

## The Good-Subject Effect: Investigating Participant Demand Characteristics

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**ABSTRACT.** Although researchers are often concerned with the presence of participant demand, few have directly examined effects of demand on participant behavior. Before beginning the present study, a confederate informed participants ( $N = 100$ ) of the study's purported hypothesis. Participants then performed a laboratory task designed to evaluate the extent to which they would respond in ways that may confirm or disconfirm the hypothesis of the study. The authors found that participants tended to respond in ways that confirmed the hypothesis, yet this tendency depended on attitudes toward the experiment or experimenter and other individual differences. In addition, results suggested that suspicion probes may be ineffective in measuring participants' previous knowledge and suspicion. Findings indicate the need for more research and consideration of demand in the design of studies and analysis of data.

Keywords: demand characteristics, good-subject effect, previous knowledge

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EXPERIMENTAL STUDIES IN THE PSYCHOLOGICAL sciences often involve some degree of demand in which participants have awareness of the study's true purpose or hypotheses. Researchers are often concerned with the presence of demand characteristics, cues that make participants aware of what the experimenter expects to find or how participants are expected to behave, and the researchers typically use methods for reducing the demand. Often, these efforts are based on the assumption that participant responses in the course of the study are unduly influenced by participants' knowledge of the researcher's hypotheses.

Hence, it is somewhat surprising that little is known about what specific effects demand characteristics may have on participant behavior. Indeed, although

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many researchers try to reduce the presence of demand in their studies and there are some classic theories about demand characteristics (e.g., Orne, 1962), in few recent empirical studies have researchers systematically investigated the effects of participant demand characteristics on participant behavior. The present study provides such an investigation. We designed this research to address two primary questions: (a) What effect, if any, does possessing knowledge of a study's hypothesis have on behavior during an experiment? and (b) What factors predict individual differences in the extent to which participants succumb to demand?

There are at least three possibilities pertaining to the effects of demand on participant responses: (a) Participants may respond by exhibiting behaviors designed to confirm the hypothesis, thereby serving as a *good subject*; (b) participants may instead respond by trying to disprove the hypothesis; and (c) the presence of demand may have no appreciable effect on participant responses. Each of these possibilities is plausible. For example, just as individuals may be motivated to help a researcher by acting as a good subject, resentment at having to participate in research studies could lead students to try to disconfirm a researcher's theory. Another possibility is that students may instead try to ignore any demand and act naturally, thereby negating any potential effects of demand.

Orne (1962) theorized that, in response to demand characteristics, most participants may strive to be good subjects. Orne hypothesized that participants want to perform well in the experiments in which they take part, confirming to themselves that they have made a worthy contribution. Orne also hypothesized that, in an experimental situation associated with a researcher as an authority figure, people may generally be willing to do what is asked of them. This would be consistent with other findings suggesting that people often act in accordance with the demands of an authority figure (e.g., Blass, 1991; Hamilton, Sanders, & McKearney, 1995; Milgram, 1974).

However, will participants still strive to confirm a study's hypothesis even when an authority figure does not apply direct pressure? Orne (1962) hypothesized that volunteer participants genuinely care about the outcome of the experiment and feel that their participation and compliance is crucial in the findings. In addition, in the past researchers have shown that, compared with nonvolunteers, volunteers are more willing to act in accordance with what they see as the purpose of a study (Goldstein, Rosnow, Goodstadt, & Suls, 1972). This finding suggests that volunteer participants may seek opportunities to be a good subject, and some researchers have suggested that participants are intrinsically motivated to respond in ways that confirm an experimenter's hypothesis (Rosnow, 2002; see also Schlenker, 1980).

However, research participants in laboratory studies may not view themselves as truly volunteering for a study, especially when they are attempting to fulfill a department research requirement (as is the case at many research universities). If the good-subject effect applies primarily to volunteers, as Rosnow and Rosenthal (1997) suggested, then it is plausible that the typical research

participant may not be as inclined to strive to confirm a study's hypothesis and may even seek to disconfirm it.

Although participants, in general, may be inclined to intentionally confirm or disconfirm a study's hypothesis, there may also be individual differences in this tendency. Moreover, several factors—both in the person and in the situation—may be used to predict the degree to which people strive to confirm or disconfirm the hypothesis of a study.

