

The Influence of Perceived Physical Attractiveness and the Use of the Honest Linguistic Style on
the Perceived Credibility of Individuals in Deceptive Communication Situations

by

Katy Lou Krieger

A Project

Submitted to

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Frank J. Bernieri

In today's media driven society where images stand in for words, we see an increase of attractive people selling us ideas and products. We begin to view their attractiveness as powerful, and influential on our own opinions and they gain credibility with us because of this. But what if it was more than their good looks that made us see them as credible? This study aimed to see if individuals that were perceived as physically attractive were judged by others as being more credible. This study sought to find if an Honest Linguistic Style consisting of more self-references, more details, a more logical structure, fewer other references, less ambivalence and fewer speech disturbances would be perceived as credible. Lastly, this study aimed to see if the physically attractive individuals were using the Honest Linguistic Style at a higher rate in their overall deceptive communication which could be a reason they are viewed as being more credible because they are being more honest in their speech. Targets were videotaped giving brief truth and lie statements and were assessed by judges on their credibility and attractiveness.

Although none of the hypotheses were supported, this study did find that females used the Honest Linguistic Style at a higher rate which could mean they will be seen by others as being more credible.

Key Words: physical attractiveness, linguistic styles, deception, credibility, LIWC

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Committee Member, representing Psychology

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I understand that my project will become part of the permanent collection of Oregon State
University, University Honors College. My signature below authorizes release of my project to
any reader upon request.

Katy Lou Krieger

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The Influence of Perceived Physical Attractiveness and the Use of the Honest Linguistic Style on the Perceived Credibility of Individuals in Deceptive Communication Situations

All humans want to be trusted and to trust those around them. In order to build social relationships and bond with the people who will help us succeed in life we need to gain trust and give it. Some social situations are high stakes and require a great deal of trust like hiring a new CEO or swearing under oath to tell the truth about witnessing a crime. Other, more common and everyday situations, are lower stakes, require a lesser amount of trust but are equally important to us like being allowed to drive your parents car to the school dance or being appointed the leader of your work team for a new project.

Deceptive situations are of particular interest to researchers because they represent both high and low stakes interactions as well as present the knowledge that a person is either lying or telling the truth and trust is essential to determining this outcome (Bond Jr. & DePaulo, 2008; O'Sullivan, 2008). Think of the last time you lied to someone or you knew your best friend was either lying to you or not. What was your mental process? What were you focusing on to determine the truth from this person or what were you focusing on to tell a good lie? In addition, think of the television shows *Criminal Minds* (Gordon, 2005) or *Lie to Me* (Nevins & Grazer, 2009). Did someone, perhaps an expert, claim to know if someone was lying or if the suspect could be trusted in their statement? How did they know if the person was to be trusted; was it their body posture, their eye contact, or the way they fidgeted when giving their statement? Most likely they claimed one of these aspects, if not all, were occurring and tipping the interrogators off as being untrustworthy behavior. But what if these experts or even lay people could tell credibility by someone's good looks (or lack of them) and the words they used when telling the story?

Credibility can be considered as a commodity where it is earned and granted through our own will and intention. However, what if credibility were already determined by our physical appearance and even our word choice? Or, on a broader sense, what if your entire credibility was determined by these physical and unconscious processes? If this were the case, then people should begin to consider their appearance and even the words that come out of their mouths or from their pencil instead of building credibility with a person or investing time in proving they are credible sources. Similarly, good looks and speech pattern would begin to predict political elections and candidate success without the need for further basis for trustworthiness, credibility and competency (Slatcher et al., 2007). This project aimed to identify if credibility was determined by attractiveness. I also sought to identify if credibility leaked through in speech patterns because honest individuals were thinking more truthfully and this came through in their word choice. This project looked at those who were viewed as more physically attractive to see if they were also seen by others as being more credible and if these attractive individuals were using an honest linguistic pattern which could help them gain credibility from others because they are being more honest.

Deceptive Behaviors and their Influence on Credibility

A growing body of research is being done on deceptive behaviors that are both nonverbal and verbal in nature (Zuckerman, DeFrank, Hall, Larrance & Rosenthal, 1979; Hartwig & Bond, 2011). Deception is hard to isolate to a handful of cues and is often based on a multiple cue approach where both verbal and nonverbal indicators produce enough information for judges to accurately detect deception (Hartwig & Bond, 2011). One of the most comprehensive ways to

study this phenomenon is by seeing if judges can identify the cues to deception in a target and if these are significantly correlated to with actual cues of deception as was done by Hartwig and Bond in their 2011 meta-analysis of deception research. Hartwig and Bond identified 66 cues that were both identified by judges as indicating deception and the target's actual deceptive behavior (2011). Examples of these cues included more logical structure, more inclusion of specific details, more references to the self to indicate closeness to the story, fewer references to others, less ambivalence, and fewer speech disturbances (Hartwig & Bond, 2011). This same analysis showed that numerous linguistic aspects of deception were indicative of lying behavior in people and that judges could pick up on these spoken or written linguistic elements (Hartwig & Bond, 2011).

