ABSTRACT

YOUNG, AMANDA LEIGH. The Influence of Subconscious Goals on Careless Responding. (Under the direction of Dr. Adam W. Meade.)

Careless responding is a prevalent problem that can affect survey data quality. Researchers have identified indicators to recognize careless responding after data collection is complete, but preventative measures are needed. Previous researchers have successfully used methods such as modifying instructions to reduce careless responding (e.g. Meade & Craig, 2012). The present study explored increasing participant motivation to reduce careless responding by using goal-setting theory. Subconscious goals are a new direction in goal-setting research, and have been shown to increase performance on different types of tasks (e.g. Shantz & Latham, 2009). The present research assessed the viability of reducing careless responding by activating a subconscious diligence goal through the combination of semantic and picture primes. These stimuli were presented to people in a prime condition, who were compared to people in neutral stimuli and control conditions. Analyses all indicated that there were no significant differences between the groups. Possible causes of the null results are discussed. Although the stimuli in the present study did not impact careless responding, motivating participants to respond to surveys carefully is an important area for future research.
The Influence of Subconscious Goals on Careless Responding

by
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BIOGRAPHY

Amanda Young was born in 1992 to parents George and Mary Beth Young. She completed her undergraduate education at Lenoir-Rhyne University, and was a psychology major and a music minor. While at Lenoir-Rhyne, she played flute in several musical ensembles and was on the tennis team. She graduated with a B.A. in Psychology on a very windy day in May 2012. Amanda is currently a student in the Industrial/Organizational Psychology doctoral program at North Carolina State University.
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The Influence of Subconscious Goals on Careless Responding

Gathering data with online surveys is common, which makes ensuring high quality data a priority. Data collected from online surveys or assessments is used not only for research, but also for many important decisions, such as hiring and promotions in organizations. However, there are response biases that could potentially skew these decisions by lowering the quality of the data. Two of the broad categories of response biases are content responsive faking and content nonresponsivity (Nichols, Greene, & Schmolck, 1989). Content responsive faking includes response patterns such as “faking good” and malingering. People engaging in these response biases answer the items in a consistent way that distorts the truth. While content responsive faking represents an important consideration in survey data quality, the focus of the present paper is on content nonresponsivity. Content nonresponsivity can have different motivators, but is characterized by selecting a response using something other than the content of the question as the criterion (Nichols et al., 1989). This type of response pattern includes the many types of careless responding (McGrath, Mitchell, Kim, & Hough, 2010). Careless responding consists of responses that are truly random, or follow a pattern that does not vary based on the content of the question, such as choosing the same response option for a section of items (Meade & Craig, 2012).

Careless Responding

There are several potential causes of careless responding. According to Meade and Craig (2012), the most applicable cause in a research setting is lack of interest or motivation. Another reason for careless responding in online surveys is the lack of social interaction between the participant and experimenters. The lack of personal interaction and physical distance from the experimenter could lead to a lower sense of accountability, which increases
the likelihood of careless responding (Johnson, 2005). However, people who are unmotivated and feel no sense of obligation are not the only sources of careless responding. Even individuals who are motivated to do well on an online survey or assessment (e.g., for a job application or promotion) may eventually experience fatigue during a long assessment, making them prone to careless responding (Berry et al., 1992). In addition, environmental distractors may prevent people from attending to items. Environmental distractors may be especially problematic for online surveys in which experimenters have no control over the participants’ choice of environment. Zwarun and Hall (2014) demonstrated that people were likely to engage in multitasking and divide their attention during an online survey. Although participants in Zwarun and Hall’s (2014) study reported that they did not feel overly distracted by multitasking, task performance is typically slower and more prone to errors when switching between tasks (Monsell, 2003).

Careless responding can have psychometric implications, such as affecting factor analysis, and creating error variance that is problematic in scale development (Woods, 2006). These problems are more concerning when the prevalence of careless responding is considered; base rate estimates of careless responders range from 3.5% to 12% (Johnson, 2005; Meade & Craig, 2012) and between 50%-73% of people self-report answering randomly on at least one survey item (Baer, Ballenger, Berry, & Wetter, 1997; Berry et al. 1992). To ensure data quality and draw justified conclusions, researchers need to minimize the effects of careless responding. One way to address the problem is to identify participants who respond carelessly after the data is collected, and then exclude their data from subsequent analyses.
Meade and Craig (2012) identified many indicators of careless responding and found evidence that the different indicators are associated with different types of response patterns. For example, consistency indicators such as Psychometric Antonyms, Psychometric Synonyms, and Even-Odd Consistency identify random responding, while Maximum LongString indicates a consistent content nonresponsive response pattern. Thus, their recommendation was that researchers use multiple indicators to capture the different kinds of careless responding.

