



Convenience samples of college students and research reproducibility



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ABSTRACT

Tests of theory in marketing and consumer behavior research are frequently based on convenience samples of undergraduate college students. In a study of business-related ethicality, analysis of data from four dozen convenience samples of undergraduate business students revealed significant differences in means, variances, intercorrelations, and path parameters across the samples. Depending on the particular convenience sample used, relationships between variables and constructs were positive or negative and statistically significant or insignificant. The present research empirically documents, for the first time, the uncertainty created by using convenience samples of college students as research subjects. Only through empirical replications can researchers pragmatically assess the reliability, validity, and generalizability of research findings.

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I challenge using students—and particularly students from a single department or school—as a sample population from which to generalize about consumer behavior, or even just for testing theory.

[– John Liefeld (2003, p. 12)]

This is not to say that findings based on students are always wrong. It is only to say that findings based on students are always suspect. Our findings would be substantially more credible if students were not so often the first and only choice.

[– William Wells (1993, p. 492)]

1. Introduction

One of the most contentious issues in consumer behavior research, and social science research generally, is the use of convenience samples of undergraduate college students as subjects in behavioral investigations. College students increasingly seem to be the subjects of choice in social psychology and consumer behavior research. To illustrate,

Peterson (2001) reports that college students constituted 86% of the research subjects in empirical studies appearing in Volume 26 of *Journal of Consumer Research*, whereas Simonson, Carmon, Dhar, Drolet, and Nowlis (2001) report that 75% of the research subjects in *Journal of Consumer Research* and *Journal of Marketing Research* articles were college students.

Arguments for and against the use of college students as research subjects have tended to focus on whether results obtained from such subjects are generalizable to non-student populations. Researchers such as Kardes (1996) and Lucas (2003) have argued that college students are appropriate research subjects when the research emphasis is on basic psychological processes or the theory tested links to human behaviors independent of sample characteristics. According to Berkowitz and Donnerstein (1982, p. 249), the “meaning the subjects assign to the situation they are in and the behavior they are carrying out plays a greater part in determining the generalizability of an experiment’s outcome than does the sample’s demographic representativeness.” However, other researchers, such as Sears (1986) and Wintre, North, and Sugar (2001), have expressed unease about the use of a narrow database of college students in behavioral research. In particular, Sears suggests that what is apparently “known” about humans is biased because college students tend to have stronger cognitive skills, less crystallized attitudes, more compliant behavior, and less stable peer group relationships than older adults.

During a nearly two-decade, highly cited dialogue, Calder and colleagues (Calder, Phillips, & Tybout, 1981, 1982, 1983; Calder & Tybout, 1999) debate Lynch (1982, 1983, 1999) regarding the need for external validity in consumer behavior research. This debate focuses on two types of empirical studies: effects application studies and theory application (or theoretical explanation) studies. Effects application

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studies focus on substantive generalizability and questions of whether college students represent some larger population sufficiently well (e.g., consumers, managers) to warrant inferences from their responses to the larger population. In general, the scientific community seems to agree that effects application studies need samples that are more representative than college students of some relevant, “real-world” population (Bello, Leung, Radebaugh, Tung, & van Witteloostuijn, 2009; Lucas, 2003; Peterson, 2001).

Disagreement arises, however, regarding whether theory application studies require representative samples as a matter of methodological generalizability. The argument for using nonrepresentative samples, as Mook (1983, p. 384) articulates succinctly, is that “Representativeness of sample is of vital importance for certain purposes, such as survey research. For other purposes, it is a trivial issue.” “Other purposes” include research that aims to draw conclusions about theory rather than about a population. If the focus of research is theoretical, Mook (1983) argues that the makeup of a sample does not matter. Consequently, college students, or any other research participants, qualify as research subjects for fundamental research and theory testing (Bello et al., 2009; Mook, 1983; Pernice, van der Veer, Ommundsen, & Larsen, 2008).

However, even if theory testing is the study purpose, few researchers using convenience samples of college students appear to recognize that their investigation possesses the characteristics of a limited laboratory test that cannot generalize to other samples. Consider recently published research using convenience samples of students in *Journal of Business Research* (2009), *Journal of Consumer Research* (2009) and *International Journal of Research in Marketing* (2008 and 2009) and which formulated and tested hypotheses. Of 60 articles that contained 131 different theory-based studies conducted using convenience samples of college students, 38 (63%) ignored the sample usage in the discussion or conclusion section (e.g., Park & Lee, 2009; Yagci, Biswas, & Dutta, 2009; Yuksel & Mryteza, 2009). Conclusions typically focused on “people,” “participants,” “individuals,” “customers,” or “consumers.”

