

The Effect of Lying on Self-Control Depletion

by

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## Abstract

The goal of the current research was to investigate the impact of lying on self-control depletion. I hypothesised that lying would require more self-control than would truth telling. In Study 1, participants were assigned one of two topics, a favourite movie or a personal problem, about which they lied or told the truth in counterbalanced order on camera for two minutes. Following the first video in which they either told the truth or lied, participants completed an anagram task that served as the measure of self-control depletion. I found that participants in the movie condition did not differ as a function of lying or telling the truth although the means were in the expected direction. Also, contrary to my predictions, participants who lied about a personal problem were significantly less depleted than were participants who told the truth about their personal problem. In Study 2, participants were assigned to either deny or confess possession of an object in two interviews, but they actually possessed the object in only one interview creating the lie versus truth-telling manipulations. After both interviews, participants' reaction times were recorded for the Stroop task, which served as the measure of ego-depletion. I did not find a significant difference between participants who lied first versus participants who told the truth first. Furthermore, participants assigned to deny versus confess to possessing the object did not differ on the Stroop task reaction times. Possible explanations for why the results did not support the hypothesis that lying is ego-depleting are discussed.

## Co-Authorship

I assumed primary responsibility for the design, execution, and analysis of the research reported in this thesis. In recognition of her assistance in the development of the research questions that were examined and her assistance in the data analysis and manuscript preparation, my supervisor, Dr. Jill A. Jacobson, serves as a co-author.

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## Chapter 1: Introduction

Although lying is perceived quite negatively, this behaviour is commonplace (Kashy & DePaulo, 1996), and contrary to popular belief, it may be an important social skill or at least have important social links. For instance, highly social or extraverted individuals tend to lie with greater frequency than do less social or introverted individuals (Kashy & DePaulo, 1996; Weiss & Feldman, 2006). Furthermore, people's reasons for lying often are related to the objectives of social interactions (Gozna, Vrij, & Bull, 2001), such as maintaining one's self-image, controlling others, and sparing another's feelings to smooth social exchanges (Kashy & DePaulo, 1996).

Lying is a frequently occurring behaviour; however, what is less clear is the impact lying has on the individual. Vrij and Graham (1997) proposed that lying is stress inducing because it often is accompanied by negative affect, including fear that one's dishonesty will be detected as well as guilt and shame due to the inconsistency with one's self-perception of being a moral and trustworthy person (Aquino & Becker, 2005; Festinger & Carlsmith, 1959; Taylor & Brown, 1988). Researchers also have proposed that the act of lying is cognitively taxing because the concealment of the truth requires that an individual suppress specific nonverbal behaviours (Murvan, Tice, & Baumeister, 1998; Pennebaker & Chew, 1985; Vrij & Graham, 1997).

Hu, Wu, and Fu (2011) found empirical evidence that lying about self-referential information is a more difficult task than telling the truth. Participants were shown self-referential information and other-referential information on a screen. During the honest block, participants were to respond truthfully to self-referential information, but during the lying block, they were to deny truthful self-referential information. The other-

referential information was neither true or false, but for all of these items, participants were to respond with 'no' during the honest block and with 'yes' during the dishonest block. Lying led to slower reaction times and less accuracy than did truth telling, and self-referential information was accessed faster and with greater accuracy than was other-referential information.

### **Ego-Depletion Theory of Self-Control**

Self-control is considered to be an adaptive quality and one of the main attributes that contributes to personal successes (Baumeister & Tierney, 2011). Individuals with higher levels of trait self-control are more likely to have higher grade point averages in university, stronger and healthier interpersonal relationships, and fewer emotional and mental health problems, including eating disorders and alcohol abuse (Tangney, Baumeister, & Boone, 2004). Researchers have shown that self-control failure is to blame for many crucial personal problems, such as underachievement in school, alcohol and drug abuse, and unhealthy life habits, including overeating, criminal behaviour, overspending, smoking, sexually transmitted diseases, and unwanted pregnancies (Baumeister & Tierney, 2011; Baumeister, 2002; Tangney et al., 2004; Baumeister, Vohs, & Tice, 2007).

According to ego-depletion theory, self-control is comparable to a muscle (Baumeister, 2002; Baumeister, Bratlavsky, Muraven & Tice, 1998). First, with practice, self-control can be strengthened. That is, people who regularly exert self-control will be depleted less easily. Second, self-control is considered to be a limited resource that can be used up, weakening self-control, just as a muscle would weaken with over-exertion. In support of ego-depletion theory, research has shown that when an individual over-

exerts their will power, they experience feelings of depletion (Baumeister et al., 1998), poorer task performance and persistence (Baumeister et al., 1998; Schmeichel, Vohs, & Baumeister, 2003), decreased physical stamina (Muraven et al., 1998), difficulty regulating emotions (Muraven, et al., 1998), and difficulty resisting temptations (Baumeister et al., 1998).

Drawing on ego-depletion theory, Debey, Verschuere, and Crombez (2012) conducted two studies to determine if lying required greater self-control than did truth telling. Contrary to expectations, they found that participants whose self-control resources were first depleted did not find lying to be more difficult or challenging than did participants who were not depleted prior to lying. However, manipulation checks revealed that their ego-depletion manipulations may not have been successful. Thus further research is warranted to test the hypothesis that lying requires greater self-control resources.

### **The Current Research**

In the current research, I conducted two studies to investigate if lying requires greater self-control than truth-telling and thus leads to greater levels of ego-depletion. In Study 1, which is presented in Chapter 2, participants were randomly assigned to lie or tell the truth about either a self-revealing or non self-revealing topic. I expected that individuals assigned to lie about either topic would experience greater ego-depletion than would people who told the truth. I also predicted that participants would experience greater ego-depletion when lying about a self-revealing versus a non self-revealing topic.

In Study 2, which is presented in Chapter 3, I examined if lying was more ego-depleting than truth telling when all participants lied about the same topic and were

motivated to lie convincingly with a potential monetary reward. I hypothesised that participants who lied would experience greater levels of ego-depletion than would participants who told the truth, regardless of whether the lie involved denial or false confession about possessing a particular object.

## **Chapter 2: The Effect of Topic Self-Relevance on the Relationship between Lying and Self-Control Depletion**

Study 1 was conducted as part of a larger data collection to create video stimuli in which participants both lied and told the truth about the same topic. My data were collected following participants' first videos in which they were randomly assigned to lie or tell the truth about one of two topics: their favourite movie or a moderately distressing personal problem. Two topics were chosen because previous research has found that lying about self-referential information is a more difficult task than lying about information that is not self-referential (Hu et al., 2011). After the first video, participants completed an anagram task that served as the measure of ego-depletion. For the purposes of the larger data collection but not my study, participants then created a second video in which they engaged in the opposite behaviour (i.e., if they first lied about the topic, they then told the truth and vice versa).

I predicted that participants who lied would complete fewer anagrams (i.e., be more depleted) than would participants who told the truth. In addition, based on Hu et al.'s (2011) research that lying about self-referential information is more difficult than lying about other-referential information, I expected that participants who lied about a mildly distressing personal problem would exhibit greater ego-depletion than would participants who lied about their favourite movie.

### **Method**

#### **Participants and Design**

Participants were 72 undergraduate students (54 women and 18 men) enrolled in the introductory psychology course at Queen's University. They received either course

credit or \$5 cash for their participation. The students' ages ranged from 17 to 25 years, with a mean age of 18.29 years ( $SD = 1.61$ ). My study had a 2 (response: lie or truth) X 2 (topic: movie or personal problem) between-subjects design.

### **Procedure**

Participants were run individually and completed the initial tasks on a laptop computer. Participants were randomly assigned to one of two topics (favourite movie or personal problem) and one of two responses (lie or truth). Participants first listed their favourite movie or a mildly distressing personal problem. Then participants assigned to lie were told that their next task was to lie on camera for two minutes about the selected topic (i.e., they had to pretend that they hated their favourite movie or that their personal problem was not actually distressing to them). The only difference between participants assigned to the truth response was that they were instructed to tell the truth about their topic (i.e., why they loved their favourite movie or why the personal problem was distressing to them). Participants assigned to discuss a movie were given one minute to prepare what they wanted to say, and participants assigned to discuss a personal problem were given two minutes to prepare because I expected that this topic would be more complex and would require greater thought. After the preparation period, participants moved to a chair in front of the camera where they spoke for two minutes. Upon completion of the video, all participants returned to the computer to complete the ego-depletion task, which consisted of 13 eight-letter anagrams. Participants had six minutes to unscramble as many words as they could. Following the filming of the second video that was part of the larger data collection but not my study, all participants completed a series of personality measures, and at the end of the session, they were debriefed and

thanked for their participation.