While being able to identify and exclude careless responders from analyses is important, it decreases the sample size and systematically removes participants. Thus, preventing careless responding is necessary in order to ensure data quality without skewing results (Ward & Pond, 2015). Recent studies (e.g. Huang, Curran, Keeney, Paposki, & DeShon, 2012; Ward & Pond, 2015) have investigated ways to reduce instances of careless responding before the data is collected. Methods for limiting careless responding have typically addressed the problem of low participant accountability. These methods have included manipulating instructions, removing participant anonymity, and using a virtual human to increase perceived accountability through a social interaction (Huang, et al., 2012; Meade & Craig, 2012; Ward & Pond, 2015). Researchers have established accountability primarily by making participants aware of the consequences of responding carelessly. For example, using “warning” instructions has reduced careless responding by either informing participants that a reward is contingent on quality responses or explicitly stating ethical consequences of not putting effort into the responses (Huang et al., 2012; Meade & Craig, 2012). Instead of focusing on salient consequences, this study addressed lack of motivation
as a reason for careless responding by assessing the viability of using a subconscious diligence goal to decrease careless responding in online surveys.

**Subconscious Goal Activation**

Goal-setting theory is a prominent motivation theory that explains how setting goals leads to high performance and other important organizational outcomes (Locke & Latham, 2002). One of the most recent additions to goal-setting theory is the activation of subconscious goals (Locke & Latham, 2004). Subconsciously activated goals are beneficial because they are believed to use less of a person’s limited cognitive resources than consciously set goals (Dijksterhuis & Nordgren, 2006; Shantz & Latham, 2011), and they can be used in conjunction with conscious goals to enhance the effects that conscious goals have on performance (Shantz & Latham, 2009, 2011; Shah & Kruglanski, 2002; Stajkovic, Locke, & Blair, 2006). Although subconscious goal activation is new to research in industrial and organizational (I/O) psychology, social psychologists have developed a model of the activation of unconscious goals.¹

**Automaticity model.** Bargh and colleagues have investigated the mechanisms for, and effects of, the activation of goals without conscious awareness using an auto-motive or automaticity model (Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trotschel, 2001; Chartrand & Bargh, 2002). The automaticity model acknowledges the importance of goals as determining responses to the environment, and adds to goal-setting theory by demonstrating that conscious initiation is not required to activate a goal. Bargh (1990) asserts

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¹ I/O psychology has used a slightly different terminology, “subconscious” rather than “unconscious,” because no one has proven that information outside of conscious awareness can never become conscious (Latham, Stajkovic, & Locke, 2010). However, subconscious goals are still defined the same as the unconscious goals researched in social psychology (Latham et al., 2010). I will follow the terminology of I/O psychology and use “subconscious” to indicate a person’s lack of awareness of the influence of a stimulus on the activation of a goal construct, which is the same as Bargh’s description of “unconscious” goals in the automaticity model.
that the environment can influence behavior by activating an existing mental representation of a goal. A mental representation is formed when a goal is activated frequently and becomes more accessible to memory. The mental representation also contains the intentions and procedures that are typically associated with the goal, and is linked to the patterns of environmental stimuli which are typically present during goal activation. This association will allow the environmental stimuli to activate the goal without the person’s conscious awareness, and once the goal is active it will influence the person’s perceptions, judgments and behaviors. For example, imagine a worker that comes home every day and sits on the couch to relax. As the worker repeats the activity many times, this would create a mental association between that environment (the couch) and the goal (relaxing). Thus, if the worker needed to do some work at home, a goal to relax would be activated by the couch and it would be more difficult for the worker to complete his or her work on the couch than from other areas in the home.

Priming is the passive creation of an internal readiness by an experience or environmental stimuli (Bargh & Chartrand, 2014). Priming can be either subliminal or supraliminal. Subliminal priming involves presenting the stimuli so quickly that the participant does not consciously perceive it, whereas with supraliminal priming, participants are consciously aware of the priming material but not its pattern that activates the relevant construct (Bargh & Chartrand, 2014). A common semantic supraliminal priming task is the scrambled sentence test (Srull & Wyer, 1979). In this task, the researcher presents participants with five words and requires them to make a grammatically correct sentence using only four of the words. A certain percent of the sentences include words related to the relevant construct. For example, words such as “succeed”, “win”, and “compete” would
prime an achievement goal (Stajkovic et al., 2006). In addition to semantic priming, some researchers use pictures to supraliminally prime mental representations (e.g., Aarts & Dijksterhuis, 2003). Researchers have used different types of priming to activate many subconscious processes, such as goals, traits, social norms, and stereotypes (Aarts & Dijksterhuis, 2003; Bargh, Chen, & Burrows, 1996; Chartrand & Bargh, 1996, 2002).

