CUES TO DECEPTION: EYE BLINKING

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Master of Arts

In

Social Psychology

by

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San Francisco, California

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CERTIFICATION OF APPROVAL

I certify that I have read *Cues to Deception: Eye Blinking* by Erika Hanson Rauch, and that in my opinion this work meets the criteria for approving a thesis submitted in partial fulfillment of the requirement for the degree Master of Arts in Psychology: Social Psychology at San Francisco State University.

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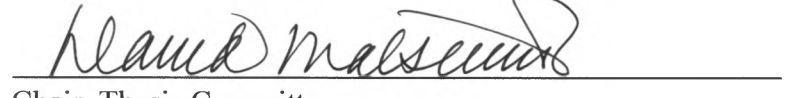
2015

Previous studies have suggested that blink rate is an indicator of deception. However, there has been debate over the question of how blink rate changes during deception. Some research has concluded that blink rate decreases during deception (Leal & Vrij, 2008, 2010; Leal, Vrij, Fisher, & van Hooff, 2008; Mann, Vrij, & Bull, 2002) while other research has found that blink rate increases during deception (Fukuda, 2001; Porter & ten Brinke, 2008; Seymour, Baker, & Gaunt, 2013; ten Brinke & Porter, 2012; Thonney, Kanachi, Sasaki, & Hatayama, 2005). Studies that observed a decrease in blink rate typically examined blink rate when participants lied while orally answering questions. On the other hand, studies that observed an increase in blink rate typically examined deception using guilty knowledge tasks involving computerized questions. The goal of the present study was to determine if the lie scenarios in previous literature influenced the differences found in the results. The following study examined blink rate during two different deception scenarios and attempted to bridge the gap within the literature by including elements from both sets of blink rate research. Participants truthfully and deceptively answered the same set of questions in two scenarios: a computer scenario and an interview scenario. Findings indicated that blink rate decreased when participants lied while answering computerized questions but did not significantly change when participants lied while answering interview questions. The results provided preliminary support for the prediction that blink rate changes as a result of the scenario in which the lie was told.

I certify that the Abstract is a correct representation of the content of this thesis.



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Introduction

As crime, terrorist attacks, and war becomes all too common in society today, deception detection research examining nonverbal cues to deception has become increasingly important. Therefore, research focused on cues to deception has merit beyond the field of psychology. Several decades of research has suggested that there are certain verbal and nonverbal cues to deception. For example, Newman, Pennebaker, Berry, and Richards (2003) found that liars used fewer first-person-singular references, fewer cognitive complexity words, and more negative emotion words. Additionally, in a meta-analysis of the deception literature, DePaulo et al. (2003) found that liars were more inhibited and tense, pressed their lips more, displayed fewer gestures, exhibited greater pupil dilation and voice pitch, and in certain conditions, showed less eye contact and more feigned smiling compared to those telling the truth. While the study of nonverbal and verbal indicators of deception has spanned many decades, gaps still exist within the literature. Specifically, eye blinking has been hypothesized as an indicator of deception but conflicting results from past studies have placed doubt on the value of this metric.

Previous research has found that blink rate decreases when cognitive demand increases (Bagley & Manelis, 1979; Bauer, Goldstein, & Stern, 1987; Drew, 1951; Goldstein, Bauer, & Stern, 1992; Holland & Tarlow, 1972, 1975; Wallbott & Scherer, 1991). For example, when participants were asked to memorize an 8-digit number, participants blinked less compared to when they memorized a 4-digit number (Holland &

Tarlow, 1972). This is relevant to the study of deception because research has shown that lying can be more cognitively demanding than telling the truth (DePaulo et al., 2003; Zuckerman, DePaulo, & Rosenthal, 1981). When telling a lie, individuals need to construct a narrative and ensure that the story is plausible. They must also remember previous statements to ensure consistency when retelling their story and monitor their speech to avoid slips of the tongue. All of these requirements increase mental load and cognitive demand (Vrij, 2008).

Blink Rate during Deception

While there has been a large amount of research examining verbal and non-verbal changes during deception (DePaulo et al., 2003), the examination of eye blinks as an indicator of deception has frequently been overlooked. Currently, there is a debate surrounding the change in blink rate during deception. Some researchers have found that blink rate decreases with an increase in cognitive load and observed a decrease in blink rate when individuals lied (Leal & Vrij, 2008, 2010; Leal et al., 2008; Mann et al., 2002). However, other researchers have found the opposite: an increase in blink rate when participants deceptively answered questions (Fukuda, 2001; Seymour et al., 2013; ten Brinke & Porter, 2012; Thonney et al., 2005).