## Results

I conducted a 2 (response) X 2 (topic) analysis of variance (ANOVA) to investigate the impact of lying on self-control. The dependent variable was the total number of anagrams completed by each participant. The independent variables were the response participants were assigned to (lie or truth) and the topic (movie or personal problem). The main effects for response and topic were not significant,  $F(1, 68) = 1.62$ ,  $p = .21$ , partial  $\eta^2 = .02$ , and  $F(1, 68) = 0.45$ ,  $p = .51$ , partial  $\eta^2 = .01$ , respectively. However, the response X topic interaction was significant,  $F(1, 68) = 4.59$ ,  $p = .04$ , partial  $\eta^2 = .06$ .

To follow up the significant interaction, I conducted four a priori *t* tests (Toothaker, 1991) related to my two hypotheses. (See Figure 1 for the means.) First, I expected that participants who lied would be more depleted than would participants who told the truth. For the movie topic, although the means were in the predicted direction such that participants who lied completed fewer anagrams than did participants who told the truth, the difference was not significant,  $t(68) = -0.94$ ,  $p = .54$ . For the personal problem topic, the means were significantly different,  $t(68) = 2.25$ ,  $p = .03$ , but in the opposite direction of the predicted pattern. That is, participants who lied completed significantly more anagrams (or were significantly less depleted) than were participants who told the truth.

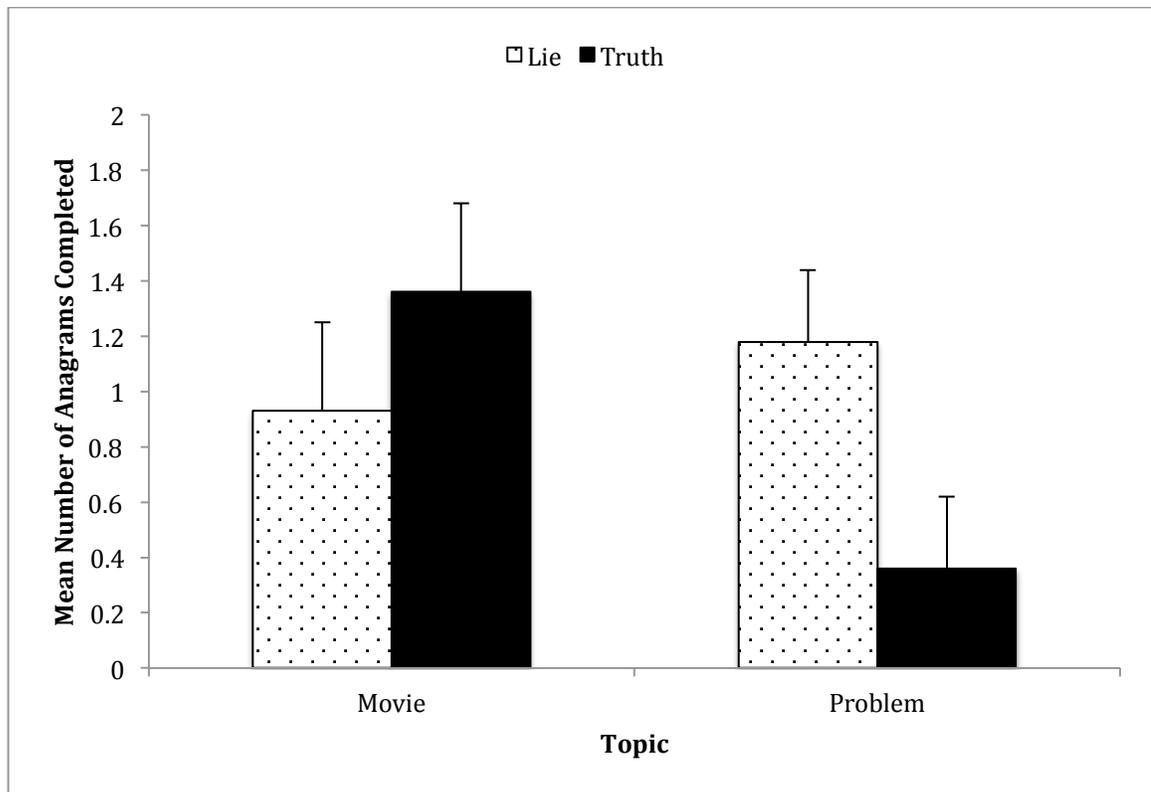


Figure 1. Mean number of anagrams completed as a function of response and topic.

Note. Lower values mean more depletion.

Second, I hypothesised that participants who lied about their favourite movie would experience less ego-depletion than would participants who lied about a personal problem. Contrary to my prediction, participants who lied about their favourite movie did not differ significantly from participants who lied about a personal problem,  $t(68) = -0.62, p = .54$ . However, participants who told the truth about their favourite movie were significantly less depleted than were participants who told the truth about a personal problem,  $t(68) = 2.41, p = .02$ .

### Discussion

Neither one of my hypotheses was supported. When the topic was non self-

revealing, the effects of lying and telling the truth were not different, but when the topic was self-revealing, lying actually yielded less rather than more depletion than did telling the truth. Furthermore, lying about self-revealing and non self-revealing topics did not yield ego-depletion differences, but unexpectedly, telling the truth about a self-revealing topic was more depleting than telling the truth about a non self-revealing topic.

Several possible explanations exist for my failure to find self-control depletion differences or at least one in the expected direction. First, lying about a movie may not have yielded reliable differences from telling the truth because the consequences of the lie were minimal. That is, participants were not given the goal to persuade someone to see or not the see movie, so they need not have felt any guilt for potentially misleading someone. Also, they knew that they would have the opportunity to later tell the truth about their feelings, so they might have felt that they could correct any such misunderstanding. Moreover, they had no fear of having to maintain the lie or being confronted by another person about their falsehood as could occur if one lied to friends or acquaintances. Thus participants may have exercised very little self-control for the movie task.

Second, practice also may have played a role. As mentioned previously, lying is quite common, so people have a lot of practice being dishonest. According to Muraven et al. (1998), just as exercise increases muscle strength, individuals who frequently engage in self-control should be able to improve their self-regulatory abilities. For example, Muraven, Baumeister, and Tice (1999) found that compared to a no exercise control group, participants who engaged in self-regulation exercises (e.g., good posture maintenance) over two weeks improved their performance on an unrelated self-control

task. Similarly, Seeley and Gardner (2003) found that individuals from collectivist cultures or with interdependent self-construals showed less regulatory depletion, hypothetically due to the greater practice they get from constantly monitoring their behaviour to meet society's expectations. Hence, contrary to expectations, lying may not be depleting because people are so well practiced at it.

Practice also may explain why telling the truth about a personal problem was more depleting than lying. Because negativity generally has detrimental consequences for one's social relations (Brissette, Scheier, & Carver, 2002; Harker, & Keltner, 2001; Taylor, Lerner, Sherman, Sage, & McDowell, 2003), people may be more accustomed to portraying their personal problems as not being distressing. Consequently, they regularly practice the executive control necessary to lie about such issues, which could make telling the truth the more cognitively taxing or less familiar of the two tasks.

Third, my self-relevance manipulation was confounded with a valence manipulation. More specifically, the different pattern for the movie and personal problem conditions may not be a result of their meaningfulness to the participants but instead due to lying about a positive topic (favourite movie) versus lying about a negative topic (personal problem). Similarly, the difference between lying about a personal problem and being truthful also may have different affective consequences. That is, putting a positive spin on a negative event actually may boost one's mood, whereas truthfully presenting a personal problem may put one in a negative mood as occurs in an autobiographical mood manipulation in which participants focus on a negative life event (cf. Harkness, Jacobson, Duong, & Sabbagh, 2010; Raes, Hermans, de Decker, Eelen, & Williams, 2003). Previous research has shown that people generally are less likely to

exert self-control in a negative than a positive mood (Tice, Bratslavsky, & Baumeister, 2001). Consequently, instead of or in addition to manipulating lying, I may have manipulated mood, and the differences that I observed in ego-depletion may be due to the latter rather than the former.