Bargh et al. (2001) conducted several experiments to demonstrate that a goal, rather than another mental representation, was the construct that their prime activated. In one of the experiments, they used a delay between the prime and the performance task. Because the effects of priming other concepts, such as a trait concept (e.g., “high achiever”) and stereotypes, fade quickly, while goals tend to persist over time, an effect after a five-minute delay is indicative of goal activation. They found that the effect was not only still present after a delay, but people primed with a scrambled sentence test containing achievement related-words performed even better on a word search after a five-minute delay than those who were primed and did not have a delay. They also conducted another experiment in which participants primed with the same scrambled sentence test were more likely to persist in the face of obstacles. These results also indicate that a goal is being primed because persistence is an important goal mechanism (Locke & Latham, 1990). In addition, these provide evidence that subconscious goals operate similarly to conscious goals.

**Relationship with conscious goals.** Chartrand and Bargh (1996) showed that subconscious activation of an impression formation or a memorization goal had the same consequence as consciously activating those goals. They replicated Hamilton, Katz, and Leirer’s (1980) free recall experiment, but instead of giving explicit goals like the original experiment, Chartrand and Bargh (1996) used a scrambled sentence test to prime either the
goal of impression formation or memorization. They found that impression formation led to higher recall than memorization, which is the same finding that Hamilton et al. (1980) found using conscious goals. Thus, Chartrand and Bargh (1996) concluded that subconscious goals lead to the same outcomes as similar conscious goals. However, this only illustrates the effects of subconscious goals in the absence of conscious goals. Understanding the effect of the presence of both a conscious and subconscious goal is necessary in order to understand the true relationship between them.

Shah and Kruglanski (2002) suggested that conscious and subconscious goals have an additive relationship. They conducted four experiments showing that the activation of a subconscious goal affected the pursuit of the focal conscious goal. Specifically, they found that when a subconscious goal is unrelated to a conscious goal, it draws cognitive resources away from the conscious goal and decreases task persistence and performance. Conversely, a related subconscious goal facilitates the conscious goal by drawing resources toward it. Shah and Kruglanski (2002) argued that the presence of subconscious goals affect behavior by affecting goal commitment and task strategies.

**Research in I/O Psychology.** Researchers in I/O psychology have used the automaticity model and priming methodology to investigate subconscious goals within Locke and Latham’s (1990) goal-setting framework. Stajkovic et al. (2006) examined the relationship between conscious goals, subconscious goals, and task performance. The results from their pilot study showed that priming an achievement goal increased performance on a brainstorming task. Specifically, primed participants listed more uses for a wire coat hanger than participants who were not primed. Their main study was a 2 (subconscious goal: present, absent) x 3 (conscious goal: easy, “do your best”, difficult) factorial design. The
prime was an adapted version of the achievement-related scrambled sentence test used by Bargh et al. (2001). They found that both conscious and subconscious goals affected performance on the same brainstorming task used in the pilot and that subconscious goals enhanced the effect of conscious difficult and “do your best” goals. This supports the facilitation effect suggested by Shah and Kruglanski (2002). The lack of a facilitative enhancement for conscious easy goals was explained by the tendency of easy goals to limit task performance. People who have an easy goal successfully reach the goal state and then do not have reason to continue to perform. Thus, a person satisfies his or her subconscious goal when the person reaches his or her conscious goal, so a subconscious goal does not add anything beyond the effect of the conscious goal.

In addition to establishing a relationship between conscious and subconscious goals, Stajkovic et al. (2006) extended the five-minute delay used by Bargh et al. (2001). Participants returned one day later, simply thought about the sentences they had constructed, and then completed a similar brainstorming task. Stajkovic et al. (2006) found that subconscious goals also enhanced the effect of difficult and do your best goals on performance after one day.

The influence of subconscious goals is not limited to a laboratory setting. Several field studies further investigated the potential use for subconscious goals in an organizational setting. Shantz and Latham (2009) conducted an experiment with 81 call center employees using a picture to prime an achievement goal. They justified the use of a picture with the inference from dual coding theory that the cognitive system is more responsive to pictures than words (Paivio, 1991). They primed call center employees by putting a picture of a woman winning a race as the backdrop of their information packet. Similar to Stajkovic et
al.’s (2006) results, Shantz and Latham (2009) also found that subconscious goals enhanced the effect of difficult and “do your best” goals. Shantz and Latham (2011) conducted two similar field experiments in two different call centers with smaller sample sizes of 20 and 44 employees. They replicated their initial findings and thereby provided additional evidence for Shah and Kruglanski’s (2002) claim that subconscious goals can enhance the effects of conscious goals.

