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Deception: Analysis of the Lying Cues Observed by Men, Women, the Self, and Others

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DECEPTION: ANALYSIS OF THE LYING CUES OBSERVED BY MEN, WOMEN,
THE SELF, AND OTHERS

A Thesis

Presented to

The Faculty of the Department of Psychology

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

By

Alysha Khavarian Kadva

August 2010

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DECEPTION: ANALYSIS OF THE LYING CUES OBSERVED BY MEN, WOMEN,
THE SELF, AND OTHERS

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ABSTRACT

DECEPTION: ANALYSIS OF THE LYING CUES OBSERVED BY MEN, WOMEN, THE SELF, AND OTHERS

by Alysha Khavarian Kadva

Lying cues observed by men and women were investigated by a combination of a 2x2 mixed subjects design and a correlational design. Fifty-nine male and 68 female fluent English-speaking college students older than 18 years of age were tasked with completing a 64-item questionnaire and observing two video clips. The participants completed the questionnaire for a self-assessment of the perception of their own lying cues, observed the video clips, and then completed the questionnaire for an assessment of the lying cues observed in the videos. Independent sample t-test results indicated that, for self-assessment of lying cues, there was a statistically significant difference in the speech behavior and facial behavior lying cues of men and women. Pearson correlation indicated that there was a correlation between the lying cues and gender. Results are discussed in terms of self-other theory and gender differences in nonverbal behavior.

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Introduction

Deceptive behavior has been explored for centuries. Deceitfulness was first defined in 1225 by Thomas Aquinas, a Roman Catholic priest and theologian. According to his assessment a lie is any communication of false information, regardless of the conveyor of the information knowing the information is false (Ford, 2006). Later, Sissela Bok, a contemporary philosopher and ethicist expanded on this definition and explained that deception is possible if the deceiver believes a message to be false (Bok, 1978). These interpretations by philosophers set the stage for the definition of deceptive behavior and the research that has followed allowed researchers to better understand the act of lying.

Research has divided lying types into two categories: minor lies, which have minimal impact on the individual and occur in everyday life, and serious lies, which are considered to be a significant violation of trust and occur less frequently (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). Research has also quantified the act of lying. Over the span of one week an individual is dishonest to one-third of all the people with whom they have social interactions (DePaulo et al., 1996). Overall, a person averages two lies per day (DePaulo et al., 1996). A poll conducted in 1991 by the American Psychological Press indicated that 90% of the Americans interviewed admitted they were deceitful (Ford, 1996). Lying has also become a social skill in which the content has been divided into three categories: “self-centered” lies are told to protect the self; “other-oriented” lies are told to protect someone else, and “altruistic” lies are told to protect a third party (Ennis, Vrij, & Chance, 2008).

As the research of lying behavior has evolved so has the method of detecting the act of lying. The oldest recorded act of detecting deception is the biblical story of King Solomon, who had the task of deciding which of two women was the mother of a child. He relied on emotional response to correctly determine the mother and the deceitful woman (Kleinmuntz & Szucko, 1984).

Contemporary lie detection is also based on a number of responses including physiological reactions, polygraph measurements, and functional magnetic resonance imaging (fMRI). The polygraph is based on the assumption that lying causes increases in autonomic arousal, which is reflected in changes of pulse and respiration rates, blood pressure, sweating, and galvanic skin response (GSR) or the electrical resistance of the skin. According to the American Polygraph Association the polygraph has an average accuracy of 98% (“Polygraph Validity Research”, n.d., para. 3).

However, validation research has indicated that the use of polygraph equipment is controversial, due to the range of accuracy in relation to the polygraph technician and the concerns of validity (Iacono, 2008; Iacono & Lykken, 1997). The fMRI technique, which is based on the assumption that four regions of the brain are activated when an individual lies, has greater accuracy than a polygraph (Simpson, 2008). The fMRI technique is based on the idea that lying is a more complex cognitive act than telling the truth. Therefore, greater neural activation should occur when a person is being deceptive compared to when she or he is telling the truth. However, there are also significant concerns about validity and reliability of brain activity revealing deception (Simpson, 2008). An additional limitation of using polygraphs and fMRI equipment is the

requirement of a comparison of lying and truth-telling. To accurately measure deception, these instruments require a baseline or a pre-test of non-deceptive behavior as a comparison to the deceptive behavior. This may be achievable in a scientific setting with controlled conditions, but it is not always possible in a criminal and judicial setting.

Aside from the use of equipment to measure physiological responses, human expression can be interpreted to recognize deception, similar to the previously mentioned judgment of King Solomon (Kleinmuntz & Szucko, 1984). The most publicized and widely published research (1969 to 2009) in this field is by Drs. Paul Ekman, Maureen O'Sullivan, and Mark Frank, which has focused on facial expressions as cues for human emotions. They noted that facial expressions of emotion can be key cues to reveal dishonesty (Frank & Ekman, 1997). They described individual facial features which could be classified as genuine vs. deceitful behavior (Ekman, O'Sullivan, & Frank, 1999).