All of these deceptive cues, both actual and perceived, heavily influence the perception of credibility of a human target or source as well as the other way around where credibility influences perceptions of deception (Bond & DePaulo, 2008). People exhibiting these behaviors are viewed by their observers as being less credible and the information they present will often times be considered false or as having something untrue in it (Hartwig & Bond, 2011).

Humans, it appears, may just be hardwired to believe others and find them truthful automatically (Bond & DePaulo, 2008). There is also little evidence to support the hypothesis that individual differences exist between experts, laypersons or even those endowed with related skills like being left-handed or right brained (Bond & DePaulo, 2008). Many of these above claims, especially those by Bond and DePaulo, have been scrutinized and an argument has been made that there are individual differences that indicate certain deception detectors are good at catching liars and that most experts excel in this task over laypersons (O'Sullivan, 2008). This

being said, deception detection by human judges is only slightly better than chance and occurs at a similar rate between experts trained in this field and laypersons (Bond & DePaulo, 2008).

Computer programs that analyze linguistic patterns and word counts such as the Linguistic Inquiry and Word Count software are equally as tuned in to these linguistic patterns of deception and can accurately categorize communications based on specific markers of lying (Bond & Lee, 2005; Tausczik & Pennebaker, 2010). As it stands, the computer programs that attempt to identify deceptive communication are about as accurate as human judges (Bond & Lee, 2005).

Therefore, we expect our attractive participants to use the Honest Linguistic Style more and for their use of this speech pattern to be viewed by judges as being more credible because their pattern is based on verbal cues that are actual and perceived cues of honesty.

Deception Task

In the current study, a low stakes deception task that was meant to approximate a typical interaction between individuals becoming acquainted was employed to determine both credibility and linguistic patterns (Zuckerman et al., 1979). The types of statements made by participants during the task were based on typical stories that people would tell when interacting in social situations. One type of statement that participants had to communicate to others was an autobiographical statement. Autobiographical statements are about a person's past experiences like stories about family vacations, college life and owning a dog for the first time. These statements are used in the present study because they are the richest in detail, are the longest

statements in our sample, and demonstrate the wide variation that deceptive communication can take where an entire story changes as compared to one word or phrase.

This task was designed to be used to garner both credibility ratings from judges viewing the participants and for the statements made in the task to be run through the linguistic software the study focuses on called the Linguistic Inquiry and Word Count software.

Physical Attractiveness and Impression Formation

Aside from the impressions of credibility that individuals give to others, there are also perceptions that are given based on attractiveness. Impression formation is based primarily on the outward appearance of an individual as it is the first presentable or visual aspect that one can experience of others (Asch, 1946). Physical attractiveness influences others judgments because of the stereotypical belief that “beauty is goodness” about the target from the perceiver (Bassili, 1981; Dermer & Thiel, 1975; Dion, Pak & Dion, 1990). There may also be a perceptual process associating beauty or attractiveness with glamour and a glamorous life (Bassili, 1981). A positive bias is given toward those who are attractive individuals even if the attractive is accompanied with other relevant personal information that would be assumed as having more influence on an impression (Brown, Cash & Noles, 1986; Dion et al., 1990).

Attractive individuals’ personalities are seen by others as socially desirable (Dermer & Thiel, 1975; Dion et al., 1990). High physical attractiveness signals to perceivers that these individuals are more successful, happier, more competent, more intelligent and more social in their lives (Eagly, Ashmore, Makhijani & Longo, 1991; Feingold, 1992). Judges even rated attractive counselors as being more able to help people with a litany of psychological and social

problems compared to their unattractive counterparts (Cash, Begley, McCown & Weise, 1975; Cash & Salzbach, 1978). Similarly, experimenter attractiveness has been shown to influence the relationships built between participants and the experimenter; attractive experimenters were more liked by their participants (Barnes & Rosenthal, 1985). These individuals are also perceived by others as having happier lives filled with more successes (Dion et al., 1990). A higher status and power is also perceived of attractive individuals (Cash et al., 1975).