Fourth, the self-control task that I used as my dependent variable also may have been problematic. Although I did obtain some significant differences, I have reason to suspect that the anagram task may not have been sensitive enough to detect other differences. That is, no one completed all 13 items, and the mean number of completed anagrams was only 0.92 ( $SD = 1.24$ ) with a range from 0 to 6. Thus the anagram task appears to have been quite challenging for participants yielding a ceiling effect.

In sum, in Study 1, I did not establish that lying was ego-depleting. Indeed, neither of my hypotheses was supported. Therefore, I ran a second study using a new methodology to try to establish the basic finding on which my hypotheses rest – that lying requires more cognitive resources, making it more ego-depleting than telling the truth.

### **Chapter 3: Establishing the Relationship between Lying and Self-Control Depletion**

In Study 2, I used a new methodology to try to establish the basic finding on which my hypotheses rest – lying requires more cognitive resources and thus will be more ego-depleting than will telling the truth. I adapted Vrij's (1995) experimental procedure in which participants are questioned by a third party about whether or not they possess an object given to them by the experimenter. Vrij's participants completed two interviews with a man dressed as a police officer in which they denied having a set of headphones. In one interview, they actually did not have the headphones; therefore, their denial was the truth. In the other interview, they did have the headphones; therefore, their denial was a lie. To increase their motivation to lie, participants were explicitly instructed to try to lie convincingly, and they were told that they could earn a monetary reward for a successful performance.

Although many researchers utilise cheating paradigms to entice participants to lie (e.g., Ariely, 2012; Bruggeman & Hart, 1996; Shu, Gino, & Bazerman, 2010), I decided not to use that approach because in those situations, lying occurs as a secondary behaviour to mask the primary immoral behaviour of cheating. That is, participants essentially engage in two dishonest behaviours, cheating and lying, and thus it may not be clear which behaviour is more responsible for the self-control depletion. In Vrij's paradigm, in contrast, the only behaviour that is manipulated is lying or truth-telling.

To explore possible individual difference moderators of my results, I also included several personality measures. Lying is typically associated with negative affect such as guilt and shame (Ekman, 1992; Vrij & Graham, 1997), so I included an adapted

version of the Differential Emotions Scale (Cacioppo, Martzke, Petty, & Tassinari, 1988) to examine discrete emotions following the lying manipulation. Trait self-control is negatively correlated with both anxiety and depression (Tangney et al., 2004); therefore, I chose to include the Mood and Anxiety Symptom Questionnaire (Watson & Clark, 1991) and the Beck Depression Inventory-II (Beck, 1996) to examine if either measure moderated my results. Jacobson, Papile, Passey, and Boucher (2005) found that individuals high in causal uncertainty displayed lower levels of self-regulatory depletion following a face-to-face interaction compared to individuals low in causal uncertainty. Thus, I included the Causal Uncertainty Scale (Weary & Edwards, 1994) to see if this construct moderated the relationship between lying and self-control. Finally, individuals high in social anxiety are frequently concerned with the possibility of being evaluated by others in social settings (Schlenker & Leary, 1982). In Study 2, participants were told they would be filmed and judged by participants in a second unrelated study. Consequently, the experimental situation may have induced evaluation concerns especially for participants high in social anxiety who might then have experienced greater levels of ego-depletion. For this reason, I included a measure of social anxiety, the Social Phobia Inventory (Connor, Davidson, Churchill, Sherwood, Foa, & Weisler, 2000).

## **Method**

### **Design**

I made the following changes to Vrij's procedure. First, I used earbuds instead of headphones. Earbuds have replaced headphones in popularity since Vrij did his study in the 1990s, and they are easier to disguise on one's person than are headphones. Second, the interviewer was not dressed as a police officer, but I attempted to establish authority

or intimidation via other means. For example, most of my participants were first-year female students; thus I recruited three upper-year male research assistants to serve as the interviewers. In addition, I used clothing cues like having the interviewer wear formal clothing (e.g., dress pants and shirt, etc.). Third, Vrij's participants always denied possession, but I manipulated whether their lie involved denial or confession.

I ran a 2 between-subjects (statement: denial or confession) X 2 between-subjects (lie order: lie first or truth first) X 2 within-subjects (response: lie or truth) design. For the statement variable, participants were randomly assigned to either always deny that they had the earbuds or always claim that they possessed them. For the lie order variable, I counterbalanced whether participants lied or told the truth about their possession of the object in the first interview and then did the opposite in the second interview. The response variable consisted of participants' mean Lie Stroop reaction times scores and their mean Truth Stroop reaction times.

I expected a response main effect such that participants would have longer Stroop latencies after telling a lie than telling the truth. Alternatively, lie order could moderate the response effect such that a between-subjects rather than within-subjects difference between lie and truth would be observed. That is, a difference may be observed only after the first interview with participants who lied during this interview having longer latencies than their counterparts who told the truth in the first round. After the second interview, all participants would have lied at least once (i.e., had their self-control resources depleted), so no differences might be expected on their second Stroop performance. The confession versus denial manipulation was largely exploratory, and thus I had no specific predictions for its effects on participants' Stroop reaction times.

## Participants

I ran 156 participants; however, 36 participants were removed from the final analysis. Three participants did not want to be filmed, which was important for the monetary motivation to lie convincingly. Technical difficulties with the Stroop task rendered eight participants' data unusable. Five participants were removed for not following the experimenter's instructions during the interview, (i.e., they denied possession of the earbuds when they were supposed to confess possession). Finally, the inclusion of the second Stroop task did not occur until after data collection had begun, so 20 participants were removed because they had completed the Stroop task only once. Thus, my final analysis included 120 undergraduate participants (24 men) enrolled in the introductory psychology course at Queen's University. They received either course credit or \$10 for their participation. The participants' ages ranged from 17 to 23 years, with a mean age of 18.34 years ( $SD = 0.90$ ).

## Measures

**Differential Emotions Scale.** An adapted version of the Differential Emotions Scale (DES; Cacioppo et al., 1988) was used to measure current mood (e.g., "Merry/Gleeful/Amused" and "Contemptuous/Scornful/Disdainful"). The scale consists of 8-items on a 7-point scale ranging from 1 (*not at all*) to 7 (*very strongly*). Two additional items were added to the scale to assess the degree to which emotions were experienced that are commonly associated with lying ("Shameful/Ashamed/Remorseful" and "Guilty/Liable/Culpable"). Both items were measured on the same 7-point scale. A total score can be calculated by reverse coding the negative affect scores and summing them with the positive affect scores. Higher scores indicate higher levels of positive

affect. In the current sample, scores ranged from 29 to 70 ( $M = 54.11$ ,  $SD = 7.27$ ). The scale had reasonable internal consistency, Cronbach's  $\alpha = .74$ , and a principal axis factor analysis supported a two-factor structure, with all of the negative affect items loading highly onto the first factor and the positive affect items loading highly onto the second factor.

**Mood and Anxiety Symptom Questionnaire.** The Mood and Anxiety Symptom Questionnaire (MASQ; Watson & Clark, 1991) is a 90-item scale with five subscales that differentiate between anxiety and depressive symptoms. All items (e.g., “Had hot or cold spell” and “Felt numbness or tingling in my body”) are on a five-point scale, ranging from 1 (*not at all*) to 5 (*extremely*). Only the Anxious Arousal (AA) subscale was used in the current study, and all items were summed for a total score, with higher total scores indicating higher levels of anxious arousal symptoms. Previous research has shown the MASQ has high convergent validity and specifically that the Anxious Arousal subscale has high discriminant validity (Watson & Clark, 1991). In my sample, the scores ranged from 17 to 57 ( $M = 29.11$ ,  $SD = 9.33$ ). The internal consistency of the scale was also high, Cronbach's  $\alpha = .89$ , and a principal axis factor analysis supported a one-factor structure, which is aligned with previous research (Watson, Clark, Weber, Assenheimer, Strauss, & McCormick, 1995). Finally, to ensure randomisation was successful and that my manipulations did not yield anxiety differences between conditions, I ran a 2 (statement) X 2 (lie order) ANOVA using the total MASQ-AA as the dependent variable, and none of the effects were significant (all  $ps > .17$ ).