Ekman's work identified "microexpressions" as facial muscle movements that are noticeable for a fraction of a second and can be observed, although only with practice and by trained professionals (Ekman & Friesen, 1969). In addition, he identified "suppressed expressions" as expressions that a person is aware of making, but attempts to conceal from others (Ekman & Friesen, 1978). A study conducted in 1991 by Ekman and O'Sullivan asked participants to use facial, vocal, and behavioral cues to determine whether a woman viewed on video tape was telling the truth or lying. The participants ranged in profession from Secret Service agents, psychiatrists, judges, police officers, and polygraph examiners. The results demonstrated that only Secret Service agents scored better than chance levels at accurately detecting liars. Since the Secret Service agents

were in an occupation which required special training in deception, their experience was correlated with their accuracy in lie detection. Specifically, Secret Service agents focused additional attention to inconsistencies between verbal and nonverbal cues than the other groups.

Similarly, a study by Mann and colleagues (2004) was conducted with 99 police officers who were not members of an agency that were trained to hone superior skills in lie detection. The officers were instructed to judge the veracity and the number of lies and truths told by potential criminals. They observed video clips of 14 suspects during their respective police interviews. Accuracy scores of the officers demonstrated that the truth and lie accuracy were both around 65%. There was a significant relationship between an officer's experience in interviewing suspects and truth accuracy. An officer's previous experience in interviewing suspects was correlated with higher truth accuracy scores. These findings supported the research by Ekman and colleagues (1991) and implied that experience enables an officer to better determine the difference between truths and lies.

A small number of studies have expanded beyond law enforcement and have included the general population as participants. One such study is by Akehurst and colleagues (1996) in which the deceptive behavior beliefs of police officers were compared to laypersons. Sixty police officers and 60 laypersons completed a postal (distribution through the mail) survey of a 64-item questionnaire entitled "Beliefs Regarding Deceptive Behavior" (BRDB). The two groups were stratified and asked to complete the questionnaire based on their experiences with deception. Thirty participants

were instructed to recall situations in which others had lied to them and the other 30 were instructed to recall when they themselves had lied. The results demonstrated a significant difference between the rating of each participant's own deceptive behavior vs. his/her rating of the deceptive behavior of others. Specifically, participants rated larger increases in the frequency of behavior when rating other's deceptive behavior than when rating their own deceptive behavior. Speech disturbances and facial behavior were rated as having greater increases in frequency for others in comparison to themselves. The only exceptions were "eye contact" and "turning toward the interviewer" which were rated as decreasing for other's deceptive behavior than their own. Overall, there were no significant differences in the beliefs of police officers and laypersons. This study leads one to question whether the general population may have similar beliefs as law enforcement agencies and possibly the same ability to assess deception.

The double standard in evaluating deception in oneself and others was briefly discussed by Bond and DePaulo (2006) in their meta-analysis of 206 unpublished and published research documents (1941-2004) investigating deception. The basic finding and prediction was that individuals judge other people's lies more critically than their own. The research indicated that people project their own moral emotions (anxiety, shame, guilt) and stereotypes of deception on a deceiver to evaluate a lie. However, individuals are not critical of lies told by themselves and those with whom they are familiar or have a relationship. Interestingly, the researchers speculated that the truth bias presented in the literature represents an extension of the self-bias to others who are reminiscent of the self. Implying that if a liar looks like or is in a relationship with the

person with whom they are trying to deceive the person being deceived is less critical of the lies. To eliminate this bias, the participants in the current investigation will evaluate the deceptive behavior of individuals outside of their social network.

A limited number of studies have assessed the interaction of gender and lying behavior. Initial research demonstrated that the content of a lie was gender-specific. Men engaged in a greater number of “self-centered” lies while women participated in a greater number of “other-oriented” lies (DePaulo et al., 1996). The review of research literature on gender-based motivations for lying indicated that women and men have the same frequency of lies; however the nature of the lie was different (Tosonse, 2006). The motivation of a man’s “self-centered” lie was to enhance his social desirability, while a woman’s “other-oriented” lie was driven by the desire to protect the feelings of others.

A study by Tyler and Feldman (2004) explored the frequency and nature of lying in men and women. In the study, 208 undergraduate students were grouped to the same or opposite gender partners and were assigned to one of two expectations: a) will not meet the partner again, or b) will meet the partner 3 times. Paralleling previous research, the study confirmed that lying was a standard social interaction behavior. A total of 80% of the participants acknowledged that they lied at least once during a 10 minute conversation. The number of lies told ranged from 0 to 8 in a 10 minute interaction. In contrast to previous research, the results indicated that women had a greater frequency of lying than men. Frequency of lying was not dependent on the gender of the individual being deceived. Researchers explained the difference in frequency as a result of the social context of lying and the predisposition of women to regulate their response to be

socially accepted by others. The explanation was further supported by the frequency of lying being greater for woman than men if the woman was given the expectation of meeting the partner again.

Current Investigation

The research discussed demonstrates that there are four main limitations in the current research on lying behavior. The first restriction is that a majority of the research involves members of federal and local agencies. As a result, the work is limited in its scope of application outside the criminal, judicial and government arena. It is not applicable to the general population. A second constraint is that the research relies heavily on skin polygraph tests and psychophysiology assessments. The use of these techniques to detect deception assumes that most liars have a criminal background or a malicious intent. The third short coming is the lack of research comparing the lying behavior of men and women. Research has identified what motivates a lie in men as opposed to women, but a side-by-side comparison of the act of lying by gender is missing. The fourth draw back is that the research does not compare the act of lying (self) and the observation of a lie (other). Essentially, there has been no assessment of how an individual lies and how that same individual perceives another person lie. Consequently, the goal of the current study is to expand on the current research and quantify the lying behavior of men, women, the self, and other. This will be done by incorporating the established methodologies of lying assessments, which include videos provided by Mark Frank's research group (no current publication) and the BRDB from Lucy Akehurst's research (Akehurst et al., 1996).