Decrease in blink rate during deception. Researchers who found a decrease in blink rate during deception attribute this change to an increase in cognitive load caused

by lying. For example, Leal and Vrij (2008) examined blink rate during a free recall experiment. Participants in this study were assigned to either a truth condition or a lying condition. Participants in the truth condition were asked to go about their normal business for 10 minutes while participants in the lie condition were asked to steal an exam from a professor's office. When questioned about their activities, liars displayed a reduction in blink rate compared to their baseline blink rate. This was followed by an increase in blink rate during the target-offset period. In another study, researchers examined truthful and deceptive blink rates during police interviews. The researchers found that lying was accompanied by a decrease in blinking (Mann et al., 2002). While these studies found a decrease in blink rate during deception, other studies have found an increase in blink rate when participants lied.

Increase in blink rate during deception. Other researchers have found an increase in blink rate during deception and attribute this change to an increase in arousal associated with masking emotions. Four studies published within the last decade found evidence to support the hypothesis that blink rate increases during deception. In a recent study, participants took part in a concealed knowledge test where they were first familiarized with photographs of faces and then were shown a series of images on a computer screen. Participants responded truthfully and deceptively when asked if the picture displayed on the screen was a picture they had seen before. For target faces, the participants were to truthfully press a button marked "yes." For irrelevant faces,

participants were to truthfully respond "no." However, for probe faces, participants were asked to deceptively respond "no" despite their actual familiarity with the stimuli. In this study, blink rate was found to increase -400ms to -100ms before the overt response (Seymour et al., 2013).

In another study, ten Brink and Porter (2012) examined videos of individuals making televised pleas to the public for the safe return of a missing relative. In half of the videos examined, the pleader was being deceptive and had murdered the relative prior to the video plea. In the other half of the videos, the individual was being truthful and had no connection to the murder of their relative. The results suggested that deceptive pleaders blinked at a faster rate compared to the truthful pleaders. It is important to note this finding was only trending towards significance.

In a study using the guilty knowledge test, Thonney et al. (2005) assessed eye blinking and galvanic skin response as lie-detection techniques. In this experiment, the researchers defined detection rate as the percentage of times the card that the subject chose to lie about evoked the largest number of blinks when compared to the other stimuli. The results showed that the guilty knowledge test detection rate based on an increase in blink rate was significantly higher than the accuracy expected by chance.

In another study using the guilty knowledge test, Fukuda (2001) had participants choose a card and were then asked if the card on the computer screen was the one they

chose previously. The participants were asked to respond with "no" to all of the cards presented on the computer screen. Fukuda found that blink rates were lower for chosen cards between 3.9 and 4.1 seconds after seeing the card and blink peak rates were higher for chosen compared to not-chosen cards. Following the chosen card presentation, more blinks occurred just before the key press compared to the not chosen cards (Appendix I).

Analysis of Previous Blink Rate Literature

A handful of studies published within the last decade examined blink rate during deception. Unfortunately, a consensus has not been reached about the effect of deception on blink rate. Currently, some research has suggested that blink rate decreases during deception while other research has suggested that blink rate increases during deception. However, the methodologies of the two competing theories were vastly different. Studies that found a decrease in blink rate typically examined blink rate when participants were orally lying while answering questions. On the other hand, studies that found an increase in blink rate typically examined deception using guilty knowledge tests involving computerized questions. The latter studies did not require participants to respond orally. Instead, participants responded by physically touching keys on a computer. Studies that only used computer keyboard deception methods ignore an important aspect of real world deception scenarios: the need to control multiple channels of communication. When individuals lie, they need to focus on and regulate many aspects of their behavior and

speech, thereby increasing the occurrence of deception cues. This divergence within the methodology of previous blink rate research highlights a crucial gap in knowledge. To date, no study has compared blink rate when participants answered questions in both types of scenarios, a computer condition and an interview condition. Therefore, this study examined blink rate during deception and attempted to bridge the gap within the literature by including elements from both sets of blink rate research. Specifically, each participant answered the same questions truthfully and deceptively in two scenarios while their blink rates were recorded. The goal of this study was to determine if the contrasting results found in previous literature were an outcome of the scenarios in which the lies took place instead of the finding that blink rate was not an accurate predictor of deception.

