Computers in Human Behavior 27 (2011) 1875–1883

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Reliability and validity of self-reported burnout in college students: A cross randomized comparison of paper-and-pencil vs. online administration

Juliana Alvares Duarte Bonini Campos [a], Miriane Lucindo Zucoloto [a], Fernanda Salloume Sampaio Bonafé [a], Paula Cristina Jordani [a], João Maroco [b,*]

[a] Faculdade de Odontologia de Araraquara-SP, Universidade Estadual Paulista – UNESP, Rua Humaitá, 1680, 14801-903 Araraquara, São Paulo, Brazil
[b] Departamento de Estatística e Unidade de Investigação em Psicologia e Saúde, ISPA – Instituto Universitário, Rua Jardim do Tabaco, 34, 1149-041 Lisboa, Portugal

ARTICLE INFO

Article history:
Available online 17 May 2011

Keywords:
Internet questionnaires
Paper-and-pencil questionnaires
Reliability
Validity
Student Burnout

ABSTRACT

Internet data collection is becoming increasingly popular in all research fields dealing with human perceptions, behaviors and opinions. Advantages of internet data collection, when compared to the traditional paper-and-pencil format, include reduced costs, automatic database creation, and the absence of researcher-related bias effects, such as availability and complete anonymity. However, the validity and reliability of internet gathered data must be established, in comparison to the usual paper-and-pencil accepted formats, before an inferential analysis can be done. In this study, we compared questionnaire data gathered from the internet with that from the traditional paper-and-pencil in a sample of college students. The questionnaires used were the Maslach Burnout Inventory – Student Survey (MBI-SS), the Oldenburg Burnout Inventory (OBI-SS) and the Copenhagen Burnout Inventory (CBI-SS). Data was gathered through a within-subject cross randomized and counterbalanced design, on both internet and paper-and-pencil formats. The results showed no interference in the application order, and a good reliability for both formats. However, concordance between answers was generally higher in the paper-and-pencil format than on the internet. The factorial structure was invariant in the three burnout inventories. Data gathered in this study supports the Internet as a convenient, user-friendly, comfortable and secure data gathering method which does not affect the accepted factorial structures existent in the paper format of the three burnout inventories used.

1. Introduction

In the last few decades, researchers have started using the internet as a vehicle to gather data. Several questionnaires have been adapted to online forms and data has been flowing steadily from these tools. The psychometric quality of data gathered on the internet, by means of online questionnaires, has been extensively scrutinized and several studies have tried to understand how the internet may affect the validity and the reliability of different questionnaires and psychometric scales (Bates & Cox, 2008; Bressani & Downs, 2002; Buchanan et al., 2005; Carlbring et al., 2007; Fish, McGuire, Hogan, Morrison, & Stewart, 2010; Hedman et al., 2010; Herrero & Meneses, 2006; Hewson & Charlton, 2005; Im et al., 2005; Luce et al., 2007; McCabe, Boyd, Young, Crawford, & Pope, 2005; Meyerson & Tryon, 2003; Miller et al., 2002; Naus, Philipp, & Samsi, 2009; Riva, Teruzzi, & Anolli, 2003; Suris, Borman, Lind, & Kashner, 2007). Some of the advantages of the internet data collection, when compared to the traditional paper-and-pencil self-report, mail and telephone surveys, include a lower cost, a larger sampling frame which may include geographically distant areas, respondent commodity, absence of interviewer biased responses, easy database creation, reduced data typos and commodity of data analysis. (Luce et al., 2007; Miller et al., 2002; Naus et al., 2009; Reips, 2001; Riva et al., 2003). However, as pointed out by Riva et al. (2003), Buchanan et al. (2005), Herrero and Meneses (2006), Luce et al. (2007), Naus et al. (2009) and Hedman et al. (2010), the psychometric properties of the data from measurement scales deployed online, are not necessarily equivalent to the psychometric properties evaluated in paper-and-pencil application of the same instruments, which have been previously shown to produce valid and reliable data. Thus, the psychometric evaluation of data gathered from online measurement instruments must be performed before one can use the data in further inferential analysis. Additionally, as stated by Bowling (2005), different response methods can produce different bias in the data and these should be investigated whenever a measurement instrument is deployed in a form different from the one validated originally.

Studies of the equivalence between internet and paper-and-pencil forms have been conducted with several measurement instruments for diverse areas, such as alcohol and drug abuse (McCabe et al., 2005; Miller et al., 2002), sexual desire clues

* Corresponding author. Tel.: +351 218811700; fax: +351 218860954.
E-mail address: joao.maroco@ispa.pt (J. Maroco).

0747-5632/$ - see front matter © 2011 Elsevier Ltd. All rights reserved.
doi:10.1016/j.chb.2011.04.011

(Meyerson & Tryon, 2003), stress and depression (Herrero & Meneses, 2006; Naus et al., 2009), panic/agoraphobia (Carlbring et al., 2007), aggression, impulsivity, health functioning (Suris et al., 2007), psychological assessment (Naus et al., 2009; Suris et al., 2007), prospective memory (Buchanan et al., 2005), social anxiety disorder (Hedman et al., 2010), personality testing (Buchanan & Smith, 1999; Naus et al., 2009) and Chronic Pain Acceptance (Fish et al., 2010).