### *Present Study*

Many researchers have suggested potential problems that may occur because of the effect of demand characteristics on participants (Eveleth & Pillutla, 2003). The most common of these concerns is that of participants' changing their behavior on the basis of the expectations of the experimenter. This could have a negative effect on the validity of a study's findings and on the participants themselves (see Chastain & Landrum, 1999). Although previous theorists have hypothesized a connection between the presence of demand and the tendency to respond in ways that confirm an experimenter's hypothesis, few researchers have designed studies to test this possibility. In the present study, our primary aim was to evaluate the extent to which, on the basis of foreknowledge of our purpose in the study, participants would strive to confirm or disconfirm the hypothesis of the study. In addition, we sought to identify variables that may predict the extent to which participants strive to confirm or disconfirm the hypothesis of a study. We focused on the potential role of (a) attitudes toward the experimenter and the experiment, (b) the tendency to respond in a socially desirable fashion, and (c) the interplay of participant gender and experimenter gender.

There are reasons to suspect that variables reflecting the participants' desire to be in the experiment, liking for the experimenter, and interest in the research may predict responses to demand. One would imagine that the more likable the experimenter is perceived to be, the more willing the participant is to act in ways that would benefit the experimenter. In addition, when participants are interested in the study and believe in its importance, they may be more likely to respond in ways that would serve to confirm the hypothesis of the study. Therefore, in the present study, we included a rating scale designed to measure attitudes pertaining to the experiment and the experimenter. We designed this scale to gauge the participant's perceptions of the friendliness, likeability, and attractiveness of the experimenter and the participant's interest in the study.

There are also reasons to think that participants who tend to respond in socially desirable ways may be relatively inclined to act in ways serving to confirm the experimenter's hypothesis. This suggests that participants respond positively to demand in part to enhance the likelihood that an experimenter would form a positive impression of them. This idea concurs with research on impression management and self-presentation (Schlenker, 2003) and suggests

that participants behave so as to present themselves positively after examining the situation and the audience (i.e., experimenter).

Another potentially important factor involves the interplay between the gender of the participant and the gender of the experimenter. Previous researchers have shown that the pairing of experimenter gender and participant gender can influence participant responses (e.g., Boutcher, Fleischer-Curtain, Gines, 1988; Galla, Frisone, Jeffrey, Gaer, 1981; Levine & De Simone, 1991). Because opposite-sex pairings may elicit feelings of attraction, they may be most likely to set the stage for hypothesis-confirming actions by the research participant. Same-sex pairings would potentially offer less benefit to the participants, thereby reducing the likelihood that they would seek to confirm the experimenter's hypothesis.

Attraction should elicit positive, hypothesis-confirming responses especially when participants are interested in seeking a romantic partner. Therefore, in the present study, we also measured whether the participant was already in a romantic relationship. Participants that are in a relationship presumably have their relationship goals satisfied to a relatively greater extent than do single participants and, thus, may have less reason to act in ways designed to elicit positive evaluations from an opposite-sex experimenter. Moreover, single participants may perceive themselves as being freer to flirt with members of the opposite sex. In addition, to account for variability in participants' overall romantic strategy (i.e., the extent to which they were inclined to seek large numbers of partners), we collected responses to the Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991; see also Maner et al., 2003).

### *Hypotheses*

We evaluated the extent to which participants acted in ways designed to confirm or disconfirm the purported hypotheses of the study. As noted, we assessed relationships among individual difference variables and participant responding. We developed hypotheses (*H*):

- H*<sub>1</sub>: On average, participants will respond in ways to confirm the hypothesis when presented with information about it beforehand.
- H*<sub>2</sub>: Participants will strive to confirm the hypothesis of the study, especially when they hold positive attitudes toward the experiment and experimenter (e.g., when the experimenter is seen as more attractive, likeable, and friendly).
- H*<sub>3</sub>: Higher levels of social desirability will be associated with a higher likelihood of hypothesis-confirming responses.
- H*<sub>4</sub>: Opposite-sex participant–experimenter pairings will produce more hypothesis-confirming responses than will same-sex pairings, and this effect will be moderated by relationship status and SOI.