Study Purpose and Hypothesis

Although a change in blink rate has been identified as a potential indicator of deception, a consensus has not been reached regarding how blink rate changes when an individual lies. In the current study, each participant answered the same questions in two modes, a computer mode and an interview mode. Participants were asked to first deceptively respond to a set of five questions and then to truthfully respond to the same set of five questions. The questions included (1) Tell me your opinion about this issue? (2) Why do you hold that opinion? (3) Is this really your true opinion? (4) Are you lying to me now? (5) You have told me your opinion, but others might hold the opposite views.

Tell me what you think might lead them to hold an opposite opinion to yours?

Participants completed both the interview mode and computer mode during their study session. Participants' faces were video recorded and their blink rates were examined. Based on previous blink rate findings, the present study hypothesizes that blink rate will increase when participants are lying compared to when they are telling the truth during the computer mode. Secondly, blink rate is predicted to decrease when participants are lying compared to when they are telling the truth during the interview mode.

Method

Study Design

This study was a 2 by 2 within-subjects design, with mode (computer vs. interview) and veracity (truth vs. lie). A convenience sample of participants was recruited from SFSU using class recruitment presentations, flyers posted around campus, the SFSU Psychology Department's Subject Pool (SONA Systems), and word of mouth. Interested persons either created an account through SONA Systems and were issued a unique numeric ID code or emailed the researcher to schedule a study session. All participants were randomly assigned before their study session to begin with the computer mode (n = 32) or the interview mode (n = 27).

Starting Mode	Interview	Computer
	27 Participants	32 Participants
	Total Participants = 59	

Participants

The study consisted of a sample (n = 59) of mixed gender students attending San Francisco State University (SFSU). The sample was comprised of 38 females and 21 males who were at least 18 years old (M = 23.91). There were 48 undergraduate students and 9 graduate students studying psychology (n = 39) or other subjects (n = 20). The majority of participants were native English speakers (n = 47).

Instruments

1. *Demographic Questionnaire:* The demographic questionnaire shown in Appendix C, asked participants for their age, gender, native language, school major, and university level.
2. *Social and Fiscal Political Attitudes Scale (SFPA)*: The SFPA (Helzer & Pizarro, 2011; Griskevicius, Durante, & Rae, 2013; Kurzban, Dukes, & Weeden, 2010) shown in Appendix D, is a tool used to assess social and

fiscal political attitudes. There are five questions that assess social-political attitudes and five questions that assess fiscal-political attitudes. The social-political attitude items are (a) Abortion is a woman's right (b) Marriage is between a man and a woman (c) Stem cell research is moral and can be useful for science (d) Marijuana should be legal (e) Laws should restrict abortion in all or most cases. The fiscal-political-attitude items are (a) The rich should pay a higher tax rate than the middle class (b) Business corporations make too much profit (c) Government should ensure that all citizens meet a certain minimum standard of living (d) In nearly every instance, the free market allocates resources most efficiently (e) Privatize Social Security. Responses to these items are made using a 7-point scale from 1 (strongly disagree) to 7 (strongly agree).

3. *Study Questions:* These questions were adapted from a similar study examining differences in deceptive and truthful speech (Arciuli, Mallard, & Villar, 2010). The questions include (1) Tell me your opinion about this issue? (2) Why do you hold that opinion? (3) Is this really your true opinion? (4) Are you lying to me now? (5) You have told me your opinion, but others might hold the opposite views. Tell me what you think might lead them to hold an opposite opinion to yours?

Procedure

On the day of their session, participants arrived at the lab and read the consent form. If they agreed to participate in the study, participants completed the Demographic Questionnaire and the Social and Fiscal Political Attitudes Scale. Once completed, they returned the questionnaires to the experimenter for processing. Based on the participants' responses to the social issues questionnaire, two topics that the participants held strong opinions towards were selected. The experimenter selected the topics for which the participants reported an opinion rating of either 1 or 7 (or the most extreme opinions). If there were two or more topics for which the participants had equally strong opinions towards, participants were asked which topic they held more dearly, if they had to choose. The two topics selected were randomly assigned to the truth and lie conditions in the interview mode by a random number generator. The truth topic in the interview mode was the lie topic in the computer mode and the lie topic in interview mode was the truth topic in computer mode. During the interview mode, a research assistant interviewed participants about their social issues beliefs. Participants' faces were video recorded via a Canon PowerShot Digital Camera set up on the left side of the interviewer, facing the participants. The interview mode was divided into two levels: lie and truth. Participants were asked to deceptively answer the first set of questions and then to truthfully answer the second set of questions.