This study will attempt to generalize the perception of lying behavior to the general population and investigate gender differences of lying behavior. The focus is to address the following questions: 1) do men and women pick up on and exhibit different lying cues; 2) what is an individual's behavior while communicating deceptive information to others. For the purposes of this study, the term "lying cue" can be loosely defined as the movement and/or change in the body, face, voice and/or language that may be the result of lying. The term "lying cue self-description" is the individual's interpretation or identification of his/her own lying cues.

Hypotheses

The three hypotheses under investigation were as follows: 1) there will be a difference between the lying cues observed by men and women, 2) there will be a difference in lying cue self-description of men and women, and 3) there will be a correlation between the lying cue self-description and the lying cues observed by men and women.

Based on the research in the field, I believed that the study results would demonstrate no significant difference in the lying cues observed by men and women. This speculation was based on the motivation people have for deception being transferred to the self-perception of lying (Bond & DePaulo, 2006). However, I expected there would be significant differences in the perceived lying cue self-description of men and women. Specifically, women would have greater responses in the BRDB than men on the perceived self-description of lying cues. This rationale was based on the research indicating that a woman's lying behavior is based on social acceptance (Tyler &

Feldman, 2004). Therefore, it was my speculation that the self-description of lying cues might also be based on social acceptance. In addition, I predicted there would be a small to modest correlation in the lying cues for self and other based on Bond and DePaulo's (2006) meta-analysis.

Design and Method

Research Participants

One hundred and twenty-seven students and volunteers from San Jose State University (SJSU) were recruited to participate in the study. The 68 female and 59 male participants were recruited from the Introduction Psychology Research Pool by sign up postings and during Open Research Day. Open Research Day is a four hour period during which undergraduate psychology students have the opportunity to participate in a research study to earn required credit for course work. According to a power analysis provided by G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007), 111 participants were required to achieve an actual power of .95 to find a medium effect of .03 and an alpha of .05. This study exceeded this requirement. Despite the unequal number of male and female participants, efforts were made to have an equal number in the study.

An inclusion criterion for the study was established and listed on the sign up posting for Open Research Day. The sole requirement was that all participants should be fluent in written and spoken English to participate in the study. Participants evaluated themselves for this requirement, and it was assumed that they were fluent in written and spoken English if they choose to participate in the study. This inclusion criterion was necessary because the videos and 64-item BRDB questionnaires were in English. The intention of this was twofold 1) to minimize misunderstanding and misinterpretation of the instructions and 2) limit confounding variables in the participants interpretation of the deceptive behavior observed in the video.

Study Design

The study was a combination of a 2 x 2 mixed subjects design and a correlational design. The two independent variables included: gender (male or female; between subjects) of the participant and person rated (self and other ratings of deception; within subjects). The dependent variable was the BRDB questionnaire, which assesses the participant's evaluation of their own perceived deceptive behavior (self) and assessing another person's deceptive behavior (other).

Setting and Apparatus

The study was conducted in a SJSU classroom. The same classroom was used throughout the study and the participants sat around a conference style table. All participants were presented the lying and truth-telling videos on a standard projector screen, six feet in diagonal. The projection screen was positioned in the center of a wall three to eight feet away from the participants; the distance varied based on the participant's position at the conference table. The sound for the video was amplified from a laptop by two standard desk top speakers. The speakers were positioned at opposite ends of the conference table, equal distance from the center of the table. The volume was consistent throughout Open Research Day. All participants were able to view the projector screen and hear the videos.

Deceptive and Non-Deceptive Videos. The acts of lying and truth-telling were depicted on two separate videos produced by Mark Frank's research team. For the purposes of the study the videos represented how the participants assessed another person's deceptive behavior. The video depicting deceptive behavior was 46 seconds in

length, and that depicting non-deceptive behavior was 55 seconds in length. Each video depicted a different male interviewee who was being questioned by a man, not visible on the screen, about money that was stolen from a lab. The man demonstrating deceptive behavior lied to the interviewer, and the man demonstrating the non-deceptive behavior provided a truthful response. Both videos had the same setting, questions, male interviewer, and cinematography. The videos have been validated with the Facial Action Coding System by Frank's research team. This validation confirmed that the two men on the video exhibited different facial behaviors and body language that were consistent with their truth-telling status.

Beliefs Regarding Deceptive Behavior (BRDB). Deception was assessed with the Beliefs Regarding Deceptive Behavior questionnaire (BRDB, Appendix A), which was designed by Lucy Akehurst and colleagues for assessing deceptive behavior. It evaluates four types of lying cues using four subscales: 18 speech behavior lying cues, 16 facial behavior lying cues, 13 body language lying cues, and 17 content of statement lying cues. The speech behavior cues include items that illustrate the details in dialogue (e.g., “repetitions” and “monotonous voice”). The facial behavior cues comprise of items that describe the movements and expressions in the face (e.g., “twitches” and “unfriendly facial expression”). The body language cues consist of items that detail the movements by the body (e.g., “gesticulation” and “reserved posture”). The content of statement cues focus on the type of information conveyed in a statement (e.g., “amount of details” and “spontaneous corrections or additions”).