## Method

### *Participants*

Participants were 100 students enrolled in an introductory psychology course (50 men, 50 women;  $M$  age = 19.67 years,  $SD$  = 2.8 years). They participated in this study as part of the fulfillment for an undergraduate research requirement. Because freshmen usually take the introductory class, it is unlikely that any participants had been previously enrolled in a research methods course.

### *Overview*

The study consisted of two parts: exposure to the confederate and completion of the experiment. First, a confederate instructed participants that, despite what they were going to be told, the true intent of the study was to test if people prefer things presented on the left side of their visual field more than on the right, adding that the expectation was to pick those on the left. Second, participants were brought into the lab and asked to pick which picture (left or right) they found more pleasing for a set of 10 pairs. We measured the responses to evaluate whether participants picked more pictures appearing on the left, thereby confirming the purported hypothesis of the study. Last, the participants completed a questionnaire designed to measure several variables about the participant, experiment, and experimenter.

### *Materials and Procedure*

When the participant arrived, the experimenter informed the participant that he or she would need to wait outside while the experimenter finished with another participant. Next, the experimenter let the male confederate out of the laboratory, treating him like a participant, and informed the participant that the experimenter would be back once the experiment was set up. After the door was closed, the confederate told the participant that the study was designed to see if people picked pictures on the left more than the right. The participant was told that the experimenter's hypothesis was that people would pick the pictures on the left more than the right. This hypothesis was specified so as to favor the left side, as opposed to the right, because previous evidence suggests that people actually exhibit a slight bias for objects presented on the right (Chokron & De Agostini, 2000). Therefore, seeming to hypothesize a left-hand bias served as a conservative test of potential demand-related responses, because trying to confirm the hypothesis required participants to overcome any inherent right-hand bias. In addition, the confederate—instead of the experimenter—transmitted this information to enable us to examine the real-world situations in which participants arrive at sessions with previous knowledge.

Once the confederate left, the experimenter opened the door and let in the participant, greeting him or her and stating that the experiment was the experimenter's master's thesis. The experimenter then provided participants with an informed consent form that contained a general statement of the purpose of the research but excluded specific study hypotheses and any details the expression of which would compromise the internal validity of the experiment. After providing informed consent, the experimenter gave participants instructions on how to perform the picture task. For this task, 10 pairs of pictures were presented on a computer screen, 1 pair at a time. The pictures, taken from the International Affective Picture System (Lang, Bradley, & Cuthbert, 2005), were selected from a set of photos prerated as neutral in pleasantness (range of 4.9–5.1 on a 10-point scale) and consisted of neutral objects (e.g., chair, lamp). We matched pictures in each pair so that they had equivalent pleasantness ratings. We randomized picture placement (left vs. right) by using a fixed random order. In addition, we counterbalanced picture placement so that half of the participants viewed a set of pictures on the left side of the screen, whereas the other half of the participants viewed those same pictures on the right side of the screen, therefore eliminating the need for a control group. After the experimenter presented each pair of pictures, participants selected the one they preferred by indicating their preference to the experimenter, who was seated next to participants. This procedure resulted in a score, ranging from 1 to 10 selections that reflected the number of times the participant chose the hypothesis-confirming left image.

After completing the picture task, participants completed questionnaires designed to measure factors potentially related to participants' willingness to confirm the hypothesis of the experimenter. We included the Experiment/Experimenter Attitudes Rating Scale (EARS), which we designed to measure attitudes toward the experiment and the experimenter (Cronbach's  $\alpha = .83$ ). This measure consists of two subscales: one that measures attitudes toward the experiment and one that measures attitudes toward the experimenter. To measure attitudes toward the experiment, we used the following questions, each rated on a 10-point Likert-type scale ranging from 1 (*not at all or no way*) to 10 (*very, very much or definitely*): (a) How happy are you to be here? (b) Would you be participating if you didn't have to? (c) How important do you feel it is for you to be here? (d) How interested are you in the outcome of the experiment? (e) Would you recommend this study to a friend of yours? We items combined to form a single scale reflecting attitudes toward the experiment ( $\alpha = .74$ ). We assessed attitudes toward the experimenter with the following questions: (a) Would you participate in a study with this experimenter in the future? (b) How friendly do you think the experimenter was? (c) How likeable did you think the experimenter was? (d) How attractive do you think the experimenter is (to the opposite sex)? (e) How much do you care about whether the experimenter's study works? We items combined to form a composite measure of attitudes toward the experimenter ( $\alpha = .78$ ).