The interview questions were the same for the truthful and deceptive accounts. The questions for the interview mode included (a) Tell me your opinion about this issue? (b) Why do you hold that opinion? (c) Is this really your true opinion? (d) Are you lying to me now? (e) You have told me your opinion, but others might hold the opposite views. Tell me what you think might lead them to hold an opposite opinion to yours? Between the interview mode and the computer mode, participants completed a filler task that included counting backwards from 100 by 3's as fast as possible. This filler task was used because it erased the contents of working memory and sentence memorization.

In the computer mode, participants were asked about their beliefs towards the same two social issues topics used in the interview mode. During the computer mode, participants' faces were video recorded via a Canon PowerShot Digital Camera set up on the left side of the computer. The computer mode was also divided into two levels: lie and truth. Participants read the same questions on the computer and responded by typing their answers to each question using the computer keyboard. For the first set of five questions, participants were instructed to deceptively answer the questions about their beliefs. For the second set of five questions, participants were instructed to answer the questions truthfully. The computer questions for the computer mode included (a) Tell me your opinion about this issue? (b) Why do you hold that opinion? (c) Is this really your true opinion? (d) Are you lying to me now? (e) You have told me your opinion, but

others might hold the opposite views. Tell me what you think might lead them to hold an opposite opinion to yours?

The interview mode and the computer mode were counterbalanced across participants. Participants were randomly assigned to start with the interview mode or the computer mode before their study session. To motivate participants to take the study seriously, they were told that the interviewer was aware that some participants would attempt to lie about some issues but would not know who those participants were. They were also told that if the interviewer suspected that they were lying, the interview would be terminated immediately and that was why it was important that they were extremely convincing during the interview. For their participation, the participants were offered credit to fulfill various course research participation requirements and $5.00.

Determination of Truth

Participants' responses to each question were reviewed after they completed the study. To ensure that each participant lied and truthfully answered questions about their social issues beliefs in the correct sections of the study, their answers were compared to their answers written on their Social and Fiscal Political Attitudes Scale. If their answers in the study did not match their answers on the scale they were excluded from analysis. Participants were also excluded from analysis if they did not allow the researchers to use their data.

Blink Coding Procedure

Each video was comprehensively coded for eye blinks by trained coders blind to the study hypothesis and the veracity of participants' responses. A blink was defined as an instance in which the bottom and top eyelids met and completely closed. At this point, the whites of the eyes were not visible. A blink occurred in both eyes and lasted for 0.1 to 0.4 seconds (Schiffman, 1990). Finally, eye blinks did not include winks, defined as when only one eye shuts completely.

Coding reliability. Two coders noted the number of times participants blinked while answering each question. Each coder analyzed 12 videos, 6 computer videos and 6 interview videos, which totaled 10% of the videos. Once coded, the inter-rater reliability was calculated for the computer videos (r = .970) and for the interview videos (r = .970). The coders then met to discuss disagreements. Next, the coders recoded the first 10% of the videos. Inter-rater reliability was calculated a second time for the interview videos (r = .995) and for the computer videos (r = .998). The coders then coded the next 18 videos, 9 computer videos and 9 interview videos, which totaled 15% of the videos. The inter-rater reliability was calculated for the computer videos (r = .996) and the interview videos (r = .981). Finally, the inter-rater reliability was calculated for the 30 videos previously coded, 15 computer videos and 15 interview videos, which totaled 25% of the

videos. The inter-rater reliability was within the acceptable range for the computer videos (r = .997) and for the interview videos (r = .984).

Blink rate calculations. Blinks per minute was calculated for each participant while answering each question. Blink rate was calculated by converting the response time for each question into minutes in decimal form. Then, the amount of blinks that occurred while participants responded to the question was divided by the response time in decimal form to calculate blinks per minute.

