharing behaviors include knowledge of metadata and its practices (Bietz, Baumer, & Lee, 2010) and whether a journal has data sharing requirements (McCain, 1995; Piwowar & Chapman, 2008). Later data sharing studies found that the availability of a data repository has a significant positive influence on the data sharing behaviors of STEM researchers (Kim and Zhang, 2015) and health scientists (Kim and Kim, 2015). However, the availability of data repository was not found to have any significant influence on social scientists' data sharing behaviors (Kim & Adler, 2015).

Data sharing behaviors among psychologists have remained relatively stable over time, but are surprisingly low considering the APA's ethical code to share data when requested. Wolins (1962) wrote to 37 authors of major APA journals inquiring about their data from a published manuscript, and nine authors provided raw datasets, leaving a data sharing response rate of 24.3%. Similarly, Craig and Reese (1973) wrote to 53 authors of major APA journals and received 20 original datasets or summaries of data analyses, leaving a data sharing response rate of 37.7%. Additionally, Wicherts, Borsboom, Kats, and Molenaar (2006) wrote to 141 authors of major APA journals and received 38 responses with datasets upon request, leaving a data sharing response rate of 27.0%. Rates of data sharing "upon request" are often lower due to the perceived effort involved in preparing readable data for external researchers (Campbell et al., 2002; Kim & Adler, 2015; Kim & Stanton, 2016; Vickers, 2006). Other reasons authors are hesitant to share data upon request include protection of data for future publication opportunities (Campbell et al., 2002), limited resource factors such as organizational or technical barriers (Welch, Feeney, & Park, 2016), misinterpretation of research data (Vickers, 2006), and fear that other researchers may not reciprocate with data sharing (Louis, Jones, & Campbell, 2002).

Prior studies have provided insights that are invaluable to the data sharing literature, however, they are limited because they do not provide a detailed data sharing behavior model in a specific research discipline such as psychology, and the studies that focus on psychology did not always employ a theoretical framework to measure psychologists' data sharing behaviors or behavioral intentions. Previous literature