The cues were evaluated for frequency and intensity during deceptive behavior in comparison to truthful behavior. Participants graded the lying cues on a 7-point scale of +3, +2, +1, 0, -1, -2, -3, which allowed grading between extremes as defined below:

- 0 - indicates that the frequency/intensity of the corresponding behavior does not systematically change during your deceptive behavior compared with your truthful behavior.
- 3 - indicates that the frequency/intensity of the corresponding behavior strongly decreases when you are lying compared to when you are telling the truth.
- + 3 - indicates that the frequency/intensity of the corresponding behavior strongly increases when you are lying compared to when you are telling the truth.

The same BRDB was used for the assessment of self (perception of own lying behavior) and other's deceptive behavior (Appendix A). The only difference between the two questionnaires was the instructions provided to the participants, which explained how to score the lying cues in the context of themselves and others. There was limited published literature addressing the reliability and validity of the BRDB. However, according to Akehurst and colleagues, who constructed the questionnaire, it included all the nonverbal behavior reported in lying behavior research, speech cues from the Statement Validity Analysis content criteria (Steller & Kohnken, 1989), and additional cues believed to be important while lying.

For the purposes of this study a set of demographic questions that assessed other's deceptive behavior was added to the last page of the questionnaire. These questions

asked the participants to specify their gender, age, occupation, familiarity with deception, and awareness of Statement Validity Assessments. The awareness question was included to determine if the participants were familiar with the videos and the BRDB. The intention was to exclude participants that were familiar with Statement Validity Assessments and capable of guessing the hypothesis of the study.

Procedures

Prior to the study, participants were provided the SJSU Institutional Review Board-approved informed consent form (Appendix B). Sufficient time was allowed for the participants to read the consent form and ask any questions related to the study. Participant confidentiality was maintained by not including personal identifying information on the 64-item questionnaire (i.e., name, SJSU student number). Participants were identified by ordered sequence and gender.

The same researcher conducted the study, briefed participants about the study, provided instructions, and debriefed per a predetermined study script (Appendix C). Participants were told that the study was about lying behavior and that they would be asked to answer some questions about themselves, watch two short videos, and answer some questions about the videos. Following the introductory briefing, the participants were presented paper copies of the BRDB and asked to complete a self-assessment of their own lying cues. Participants indicated their completion of the questionnaire by raising their hand, and the researcher reviewed it for incomplete or unclear responses. If information was missing the participant was asked to provide an answer before turning in the questionnaire. Once all the questionnaires were completed and collected the

participants were presented two videos on a projector screen. Participants were told to watch the videos and notified that some of the people in the video would be lying and some would be telling the truth. The videos were presented once, in the order of deceptive behavior and then non-deceptive behavior. After viewing the videos, the participants were presented the 64-item questionnaire and asked to identify the lying cues they observed in the videos. Observing lying cues in the videos simulated their manner of observing lying cues in others. After the review for missing responses and completion of the questionnaire, the participants were debriefed, the intention of the study explained, and participants' questions addressed.

Results

Each participant's numerical response from the BRDB for self and BRDB for other's deceptive behavior and the demographic responses were entered and analyzed in Predictive Analytics Software, PASW Statistics (formerly SPSS Statistics). Data was considered missing and left blank if a participant did not indicate a response to a question. Only 12 data points were missing. This low number of missing data was due to the researcher reviewing the questionnaires for incomplete and unclear responses during the study to ensure that participants completed the questions appropriately.

The review of the demographic questions indicated that 56% of the participants were employed in jobs outside of school. The mean age of the participants was 19.43 years ($SD = 3.32$) and ranged from 18 to 42 years. In addition, all participants were unfamiliar with Statement Validity Assessments (verbal veracity assessment tool) and were not successful in determining the study hypothesis. Therefore, the data for all 127 participants were included in the data analyses.

In an effort to simplify the interaction of gender and lying cues and clearly assess the correlations, the BRDB was subdivided into its four subscales of lying cues: speech behavior lying cues, facial behavior lying cues, body language lying cues, and content of statement lying cues (Table 1). These four subscales are consistent with the headings with in the BRDB.

Table 1

Summary of Four Lying Cue Subscales in the Beliefs Regarding Deceptive Behavior (BRDB)

Lying Cue Subscale	Total Number of Items	Item Number
Speech Behavior	18	1 – 18
Facial Behavior	16	19 – 34
Body Language	13	35 – 47
Content of Statement	17	48 – 64

Examination of Reliability

To assess the BRDB for internal consistency the reliability of the four sub scales for the assessment of self and others were estimated with the calculation of Cronbach’s alpha. Table 2 indicates that for the assessment of self the lowest internal consistency was in the facial behavior and content of statement subscales, while the highest internal consistency was in the speech behavior subscale. In addition, for the assessment of others, the lowest internal consistency was in the content of statement subscale, while the highest internal consistency was in the speech behavior and body language sub scales. Overall the level of reliability calculated by the Cronbach’s alpha indicated a strong level of consistency.

Table 2

Summary of Cronbach's Alpha of the Beliefs Regarding Deceptive Behavior (BRDB) by Four Subscales and Assessment

Lying Cue Subscale	Assessment of Self Alpha	Assessment of Others Alpha
Speech Behavior	.84	.81
Facial Behavior	.76	.80
Body Language	.83	.81
Content of Statement	.76	.78

Descriptive Statistics

The descriptive statistics of each of the 64-item lying cues was conducted to examine the shape of distribution of the participant's responses for self-assessment and others assessment of lying cues. The total responses for an item, minimum and maximum response value, mean response, and standard deviation of a response were reviewed.