Results

The study's hypothesis proposed that blink rate during the interview mode would decrease when participants deceptively answered questions compared to when they truthfully answered questions. In addition, during the computer portion of the study, blink rate was predicted to increase when participants deceptively answered questions compared to when they truthfully answered questions.

In order to test the hypothesis that blink rate changes when individuals lie in different situations, a three-way 2 by 2 by 5 ANOVA for within-group measures was run with mode (interview and computer), veracity (truth and lie), and questions as the factors and blink rate as the dependent variable. A marginally significant interaction was found between mode and veracity, $F(1, 58) = 3.68$, $p = .06$, $\eta^2 = .06$ (Table 1). Planned

comparisons revealed that there was a marginally significant simple effect for the computer mode, $F(1, 58) = 3.79$, $p = .06$, $\eta^2 = .06$. Blink rate during the lie condition was lower ($M = 28.60$) compared to blink rate during the truth condition ($M = 36.48$). There was not a significant simple effect for the interview mode, $F(1, 58) = 1.08$, $p = .30$, $\eta^2 = .02$. The initial hypothesis predicting an increase in deceptive blink rate during the computer scenario and a decrease in deceptive blink rate during the interview scenario was not supported.

Additional Analyses

In addition, a significant main effect of mode was found, $F(1, 58) = 7.36$, $p = .009$, $\eta^2 = .113$. Participants had higher blink rates during the interview mode ($M = 48.03$) compared to the computer mode ($M = 32.54$). Mauchly's test indicated that the assumption of sphericity had been violated for questions, $\chi^2(9) = 389.22$, $p < .001$. Therefore, degrees of freedom was corrected using Greenhouse-Geisser estimates of sphericity ($\varepsilon = .49$). The results indicated that there was a significant main effect of questions, $F(1.96, 113.75) = 25.72$, $p < .001$, $\eta^2 = .307$. Participants had higher blink rates for Question 3 ($M = 64.58$) and Question 4 ($M = 65.86$) compared to Question 1 ($M = 22.64$), Question 2 ($M = 24.16$), and Question 5 ($M = 24.19$).

These analyses suggest that blink rate changed when participants lied and truthfully answered questions during the two modes. However, the initial hypothesis

predicting the direction of change in blink rate was not supported. Instead, the opposite was found. Blink rate during deception was predicted to decrease during the interview mode and increase during the computer mode when compared to the truth conditions. The results of this study suggest that blink rate during deception decreased during the computer mode and did not significantly change during the interview mode.

Discussion

In the last decade, only a handful of studies have been published examining blink rate during deception. However, a consensus has not been reached surrounding the effect of deception on blink rate. Some research has suggested that blink rate decreases during deception while other research has suggested that blink rate increases during deception. However, the methodologies of the two competing theories were vastly different. Studies that found a decrease in blink rate during deception often had participants orally answer interview questions, while studies that found an increase in blink rate typically examined blink rate when participants were deceptively answering questions on a computer. The goal of the present study was to determine if the scenario in which the lie was told would affect participants' blink rate.

To date, this is the only study that examined blink rate resulting from participants deceptively answering questions in multiple scenarios. In this study, each participant answered the same questions truthfully and deceptively in two scenarios, an interview

scenario and a computer scenario. The resulting blink rates during each deceptive response were compared to the blink rates during each truthful response. The results supported the prediction that blink rate changes as a result of the scenario in which the lie was told. However, contrary to the study's hypothesis, the direction of this predicted change was not supported. Participants' blink rates were found to decrease when deceptively answering computer questions when compared to their blink rates during the truthful responses. Additionally, a significant change in participants' blink rates during the interview mode was not found.

While the results were not in the hypothesized direction, this study did provide preliminary evidence to support the overarching prediction that changes in blink rate occur as a result of the scenario in which the lie took place. Participants' blink rates significantly changed when answering questions in the computer scenario. However, their blink rates were not significantly different when answering the same questions in an interview scenario. The observed change in blink rate as a result of deceptively and truthfully answering the same questions supports the idea that blink rate can be a useful indicator of deception. However, the scenario in which the lies take place was found to impact blink rate. Moreover, how and why blink rate changes should be investigated further before blink rate can be generalized and used in real-life deception scenarios.

