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Timing and selection effects within a psychology subject pool: Personality and sex matter

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ABSTRACT

Previous work has raised concerns about the heavy use of college student samples in psychological research. The current study evaluates whether demographic and personality variables predict mode (online versus in-person) and timing (week of semester) of participation in a subject pool study. Results suggested that college students who chose in-person participation were more extraverted than students who chose to participate online whereas women and more conscientious students were more likely to participate earlier in the semester. These results suggest that researchers using college student samples should be aware of these within-pool differences and carefully consider how participant characteristics may affect the conclusions drawn from their work.

1. Introduction

College students are a major source of data in many psychology departments (Sieber & Saks, 1989) and research in social and personality psychology is overwhelmingly based on college student samples (Henry, 2008; Sears, 1986, 2008; see e.g., Table 2 in Gosling, Vazire, Srivastava, & John, 2004). Researchers, however, often have limited insight regarding how the characteristics of subject pool participants may impact the generalizability of their findings (e.g., Henry, 2008; Peterson, 2001; Zelenski, Rusting, & Larsen, 2003). For example, personality seems to predict absenteeism from experiments (Paunonen & Ashton, 2001) and personality attributes might be related to selection into particular kinds of studies (e.g., Carnahan & McFarland, 2007). Important for our purposes, the personality characteristics of participants may shift across the semester (e.g., Aviv, Zelenski, Rallo, & Larsen, 2002; Zelenski et al., 2003). In short, selection effects might be present in subject pool studies and these artifacts may compromise the external validity of a given study. The goal of the present study is to contribute to the literature on subject pool biases by investigating whether individual differences within psychology subject pool participants predict the mode (online versus in laboratory) and timing (week of semester) of participation.

Many psychology departments now use web-based applications that allow students to register for studies and even complete an entire study online. This feature is usually advantageous because web-based data collections can reduce data entry errors and obviate the hassles of scheduling participants (Fraley, 2004). The available evidence suggests that web-based studies produce high quality data in terms of psychometric properties (i.e., comparable internal consistency estimates to in-person studies; see Buhrmester, Kwang, & Gosling, in press; Gosling et al., 2004). However, a possible downside is that the flexibility of web-based studies may introduce unrecognized selection biases. Quite simply, certain kinds of students may prefer online versus in-person studies within a subject pool.

A more active area of subject-pool research concerns the characteristics of participants who choose to participate at different times during the semester (see Aviv et al., 2002 for a review). Students often have the entire academic term (i.e., semester or quarter) to earn participation credit. This raises the possibility that different kinds of students will enroll in studies at different times. Sex is one such factor, as women are more likely to participate earlier in the semester than are men (Aviv et al., 2002).

More broadly, a view shared by many of our colleagues is that the "best" participants are more likely to be found earlier in the academic term. Their expectation is that highly motivated and diligent students are more likely to complete their course requirements sooner in the term as opposed to later. Aviv et al. (2002) found that GPA had a moderate negative correlation with week of participation ($r = -.27$), evidence which provides some support for this anecdotal impression. This possible selection effect can create problems for researchers in terms of limiting the generalizability of findings. Results obtained at the beginning of the semester may only apply to highly motivated students. This sort of effect

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might also impair the ability of researchers to detect subtle laboratory effects that are potentially moderated by individual difference variables. For example, certain experimental manipulations might be more powerful for motivated students who pay more attention to experimental stimuli than less motivated students. Different kinds of students might respond differently to the manipulations used in a study. For instance, false feedback about performance on achievement-related tasks might be more ego-threatening for highly motivated as opposed to less motivated students. If these considerations have merit, then it will be harder to detect experimental effects in samples that have relatively low numbers of motivated students.

Unfortunately, the empirical basis for judging the plausibility of these concerns is not well developed. Although research concerning the personality correlates of timing of participation exists, the findings are mixed with regard to the particular dimensions of personality that are systematically associated with participation (Zelenski et al., 2003). One complication is that few researchers have conducted a comprehensive study using an omnibus personality inventory that simultaneously assesses a broad range of individual differences. An exception to this limitation is work by Aviv et al. (2002). They used a measure of the facets of the Five Factor model to investigate personality correlates of the timing of participation. Aviv et al. (2002) found that Extraversion and nearly all of its facets were related to later participation. Openness had a similar pattern of results whereas facets of Agreeableness and Conscientiousness were related to earlier participation. Thus, there are reasons to believe that personality differences will emerge across the academic term. However, more work like this is needed.