Latham and Piccolo (2012) extended the existing literature in two ways: testing the importance of prime specificity and testing whether a prime would continue to have an effect throughout a four-day workweek. Difficult, specific goals are an important part of goal-setting theory (Locke & Latham, 1990), but subconscious goals cannot be specific in the same way as conscious goals. A conscious goal can be quantified (e.g., brainstorm 14 uses for a coat hanger), but the subconscious goal can only be a general idea (e.g., achievement). However, the stimuli that activate subconscious goals can vary on how specific they are to the task, so a more context-specific priming stimulus could activate a more task-specific goal and lead to higher performance. Latham and Piccolo (2012) used the same picture of a women finishing a race as Shantz and Latham’s (2009; 2011) field experiments as the general prime and used a picture of people with headsets and computers working in a call center as a context-specific prime. Out of the sample of 58 call center employees, those exposed to the context-specific prime raised more money than the employees in both the general prime and no prime conditions. Latham and Piccolo further demonstrated that the overall benefit of the prime for the four days was not due to a short-term effect that was only present in the first few days; there was no difference in the effect between the first day and the fourth day. The practical significance of their results is that choosing a context-specific
prime is more effective than a general prime, and priming subconscious goals can last at least as long as a four-day workweek.

Chen and Latham (2014) also used goal-setting theory to investigate the most effective way to prime a subconscious goal. The previous laboratory and field experiments had only used performance goals and tasks that did not require learning, but goal-setting theory distinguishes between a performance goal and a learning goal. Performance goals are effective at increasing performance in a task that the employee knows how to do, but are less effective than do your best goals for tasks that require knowledge acquisition (Latham & Locke, 2007). Performance goals take away cognitive resources from the acquisition of knowledge, which decreases performance. However, learning goals increase performance when the task requires acquisition of knowledge. Chen and Latham (2014) used a complex scheduling task (Earley, 1985) that required learning the appropriate task strategy to complete it. In earlier research this task demonstrated different effects for conscious performance goals and learning goals (Winters & Latham, 1996). They used a picture of “The Thinker” to prime a learning goal, and a photograph of a woman winning a race to prime the performance goal. They found that a primed subconscious learning goal increases performance on a complex task that requires knowledge acquisition, which provides further evidence that subconscious goals follow the same principles of goal-setting theory as conscious goals.

These laboratory and field experiments in I/O psychology illustrate that subconscious goals function similarly to conscious goals, enhance the effects of conscious goals, and have potential benefits for an organizational setting. I extended this research by investigating whether subconscious goals could improve survey data quality.
Summary

In survey research, an unmotivated participant’s goal is to complete the survey for an extrinsic reward, which can lead to careless responding and lower data quality. The present research tested the relationship between a subconscious diligence goal and indicators of careless responding. Given past research showing that the activation of subconscious goals can improve performance (e.g., Stajkovic, et al., 2006), I expected that a subconscious diligence goal will reduce careless responding. Thus:

Hypothesis: Subconscious activation of a diligence goal will be negatively related to careless responding.

Pilot Study

A pilot study was conducted to assess the viability of combining a picture and semantic prime. Because research in organizational psychology has used a picture or semantic prime, the present research used both stimuli in an attempt to capitalize on the combined influence of both types of primes. This design is supported by the additive relationship between words and images in Paivio’s (1991) dual-coding theory. I expected that participants primed with an achievement-related picture and semantic task would perform better than participants in a neutral or control condition on a brainstorming task.

Method

Participants. Participants were recruited from introductory psychology courses at a large southeastern university. Participants received credit to meet a research requirement for completion of the study. There were 78 total participants; however, one was excluded from the analyses because he indicated that the prime picture made him think of achievement, indicating conscious awareness of the prime. Approximately 52% of the 77 participants
indicated that they were men. The participants had a mean age of 19.08 ($SD = 1.06$).

Seventy-nine percent of the sample identified as White, 9% Asian, 9% Black, and 3% other races. Five percent of the sample reported their ethnicity as Hispanic or Latino.

**Design.** The study used a between subjects design in which participants were randomly assigned to either the prime, neutral, or control condition. The purpose of the neutral condition was to determine whether the presence of a task and a picture have an effect without any relationship to a subconscious goal of achievement. A control group was used in addition to the neutral group to estimate the baseline for the performance task.

**Prime condition.** Participants were primed both semantically and with a picture. The semantic prime was the scrambled sentence test used by Stajkovic et al. (2006). Participants were asked to create meaningful sentences using four of the five words given. In the prime condition, 12 out of 20 total sentences used a verb related to achievement (prevail, compete, accomplished, strive, thrive, triumphed, achieve, mastered, wins, success, effort, and attain). The other eight sentences contained achievement-neutral words. In addition to the semantic prime, an achievement-related picture was present on the webpage during the performance task and the priming task. Because context-specific pictures are more effective than general achievement pictures (Latham & Piccolo, 2012), a picture specific to college students was used. The picture was of several students wearing a cap and gown before graduation.

**Neutral condition.** Participants in the neutral condition completed Stajkovic et al.’s (2006) scrambled sentence test in which all 20 sentences contain achievement-neutral words.