**Beck Depression Inventory-II.** The Beck Depression Inventory-II (BDI-II; Beck, 1996) assesses the presence and level of depression an individual has experienced over a

two-week period. The scale consists of 21 items, on a four-point scale, ranging from scores of 0 to 3. The 21 items were summed, with higher scores indicating higher levels of depressive symptoms. In the current sample, scores ranged from 0 to 36 ( $M = 9.77$ ,  $SD = 8.15$ ). The previously reported internal consistency of the scale is high, Cronbach's  $\alpha = .93$  (Dozois, Dobson, & Ahnberg, 1998) as was true for the current study, Cronbach's  $\alpha = .90$ . Although Dozois et al. (1998) identified a two-factor model, I conducted a principal axis factor analysis, which instead supported a one-factor structure with all items loading highly except one item that refers to changes in interest in sex. Participants' BDI-II scores did not differ as a function of the statement or lie order manipulations (all  $ps > .55$ ).

**Causal Uncertainty Scale.** The Causal Uncertainty Scale (CUS; Weary & Edwards, 1994) is a 14-item self-report questionnaire assessing the degree to which an individual experiences difficulty explaining events (e.g., "I do not understand what causes most of the good things that happen to me"). The response options are on a six-point scale, ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). The items were summed to create a total score, with higher scores indicating higher levels of causal uncertainty. The scores in the current sample ranged from 13 to 69 ( $M = 37.04$ ,  $SD = 10.57$ ). Previously, the scale has shown high internal consistency, Cronbach's  $\alpha = .83$  (Edwards, Weary, & Reich, 1998), and it was similarly high in the current study, Cronbach's  $\alpha = .87$ . A principal axis factor analysis supported a one-factor structure, and participants' CUS scores did not differ as a function of the two manipulated variables (all  $ps > .06$ ).

**Social Phobia Inventory.** The Social Phobia Inventory (SPIN; Connor et al.,

2000) examines fear, avoidance, and physiological symptoms linked to social anxiety (e.g., “Parties and social events scare me” and “I avoid activities in which I am the centre of attention”). It is a 17-item scale with response options ranging from 0 (*not at all*) to 4 (*extremely*). All items were summed for a total score, with higher scores indicating a higher level of social anxiety. The scores ranged from 17 to 67 ( $M = 34.93$ ,  $SD = 10.65$ ). The scale has good internal consistency (Cronbach’s  $\alpha = .94$ ), test-retest reliability, and convergent validity (Connor et al., 2000). Internal consistency also was high in the current study, Cronbach’s  $\alpha = .88$ , and a principal axis factor analysis supported a one-factor structure. Participants’ SPIN scores were not affected by the two manipulated variables (all  $ps > .31$ ).

### **Procedure**

Participants were run individually, and the experimenter delivered the instructions below adapted from Vrij (1995):

We are attempting to determine the extent to which you are able to lie and tell the truth. Therefore, you will be questioned twice by an interviewer about the possession of a set of earbuds. The interviewer will come in just to introduce himself, and then I will return to give you more detailed instructions before your first interview.

After participants were given the first set of instructions, the interviewer entered the room and conducted a brief baseline interview with the participants asking them to describe their activities since the start of the experiment.

The participants then were told to wait for the experimenter to return with their next set of instructions, which were as follows:

**Denial/Lie First:** For both interviews, you need to deny that you possess the earbuds. You will actually carry the set of earbuds in your pocket during the first interview. After the first interview, I will retrieve the earbuds from you, so during the second interview, they will not be in your possession.

**Denial/Truth First:** For both interviews, you need to deny that you possess the earbuds. The earbuds will not be in your possession during the first interview. After the first interview, I will give you the earbuds, so during the second interview, you will actually carry the set of earbuds in your pocket.

**Confession/Lie First:** For both interviews, you need to claim that you possess the earbuds. The earbuds will not be in your possession during the first interview. After the first interview, I will give you the earbuds, so during the second interview, you will actually carry the set of earbuds in your pocket.

**Confession/Truth First:** For both interviews, you need to claim that you possess the earbuds. You will actually carry the set of earbuds in your pocket during the first interview. After the first interview, I will retrieve the earbuds from you, so during the second interview, they will not be in your possession.

To help motivate participants to take the task seriously, the following motivational instructions, also adapted from Vrij (1995), were provided:

You will be filmed during both interviews for a second study in which other participants will rate their impression of you. Research has shown that making a credible impression is an important quality for a flourishing career. Therefore, we will be offering a reward of \$10 if you succeed in making a reliable impression in both interviews on a high percentage of participants.

Participants assigned to receive the denial/lie first and the confession/truth first instructions were handed a pair of earbuds and were instructed to hide them in one of their pockets or somewhere on their person. Participants assigned to receive the denial/truth first and the confession/lie first instructions did not receive earbuds. The interviewer was blind to the lie order manipulation.

The interviewer returned to the interview room and asked participants five questions adapted from Vrij (1995):

- (1) Do you know what you are being accused of?
- (2) Do you have a set of earbuds in your pocket?
- (3) Are you being truthful?
- (4) Please describe the contents of your pocket.
- (5) Please describe the earbuds.

Upon completion of the first interview, the interviewer left the interview room. The experimenter then retrieved the earbuds from the participants assigned to receive the denial/lie first and the confession/truth first instructions. Participants returned to the computer and completed the DES and the Stroop task, which served as the ego-depletion measure. The Stroop task is a frequently used dependent variable for ego-depletion studies (cf. Baumeister, Gailliot, DeWall, & Oaten, 2006; Inzlicht, McKay, & Aronson, 2006; Vohs, Baumeister, & Ciarocco, 2005). The Stroop task requires participants to read the colour in which the words are displayed on the computer screen into a microphone. The task is cognitively challenging because some of the colours used to display the words are not the same colour as the word itself. For example, the word “green” may appear in red font, and typically the correct response of “red” will take longer for participants to say than during a congruent trial (i.e., when the word “green”

appears in green font).

Once participants finished the Stroop task, the experimenter returned to the room and reminded participants that they were to still either deny possessing the earbuds (denial response) or claim that they possessed the earbuds (confession response). The experimenter handed the earbuds to the participants assigned to receive the denial/truth first and the confession/lie first instructions. Next the interviewer returned to the interview room and asked the participant the same set of five questions. Upon completion of the interviews, the interviewer left the room, and the experimenter entered the room to retrieve the earbuds if necessary and to enter the password on the computer, so the participants could complete the Stroop task again. Following the completion of the second Stroop task, all participants completed a series of questionnaires, including the MASQ-AA, BDI-II, CUS, and the SPIN. The questionnaires were randomly ordered except for the BDI-II, which was always administered last to avoid mood effects (Mark, Sinclair, & Wellens, 1991). At the end of the study, participants were debriefed and thanked for their participation.

## Results

### Manipulation Check

Lying is associated with feelings of guilt (Ekman, 1992), which would suggest that participants who lied should display significantly higher scores on the DES item “Guilty/Liable/Culpable.” As a manipulation check, I conducted an independent-samples *t* test to compare the guilt ratings of participants who lied versus told the truth during the first interview. As expected, participants who lied reported significantly greater feelings of guilt ( $M = 2.80, SD = 1.75$ ) than did participants who told the truth ( $M = 2.02, SD = 1.31$ ),  $t(118) = 2.78, p = .01$ .