Physical attractiveness even leads to a larger impression of credibility, trustworthiness and persuasive abilities in individuals (Chaiken, 1979; Lewis & Walsh, 1978). In Chaiken's study, individuals were trained on how to standardize their voices so as to remain emotionally neutral and then deliver persuasive messages to a confederate whilst being videotaped. Later, these videos were shown to raters to be judged on persuasive ability, attractiveness and communication skills such as nonfluencies in their speech (Chaiken, 1979). Highly physically attractive individuals were shown through various aptitude and communication tests to be more effective communicators and this was apparent in the impressions they gave to others as the raters identified them as being more persuasive than their unattractive counterparts (Chaiken, 1979). This positive bias for attractiveness will even hold up when judges know that attractive individuals are lying or are trying to persuade them to believe an idea (Chaiken, 1979; Maddux & Rogers, 1980). Clearly attractiveness strongly influences the impressions we make on others.

However, there are drawbacks to being highly physically attractive because these individuals are also perceived as being more snobbish and more materialistic (Dermer & Thiel, 1975). These individuals are expected to hold higher status marriages but also be more likely to experience divorce (Dermer & Thiel, 1975). Cash and Salzbach also identified that although the attractiveness of a counselor greatly improved impression judgments of him/her, there was no

difference between the unattractive and the attractive counselor for trustworthiness (1978).

Feingold's large meta-analysis of the attractiveness research also yielded results that indicated that attractive individuals were overall not attributed with a greater character but that their status was influenced by their looks; this shows that perhaps only power is influenced by attractiveness which would change the phrase to "beauty is power/status" (Feingold, 1992).

Physical attractiveness, in most research studies that are either correlational or empirical, is defined by the overall outward appearance of a person (Eagly et al., 1991). This means that clothing and grooming impact perceptions of attractiveness (Barnes & Rosenthal, 1985). Perceptions of attractiveness are also influenced by whether or not the study is conducted using face to face interactions versus photographs or videos as some research has shown no difference whereas other studies have shown a dilution in the impressions of attractiveness in face to face situations (Barnes & Rosenthal, 1985). In either condition, most attractiveness research focuses on the information derived by the perceiver from the target instead of providing them with information. Similarly, acquaintance interferes with impressions of targets attractiveness because more information is known about a target compared to inferences we drawn from just looks and the sexual inclination toward a person (Eagly et al., 1991).

Attractiveness research is studied using both same sex and opposite sex targets and judges although it is not clear which gives the clearest interpretation of attractiveness of a target (Feingold, 1992; Green, Cunningham & Yanico, 1986; Lewis & Walsh, 1978). However, both groups of judges and targets are useful in person perception research and should be considered fully to understand the breadth of attractiveness. Previous research indicates that attractiveness is bolstered by the hyper emphasis of masculinity in males and femininity in females through clothing, grooming and body posture (Brown et al., 1986). Similarly, the physical attractiveness

stereotype has also been considered through a global lens and researchers have found that attractiveness indicates a positive personality bias across races (Green et al., 1986).

Attractiveness is multi-faceted in its nature because researchers have shown that voice intonation, emotional expression, acquaintance, and intelligence influence judgments of attraction (Dermer & Thiel, 1975; Dion et al., 1990). Often times, for example, intelligence can influence perceptions of attractiveness, but, these perceptions are not based on initial and more instinctual perceptions of attraction (Eagly et al., 1992). The current study chose to look at sexual attractiveness because it kept in line with this previous research and only focused on outward appearances that create quick impressions to others (Dermer & Thiel, 1975; Dion et al., 1990). Physical features related to attractiveness are also a large part of the perception process and by focusing in the current study on these physical features, which we called sexy/hotness, we were able to more clearly define the variable of physical attractiveness to being strictly related to outer appearances that are perceived by raters or viewers. Sexual attraction may also be more closely related to credibility as many studies on attractiveness, competence, intelligence and trustworthiness focus primarily on the physical features of the target because they are the most evident to judges and they are the most persuasive aspect as they influence any and all impressions of the target (Chaiken, 1979; Lewis & Walsh, 1978). Physical attractiveness, then, in this study is only considered to be the perception of others outward appearance in a sexual or lust driven way toward a target and no other aspect(s) of attraction other than sexy/hotness was used.

Based on this previous research, then, it was hypothesized that physically attractive individuals would receive a high score on the “sexy/hot” scale because it is a direct measurement of their outward attractiveness. Also based on previous findings, it was expected that our highly

physically attractive participants would be considered more credible by others because of the “beauty is goodness” stereotype (Dion et al., 1990).

Linguistic Inquiry and Word Count Software and Honest Linguistic Patterns

Linguistic patterns have recently become popular because of the creation of a software program developed in 2001. The Linguistic Inquiry and Word Count software program or LIWC was developed by James Pennebaker and colleagues as a way to advance research on language and its use as it related to personality and health (Tausczik & Pennebaker, 2010). The program was designed to count words in pre-determined categories such that a total word counts for a text sample can be derived.