The influence of the internet on possible bias in responses, lack of reliability, validity and the factorial structure of measurement instruments is controversial. Several studies have shown that some instruments maintain their psychometric properties when adapted to the internet, when compared to the traditional paper-and-pencil format (Bates & Cox, 2008; Bressani & Downs, 2002; Fish et al., 2010; Herrero & Meneses, 2006; Hewson & Charlton, 2005; McCabe et al., 2005; Meyerson & Tryon, 2003; Thorndike et al., 2009). However, several other reports have shown that the reliability, validity and factor structure of instruments adapted to the internet were not equivalent to the observed in paper-and-pencil applications (Buchanan et al., 2005; Finegan & Allen, 1994; Hedman et al., 2010; Im et al., 2005; Luce et al., 2007; Naus et al., 2009; Suris et al., 2007; Whitener & Klein, 1995). It needs to be pointed out that, although invariance of factor structures of internet vs. paper-and-pencil applications are a common concern amongst researchers, only a very few studies have explored the formats' equivalence using appropriate cross-sampling within-subject designs (Bressani & Downs, 2002; Carlbring et al., 2007; Naus et al., 2009), and/or multi-group structural equation modeling analysis to demonstrate invariance of factorial structures (Buchanan et al., 1999; Fish et al., 2010; Herrero & Meneses, 2006; Hewson & Charlton, 2005).

As far as we know, there is no published research on Burnout inventories application through the internet, nor any studies on the psychometric properties of the data gathered on another format different from paper-and-pencil.

Burnout is a multifactorial syndrome characterized by three key dimensions: emotional exhaustion, cynicism and reduced efficiency (Maslach, Jackson, & Leiter, 1996). The first studies about burnout in the work place showed that this syndrome can impair productivity, damage human relations, cause depression and be the precursor to more serious mental and psychological conditions. Initially, burnout was considered a psychological syndrome specific to professionals performing aid or support tasks to other people (e.g., doctors, lawyers, psychologists, teachers, etc.). Research on the burnout syndrome has shown, however, that it is not exclusive to aid-related professionals. On the contrary, it is extensible to all professional activities (Leiter & Schaufeli, 1996; Maslach, Schaufeli, & Leiter, 2001). The concept of burnout has also been applied to people involved in such activities as full-time motherhood or undergraduate/graduate full-time studies (Koeske & Koeske, 1991; Maroco & Tecedeiro, 2009; Maroco, Tecedeiro, Martins, & Meireles, 2008), that are not generally labeled as professions, but share some of the characteristics of the so-called 'classical' jobs. According to Maroco et al. (2008), college students constitute a population susceptible to burnout, since they experience multiple socio-economic constrains, academic work requirements (term papers, tests and examinations), social and personal pressures related to teachers and colleagues. On the other hand, they frequently experience a lack of quality time spent with family and friends, and may experience stress related with future professional expectations and usefulness of their studies. Student burnout has been mainly evaluated with the Maslach Burnout Inventory (MBI), adapted to college students by Schaufeli, Martinez, Pinto, Salanova, and Bakker (2002) from the MBI-General Survey proposed by Maslach et al. (1996). MBI's use to measure burnout has been criticized by some researchers, and there are two other burnout measuring instruments in the public domain, namely the Oldenburg Burnout Inventory (OLBI) (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) and the Copenhagen Burnout Inventory (CBI) (Kristensen, Borritz, Villadsen, & Christensen, 2005). As far as we know, these inventories have been applied only in the paper-and-pencil format. More recently, the MBI has been adapted to the internet (Maroco & Tecedeiro, 2009; Maroco et al., 2008). However, no studies of the psychometric properties as well as of the factorial invariance of the internet format, when compared to paper-and-pencil format, have been reported. In this study, we investigated the reliability, inter-format agreement, factorial validity and the invariance of the MBI-SS, OLBI and CBI applied through the internet, as an online format vs. paper-and-pencil format, using a within-subjects counterbalanced design.

2. Methods

2.1. Design

A crossover experiment was used in two sequential steps. In the first evaluation step, half the participants were randomly assigned the paper-and-pencil questionnaire (group 1) and the other half the internet questionnaire (group 2). After a 1-week washout period, the two groups were switched: group 1 was therefore assigned the internet questionnaire in the 2nd moment, while group 2 was assigned to the paper-and-pencil questionnaire. The pairing of the two questionnaire forms (internet and paper-and-pencil) was assured by an anonymous alphanumeric code given to each participant who filled it in on both questionnaire formats. Paper and pencil questionnaires were filled in a classroom while the internet questionnaires were filled in the computer lab. In both situations, after giving the filling instructions, the researcher left the rooms unattended. Items' order in the three questionnaires was maintained as in the original versions, but the three questionnaires order was randomly assigned.

2.2. Participants

Participants were recruited from a pool of 170 graduating students from the Faculdade de Odontologia de Araraquara, UNESP, Brazil. After a brief presentation of the project and its objectives, 151 participants, from both genders, signed up voluntary (88.8% sampling rate). From these 151 students, one did not answer the internet questionnaire and was therefore removed from the study. Only students that completely answered both paper-and-pencil and internet questionnaires were included in the final sample. Thus, the final, non-probabilistic convenience, sample was composed by 150 participants. Participants average age was 21.2 (SD = 2.32) years old. In terms of gender, 24.7% were male and 75.3% were female.

2.3. Instruments

The burnout status was evaluated by a set of three burnout inventories, that were available in the researched literature: the Maslach Burnout Inventory – Student Survey (Schaufeli et al., 2002); the Oldenburg Burnout Inventory (Demerouti et al., 2001) and the Copenhagen Burnout Inventory (Kristensen et al., 2005).

2.3.1. Maslach Burnout Inventory – Student Survey (MBI-SS)

The Maslach Burnout Inventory (MBI), originally proposed by Maslach and Jackson (1981), is the most used Burnout inventory both in research and clinical practice to diagnose Burnout. Schaufeli et al. (2002) adapted the MBI to college students, generating the Maslach Burnout Inventory – Student Survey (MBI-SS).