The current study did not find the same direction of blink rate change as previous blink rate literature. A possible explanation for these results could be the question type used. In this study, the participants were asked a series of five short answer questions four times during their session. Previous research with an oral lie component had longer, open-ended questions, where participants were asked to freely recall exactly what they were doing in as much detail as possible. However, previous research with a computer lie component typically asked participants to respond with yes or no answers for each question. Therefore, the type of response could have contributed to the observed change in blink rate. Future studies should test this hypothesis by examining the role of question type and lie scenario on blink rate.

The examination of blink rate during deception has substantial practical implications that could affect many different fields. For example, in the field of criminal justice, deception cue training focusing on differences in behaviors during deception can be especially useful to parole officers, police officers, military personnel, and legal decision-makers to indicate possible deception scenarios and deceptive pleas of innocence. Additionally, during questioning settings, these cues can signal when and where subjects should be questioned further and the direction in which this questioning should occur. Deception cues can also be useful in the field of business and human resources. Companies can use these cues during the interview process to determine when applicants are being deceptive and genuine.

Limitations of the Current Study and Directions for Future Studies

Participants in this study were taken from the student pool at San Francisco State University. Therefore, the results of this study may not be directly applicable to populations other than college students. Also, the design of this study, in which student participants were asked to lie and tell the truth, is not directly related to real life high-stakes lies. Specifically, there was little motivation to tell convincing lies and there were not severe consequences if their lies were discovered. Therefore, these results should be expanded to include real-life lie scenarios in which the individuals decide to lie by their own free will. Expanding from these results, researchers should examine the specific types of deception scenarios that cause blink rate to increase and decrease.

In sum, the implications of this study lend credibility to the prediction that blink rate changes during deception. Further, the results foster a greater understanding of the scenario components underlying deception detection. Lastly, the study's results support the need for future studies investigating the specific scenarios that cause deception cues.

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Appendix A

San Francisco State University

Informed Consent to Participate in Research
Attitudes Study

A. PURPOSE AND BACKGROUND

The purpose of this research is to examine the social attitudes of SFSU students. The researcher, Erika Rauch, is a graduate student at San Francisco State University conducting research for a master's degree in the Psychology Department. You are being asked to participate in this study because you are an English speaking student at SFSU and are 18 years of age or older.

B. PROCEDURES

If you agree to participate in this research, the following will occur:

- you will be video recorded during the interview and computer task after filling out the video release form.
- you will complete a demographic questionnaire and a social issues questionnaire that will take approximately 10 minutes to complete.
- you will be interviewed for approximately 15 minutes about your social, fiscal and political attitudes.
- you will complete a counting task.
- you will complete a computer task answering questions about your social, fiscal and political attitudes for approximately 15 minutes.
- the study will take place in EP Room 329 at a time convenient for you.
- The total time commitment will be approximately 45-60 minutes.

C. RISKS

There is a risk of loss of privacy. However, no names or identities will be used in any published reports of the research. Only Professor David Matsumoto will have access to the identifiable research data.

There is a risk of discomfort or anxiety due to the nature of the questions asked; however, the participant can answer only those questions he/she chooses to answer, and can stop participation in the research at any time.

D. CONFIDENTIALITY

The research data will be kept in a secure location and only the researcher will have access to the data. All research data will be stored in an encrypted document on a password-protected computer. All identifiable research data will be kept with Professor David Matsumoto in his locked and secured office on campus. At the conclusion of the study, all identifying information will be removed from the data. The data collected in this study may be used in the future only for research purposes consistent with the original purpose of the research as stated in this consent document. All identifiable data will be kept with the faculty advisor Professor David Matsumoto. Research designs often require that the full intent of the study not be explained prior to participation. When the study is completed, you will receive a full debriefing on the purpose and the procedures of the research. The data from this study will be kept for an indefinite amount of time.

E. DIRECT BENEFITS

There will be no direct benefits to the participant.

F. COSTS

There will be no cost to you for participating in this research.

G. COMPENSATION

You will receive $5.00 for participating.

H. ACADEMIC CREDIT

You will receive 1.5 SONA credits for participating.

I. ALTERNATIVES

The alternative is not to participate in the research.

J. QUESTIONS

You have spoken with Erika Rauch or a research assistant about this study and have had your questions answered. If you have any further questions about the study, you may contact the researcher by email at erauch@mail.sfsu.edu or you may contact the researcher's advisor, Professor David Matsumoto at dm@sfsu.edu.