## Primary Analyses

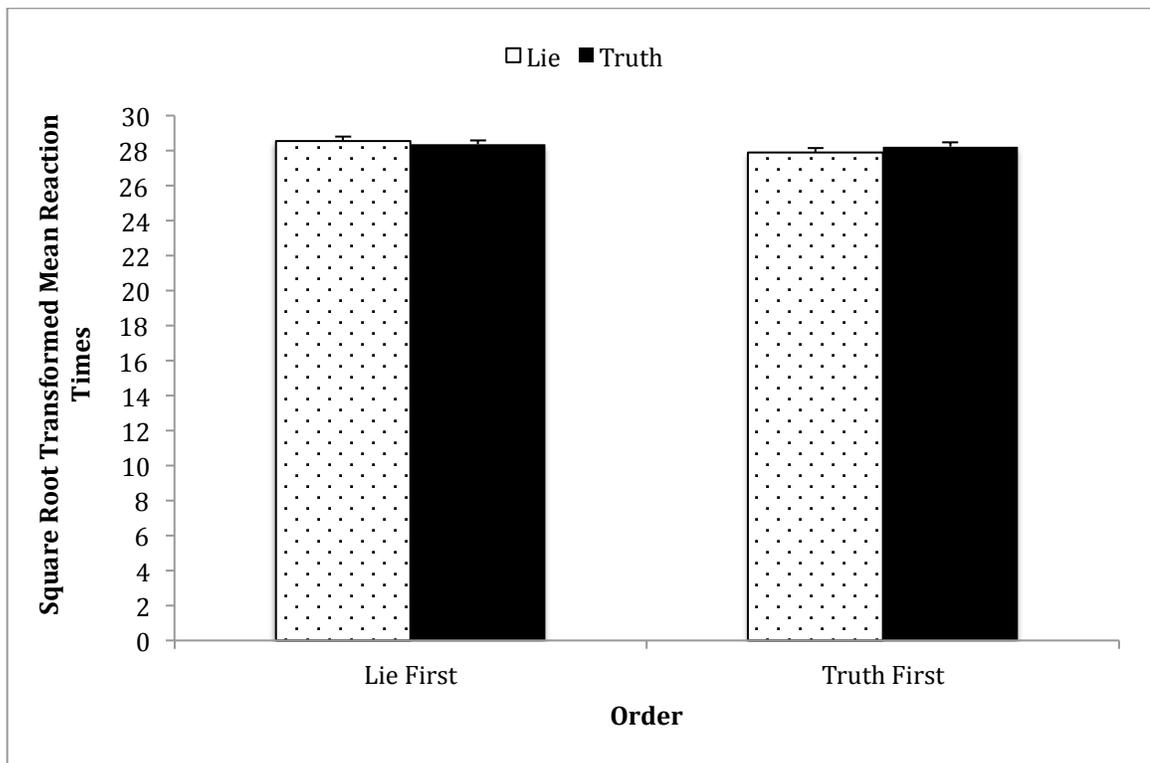
I conducted a 2 between-subjects (statement: denial or confession) x 2 between-subjects (lie order: lie first or truth first) X 2 within-subjects (response: lie or truth) ANOVA to investigate the impact of lying on self-control. The dependent variables were the reaction times on the two Stroop tasks (one following the lie and one following the truth).

The equipment used to record the reaction times does not always register responses (i.e., when the person is not speaking loudly), so many participants had reaction times that exceeded the average ( $M = 882.95$ ,  $SD = 346.32$ ), and these scores were likely due to technical reasons rather than accurate reaction times. To remove outliers, reaction times were trimmed at 1921.91 milliseconds (3  $SD$  above the mean) for all trials for each participant. I calculated an average score for each participant, and because reaction times are positively skewed, I used a square-root transformation.

I predicted a response main effect such that participants would have longer Stroop latencies after telling a lie than the truth, but contrary to my expectations, participants' performance on the Stroop task following a lie ( $M = 28.23$ ,  $SD = 1.95$ ) did not differ from their reaction times following the truth ( $M = 28.30$ ,  $SD = 1.91$ ),  $F(1, 116) = 0.40$ ,  $p = .53$ , partial  $\eta^2 = .003$ . Indeed, the only significant effect (all other  $ps > .25$ ) related to my alternative prediction that lie order could moderate the response effect,  $F(1, 116) = 5.50$ ,  $p = .02$ , partial  $\eta^2 = .05$ .

To follow up the significant lie order X response interaction, I conducted six mixed-design  $t$  tests (Toothaker, 1991). (See Figure 2 for the means.) I expected that I might find a difference only after the first interview with the participants who lied first

having longer reaction times than participants who told the truth first but no difference after the second interview because everyone would have lied at least once and had their resources depleted. Neither of these comparisons, however, was significant,  $ts \leq .89$ ,  $ps \geq .19$ . Next I compared participants' lie versus truth Stroop reaction times separately within each level of the lie order variable in case lying first had a different effect on depletion than did lying after already having told the truth, but neither set of means was significantly different,  $ts \leq .94$ ,  $ps \geq .35$ . Finally I compared the participants who lied first versus second on their lie Stroop reaction times and separately on their truth Stroop reaction times. Again none of these comparisons attained the cut off for traditional levels of statistical significance,  $ts \leq 1.85$ ,  $ps \geq .07$ .



*Figure 2.* Square-root-transformed mean reaction times on the Stroop task as a function of response and lie order.

*Note.* Higher values mean more depletion.

The Stroop task consisted of 80 trials with 15 congruent trials (i.e., “red” appeared in red font). I ran a second 2 between-subjects (statement) x 2 between-subjects (lie order) X 2 within-subjects (response) ANOVA using mean reaction times of the incongruent trials only to ensure that removal of the congruent trials did not alter the results. However, again only the lie order X response interaction was significant,  $F(1, 116) = 8.29, p = .01, \text{partial } \eta^2 = .07$ .

Finally, I ran a 2 between-subjects (statement) x 2 between-subjects (lie order) X 2 within-subjects (response) ANOVA using the untrimmed mean reaction time scores to ensure trimming was not responsible for the null results. None of the effects were significant including the lie order X response interaction ( $p = .23$ ).

### **Secondary Analyses**

I conducted four separate General Linear Model analyses to investigate if the relationship between Stroop reaction time difference scores (DV), and statement and response (IVs) were moderated by any of the four personality variables that I included in my study. To reduce the effects of multicollinearity, all continuous predictor variables were standardised. The dependent variable was the standardised Stroop reaction time difference scores,  $D = M(\text{Lie Stroop}) - M(\text{Truth Stroop})$ . The predictors were the standardised personality variables (e.g., MASQ-AA, BDI-II, etc.), a dummy-coded statement variable (denial = 1, confession = 0), a dummy-coded response variable (lie = 1, truth = 0), and all two- and three-way interactions. Because anxiety and depression are often comorbid, participants’ BDI-II scores were included as a covariate in the MASQ-AA analysis, and participants MASQ-AA scores were included as a covariate in the BDI-II analysis. None of the effects were significant in any of the four regressions (all  $ps >$

.20).

## Discussion

In sum, my hypothesis that lying would be more ego-depleting than would truth telling was not supported. Participants who lied did not have significantly different reaction times from participants who told the truth. Furthermore, the instructions to deny versus confess also yielded null results.

First, I examined errors instead of reaction times on the Stroop task in case the reaction time scores were not sensitive enough to detect any potential significant differences between lying and truth telling. All effects were still nonsignificant even with this alternative dependent variable. However, participants who lied did make slightly more errors ( $M = 1.52$ ,  $SD = 2.32$ ) than did participants who told the truth ( $M = 1.26$ ,  $SD = 1.59$ ) although the difference was not statistically significant. Furthermore, considering participants completed 80 trials, they made surprisingly few errors on this task ( $M = 1.29$ ,  $SD = 1.99$ ) suggesting that they may not have found this task particularly cognitively taxing and/or challenging. Consequently, although it has been used as an ego-depletion task in many studies, it may not have been a good measure in my study.

Second, during data collection, I became aware of two confounds in the study. Eighteen participants who were assigned to tell the truth first and deny possession of the earbuds lied in their first interview in response to the interviewer's question "please describe the earbuds" by stating that they had not seen the earbuds. This statement was false because all participants were shown the earbuds prior to their first interview. Fifteen participants who were assigned to lie first and deny possession also lied in response to that question during their second interview. Because participants were

instructed to deny possession, even when they did not possess the earbuds, they may have felt it was important to maintain a cohesive story by denying they had knowledge of what the earbuds looked like. Upon completion of data collection, I coded the videos for whether or not each participant told a lie during an interview for which they were supposed to be truthful. However, when this variable was included in the analyses, the only significant effect was still the lie order X response interaction.

Third, lying during the interview may not have been a strong enough manipulation because the interviews lasted less than one minute. Perhaps participants did not feel depleted by such a short instance of lying. Additionally, participants may not have been depleted because they were following instructions given to them by the experimenter. Perhaps being instructed on how to respond rather than having to devise how to respond did not cause them to feel depleted by the task. Furthermore, although one of the goals of this study was to ensure participants were motivated to lie convincingly by offering them a potential monetary reward, they may not have been as motivated as I had hoped. Perhaps they did not believe they would actually win the money. For instance, many participants told the experimenter that they were bad liars and would not be able to win the money. Unfortunately no manipulation check question was included to determine if participants' motivations to lie differed by condition.