The item means for self-assessment ranged for men from a low of $M = -.29$ to high of $M = .69$ and female from a low of $M = -.16$ to a high of $M = .94$. The means for the others assessment ranged for men from a low of $M = -.31$ to a high of $M = 1.78$ and female from a low of $M = -.65$ and a high of $M = 1.69$. Overall the majority of the self and other means were near .05 and the minimum and maximum responses ranged from -3 to +3 for most of the items, and the standard deviation was around 1. This limited mean range implied that the participant's responses to the BRDB did not dramatically change, however there were extremes for specific lying cue items. For the self-assessment,

item 16, “range of vocabulary” had the greatest lying cue decrease ($M = -.17$) and item 39, “shrugs” had the greatest lying cue increase ($M = .79$). For the assessment of others, item 25, “smiling” had the greatest lying cue decrease ($M = -.49$) and item 22, “eye blinks” had the greatest lying cue increase ($M = 1.73$).

Inferential Statistics

The first hypothesis (there will be a difference between the lying cues observed by men and women) was evaluated by an independent sample *t*-test comparing the responses of men and women across the four subscales. The second hypothesis (there will be a difference in lying cue self-description of men and women) was also evaluated by an independent sample *t*-test. The *t*-test evaluated the mean differences between men and women for each of the 64-items on the BRDB. The third hypothesis (there will be a correlation between the lying cue self-description and the lying cues observed by men and women) was evaluated with a Pearson correlation.

Independent sample *t*-test, with equal variance assumed were conducted to assess whether there was a main effect between gender, specifically the difference between the mean scores by gender of the four lying cue groups of the BRDB. Before the *t*-test was conducted the participant’s responses for each of the four subscales was summed and the total was averaged. Table 3 indicates that for the self-assessment of lying cues there was a statistically significant difference between the responses for men and women for the speech behavior and facial behavior lying cue groups. In both cases women were more likely than men to describe themselves as changing their speech and facial behavior when lying compared to when they were not lying. The effect size ($d = .39$) indicated that there

was a .39 standard deviation difference between men and women, which further implied that women were more likely than men to vary their speech behavior when telling a lie. In addition, women were nearly a half a standard deviation higher than men ($d = .46$) in the amount of change that occurred in their self-assessment of their facial behavior lying cues. These results implied that women were more likely than men to vary their facial behavior when lying. Table 4 indicates that for the assessment of others lying cues there was no statistical significance between the means for men and women.

Table 3

Summary of Self Lying Cue Subscales by Gender

Lying Cue Subscale	Gender	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>d</i>
Speech Behavior	Male	4.23	13.17	-2.20	.03	.39
	Female	8.93	10.71			
Facial Behavior	Male	3.76	9.77	-2.04	.04	.46
	Female	6.99	8.03			
Body Language	Male	4.82	9.35	-1.49	.14	.27
	Female	7.10	7.73			
Content of Statement	Male	4.05	9.43	-1.82	.07	.32
	Female	7.12	9.44			

Table 4

Summary of Others Lying Cue Subscales by Gender

Lying Cue Subscale	Gender	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>d</i>
Speech Behavior	Male	12.61	10.53	.30	.77	.05
	Female	12.05	10.82			
Facial Behavior	Male	11.39	9.84	.41	.69	.07
	Female	10.67	10.00			
Body Language	Male	5.17	8.05	-.12	.92	.02
	Female	5.31	7.29			
Content of Statement	Male	4.89	10.34	-.66	.51	.12
	Female	6.04	9.12			

In addition to the subscales, independent sample *t*-test, with equal variance assumed, were conducted to assess if there were significant differences between the item mean responses of men and women for each of the BRDB for self and others assessments of lying cues. For self-assessment there was a significance ($p = .00$) for item 4, “false starts” and there was significance ($p = .01$) for item 17, “length/detail of answer”. For both of these items, women had a higher mean response than men, indicating they were more likely to change these forms of speech behavior when lying. For others assessment there was a significance difference ($p = .04$) for item 46, “reserved posture” and significance ($p = .01$) for item 59, “description of interactions”. For both of these items, women had the higher mean, implying that when a woman evaluates other’s lying cues, she is more likely to notice changes in reserved posture and description of interactions.

Pearson correlation analyses were calculated to evaluate if the self and other’s lying cues were positively correlated on each of the BRDB subscales (Table 5). There were significant correlations between the self-assessment lying cues and the assessment

of other's lying cues. There was a significant correlation (with p at 0.01 level to control for family-wise error) for the following: other speech behavior and self body language; other facial behavior and self body language; other facial behavior and self content of statement. In addition, there were trends (i.e., $p < .05$) for the following: other speech behavior and self speech behavior; other body language and self body language; other content of statement and self content of statement.

Table 5

Summary of Pearson Correlations by Lying Cue Subscale of Self and Other

	Self Speech	Self Face	Self Body	Self Content Statement	Other Speech	Other Face	Other Body	Other Content Statement
Self Speech	1							
Self Face	.625**	1						
Self Body	.548**	.732**	1					
Self Content Statement	.337**	.490**	.494**	1				
Other Speech	.204	.151	.321**	.174	1			
Other Face	.090	.162	.383**	.313**	.707**	1		
Other Body	.126	-.041	.186	.042	.456**	.561**	1	
Other Content Statement	.126	-.025	.172	.212	.475**	.511**	.558**	1

** Correlation is significant at the 0.01 level (2-tailed); N ranges from 123 to 127.

Unplanned Analyses

Exploratory Pearson correlation analyses were conducted on self-self and other-other cues and for gender and the item responses to the BRDB. There was a significant correlation (with p at the 0.01 level to control for family-wise error) for the following self-assessments of lying cues: facial and speech behavior, body language and speech behavior; body language and facial behavior; content of statement and speech behavior; content of statement and facial behavior; content of statement and body language. There was a significant correlation (with p at the 0.01 level to control for family-wise error) for the following assessment of other's lying cues: facial and speech behavior, body language and speech behavior; body language and facial behavior; content of statement and speech behavior; content of statement and facial behavior; and content of statement and body language.