Questions about your rights as a study participant, or comments or complaints about the study, may also be addressed to the Office for the Protection of Human Subjects at 415 338-1093 or protocol@sfsu.edu.

K. CONSENT

You have been given a copy of this consent form to keep.

PARTICIPATION IN THIS RESEARCH IS VOLUNTARY. You are free to decline to participate in this research, or to withdraw your participation at any point, without penalty. Your decision whether or not to participate in this research will have no influence on your present or future status at San Francisco State University.

Signature _____ Date: _____
Research Participant

Signature _____ Date: _____
Researcher

Appendix B

Attitudes Study
Erika Rauch

Video Release Form

As part of this project, I will be making video recordings of you during your participation in the research. Please indicate what uses of these video recordings you are willing to permit, by putting your initials next to the uses you agree to, and signing the form at the end. This choice is completely up to you. I will only use the video recordings in ways that you agree to. In any use of the tapes, you will not be identified by name.

1. _____ The video recordings can be studied by the research team for use in the research project.

2. _____ The video recordings can be used for scientific publications.

3. _____ The video recordings can be shown at scientific conferences or meetings.

4. _____ The video recordings can be shown in classrooms to students.

5. _____ The video recordings can be shown in public presentations to non-scientific groups.

6. _____ The video recordings can be used on television or the audio portion can be used on radio.

7. _____ The video recordings can be posted to a web site.

I have read the above descriptions and give my consent for the use of the video recordings as indicated by my initials above.

Name_____

_____ _____
(Signature) (Date)

Appendix C

Demographic Questions

1. What is your age?

_____

2. What is your gender?
A. Female
B. Male
C. Other
D. Decline to answer

3. Are you a native English speaker?
A. Yes
B. No
C. Decline to answer

4. What is your major?
A. Psychology
B. Other

5. What class/level most closely describes you?
A. Freshman
B. Sophomore
C. Junior
D. Senior
E. Graduate Student
F. Other

Appendix D

SFPA Questionnaire

Please read each item carefully and circle the answer that best reflects your response.

1. Abortion is a woman's right.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

2. Marriage is between a man and a woman.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

3. Stem cell research is moral and can be useful for science.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

4. Marijuana should be legal.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

5. Laws should restrict abortion in all or most cases.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

6. The rich should pay a higher tax rate than the middle class.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

7. Business corporations make too much profit.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

8. Government should ensure that all citizens meet a certain minimum standard of living.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

9. In nearly every instance, the free market allocates resources most efficiently.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

10. Privatize Social Security.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Disagree Somewhat	Undecided	Agree Somewhat	Agree	Strongly Agree

Appendix E

Multiple Answers

If the participant has more than two social issues for which they have strong opinions towards, circle the topics on this sheet.

1. Abortion is a woman's right.
2. Marriage is between a man and a woman.
3. Stem cell research is moral and can be useful for science.
4. Marijuana should be legal.
5. Laws should restrict abortion in all or most cases.
6. The rich should pay a higher tax rate than the middle class.
7. Business corporations make too much profit.
8. Government should ensure that all citizens meet a certain minimum standard of living.
9. In nearly every instance, the free market allocates resources most efficiently.
10. Privatize Social Security.

Enter the study room and ask:

Interviewer: Which of these statements do you hold more dear if you had to choose? (Read the list of topics that they chose previously).

Once you have determined the two topics, write a "1" and a "2" next to the topics on this sheet. The 1 and 2 correspond to the level that the topic is assigned. Refer to the Participant Spreadsheet to determine which topic goes in level 1 or level 2.

Appendix F

Computer Directions

In this study you will be interviewed about your beliefs about multiple social, fiscal and political topics.

You are now asked to **LIE** about your beliefs when answering the next set of questions.

The interviewer is watching the video feed and is aware that some participants will attempt to lie about some issues, but will not know who those participants are. If the interviewer suspects that you are lying, the interview will be terminated immediately and that is why it is important that you are extremely convincing during the interview.

When you are finished reading these directions, please put this paper back in the folder.

Appendix G

Interview Directions

In this study you will be interviewed about your beliefs about multiple social, fiscal and political topics.

You are now asked to LIE about your beliefs when answering the next set of questions.