Finally, I am left with the same explanation that I had for the results in Study 1. That is, lying is a frequently occurring behaviour, and thus it may not be as depleting as Baumeister and others had hypothesised. Additionally, the factors that may make lying require greater self-control (e.g., having to maintain a façade over time) cannot easily be replicated in a laboratory setting.

## Chapter 4: General Discussion

According to various researchers, lying is more cognitively taxing than truth telling (Proverbio et al., 2013; Zuckerman et al., 1981) and thus requires greater self-regulation than truth telling (Aquino & Becker, 2005; Muraven et al., 1998; Pennebaker & Chew, 1985; Vrij & Graham, 1997). For these reasons, in both Studies 1 and 2, I hypothesised that lying would require greater cognitive resources than would truth telling and would, therefore, lead to greater levels of ego-depletion. My hypothesis was not supported in either study. In Study 1, when the topic was non self-revealing, the effects of lying and telling the truth were not different, but when the topic was self-revealing, lying actually yielded less rather than more depletion than did telling the truth. Furthermore, lying about self-revealing and non self-revealing topics did not yield ego-depletion differences, but unexpectedly, telling the truth about a self-revealing topic was more depleting than telling the truth about a non self-revealing topic. In Study 2, I found no significant differences in ego-depletion as a function of lying versus telling the truth regardless of whether the lie involved a denial or a confession.

I already have discussed some reasons why my studies yielded null results, but other possibilities exist. Emotional cues are more likely to be inadvertently displayed by a liar when the stakes are high because the liar usually will feel more intense emotions than when the stakes are low (Frank & Ekman, 1997). In lab studies like mine, the stakes are low even with a monetary motivation (Study 2), and thus fewer resources may have been required to lie. In addition, individuals generally feel more uncomfortable lying to their close friends than a stranger (Bell & DePaulo, 1996), so future research on the relationship between lying and self-control may want to avoid having just a camera

(Study 1) or a stranger (Study 2) be the recipient of the lie. Perhaps even instructing participants to imagine lying to a friend or family member would serve as a stronger manipulation to detect significant differences in ego-depletion. Lying quite often occurs for reasons related to objectives of social interactions (Gozna et al., 2001), such as maintaining one's self-image, controlling others, sparing another's feelings, or maintaining a sense of privacy (Kashy & DePaulo, 1996; Saarni & Lewis, 1993). Perhaps lying for social objectives is ego-depleting as has been hypothesised, and I did not find support because my participants' lies were not in this domain.

Future studies also should examine lying in a more natural form—perhaps creating an experimental design in which participants are induced to lie rather than instructing them to lie would require more cognitive resources. Furthermore, research suggests that lying about a self-referential situation is more depleting than lying about an other-referential situation (Hu et al., 2011). Although I attempted to examine differences in lying about self-revealing versus non self-revealing information in Study 1, participants were able to choose any personal problem to discuss, which may have introduced greater within-subjects variability making it harder to detect a difference. Therefore, future research should require all participants to lie about the same self-revealing situation to ensure control over the lying manipulation.

## **Conclusions**

In two studies, I failed to find support for the hypothesis that lying is more cognitively taxing and therefore more ego-depleting than telling the truth. Although many improvements could be made on the approach that I took to this research question, it also may be the case that the underlying hypothesis is incorrect. As I already

mentioned, lying is a well-practiced behaviour, and thus it may not require as much self-control as previously thought.

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Appendix A

General Research Ethics Board Letter of Approval



September 18, 2012

Miss Madeleine D'Agata  
Master's Student  
Department of Psychology  
Queen's University  
Kingston, ON K7L 3N6

GREB Ref #: GPSYC-577-12; Romeo # 6007395  
Title: "GPSYC-577-12 The Effect of Lying on Self-Control Depletion"

Dear Miss D'Agata:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "GPSYC-577-12 The Effect of Lying on Self-Control Depletion" for ethical compliance with the Tri-Council Guidelines (TCPS) and Queen's ethics policies. In accordance with the Tri-Council Guidelines (article D.1.6) and Senate Terms of Reference (article G), your project has been cleared for one year. At the end of each year, the GREB will ask if your project has been completed and if not, what changes have occurred or will occur in the next year.

You are reminded of your obligation to advise the GREB, with a copy to your unit REB, of any adverse event(s) that occur during this one year period (access this form at [https://eservices.queensu.ca/romeo\\_researcher/](https://eservices.queensu.ca/romeo_researcher/) and click Events - GREB Adverse Event Report). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example you must report changes to the level of risk, applicant characteristics, and implementation of new procedures. To make an amendment, access the application at [https://eservices.queensu.ca/romeo\\_researcher/](https://eservices.queensu.ca/romeo_researcher/) and click Events - GREB Amendment to Approved Study Form. These changes will automatically be sent to the Ethics Coordinator, Gail Irving, at the Office of Research Services or [irvingg@queensu.ca](mailto:irvingg@queensu.ca) for further review and clearance by the GREB or GREB Chair.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Yours sincerely,

A handwritten signature in black ink that reads "Joan Stevenson".

Joan Stevenson, Ph.D.  
Professor and Chair  
General Research Ethics Board

cc: Dr. Jill Jacobson, Faculty Supervisor  
Dr. Leandre Fabrigar, Chair, Unit REB  
Marie Tooley, Dept. Admin.

Appendix B  
Study 1 Materials

Letter of Information & Consent to Act as a Human Research Subject  
Study 1  
Kevin Rounding, M.Sc., Jill A. Jacobson, Ph.D., Maddie D'Agata, B.Sc.  
Department of Psychology, Queen's University

**PURPOSE OF THE STUDY:** I have been asked to participate in a research project designed to investigate deception.

**PARTICIPANT:** I understand that I have been asked to participate in a study on nonverbal behaviour in which I will be asked to recall and talk about various situations. I will be asked to both tell the truth about this situation, as well as lie about the situation. I will be videotaped for the duration. I may also complete some personality measures. This experiment will take approximately one half hour in total.

**RISKS:** Some questions may seem personal in nature or may make me feel uncomfortable. Except for this, we anticipate no risks to you as a result of your participation in our study. Please note that the questionnaires included in this study are for research purposes only. They are not meant to diagnose a psychological disorder or be in any way meant to determine whether or not I need psychological treatment. If there is something that makes me uncomfortable, I understand that I have the right to refuse to answer any questions or withdraw from the study by letting the experimenter know I do not wish to continue at any time and without penalty. If I do experience any discomfort from participating in this study, I realize that I may contact the Student Health, Counselling, and Disabilities Centre at 613-533-2506.

**BENEFITS:** I will receive 0.5 credit per half hour for my Psychology 100 course through the Queen's University Psychology subject pool for participation. I will also have the opportunity to learn more about social psychology and research in general.

**CONFIDENTIALITY:** I understand that any information gathered from this study may be used in multiple analyses related to social and personality psychology, and that this information will remain entirely confidential and will be stored in a locked cabinet in a secured building for the duration. I hereby authorize the use of all records and personal data derived from this experiment for these research purposes. I understand that any information derived from this research project that personally identifies me will not be voluntarily released or disclosed by the researchers without my separate consent, except as specifically required by law.

**IF I HAVE QUESTIONS:** Any questions about study participation may be directed to Dr. Jill Jacobson at 613-533-2847 or [jill.jacobson@queensu.ca](mailto:jill.jacobson@queensu.ca). Any ethical concerns about the study may be directed to the Chair of the Queen's University General Research Ethics Board at 613-533-6081 or [Chair.GREB@queensu.ca](mailto:Chair.GREB@queensu.ca).

**VOLUNTARY PARTICIPATION:** By agreeing below, I indicate that I have read this Letter of Information and Consent Form and understand the nature of this study. In addition, the experimenter has answered my questions satisfactorily. I know that I may refuse to answer any questions or discontinue my involvement at any time without penalty. Agreeing below indicates that I have

read the information in this form and consent to participate in this study voluntarily.