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2 Higher proportions of sentences including priming words lead to a stronger effect, but also increase the probability that participants will become aware of the manipulation (Bargh & Chartrand, 2014). Stajkovic et al. (2006) only included an achievement-related word in 60% of the sentences to minimize the number of participants who would become consciously aware of the prime.
In addition, an achievement-neutral picture of rocks and trees was present on the webpage during the performance task and the priming task (Chen & Latham, 2014).

**Control condition.** Participants in the control condition did not complete any type of semantic prime nor have any picture present on the webpages.

**Procedure.** Participants were randomly assigned to one of the three conditions. Participants in the prime condition and the neutral condition first completed a scrambled sentence test, labeled as a “psycholinguistic task.” Then they completed the performance task, labeled as a “brainstorming task.” Participants in these groups had the relevant picture at the top of the page during the scrambled sentence test and the performance task. After completing both tasks, participants in the prime and neutral conditions answered the awareness questions and then read the debriefing page. Participants in the control condition proceeded directly to the performance task, and then to the debriefing page.

**Measures.** Participants completed a performance measure and a funneled debriefing or awareness questionnaire.

**Performance task.** The performance task was a brainstorming task typical of conscious goal-setting research similar to the task used by Stajkovic et al. (2006). Instructions asked participants to list as many different uses as they have seen or can imagine for a paper clip within a five-minute time limit. Two independent raters evaluated the responses to determine whether they were acceptable. “Acceptable” was defined as responses containing meaningful words (i.e. not random strings of letters or uninterpretable string of words) related to the prompt (something about a paperclip) regardless of the practicality of the uses.
**Awareness questionnaire.** An awareness questionnaire consistent with the open-ended funneled debriefing method described by Bargh and Chartrand (2014) followed the tasks in the prime and neutral conditions. Funneled debriefing involves asking participants vague questions about the purpose of the experiment and then progressing to more specific questions regarding the relationship between the priming task and performance task (Bargh & Chartrand, 2014). The awareness questionnaire contained five questions, each on a different successive page. The questions are: “What was the purpose of this study?” “Was there any relationship between the psycholinguistic task and the brainstorming task?” “Did the completion of the psycholinguistic task have any effect on your performance on the brainstorming task? If so, how?” “Did you notice the photograph present on the webpage during the tasks?” “Did the photograph affect your performance in any way? If so, how?” One participant showed clear knowledge of the prime (e.g., “there were a lot of words about success”), so his data was excluded from the analysis (Bargh & Chartrand, 2014; Chartrand & Bargh, 1996).

**Results**

A one-way analysis of variance (ANOVA) with three levels was used to test the pilot manipulation. The ANOVA showed no difference between conditions ($F(2, 74) = 0.693, p = .503$), indicating that the prime ($M = 9.96, SD = 4.94$), neutral ($M = 11.6, SD = 5.55$), and control conditions ($M = 11.15, SD = 4.98$) were not significantly different.

**Discussion**

The purpose of the pilot was to assess the combination of a picture and semantic prime. Only one participant reported awareness of the prime, and only the picture, so the combination of the two primes did not raise the goal to conscious awareness. This indicates
that using two primes should not detract from the research methodology. The lack of significant difference between the groups could imply that the combination of two primes decreases a priming effect; however, a more likely explanation is that priming achievement was not the most relevant goal to completing an experiment for course credit. The goal for most of the participants was likely simply to complete the experiment so that they would receive credit and not necessarily to perform to their best ability on every task. Thus the subconscious goal to achieve would not add to the conscious goal to finish in a way that would increase motivation.

Because of this lack of a priming effect in the pilot, I modified the stimuli for the main study to prime a more relevant goal, diligence, rather than achievement. I also changed the sample to workers on Amazon’s Mechanical Turk (MTurk). MTurk workers are aware that they may not earn compensation if they do not complete tasks sufficiently; so in addition to a primary motivation of making money, they have a goal to complete the work satisfactorily. In a survey, satisfactory completion is based on accurate responses to each question, which cannot be accomplished without carefully reading each item. I did not conduct another pilot to test the modified diligence-related stimuli because the outcome variable would have to be very similar to the outcome in the main study in order to be relevant. Thus, a pilot study would have been a less powerful version of the main study.

Main Study Method

Participants

Participants were recruited from MTurk and paid for completion of the study. There were 303 total participants. Approximately 42% of the sample were men. The participants had a mean age of 36.37 (SD = 12.44). Eighty-five percent of the sample identified as White,
8% Asian, 5% Black, and 2% other races. Eight percent of the sample reported their ethnicity as Hispanic or Latino.