We also included the Balanced Inventory of Desirable Responding (BIDR; Paulhus, 1998), which assesses the tendency to respond in socially desirable ways, and the SOI (Simpson & Gangestad, 1991) in the questionnaire. The BIDR includes two subscales: self-deceptive enhancement and impression management.

Participants also characterized themselves as (a) married, (b) single but in a committed relationship, (c) single and dating, (d) single and not currently dating, or (e) other (free response—no participants chose this option). For the purposes of analysis, participants describing themselves as married or in a committed relationship were categorized as in a relationship, whereas all other participants were categorized as not in a relationship. After completing these questionnaires, participants completed a suspicion probe and then were debriefed and dismissed.

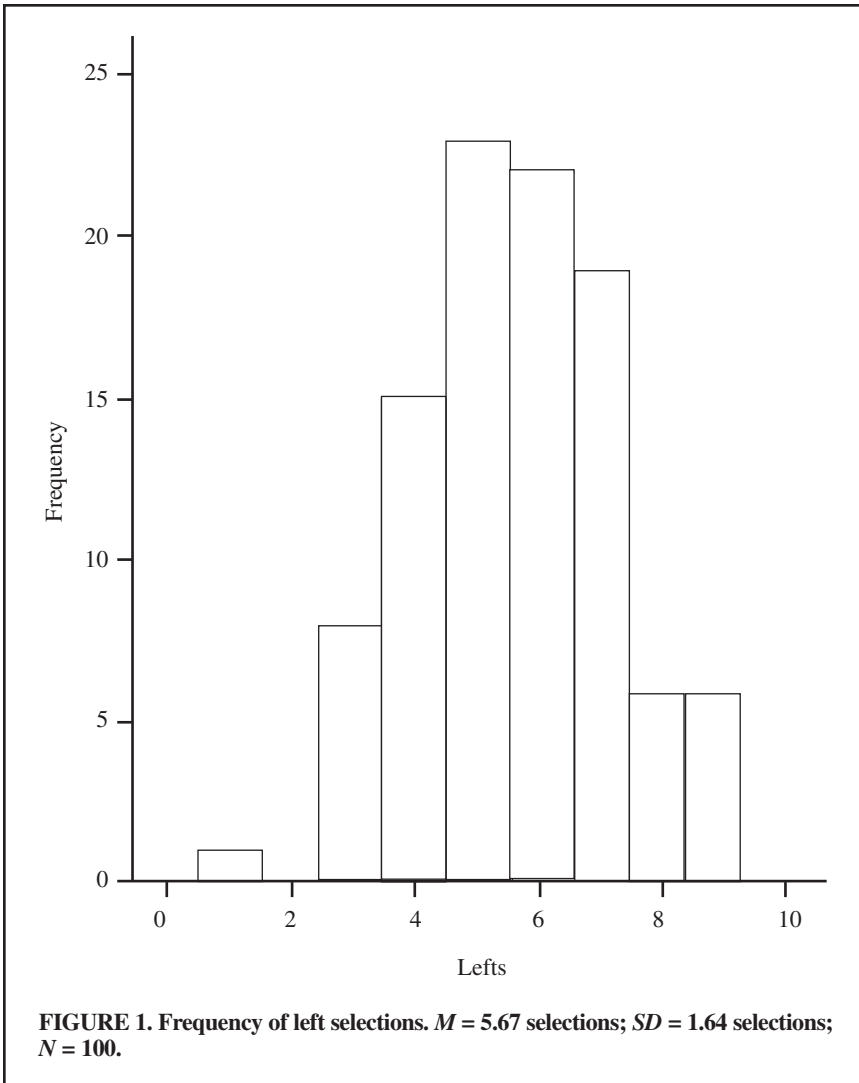
## Results

### *Hypothesis 1*

We first conducted analyses to assess whether participants exhibited any bias toward trying to confirm or disconfirm the purported hypothesis of the study. Because each picture appeared an equal number of times on the right and left and all pictures were evenly matched, a researcher would expect the average number of times when participants chose the picture on the left to equal 5, assuming that no demand-related bias was present. Instead, a one-sample *t* test indicated that participants exhibited a moderately sized bias toward confirming the seeming hypothesis of the study,  $t(99) = 4.09$ ,  $p < .001$ ,  $r = .38$ , therefore confirming our actual hypothesis that participants would act as good subjects. The overall mean of the number of lefts picked out of 10 was 5.67 selections ( $SD = 1.64$  selections). In addition, the majority of scores were distributed between 3 and 9 left selections, with only 1 participant picking a single left and 79% of the scores ranging from 4 to 7 selections, as shown in Figure 1.

### *Hypothesis 2*

We performed a correlational analysis to examine the relation among attitudes toward the experiment, attitudes toward the experimenter, and number of lefts selected. The tendency to confirm the seeming hypothesis of the study was related to attitudes toward the experiment and the experimenter,  $r = .21$ ,  $p < .05$ , so that more positive attitudes toward the experiment and experimenter were associated with greater degree of confirmation of the seeming hypothesis. Analyzing each subscale separately produced similar results among the number of lefts chosen and attitudes toward the experiment,  $r = .18$ ,  $p = .07$ , and the experimenter,  $r = .21$ ,  $p = .05$ . This is not surprising because the two subscales were highly correlated,  $r = .49$ ,  $p < .01$ . Last, we performed a partial correlation to control for social desirability. Even after controlling for social desirability, attitudes toward