I may obtain a copy of this consent form from the experimenter at any time.

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies





## E-mail Recruitment

Hi \_\_\_\_\_,

My name is Maddie and I'm working with Dr. Jill Jacobson in the Psychology department on a research project. Your name was selected from the prescreening questionnaires completed in PSYC100. You are eligible to participate in a study we're running.

For this study, you will receive 0.5 credit or \$5 for participating in this half-hour experiment. In this experiment on verbal behaviour, you will be interviewed about various situations. You will also complete some personality measures.

You can check out more details of the study by looking it up on the subject pool site - it's called EARBUDS. You can sign up yourself by logging into the subject pool <http://www.queensu.ca/psychology/Undergraduate/CourseInfo/Psyc100Information.html>

This might require a password; if so, the password is "earbuds". If you have any questions you can ask me, or call us at our lab: tel: 533-6000 ext. 75417.

Alternatively, if you're interested, email me back. I have some time slots available on:

Mondays: 0830 - 1200 (every half hour)  
Tuesdays: 0830 - 1700 (every half hour)  
Thursdays: 1330 - 1700 (every half hour)  
Fridays: 0830 - 1700 (every half hour)

Please list a couple options that would work for you.

Thanks for your time!  
Maddie

Debriefing Letter – Study 1  
Department of Psychology, Queen’s University

During this study you were asked to talk about something that you liked or about a mildly distressing personal problem. We wanted to see if people who have greater levels of negative affectivity are better able at discerning whether or not you were telling the truth. So in a different experimental session, other people may watch you describe why you liked or disliked this topic and will be asked to make a decision as to whether or not they believe you were telling the truth. Should you consent for us to use your video, it will be stored in a locked cabinet with no other identifying information. Although these other people may recognize you from the video, they will not be privy to any other information about you.

If you have any questions regarding the use of the videos or any concerns regarding confidentiality, please contact the experimenter now. Please press continue in order to indicated if you consent to the use of your video tape.

We would appreciate it if you would not reveal the purpose and hypotheses of this study to others as this may bias their performance should they sign up for this study. Please note once again that the questionnaires included in this study were for research purposes only. They were not meant to diagnose a psychological disorder or be in any way meant to determine whether or not you need psychological treatment. If talking about these issues or answering any of the questions in this study has raised concerns for you or made you uncomfortable, and/or if you would like to speak to a psychologist about a psychological or emotional issue, please contact Health, Counseling, and Disability Services at 613-533-2506. We also have a treatment referral list available for your convenience; please ask the experimenter and we will provide you with this list.

Any questions about study participation may be directed to Dr. Jill Jacobson at 613-533-2847 or [jill.jacobson@queensu.ca](mailto:jill.jacobson@queensu.ca). Any ethical concerns about the study may be directed to the Chair of the Queen's University General Research Ethics Board at 613-533-6081 or [Chair.GREB@queensu.ca](mailto:Chair.GREB@queensu.ca).

If you would like more information about this area of research, the article below may be of interest to you:

Lane, J.D., and DePaulo, D.M. (1999). Completing Coyne’s cycle: Dysphorics’ ability to detect deception. *Journal of Research in Personality*, 33, 311-329.

Thank you for participating! Your interest in participating in this research study is appreciated.

Kevin Rounding  
M.Sc.

Jill A. Jacobson  
Associate Professor

Maddie D’Agata  
B.Sc.

You may obtain a copy of this debriefing letter from the experimenter at any time.

Appendix C  
Study 2 Materials

Letter of Information & Consent to Act as a Human Research  
Study 2

Maddie D'Agata, B.Sc., and Jill A. Jacobson, Ph.D.  
Department of Psychology, Queen's University

**NAME OF PARTICIPANT** (please print): \_\_\_\_\_

**PURPOSE OF THE STUDY:** I have been asked to participate in a research project designed to investigate verbal behaviour.

**PARTICIPANT:** I understand that I have been asked to participate in a study on verbal behaviour in which I will be interviewed by a researcher about various situations. I will be asked to tell the truth or lie about this situation while being videotaped. I may also complete some personality measures. This experiment will take approximately 30 minutes.

**RISKS:** Some questions may seem personal in nature or may make me feel uncomfortable. Otherwise, there are no anticipated risks for participation. Please note that the questionnaires included in this study are for research purposes only. They are not meant to diagnose a psychological disorder or be in any way meant to determine whether or not I need psychological treatment. If there is something that makes me uncomfortable, I understand that I have the right to refuse to answer any questions or withdraw from the study at any time by letting the experimenter know I do not wish to continue at any time and without penalty. If I choose to withdraw from the study I understand that I will still receive compensation. If I do experience any discomfort from participating in this study, I realize that I may contact the Student Health, Counselling, and Disabilities Centre at 613-533-2506.

**BENEFITS:** I will receive 0.5 credit per half hour for my Psychology 100 course through the Queen's University Psychology subject pool for participation or receive \$5 per half hour if I am not enrolled in the course or already have completed my credits. I will also have the opportunity to learn more about social psychology and research in general.

**CONFIDENTIALITY:** I understand that any information gathered from this study may be used in multiple analyses related to social and personality psychology, and that this information will remain entirely confidential and will be stored in a locked cabinet in a secured building for the duration. I hereby authorize the use of all records and personal data derived from this experiment for these research purposes. I understand that any information derived from this research project that personally identifies me will not be voluntarily released or disclosed by the researchers without my separate consent, except as specifically required by law.

**IF I HAVE QUESTIONS:** Any questions about study participation may be directed to Dr. Jill Jacobson at 613-533-2847 or [jill.jacobson@queensu.ca](mailto:jill.jacobson@queensu.ca). Any ethical concerns

about the study may be directed to the Chair of the Queen's University General Research Ethics Board at 613-533-6081 or [Chair.GREB@queensu.ca](mailto:Chair.GREB@queensu.ca).

**VOLUNTARY PARTICIPATION:** By agreeing below, I indicate that I have read this Letter of Information and Consent Form and understand the nature of this study. In addition, the experimenter has answered my questions satisfactorily. I know that I may refuse to answer any questions or discontinue my involvement at any time without penalty. Agreeing below indicates that I have read the information in this form and consent to participate in this study voluntarily.

---

**SIGNATURE OF PARTICIPANT**

**DATE**

This study has been granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

It is recommended that I keep a copy of this letter for my own records.

Debriefing Letter – Study 2  
Department of Psychology, Queen’s University

During this study you were assigned to lie and tell the truth about concealing a pair of earbuds. The purpose of this study was to see if lying requires self-control and thus affects performance on subsequent tasks like the colour-naming task you completed. We also wished to investigate if lying emotionally affects the individual, altering the amount of self-control required for the task.

We will be running this experiment for some time. Sometimes if people know what the study is about, that knowledge will affect their responses even when they don't mean for it to, **so we would really appreciate it if you would not talk to anyone about the study.**

The experimenter informed you at the start of the study that the most convincing liars will receive \$10 payment. In our second study participants will be rating your videos to determine how convincing you were. Please write down your e-mail address on the form provided to you by the experimenter before leaving to be eligible to receive payment at the end of the semester.

Please note once again that the questionnaires included in this study were for research purposes only. They were not meant to diagnose a psychological disorder or be in any way meant to determine whether or not you need psychological treatment. If talking about these issues or answering any of the questions in this study has raised concerns for you or made you uncomfortable, and/or if you would like to speak to a psychologist about a psychological or emotional issue, please contact Health, Counseling, and Disability Services at 613-533-2506. We also have a treatment referral list available for your convenience; please ask the experimenter who can provide you with this list.

Any questions about study participation may be directed to the Dr. Jill Jacobson at 613-533-2847 or [jill.jacobson@queensu.ca](mailto:jill.jacobson@queensu.ca). Any ethical concerns about the study may be directed to the Chair of the General Research Ethics Board at 613-533-6081 or [Chair.GREB@queensu.ca](mailto:Chair.GREB@queensu.ca).

If you are interested in this area of research, you may wish to read the following references:

Muraven, M., Tice, D.M., & Baumeister, R.F. (1998). Self-control as limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology*, 74, 774-789.

Thank you for participating! Your efforts in this research study is appreciated.

Madeleine T. D’Agata  
M.Sc. Candidate

Jill A. Jacobson, Ph.D.  
Associate Professor

Please retain this debriefing form for your records.