In sum, the goal of the present study is to provide additional insights into differences in subject pool participants. We used a comprehensive personality measure derived from the International Personality Item Pool (IPIP; see Goldberg, 1999) to assess the 30 facets of personality associated with the Five Factor model. These facets represent key areas of human individuality that have been linked to behavior (see e.g., Paunonen, 2003). Thus, we extend the work by Aviv et al. (2002) by using a larger sample size (i.e., $N = 512$ versus 257 in their study) and by investigating whether personality also predicts mode of participation (entirely online versus in-person). In addition, we also evaluated the impact of demographic attributes like sex.

Given existing impressions, we predicted that Conscientiousness scores will be highest for those students participating earlier in the term. We also expected a higher proportion of males at the end of the semester as opposed to the beginning in light of earlier work. Little work has been done on differences between modes of participation in subject pool studies (online versus in-person) and thus our examination of these associations was exploratory in nature.

2. Method

A total of 512 college students participated in this investigation. Students were recruited through the Michigan State University Psychology Department's Human Participation in Research Subject Pool system (HPR). Participants were primarily women (75.2%), white (87.3%), and between 18 and 20 years of age (76.4%). This profile differs from the overall undergraduate population at this university which is more sex-balanced (52% women), less white (74%), but similar in age (e.g., the average age is 20 and only 4% of students are older than 24 years). Students in Introductory Psychology are required to complete several hours of experimental work or an alternative assignment to receive course credit. Students in other psychology courses are also required to participate in research or given the opportunity to earn extra credit via participation. Participants log onto the HPR website to view information about available studies. This information includes the study title, study description, number of credits earned, and date/time of available sessions.

The data presented here were collected in two separate HPR experiments listed during the spring semester of 2010. The only difference between the two studies was the title and whether participants were required to show up in-person (i.e., "Personality Questionnaire Study" versus "Online Personality Questionnaire Study"). Data were collected over the course thirteen weeks during the semester. Each week 60 participant slots were posted (30 in-person and 30 online). The HPR site allowed people to see both studies but only sign up for one to avoid sample overlap. In-person study sessions were posted by Monday morning each week of participation. To control for potential time of day and day of the week effects, data were always collected on Wednesdays at 12:30 pm regardless of mode (online or in-person). Data were not collected during spring break and in-person data collection ended 1 week earlier than online data collection. This procedure resulted in 13 weeks of online data and 12 weeks of in-person personality data. More participants completed measures online than in-person (70.1% completed online measures). This trend held for each week of the semester.

Both the online and in-person surveys were collected with the same web page interface via either an in-person computer laboratory (supervised by the third author) or participants' own computers, respectively. Surveys were identical with the exception of three additional questions administered to online participants that asked details about their participation at the end of the survey. These questions pertained to where they were completing the survey, what kind of device they were using, and whether they were using a wireless connection. None of these results were noteworthy, so they are not discussed further.

2.1. Measures

2.1.1. International Personality Item Pool – NEO Inventory (IPIP-NEO; Johnson, 2000)

The IPIP-NEO is a measure designed to assess the 30 facets of the Five Factor traits of Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience commonly assessed with the NEO PI-R (see Costa & McCrae, 1992). Johnson (personal communication; see also Goldberg, 1999) reported an average correlation between the NEO PI-R facets and the IPIP-NEO of .66 (.91 when corrected for measurement error). McAdams and Donnellan (2009) provide data on the test–retest consistency of the IPIP-NEO inventory across one semester of college taken from a different sample of participants. Due to a programming error, participants did not complete one Cheerfulness item: "I love life." This item was excluded from all analyses.

3. Results and discussion

3.1. Overview

For all analyses we used a two-tailed alpha of .05 for judging statistical significance. Given the inconsistencies in the previous literature and the importance of detecting subtle effects, we did not correct for multiple comparisons (see also Rothman, 1990). Depending on the analyses, we quantified effect sizes using the correlation coefficient or Cohen's d. We followed typical conventions for interpreting these coefficients such that we considered effects "small" if the r was around |.10| or the d was around |.20| whereas effects were considered "moderate" if the r was around |.30| or the d was around |.50|. We did not expect large effects sizes given previous results (e.g., Aviv et al., 2002).