the experiment and the experimenter were highly correlated with the number of responses confirming the stated hypothesis,  $r = .22$ ,  $p < .05$ .

### *Hypothesis 3*

Next, we evaluated BIDR scores to assess the potential relation between high social desirability and a high degree of hypothesis confirmation. We used continuous, instead of dichotomous, scoring to ensure the highest possible validity and



reliability (Stober, Dette, & Musch, 2002). We observed a significant relation,  $r = -.21$ ,  $p < .05$ . However, this relation was in the opposite direction from what we hypothesized. Participants exhibiting higher levels of social desirability were less inclined to make selections that were consistent with this stated hypothesis of the study. At the subscale level, self-deceptive enhancement proved to be a stronger predictor,  $r = -.21$ ,  $p < .05$ . The relation between participants' selections and their level of impression management was not significant,  $r = -.14$ ,  $p = .18$ . Correlations among all studied variables are shown in Table 1.

#### *Hypothesis 4*

We conducted further analyses to assess any differences as a function of participant sex or experimenter sex. We conducted an analysis of variance (ANOVA) with experimenter sex, participant sex, and romantic relationship status as between-subjects factors with and without SOI score as a covariate to determine if opposite sex pairings would produce more seeming-hypothesis confirming responses and whether relationship status and SOI would prove to moderate this effect. This analysis revealed a significant 3-way interaction among experimenter sex, participant sex, and relationship status,  $F(1, 87) = 3.97$ ,  $p < .05$ . To interpret this interaction, we performed follow-up tests across and within participant sex. An ANOVA revealed that when the participants were instructed by an opposite sex experimenter, single participants ( $M = 6.16$ ,  $SD = 1.34$ ) were more likely to confirm the experimenter's hypothesis than were participants in a relationship ( $M = 5.15$ ,  $SD = 1.82$ ),  $F(1, 48) = 4.48$ ,  $p < .05$ . Using an ANOVA, we observed a significant interaction between experimenter sex and participant's relationship status in female participants,  $F(1, 42) = 4.59$ ,  $p < .05$ . Tests of simple effects showed that with a male experimenter, single women were more inclined to confirm the hypothesis ( $M = 6.29$ ,  $SD = 1.05$ ) than were women in a relationship ( $M = 5.00$ ,  $SD = 1.67$ ),  $F(1, 20) = 5.29$ ,  $p < .05$ . We did not observe a similar effect when the experimenter was also a woman,  $N = 24$ ,  $F(1, 21) = .73$ ,  $p = .40$ . In addition, we did not find any effects of experimenter sex or relationship status for male participants,  $N = 49$ , main effect (experimenter sex):  $F(1, 44) = .25$ ,  $p = .62$ ; main effect (relationship status):  $F(1, 44) = .49$ ,  $p = .49$ ; interaction:  $F(1, 44) = .66$ ,  $p = .42$ .