Discussion

The study evaluated the lying cues observed by men and women in themselves as well as in others. The three hypotheses examined addressed whether there was a difference in the lying cues men and women expressed; whether men and women noticed different lying cues in others; and whether there were correlations between the lying cues reported in self and others.

Supporting the prediction, men and women differed in their lying cue self-description for speech behavior and facial behavior. There were no gender-specific differences on the self-reported lying cues for body language and content of statement. In addition, there were no differences in the lying cues men and women observed in other people. Therefore, the only difference between sexes was that when women lie, they claimed they had a greater change in frequency and intensity of speech and facial behavior in comparison to when they told the truth. These results can be explained by the conclusion from Tyler and Feldman's (2004) research, which concluded that women regulated their responses to be socially accepted by others. Therefore, the women in the study anticipated a greater change in the self-lying cues because they regulated their speech and facial cues to be socially accepted.

Interestingly, there were many correlations between the lying cues for self and others. The most evident correlation was the positive linear relationships within all the self subgroups and the other subgroups. These correlations implied that when the research participants perceived that they made changes in one of their own lying cues, this change was correlated with a self-lying cue. This correlation can be further

interpreted to suggest that the cues were working together when the research participants were deceptive or observed deception.

The lying cues observed in others had the same relationship. Based on this finding, one can conclude that the act of lying and interpreting lying behavior is a complex system of inter-related behavior changes. The lying cues were clearly connected and may even have influenced or primed the individual in enacting and observing another cue. For example, if a person observed someone blink frequently, then that may trigger the individual to focus on stuttering speech behavior, which may in turn trigger another lying cue to be observed. Essentially, a chain reaction would be triggered to observe lying cues.

There were also correlations between the other speech behavior and self body language, other facial behavior and self body language, other facial behavior and self content of statement. The correlations indicated that when a person lies and observes another person lie, these specific lying subgroups are correlated. The meta-analysis by Bond and DePaulo (2006) alluded to this connection between the self and others. However, the results of this study were not consistent with the findings of Bond and DePaulo (2006) and Akehurst and colleagues (1996) because their research revealed evidence for differences between self and other lying behavior. In contrast, this study found evidence that there were positive correlations between the self and others lying cues. Interestingly, the results of the current study were consistent with the self-and-other study by Epstein and Feist (1988). Their study explored if there was a correlation between the favorable ratings of self and others in preadolescent boys and girls. The

results indicated that there were significant positive correlations for self and others in favorable ratings.

There are a couple of limitations of the study. The most obvious was the inability to generalize the results from the research sample to a wider population. Specifically, the research participants were undergraduate psychology students in a metropolitan California area; the responses of these participants may not be applicable to different age groups, demographic areas, and socio-economic groups on a larger population scale.

Another limitation was that the videos depicting deceptive and non-deceptive behavior contained only men. The individuals lying, telling the truth, and interviewing were of the same gender. Because gender was a factor being evaluated in the study, this limitation may have influenced how participants answered the questions in the BRDB. The male participants may have identified with the behavior of the men on the video, while the women may not have been able to relate, which may have influenced their responses to the self BRDB. Since only men were depicted lying or truth-telling the videos may have also influenced the responses to the other BRDB. The male interviewee may have primed the participants to only remember their interactions with male deceptive behavior. Future studies can rule out these influences by incorporating multiple videos and balancing the number of male and female individuals on the videos.

There are areas for improvement of this study. The first revision would be in the study design. During the study, the participants were asked a question, “Do you think the people in the video were lying or telling the truth?” However, the participants did not write down their answers, so their accuracy of identifying deception was not evaluated.

Their response would have been helpful because the ability of a man or woman to correctly identify deception could have been correlated with the lying cues he/she observed.

In addition, the videos depicting deceptive and non-deceptive behavior could have been evaluated with the BRDB questionnaire, which would have indicated which of the lying cue subscales were expressed in the video. Such changes would have allowed a clear correlation between the lying cues depicted in the deceptive video, in the BRDB, and by the participants in evaluating other's lying behavior.

The second improvement would be to change the dependent variable. Because published literature demonstrating the validity and reliability the BRDB is lacking, any conclusions drawn from it are necessarily tentative. Another limitation would be that the BRDB evaluates frequency and intensity within the same scale, which implies that they are interrelated. A more comprehensive evaluation would be possible if frequency and intensity were defined within the scale and evaluated on separate rating scales. The ideal method would be to use a gold standard in assessing deceptive behavior. However, since the literature does not indicate an agreement to a gold standard, another possibility is the use of the Assessment Criteria Indicative of Deception (ACID). ACID is a validated tool that is an integrated system composed of investigative interviews to detect deception (Colwell et al., 2008). This technique could be applied to the evaluation of the self and other's lying behavior.