## Differential Emotions Scale

Please circle the point on the scales that best describes the way you feel at this moment.

	Not At All				Very Strongly		
	1	2	3	4	5	6	7
1. Merry/Gleeful/Amused	1	2	3	4	5	6	7
2. Warmhearted/Joyful/Elated	1	2	3	4	5	6	7
3. Sad/Downhearted/Blue	1	2	3	4	5	6	7
4. Irritated/Angry/Mad	1	2	3	4	5	6	7
5. Fearful/Scared/Afraid	1	2	3	4	5	6	7
6. Tense/Anxious/Nervous	1	2	3	4	5	6	7
7. Disgusted/Turned-Off/Repulsed	1	2	3	4	5	6	7
8. Contemptuous/Scornful/Disdainful	1	2	3	4	5	6	7
9. Shameful/Ashamed/Remorseful	1	2	3	4	5	6	7
10. Guilty/Liable/Culpable	1	2	3	4	5	6	7

Beck Depression Inventory—II

This scale is under a copyright and cannot be reproduced here.

## Causal Uncertainty Scale

Fill in the circle below the response that best expresses how much you agree or disagree with the statement.

	Strongly Disagree	Moderately Disagree	Slightly Disagree	Slightly Agree	Moderately Agree	Strongly Agree
1. I do not know what it takes to get along well with others.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. When I receive good grades, I usually do not understand why I did so well.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. I do not understand what causes most of the problems that I have with others.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. When I see something good happen to others, I often do not know why it happened.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. When I receive poor grades, I usually do not understand why I did so poorly.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. When someone I know receives a poor grade, I often cannot determine if they could have done anything to prevent it.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I do not understand what causes most of the good things that happen to me.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. When things go right, I generally do not know what to do to keep them that way.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. When bad things happen, I generally do not know why.---	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. When there is more than one possible reason for a person's action, it is difficult to determine which one is the actual reason.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11. I often feel like I don't have enough information to come to a conclusion about why things happen to other people. -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. When I see something bad happen to others, I often do not know why it happened.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. I often feel like I do not have enough information to come to a conclusion about why things happen to me.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. When I think about why someone does something, there are usually so many possible reasons for it that I cannot determine which one was the cause.-----	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### Mood and Anxiety Symptom Questionnaire – Anxious Arousal Subscale

Below is a list of feelings, sensations, problems, and experiences that people sometimes have. Read each statement and then fill in the circle below the appropriate choice in the space next to that item. Use the choice that best describes how much you have felt or experienced things this way during the past SEVEN WEEKS, including today.

Not At All 1	A Little Bit 2	Moderately 3	Quite A Bit 4	Extremely 5	
<input type="radio"/>	1. Felt cheerful.				
<input type="radio"/>	2. Felt afraid.				
<input type="radio"/>	3. Startled easily.				
<input type="radio"/>	4. Felt confused.				
<input type="radio"/>	5. Slept very well.				
<input type="radio"/>	6. Felt sad.				
<input type="radio"/>	7. Felt very alert.				
<input type="radio"/>	8. Felt discouraged.				
<input type="radio"/>	9. Felt nauseous.				
<input type="radio"/>	10. Felt like crying.				
<input type="radio"/>	11. Felt successful.				
<input type="radio"/>	12. Had diarrhea.				
<input type="radio"/>	13. Felt worthless.				
<input type="radio"/>	14. Felt really happy.				
<input type="radio"/>	15. Felt nervous				
<input type="radio"/>	16. Felt depressed.				
<input type="radio"/>	17. Felt irritable.				
<input type="radio"/>	18. Felt optimistic				
<input type="radio"/>	19. Felt faint.				
<input type="radio"/>	20. Felt uneasy.				
<input type="radio"/>	21. Felt really bored				
<input type="radio"/>	22. Felt hopeless				
<input type="radio"/>	23. Felt like I was having a lot of fun.				
<input type="radio"/>	24. Blamed myself for a lot of things.				
<input type="radio"/>	25. Felt numbness or tingling in my body.				
<input type="radio"/>	26. Felt withdrawn from other people.				

- 27. Seemed to move quickly and easily.
- 28. Was afraid I was going to lose control.
- 29. Felt dissatisfied with everything.
- 30. Looked forward to things with enjoyment.
- 31. Had trouble remembering things.
- 32. Felt like I didn't need much sleep.
- 33. Felt like nothing was enjoyable.
- 34. Felt like something awful was going to happen.
- 35. Felt like I had accomplished a lot.
- 36. Felt like I had a lot of interesting things to do.
- 37. Did not have much of an appetite.
- 38. Felt like being with other people.
- 39. Felt like it took extra effort to get started.
- 40. Felt like I had a lot to look forward to.
- 41. Thoughts and ideas came to me very easily.
- 42. Felt pessimistic about the future.
- 43. Felt like I could do everything I needed to do.
- 44. Felt like there wasn't anything interesting or fun to do.
- 45. Had a pain in my chest.
- 46. Felt really talkative.
- 47. Felt like a failure.
- 48. Had hot or cold spell.
- 49. Was proud of myself.
- 50. Felt very restless.
- 51. Had trouble falling asleep.
- 52. Felt dizzy or light-headed.
- 53. Felt unattractive.
- 54. Felt very clearheaded.
- 55. Was short of breath.
- 56. Felt sluggish or tired.

- 57. Hands were shaky.
- 58. Felt really “up” or lively.
- 59. Was unable to relax.
- 60. Felt like being by myself.
- 61. Felt like I was choking.
- 62. Was able to laugh easily.
- 63. Had an upset stomach.
- 64. Felt inferior to others.
- 65. Had a lump in my throat.
- 66. Felt really slowed down.
- 67. Had a very dry mouth.
- 68. Felt confident about myself.
- 69. Muscles twitched or trembled.
- 70. Had trouble making decisions.
- 71. Felt like I was going crazy.
- 72. Felt like I had a lot of energy.
- 73. Was afraid I was going to die.
- 74. Was disappointed in myself.
- 75. Heart was racing or pounding.
- 76. Had trouble concentrating.
- 77. Felt tense or “high-strung.”
- 78. Felt hopeful about the future.
- 79. Was trembling or shaking.
- 80. Had trouble paying attention.
- 81. Muscles were tense or sore.
- 82. Felt keyed up, “on edge.”
- 83. Had trouble staying asleep.
- 84. Worried a lot about things.
- 85. Had to urinate frequently.
- 86. Felt really good about myself.
- 87. Had trouble swallowing.

- 88. Hands were cold or sweaty.
- 89. Thought about death or suicide.
- 90. Got tired or fatigued easily

## Social Phobia Inventory

Please read each statement and select a number 0, 1, 2, 3 or 4 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any one statement. This assessment is not intended to be a diagnosis. If you are concerned about your results in any way, please speak with a qualified health professional.

A Little Bit 0	A Little Bit 1	Somewhat 2	Very Much 3	Extremely 4	
<input type="radio"/>	1. I am afraid of people in authority.				
<input type="radio"/>	2. I am bothered by blushing in front of people.				
<input type="radio"/>	3. Parties and social events scare me.				
<input type="radio"/>	4. I avoid talking to people I don't know.				
<input type="radio"/>	5. Being criticized scares me a lot.				
<input type="radio"/>	6. I avoid doing things or speaking for fear of embarrassment.				
<input type="radio"/>	7. Sweating in front of people causes me distress.				
<input type="radio"/>	8. I avoid going to parties.				
<input type="radio"/>	9. I avoid activities in which I am the centre of attention.				
<input type="radio"/>	10. Talking to strangers scares me.				
<input type="radio"/>	11. I avoid having to give speeches.				
<input type="radio"/>	12. I would do anything to avoid being criticized.				
<input type="radio"/>	13. Heart palpitations bother me when I am around people.				
<input type="radio"/>	14. I am afraid of doing things when people might be watching.				
<input type="radio"/>	15. Being embarrassed or looking stupid are among my worst fears.				
<input type="radio"/>	16. I avoid speaking to anyone in authority.				
<input type="radio"/>	17. Trembling or shaking in front of others is distressing to me.				

## Stroop Task

Participants were presented with the following words one at a time and were instructed to name the colour in which the word is printed, not read the word itself.