The interviewer is aware that some participants will attempt to lie about some issues, but will not know who those participants are. If the interviewer suspects that you are lying, the interview will be terminated immediately and that is why it is important that you are extremely convincing during the interview.

When you are finished reading these directions, please put this paper back in the folder.

Appendix H

Study Debriefing Form
Attitudes Study

Information about the Study

This study examines the behavioral differences during truth and lie scenarios. Previous research has found behavioral changes in individuals when they are telling the truth compared to when they are lying. You were asked to answer questions truthfully and deceptively while being video recorded and these videos will be examined for certain behaviors that may change when individuals lie.

Deception

Some information that you were told was not true in order for you to participate in the study without directing your attention to the study hypothesis. In this way, it was possible to get the most spontaneous and natural responses. You were told that the interview would be terminated if the interviewer suspected that you were lying. However, even if the interviewer suspected that you were lying, they were instructed to continue with the interview. In addition, you were told that this study examined social issues beliefs of students on the SFSU campus. The true purpose of this study was to examine the behavioral changes in individuals when they are being deceptive.

Psychological Discomfort

If you experienced psychological discomfort as a result of this study and want to discuss your mental health with a counselor, please visit the Counseling and Psychological Services Center at SFSU. Fall and Spring semester office hours are 8AM to Noon and 1PM to 7PM Monday through Thursday and until 5PM on Friday. Appointments may be made and cancelled by phone (415) 338-2208 or in person at Student Services Building Room 208.

Thank you again for participating in this study. You will receive 1.5 Sona credits for participating.

If you have any questions or concerns for the experimenter, please contact Erika Rauch at erauch@mail.sfsu.edu.

If you have concerns about your rights as a participant in this experiment, please contact the SFSU IRB at (415) 338-1093.

Thank you again for your participation.

Now that you know the true purpose of the research, do you allow the researchers to use your data? Please initial:

Yes_____ No_____.

Appendix I

Authors and Year Published	Question Type	Methods	Findings
Leal & Vrij (2008)	Interview	Participants were assigned to the truth or lie condition. Participants in the truth condition went about their normal business for 10 minutes while participants in the lie condition stole an exam from a professor's office.	Liars displayed a reduction in blink rate compared to their baseline blink rate followed by an increase in blink rate during the target-offset period.
Mann, Vrij, & Bull (2002)	Interview	Researchers examined videotapes of suspects being interviewed by police.	Liars displayed a decrease in blink rate.
Seymour, Baker, & Gaunt (2013)	Computer	Participants responded truthfully and deceptively when asked if the picture displayed on the screen was a picture they had seen previously. For target and irrelevant faces, participants were to respond truthfully. For probe faces, participants responded deceptively.	Blink rate was found to increase -400ms to -100ms before overt response.
ten Brink & Porter (2012)	Televised Pleas	Individuals made televised pleas to the public for the safe return of a missing relative. In half of the videos, the pleader was being deceptive and had murdered the relative. In the other half of the videos, the individual was being truthful and had no connection to the murder of their relative.	Deceptive pleaders blinked at a faster rate compared with the truthful pleaders. However, this finding was only trending towards significance.

Thonney et al. (2005)	Computer	Subjects selected a card and were asked to make up a story about the card. After the subjects selected one of the stimuli and told a story, the guilty knowledge test was applied.	The results showed that the guilty knowledge test detection rate based on an increase in blink rate was significantly higher than the accuracy expected by chance.

Table 1

Three-way 2 by 2 by 5 ANOVA for within-group measures with blink rate as the dependent variable

		Interview		Computer		
		Lie	Truth	Lie	Truth	Marginal Means
Question 1	Mean	28.26	26.70	16.47	19.15	22.65
	Standard Error	2.20	2.52	1.68	1.70	
Question 2	Mean	27.44	30.43	19.38	19.37	24.16
	Standard Error	2.24	2.49	1.78	1.78	
Question 3	Mean	88.37	58.06	48.20	63.68	64.58
	Standard Error	22.35	10.04	11.23	12.02	
Question 4	Mean	82.53	81.17	39.13	60.59	65.86
	Standard Error	14.40	13.62	10.45	12.80	
Question 5	Mean	26.96	30.36	19.81	19.64	24.19
	Standard Error	1.85	2.43	1.82	1.69	
Marginal Means		50.71	45.34	28.60	36.50	