Future research would benefit from tackling the question of the cause of the correlation between the lying cues an individual perceives, expresses, and observes in

others. Specifically, what factors influence how people express lying cues and how they perceive these lying cues in themselves and in others? Based on the research to date, a limited number of influences have been identified for being deceitful (e.g., motivation, social acceptance) and being successful in detecting deceit (e.g., experience, occupation). However, the literature does not demonstrate a clear connection between the practiced self-deception and evaluation of other's deception. If a silver lining is found in the current study and in other similar studies, it may lead to a better understanding of deception and human behavior in general.

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Appendix A

Beliefs Regarding Deceptive Behavior (BRDB) Questionnaires for Self and Others'

Deceptive Behavior

QUESTIONNAIRE: SELF DECEPTIVE BEHAVIOR

Instructions (for own deceptive behavior condition)

While completing this questionnaire try to recall situations in which you have given deceptive information to other people. How did your behaviors change if they were to be compared with those during a truthful account?

In the following pages are listed a number of potential behaviors and content characteristics of statements which you may or may not feel differ during your own deceptive and truthful accounts.

Please indicate, with a "X" under the appropriate number, whether you feel behavior or content characteristic increases or decreases in frequency/intensity during deceptive behavior compared with truthful behavior.

- 0 - indicates that the frequency/intensity of the corresponding behavior does **not** systematically change during your deceptive behavior compared with your truthful behavior.
- 3 - indicates that the frequency/intensity of the corresponding behavior strongly decreases when you are lying compared to when you are telling the truth.
- 3 - indicates that the frequency/intensity of the corresponding behavior strongly increases when you are lying compared to when you are telling the truth.

The numbers between -3 and +3 allow for grading between each extreme. For example, +1 would indicate a small increase in the frequency/intensity of that behavior.

Please remember that there are **no** right or wrong answers. We are interested in the judgment **you** would make with regard to your own personal experience of your own deceptive behavior.

* Thank you for giving up your time to help in this study *

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

A: SPEECH BEHAVIOR

		-3	-2	-1	0	1	2	3
1	Pauses							
2	Stuttering							
3	Clearing of throat							
4	False starts							
5	Grammatical errors							
6	Repetitions							
7	Clichés							
8	Evasive responses							
9	Response latency							
10	Hectic speech							
11	Faltering speech							
12	Voice pitch							
13	Monotonous voice							
14	Shaky voice							
15	Soft voice							
16	Range of vocabulary							
17	Length/detail of answers							
18	Short, simple sentences							

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

B: FACIAL BEHAVIOR

		-3	-2	-1	0	1	2	3
19	Changes in line of sight							
20	Eye contact							
21	Twitches							
22	Eye blinks							
23	Frowning							
24	Wrinkling of nose							
25	Smiling							
26	Biting of lips							
27	Swallowing							
28	Head movements							
29	Blushing							
30	Turning pale							
31	Variations in facial expression							
32	Tense facial expression							
33	Unfriendly facial expression							
34	Nervous facial expression							

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

C: BODY LANGUAGE

		-3	-2	-1	0	1	2	3
35	Postural shifts							
36	Shaking							
37	Self-manipulation or manipulation of objects							
38	Gesticulation							
39	Shrugs							
40	Arm movements							
41	Hand and finger movements							
42	Leg movements							
43	Feet movements							
44	Turning body towards the interviewer							
45	Tense posture							
46	Reserved posture							
47	Nervous bodily expression							

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

D: CONTENTS OF STATEMENTS

		-3	-2	-1	0	1	2	3
48	Plausible description of events							
49	Logical consistency							
50	Unstructured report							
51	Amount of details							
52	Unusual details							
53	Superfluous details							
54	Description of own feelings							
55	Description of other's feelings							
56	Reproduction of speech							
57	Description of unexpected complications							
58	Relating events to independent external context							
59	Description of interactions							
60	Spontaneous corrections or additions							
61	Admitting lack of memory or knowledge							
62	Raising doubts about own testimony							
63	Self-deprecation							
64	Contradictions							

QUESTIONNAIRE: OTHERS' DECEPTIVE BEHAVIOR

Instructions (for others' deceptive behavior condition)

While completing this questionnaire try to recall the videos. How did the behaviors of these people change if they were to be compared with those during a truthful account?

In the following pages are listed a number of potential behaviors and content characteristics of statements which you may or may not feel differ during other people's deceptive and truthful accounts.

Please indicate, with a "X" under the appropriate number, whether you feel a behavior or content characteristic increases or decreases in frequency/intensity during deceptive behavior compared with truthful behavior.

- 0 - indicates that the frequency/intensity of the corresponding behavior does **not** systematically change during deceptive behavior compared with truthful behavior.
- 3 - indicates that the frequency/intensity of the corresponding behavior strongly decreases when a person is lying compared to when s/he is telling the truth.
- 3 - indicates that the frequency/intensity of the corresponding behavior strongly increases when a person is lying compared to when s/he is telling the truth.

The numbers between -3 and +3 allow for grading between each extreme. For example, +1 would indicate a small increase in the frequency/intensity of that behavior.

Please remember that there are **no** right or wrong answers. We are interested in the judgment **you** would make with regard to your own personal experience of other people's deceptive behavior.