**Design**

The same three conditions used in the pilot (prime, neutral, and control; see Table 1 for descriptive statistics by condition) were used in the main study, but the prime stimuli were modified because of the results of the pilot. The scrambled sentence task used by Stajkovic et al. (2006) was modified so that the 12 sentences containing achievement-related words instead contained diligence-related words (caution, vigilantly, successful, diligently, attentively, responsible, meticulous, careful, thorough, accurate, effort, consistent; see Table 2). The picture for the prime condition was changed to a book with a magnifying glass to be more diligence-related. The picture for the prime and neutral conditions were present at the top of the priming task and on each page of the survey (see Appendix). Participants in the prime and neutral condition completed the scrambled sentence test first, then the personality survey, then the engagement scales, then the awareness questions. Participants in the control condition only completed the personality survey and engagement scales.

**Procedure**

Participants were randomly assigned into one of the three conditions. Participants in the prime and neutral conditions first completed a scrambled sentence test, again called the “psycholinguistic task,” and then proceeded to the personality survey. Participants in these groups had the appropriate picture at the top of every webpage. After completion of the personality survey, participants in the prime condition and neutral condition responded to the engagement scales, answered the awareness questions, and then were directed to the debriefing page. The participants in the control condition began with the personality survey.
After completion of the personality survey, participants in the control condition completed
the engagement scales, and then were directed to the debriefing page.

**Measures**

**Survey.** I used the 300 item International Personality Item Pool (IPIP; Goldberg, 1999) as an example of a typical survey. Responses for all of items were on a 7-point Likert-type scale, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The personality constructs were not of interest. The IPIP was chosen because it is a realistic example of an online survey, and it is long enough to show instances of careless responding (Meade & Craig, 2012). The 300 items were displayed across six webpages with 50 IPIP items per page.

**Awareness questionnaire.** The awareness questionnaire consisted of funneled awareness questions similar to those used in the pilot. The questions had the same format as the pilot questions with “personality questionnaire” in the place of “brainstorming task.”

**Engagement Scales.** The two self-report scales of participant engagement developed by Meade and Craig (2012) were used. There were nine items to measure self-reported diligence ($\alpha = .91$), and six items to measure interest ($\alpha = .86$).

**Instructed response and bogus items.** Instructed response items clearly show if a participant is not basing his or her responses on content of the survey items. These items instruct the participant to choose a specific response (e.g., “Select ‘agree’ for this item”). Choosing any other response is a clear indication of careless responding. Incorrect responses were scored as a 1, while correct responses were scored as 0. Bogus items are similar to instructed response in that every person who reads the item should answer it in a similar way. The items could not possibly be true (or false, depending on the specific item). Three items
used by Meade & Craig (2012) were included: “I do not understand a word of English,” “All my friends are aliens,” and “I have never brushed my teeth.” The bogus items were scored as correct or incorrect, similar to the instructed response items. Responses of “disagree” and “strongly disagree” were scored as correct, while all other responses were considered incorrect. A total of three instructed response and three bogus items were added to the 300 IPIP items, one on each webpage, so that there are a total of 51 items per page. A total score was calculated by summing the scores from the six items. The scores can range from 0, all items correct, to 6, all items incorrect. In addition, a separate dichotomous score was computed. Participants received a 0 if they answered all of the instructed response and bogus items correctly, and a 1 if any were answered incorrectly.

**Mahalanobis distance.** The Mahalanobis distance is an outlier analysis that calculates each participant’s distance from the average response pattern for each scale. Five different Mahalanobis distance scores were computed for each participant, corresponding to the five personality factors measured. The five scores were averaged to calculate a single Mahalanobis distance for each participant.

**Psychometric Antonyms.** Psychometric Antonyms (Goldberg, 2000, as cited in Johnson, 2005) is a within-person correlation on item pairs that have a strong negative relationship. Item pairs were chosen post hoc and required a negative correlation stronger than -.60 (Meade & Craig, 2012). There were a total of 9 item pairs. A high negative within-person correlation indicated consistent responding and a weak or positive within-person correlation indicated careless responding.

**Psychometric Synonyms.** Psychometric Synonyms are similar to Psychometric Antonyms, except that the item pairs are positively related and have a correlation stronger
than .60 (Meade & Craig, 2012). There were a total of 149 item pairs. A within-person correlation was computed for the paired items. A high positive within-person correlation indicated consistent responding and a weak or negative within-person correlation indicated careless responding.

Even-odd Consistency. Even-odd Consistency (Jackson 1976, as cited in Johnson, 2005) is a measure of within-person internal consistency. Each of the IPIP unidimensional subscales was divided into two subscales by order of item presentation. The responses on the even and odd subscales were averaged so that each subscale has one even score and one odd score. These scores were then correlated.

Maximum LongString. Maximum LongString indicates whether a participant chooses the same option for several items in a row. The Maximum LongString for each participant was the most identical responses chosen in a row for the whole survey.