## **Discussion**

Social psychologists often worry about the possible effects that demand characteristics may have on participant behavior during the course of an experiment, and efforts are commonly directed toward reducing the possibility of demand. Nevertheless, few empiricists have directly examined effects of demand on participant behavior or sought to identify factors that may increase or decrease the likelihood of demand-induced responding.

**TABLE 1. Means, Standard Deviations, and Correlations Among Study Variables**

| Variable   | <i>M</i> | <i>SD</i> | 1     | 2     | 3     | 4    | 5     | 6     |
|--|----------|-----------|-------|-------|-------|------|-------|-------|
| 1. Left selections                                   | 5.67     | 1.64      | —     |       |       |      |       |       |
| 2. Experiment/Experimenter<br>Attitudes Rating Scale | 7.08     | 1.28      | .21*  | —     |       |      |       |       |
| 3. Attitudes toward experiment                       | 6.22     | 1.66      | .18   | .92** | —     |      |       |       |
| 4. Attitudes toward experimenter                     | 8.42     | 1.29      | .21   | .77** | .49** | —    |       |       |
| 5. Social desirability                               | 3.91     | 0.53      | -.21* | .01   | .04   | -.09 | —     |       |
| 6. Self deceptive enhancement                        | 4.27     | 0.54      | -.21* | .06   | .09   | .00  | .73** | —     |
| 7. Impression management                             | 3.55     | 0.76      | -.14  | -.03  | .00   | -.12 | .87** | .31** |

\* $p < .05$ . \*\* $p < .01$ .

*Effects of Participant Demand*

In the present study, we investigated the possibility that possessing foreknowledge of the stated hypothesis of a study would influence participants' responses during the course of an experiment. In general, the present findings suggest that knowledge of the hypothesis of a study appreciably shapes participant responses, leading them to perform in a manner designed to confirm the hypothesis of the experiment. Participants in the present study tended to make choices consistent with what they believed would help the experimenter.

However, not all participants responded in this way to an equivalent degree. The extent to which participants behaved in accordance with the hypothesis was related to their attitudes toward the experiment and experimenter. Participants reporting more positive attitudes were more likely to behave as a good subject. This coincides with the perspective that participants who like the experiment and experimenter are likely more motivated to perform in a way that would enhance the experimenter's outcome. Moreover, this relation was not a consequence of social desirability. Even after we controlled scores on a widely used measure of socially desirable responding, positive attitudes were related to hypothesis-confirming choices. Thus, it does not appear that a participant's actions were intended simply to foster a positive impression of him- or herself. Rather, the data suggest that participants acted in a way that they thought would benefit the experimenter.

One unanticipated finding in the present study warrants particular mention. Contrary to our prediction, findings suggest that the more social desirability the participant sought, the less he or she was inclined to behave in accordance with the experimenter's hypothesis. This was somewhat surprising, but a couple of possible explanations exist. One possibility is that the reference point for social desirability lies not with the experimenter but with the student's peer network that may not appreciate having to fulfill a psychology course research requirement. Although the participant's peer group was not present, it is not uncommon to expect people to integrate their private and public selves. This could mean that those scoring high in social desirability were behaving in accord with what is socially acceptable or "cool" by working against the experimenter. Sigall, Aronson, and Van Hoose (1970) found that participants chose to look good over confirming the hypothesis when the two were mutually exclusive. Therefore, those high in social desirability may have chosen to disconfirm the hypothesis, whereas those low in social desirability may have chosen to confirm the hypothesis. Conversely, participants with low levels of social desirability may have regulated their behavior so as not to confirm or disconfirm the hypothesis because this is what they believed they should do. More research is needed to clarify the nature of the relation between socially desirable responding and reactions to participant demand.