* Thank you for giving up your time to help in this study *

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

A: SPEECH BEHAVIOR

		-3	-2	-1	0	1	2	3
1	Pauses							
2	Stuttering							
3	Clearing of throat							
4	False starts							
5	Grammatical errors							
6	Repetitions							
7	Clichés							
8	Evasive responses							
9	Response latency							
10	Hectic speech							
11	Faltering speech							
12	Voice pitch							
13	Monotonous voice							
14	Shaky voice							
15	Soft voice							
16	Range of vocabulary							
17	Length/detail of answers							
18	Short, simple sentences							

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

B: FACIAL BEHAVIOR

		-3	-2	-1	0	1	2	3
19	Changes in line of sight							
20	Eye contact							
21	Twitches							
22	Eye blinks							
23	Frowning							
24	Wrinkling of nose							
25	Smiling							
26	Biting of lips							
27	Swallowing							
28	Head movements							
29	Blushing							
30	Turning pale							
31	Variations in facial expression							
32	Tense facial expression							
33	Unfriendly facial expression							
34	Nervous facial expression							

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

C: BODY LANGUAGE

		-3	-2	-1	0	1	2	3
35	Postural shifts							
36	Shaking							
37	Self-manipulation or manipulation of objects							
38	Gesticulation							
39	Shrugs							
40	Arm movements							
41	Hand and finger movements							
42	Leg movements							
43	Feet movements							
44	Turning body towards the interviewer							
45	Tense posture							
46	Reserved posture							
47	Nervous bodily expression							

-3 = strong decrease

+3 = strong increase

-2 = moderate decrease

+2 = moderate increase

-1 = small decrease

+1 = small increase

0 = no change

D: CONTENTS OF STATEMENTS

		-3	-2	-1	0	1	2	3
48	Plausible description of events							
49	Logical consistency							
50	Unstructured report							
51	Amount of details							
52	Unusual details							
53	Superfluous details							
54	Description of own feelings							
55	Description of other's feelings							
56	Reproduction of speech							
57	Description of unexpected complications							
58	Relating events to independent external context							
59	Description of interactions							
60	Spontaneous corrections or additions							
61	Admitting lack of memory or knowledge							
62	Raising doubts about own testimony							
63	Self-deprecation							
64	Contradictions							

Finally, we would be grateful if you would complete the items below to help us with our research.

Age: _____

Sex: Male/Female

1. Are you employed at present? If so, what is your job title?

2. Does your job require judging peoples' credibility on a professional level? If so, please elaborate.

3. Have you ever read any literature (i.e. books, journal articles, reports etc.) relevant to this area of research (the detection of deception)? If yes, please specify.

4. Have you any knowledge, at all, of a technique known as Statement Validity Assessment? If yes, please elaborate.

5. Do you have any comments regarding this questionnaire?

Appendix B

Informed Consent Form

Agreement to Participate in Research

Responsible Investigator: Alysha Khavarian

Title of Protocol: Lying Cues Observed by Men and Women

1. You have been asked to participate in a research study investigating how people observe lying behavior. As part of the task you will be asked to watch a couple of 1 minute videos and then answer questions about what you viewed. The study will take place at San Jose State University in the Psychology Building.
 2. The risks encountered in this study are no greater than those encountered in day-to-day Life.
 3. You are not expected to receive any direct benefits from participation in the research.
 4. Although the results of this study may be published, no information that could identify you will be included.
 5. There is no compensation for participation in this study.
 6. Questions about this research may be addressed to the researcher or to Dr. Greg Feist, Assistant Professor of Psychology, 408 924-5617, greg.feist@sjsu.edu. Complaints about this research may be presented to Sheila Bienenfeld, Departmental Chair, Psychology Department, (408) 924-5600, sbienenf@email.sjsu.edu. Questions about a research subject's rights or research-related injury may be presented to Pamela Stacks, Ph.D., Associate Vice President, Graduate Studies and Research, at (408) 924-2480.
 7. No service of any kind, to which you are otherwise entitled, will be lost or jeopardized if you choose to "not participate" in the study.
 8. Your consent is being given voluntarily. You may refuse to participate in the entire study or in any part of the study. If you decide to participate in the study, you are free to withdraw at any time without negative effect on your relations with San Jose State University or with any other participating institutions or agencies.
 9. At the time that you sign this consent form, you will receive a copy of it for your records, signed and dated by the investigator.
1. **The signature of a subject on this document indicates agreement to participate in the study.**
 2. **The signature of a researcher on this document indicates agreement to include the above named subject in the research and attestation that the subject has been fully informed of his or her rights.**

Signature

Date

Investigator's Signature

Date

Appendix C

Study Script

Instructions: Thanks for choosing to volunteer for this study. Please read over the informed consent and let me know if you have any questions. Sign the bottom if you choose to participate in this study. This study is about lying behavior and it will involve you answering some questions about yourself and watching a video and then answering some questions about the video.

Study Procedures Instructions:

1. Please complete this questionnaire. Fill it out as though you are answering these questions about your own lying behavior. Try to remember a recent situation when you were deceitful and answer the questions based on you own behavior.
2. Now you are going to watch two videos. Some of the people in the video will be lying and some will be telling the truth. Please watch without talking or writing any notes.
3. Do you think the people in the video were lying or telling the truth?
4. Please complete this questionnaire. Fill it out as though you are answering these questions based on what you look for in trying to determine if someone is lying. Answer the questions based on how you observed the lying behavior of the person in the video. Also complete the extra questions on the last page.

Debriefing Instructions: This study is designed to determine whether men and women notice different lying cues and if people view their own lying differently than what they observe in lying behavior in others. Any questions? Thanks for participating.