College students may be appropriate research subjects in certain situations, especially if they represent a population of interest. For example, business students are future business leaders, which may make them appropriate for studies in this domain (e.g., Abdolmohammadi, Gabhart, & Reeves, 1997; Ahmed, Chung, & Eichenseher, 2003; Borkowski & Ugras, 1998). College students may also be a key target market (e.g., Megehee, 2009) or used to replicate a prior study employing a student sample.

College student subjects might enhance research validity because of their apparent homogeneity. They tend to be homogeneous on dimensions such as age and education (which tend to influence attitudes), as well as possess weak self-definitions, high egocentrism, and a strong need for peer approval (Sears, 1986). Such homogeneity intuitively decreases variability in measurements and, ceteris paribus, increases the likelihood of rejecting a null hypothesis of no difference (Lynch, 1982, 1983), which in turn increases the probability of identifying theory violations when a theory is false (Lucas, 2003). Furthermore, such apparent homogeneity makes college student samples easier to compare than other groups of people because of their demographic and psychographic characteristics. This comparability premise may justify the choice of college student samples to represent different cultures in cross-cultural research (e.g., Aaker & Sengupta, 2000; Mikhailitchenko, Javalgi, Mikhailitchenko, & Laroche, 2009).

However, to deem college student samples acceptable or even recommended for theory-based behavioral research, the issue is not generalizability to other populations (e.g., general consumers) but generalizability to other college student samples. Assuming agreement that findings from a convenience sample of college students in one university (who often are drawn from only one class) do not generalize to different populations (e.g., managers, general consumers), the question that remains is whether researchers can

replicate the findings from a convenience sample of college students under similar research conditions.

Therefore, a key issue relating to the use of convenience samples of students to test theory is reproducibility, or whether under similar conditions, the findings replicate. In brief, the present study considers the extent to which research findings obtained from a convenience sample of college students at a single college or university can be replicated with convenience samples of college students in other colleges or universities. Although researchers employing college student samples may conduct pretests and validation and cross-validation studies, the studies typically employ a single subject pool from one department, college, or university.

Despite widespread concerns surrounding the use of convenience samples of college students for theory testing (Ferber, 1977; Peterson, 2001), the authors could not find any study that offered convincing empirical evidence regarding the negative consequences for research conclusions drawn from them. Nor have proponents of using convenience samples of college students offered convincing empirical evidence regarding their benefits (other than cost and convenience). Rather, proponents have simply argued that because they study theoretical effects, not personal characteristics, the convenience sampling issue is moot. An additional argument—without empirical support—is that because college student samples are homogeneous on many dimensions, theory testing with these samples might be more valid than testing with nonstudents because of the reduction in measurement variability.

For example, in a study of information incongruity, Aaker and Sengupta (2000) justify the choice of student subjects from undergraduate programs in major universities because of an alleged high degree of similarity on demographic and psychographic dimensions. Strizhakova, Coulter, and Price (2008) analyze data on samples of college students because the students “exhibited” a high degree of homogeneity and could be compared with minimal extraneous biases across multiple cultural sites. Finally, numerous articles reporting the results of consumer behavior research present multiple experiments that are cumulative in their results and findings. Thus, building on results from one convenience sample of students to another implies inter-sample homogeneity (e.g., Lalwani, 2009 used five different convenience samples of undergraduate students in five consecutive experiments). The present research investigates empirically the extent to which a particular convenience sample of college students produces research findings identical to, or at least consistent with, research findings from similar convenience samples of college students. Peterson's (2001) results clearly augur against generalizing from college students to nonstudents, but the possibility of generalizing from a “typical” convenience sample of college students to a larger body of convenience samples of college students remains unclear. If the results from a “typical” convenience sample of college students do not generalize to a larger body of college students, then the rationale for using convenience samples of college students as research subjects for theory testing, because of their homogeneity or generalizability, is suspect.

2. Theory testing

To investigate the use of convenience samples of college students to test theories through formal hypotheses, this study focuses on the attitudinal domain of business ethics. Students are often participants in investigations in this domain, and both precedents and a rationale exist for studying undergraduate business students. For example, undergraduate business students have often been studied because they represent prospective managers (Preble & Reichel, 1988; Stevenson & Bodkin, 1998) or business executives (Ahmed et al., 2003; Jones & Gautschi, 1988). Further, by employing a relatively homogeneous group of individuals, minimizing possible contaminants (e.g., family status, work experience, academic major) of perceptions of business ethics

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