Results

Because Maximum LongString indicates a fundamentally different type of careless responding than the other indices (Meade & Craig, 2012), it was analyzed separately from a composite score of the other indicators (see Table 3 for correlations between careless responding indicators). A one way ANOVA with three levels and Maximum LongString as the outcome variable showed no significant difference between prime ($M = 5.80$, $SD = 2.37$), neutral ($M = 5.82$, $SD = 3.80$), and control ($M = 6.69$, $SD = 7.05$) conditions ($F(2, 300) = 1.13, p = .33$).

A one-way multivariate analysis of variance (MANOVA) was used to test the hypothesis with a composite score of Psychometric Synonyms, Psychometric Antonyms, Even-Odd Consistency, Mahalanobis distance, instructed response and bogus items, and both
engagement scale scores as the dependent variable and survey condition as the independent variable. Planned comparisons showed no differences between the prime and control ($F(1, 198) = 0.79, p = .60$), prime and neutral ($F(1, 189) = 1.16, p = .27$), or neutral and control ($F(1, 195) = 1.61, p = .13$) conditions.

In addition, instructed response and bogus items are often utilized to screen out participants. Thus, a dichotomized score of “flagged” as a careless responder or “not flagged” as a careless responder was used. A Chi-Square test for independence indicated that status as “flagged” was independent of condition, $\chi^2(2, N = 303) = 2.34, p = .31$. This failed to show support for the hypothesis.

**Discussion**

The hypothesis of this study was not supported; careless responding was not lower for people who were primed with two diligence-related stimuli. There are several possible explanations for the null findings. The first is a limitation of the study methodology. The stimuli used for the present study have not been tested in this specific form, so it impossible to know whether the stimuli activated a subconscious diligence goal. However, the stimuli were based directly on those used by Stajkovic et al. (2006), which have been tested and shown to activate an achievement goal. Because of the similarity of the stimuli, the present study assumed that the modified stimuli would also function to prime a goal, specifically diligence. However, no projective measures were used to confirm the activation of the diligence-related thoughts and no time lapse was used to confirm whether a goal was primed.

In addition, it is not clear whether a goal to be diligent would have an impact on careless responding. There have been no empirical investigations of explicit diligence or asking participants to set diligence goals, so perhaps that specific goal has no effect on
careless responding. Thus, a diligence goal, regardless of whether it is conscious or subconscious, may not have been effective.

In addition to methodological concerns, another possible explanation is a problem with the robustness and replicability of priming effects. In recent years, published failures to replicate classic priming effects (e.g. Doyen, Klein, Pichon, & Cleeremans, 2012) and specifically goal priming effects (Harris, Coburn, Rohrer, & Pashler, 2013) have spurred controversy regarding the true power of subconscious primes. Several researchers have published responses regarding the importance of replication for establishing priming effects (e.g. Simons, 2014; Stroebe & Strack, 2014). Some argue that the lack of an established theory to describe possible moderating variables that could interfere with replication led to this replication crisis (Cesario, 2014). Because of this lack of a theoretical foundation and the study design, it is impossible to know whether the results of the present study showed a real lack of a relationship between goal priming and careless responding or were an artifact of not incorporating the proper controls for potential moderators.

One potential moderator that may have affected the present study is affect. Negative mood is associated with a more conservative and analytical cognitive style, which can reduce the impact of a prime (Fiedler, Asbeck & Nickel, 1991). Fiedler et al. (1991) showed this effect in relation to impression formation by priming differentially valenced personality attributes, but the effect is likely to also apply to goal priming. The open, creative cognitive style associated with positive mood is logically more likely to be influenced by primes because it is associated with a general tendency to rely on heuristics for making judgments. However, the more analytical cognitive style associated with negative mood should increase cognitive effort and thus reduce any priming effects. Many participants in the present study
reported anger, frustration, and other negative emotions regarding the length and the perceived tediousness of the procedure of this study. This may have created a bias toward negative affect that negated any potential influence of the prime. Future research priming subconscious goals should examine affect, as well as other potential moderators, to determine whether null results are due to problems with the automaticity model or simply a lack of information regarding relevant moderators.

One of the relatively recent frameworks that attempts to disambiguate the inconsistencies of priming effects is the Active-Self Account (Wheeler, DeMarree, & Petty, 2007). This framework asserts that primes influence behavior by modifying a person’s active self-concept (Wheeler et al. 2007). The situation is relevant to the effectiveness of a prime under this framework. For example, a prime does not have an inherent perceptual target, so it can be attributed to the self or someone else. This ambiguity of the target of a prime introduces another limitation of the present study. The participants viewed the prime in an uncontrolled environment of their choosing, so the stimuli may have primed diligence, but the construct could have been attributed to someone nearby. For example, if a participant happened to complete the study while at work, then people around the participant who were working would easily be perceived as diligent, and the prime would have no effect on careless responding because the person attributed it to others rather than the self. Future research should take features of the survey environment such as proximity to and interactions with other people into account when determining the effectiveness of a prime.