In addition, there was some evidence that the interplay of participant gender and experimenter gender may shape the effects of demand. Findings suggest that when participants were instructed by an opposite-sex experimenter,

single participants were more likely than participants in relationships to act in ways that confirmed the experimenter's hypothesis. This could reflect mating-related motives on the part of the participant, although it could also reflect differences between responses to male experimenters and responses to female experimenters. The effect of relationship status was particularly apparent in female participants, who were more inclined to act as the good subject when they were single and the experimenter was male. This suggests the possibility that mating-related motives shape the manner in which research participants respond to the presence of demand.

Indeed, college is typically a time in which mating is an especially salient characteristic of the social environment. There are several specific mating-related factors that may explain this trend including (a) that women in relationships may have their relationship goals satisfied to a greater extent than do single women and (b) that in comparison with women already in a relationship, single women may have a greater perceived freedom to flirt with someone of the opposite sex. The absence of effects in men is consistent with previous evidence suggesting that men are generally less likely than women to succumb to demand characteristics (Silverman & Shulman, 1970) and also less likely to reduce interest in the opposite sex when in a relationship (e.g., Maner et al., 2003). Nevertheless, although similar effects were not observed for male participants, it would be premature to rule out the possibility that male participants, like female participants, respond to mating-related situational factors (e.g., an attractive opposite-sex experimenter) in a way that could adversely affect the validity of an experiment.

Last, we address the issue of suspicion probes. During a post hoc review of the participants' suspicion probes, we discovered that not a single participant admitted to knowing about the stated hypothesis. This is especially troubling in light of the present findings. This suggests not only that participants respond in ways to confirm the experimenter's hypothesis, but also that the typical suspicion probe may not be sensitive or appropriate enough to detect this bias.

### *Limitations*

The present study should be considered with regard to its limitations. Although our study identified possible consequences of demand in a single experimental context, this does not imply that the results are generalizable to other research contexts. Future researchers should seek to examine the ability to generalize these results to a broader range of tasks. The extent to which demand is apt to affect participant responses likely depends on several factors, including the nature of the study and tasks performed by the participant, the degree and quality of contact between the participant and others involved in the study (e.g., experimenters, other participants), and various aspects of the participant (e.g., personality factors). Moreover, the confederate in this study

was always a man, and it is possible that participants would behave differently if the confederate were a woman. In addition, self-presentation may have played a role in how participants answered the questionnaires. Because self-presentation affects people in ways that enable and pressure them to act in a socially desirable manner, participants may also answer in ways to secure or benefit their own self-image. We examined only a few of the many situational and personal factors likely to shape the consequences of demand. It remains for future researchers to more fully identify these factors and clarify their role in research settings.

### *Implications*

We believe that researchers should make every effort to reduce demand. Although we did not specifically test this hypothesis, training any research assistants to be as neutral as possible in their actions toward research participants may help reduce the likelihood of demand, and future researchers should consider focusing on this. Making every effort to maintain the confidentiality of the study and its hypotheses is critical. Prior knowledge of the purpose and hypotheses of a study may have appreciable effects on data quality and, in particular, may unduly increase the likelihood of confirming the hypothesis of the study. Future researchers may also benefit from testing more specifically the possibility that aspects of the personal interaction between participants and experimenters could increase demand. For example, reducing one-on-one contact with an experimenter may reduce the likelihood of demand, although this could also have the deleterious effect of reducing the effect of the experimental situation.

Of course, it is not always possible to reduce the presence of demand. Thus, it is also important to identify the presence of demand where it exists and to identify those particular research participants whose actions the demand is likely to influence. Because the presence of demand seems to shape participant responses, it is also important to attend to demand during the informed consent process, and researchers should be wary of providing unnecessary or extraneous information to participants before the experiment begins. In addition, in the analysis of a study, researchers may be prudent to assess, as much as possible, the effects of demand on observed patterns of data. Unfortunately, it may be that suspicion probes do not accomplish this, and alternative measures are needed. In particular, the present findings suggest that the presence of demand may make experimental effects appear more substantial than they actually are.

### **AUTHOR NOTES**

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