Despite frameworks like the Active-Self Account, there is no agreed upon comprehensive theory of subconscious goals; perhaps future research should focus more on motivation through conscious goals. For example, Huang et al.’s (2012) manipulation of
response instructions reduced careless responding by telling participants that if the statistical
control methods indicated they had not answered carefully, then they would not receive
credit. Assuming the likely conscious motivation for participants is to finish the study and
receive credit or compensation, these instructions affect that conscious goal. In order to reach
the more distal goal of compensation, participants are told that they must meet a proximal
goal of responding in a way that is accurate enough. Huang et al. (2012) did not actually use
data quality to determine whether participants were compensated, so their warning was
vague. However, a basic principle of goal-setting theory is goal specificity (Locke & Latham,
1990). Thus future researchers should consider using more specific warnings or other
specific proximal goals to see whether the effect found by Huang et al. (2012) can be
enhanced.

Regardless of the limitations of the present study, careless responding is still a
problem for psychological data quality, so other methods to reduce it should be explored.
There is a lack of research addressing the problem of low respondent motivation or interest,
and although the present study did not find an effective motivator, it is a first step in finding
motivational factors to prevent careless responding.
REFERENCES


Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several five-factor models. In I. Mervielde, I. Deary, F. D. Fruyt, & F. Ostendorf (Eds.), *Personality Psychology in Europe* (pp. 7–28). Tilburg, the Netherlands: Tilburg University Press.


Table 1.

*Descriptive Statistics by Condition*

<table>
<thead>
<tr>
<th>Condition</th>
<th>N</th>
<th>Age</th>
<th>Percent Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime</td>
<td>99</td>
<td>36.43 (12.26)</td>
<td>54%</td>
</tr>
<tr>
<td>Neutral</td>
<td>100</td>
<td>37.27 (11.98)</td>
<td>57%</td>
</tr>
<tr>
<td>Control</td>
<td>104</td>
<td>36.43 (13.09)</td>
<td>63%</td>
</tr>
</tbody>
</table>
Table 2.

*Prime Scrambled Sentence Task*

<table>
<thead>
<tr>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. was Bob visits yesterday married</td>
</tr>
<tr>
<td>2. proceed mirror we with caution</td>
</tr>
<tr>
<td>3. vigilantly I green watch it</td>
</tr>
<tr>
<td>4. melts water when butter heated</td>
</tr>
<tr>
<td>5. successful mountain studious are students</td>
</tr>
<tr>
<td>6. pet soccer the gently dog</td>
</tr>
<tr>
<td>7. diligently car always she works</td>
</tr>
<tr>
<td>8. we attentively all highlighter listened</td>
</tr>
<tr>
<td>9. wood eating pie she likes</td>
</tr>
<tr>
<td>10. responsible notebook he people hires</td>
</tr>
<tr>
<td>11. on sleeping turn the lamp</td>
</tr>
<tr>
<td>12. work I rewarded meticulous is</td>
</tr>
<tr>
<td>13. careful a he book reads</td>
</tr>
<tr>
<td>14. an aspirin Suzie clock took</td>
</tr>
<tr>
<td>15. thorough the piano review was</td>
</tr>
<tr>
<td>16. a trees fly kite go</td>
</tr>
<tr>
<td>17. results I superficial accurate expect</td>
</tr>
<tr>
<td>18. by sunny money effort gain</td>
</tr>
<tr>
<td>19. sang sweetly robin the scratching</td>
</tr>
<tr>
<td>20. import our values consistent are</td>
</tr>
</tbody>
</table>

*Note.* These items were based on the scrambled sentence task created by Stajkovic et al. (2006) altered for the present study.
Table 3.

*Correlations Between Careless Responding Indicators*

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mahalanobis Distance</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Psychometric Synonyms</td>
<td>-0.34**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Psychometric Antonyms</td>
<td>0.27**</td>
<td>-0.62**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Even-Odd Consistency</td>
<td>-0.24**</td>
<td>0.70**</td>
<td>-0.51**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. LongString</td>
<td>0.08</td>
<td>-0.27**</td>
<td>0.19**</td>
<td>-0.32**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Bogus/Instructed Response</td>
<td>0.18*</td>
<td>-0.58**</td>
<td>0.36**</td>
<td>-0.74**</td>
<td>0.37**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Diligence</td>
<td>0.04</td>
<td>0.39**</td>
<td>-0.30**</td>
<td>0.46**</td>
<td>-0.20**</td>
<td>-0.45**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>8. Interest</td>
<td>-0.03</td>
<td>0.16*</td>
<td>-0.09</td>
<td>0.06</td>
<td>-0.01</td>
<td>-0.01</td>
<td>0.30**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*Note.* *p* < .01. **p** < .001.
APPENDIX
NC STATE UNIVERSITY

Personality and Cognitive Tasks