The LIWC categories are comprised of linguistic processes, psychological processes, personal concerns and spoken categories. The overarching category of linguistic processes focuses primarily on the structure of statements such as verbs, functional words, articles and pronouns (Pennebaker, Booth & Francis, 2007). The psychological processes include categories relating to social interactions, cognition, perception, affect and biological processes (Pennebaker et al., 2007). The category of personal concerns is centered on success and achievement as well as work, money and leisure (Pennebaker et al., 2007). Spoken categories, applicable to the current study, feature special communicative characteristics of utterances that are non-lexical utterances such as pauses, filler words (e.g. like, you know, I mean) and assent (e.g. yes, OK, agree) (*See Appendix A for a full list of categories*) (Pennebaker et al., 2007).

This program has been tested empirically and has been validated to measure and categorize text (Tausczik & Pennebaker, 2010). Using human judges to create dictionary lists,

this program verified the inclusion of words within the dictionary and within specific categories (Tausczik & Pennebaker, 2010). These words were also put into the two larger categories of function and content words and later broken into smaller categories based on their ties to psychological processes, social relationships, deception, etc. (Tausczik & Pennebaker, 2010).

This software program, although advance in categorizing and counting words, is not savvy when it comes to context. There is no differentiation the program considers when placing a word in one category over another and the use of the categories is to show how words have multiple meanings (especially in the English language). Pennebaker's own work with LIWC on personality and health related speech patterns is focused primarily on function words like verbs and pronouns over more complex categories like psychological processes (Tausczik & Pennebaker, 2010). This is to say that more recent studies, including the present study, use these more complicated categories to create contextual information and patchwork is employed to make the linguistic or speech patterns. The program, then, can only tell us what words are used by an individual and how many times and as researchers we infer why they use these words and what is causing them to make these patterns in their speech during specific social situations like lying or telling the truth.

Linguistic cues can be found in both written and spoken communication (Tausczik & Pennebaker, 2010). Although communication can often be planned and words can be strategically chosen, there is still a strong link between personality, thought processing and linguistic styles (Hirsh & Peterson, 2009). For example, a study on the Big Five Personality traits and written personal experience yielded results indicating that each trait had a specific pattern of word choice (Hirsh & Peterson, 2009). Extraverts, in this study, used more words related to family, humans and social processes (Hirsh & Peterson, 2009). Psychological processing can

also be shown through language patterns and a particular emphasis on word categories can determine what a person is thinking about (Tausczik & Pennebaker, 2010). If a person is thinking about their date last night, their readiness for a relationship and what they are going to say when the person calls later tonight, we will see this leak through their language.

Honesty can also be seen leaking through in the language of humans (Bond & Lee, 2005). Slatcher, Chung, Pennebaker and Stone's research identified a linguistic pattern in particular that indicated honest communication use by presidential and vice presidential candidates during their campaign speeches by using linguistic coding software to count word categories (2007). Text samples were taken from presidential and vice presidential candidates from randomly selected debates, interviews and press conferences during the 2004 elections (Slatcher et al., 2007). Using the Linguistic Inquiry and Word Count software program, each candidate was identified as having varying levels of feminine language, honest language, cognitive complexity and presidentiality (Slatcher et al., 2007). Among these was the honest linguistic style, which was a previously identified pattern that non-liars used more than liars, characterized by more references to the self (*me, I*), more references to others (*he, she*), more exclusive words (*but, without*), and fewer negative emotion words (*hate, anger*) and motion words (*run, move*) (Bond & Lee, 2005; Slatcher et al., 2007). Similar to this finding, the earlier mentioned meta-analysis of deception research by Hartwig and Bond yielded a significant linguistic pattern of honesty (2011). This honest linguistic style is defined as having a logical structure, more details, more self-references, fewer other references, fewer unfilled pauses and fewer speech disturbances (Hartwig & Bond, 2011). Consequently the present study used the latter linguistic pattern created by Hartwig and Bond as it was more theoretically derived and in line with the person perception and impression formation research being done by the

investigator. These linguistic categories can be picked up on by both computer programs and human judges as contributing to the honesty and more generally the trustworthiness of a target communicating a story (Bond & Lee, 2005).

The Honest Linguistic Style, created from the Hartwig and Bond study, is hypothesized to be perceived as more credible by others because it is based off of honest verbal cues that judges pick up on and that truth-tellers use. It is also hypothesized that physically attractive individuals will this linguistic style at a higher rate than unattractive individuals when lying and when telling the truth because they are perceived as being more honest by others and this makes them more honest people which comes to be reflected in their speech.

Present Investigation

In the present research project, the researcher hypothesized that those individuals in our study that were perceived as more physically attractive or “sexy/hot” would be judged as more trustworthy and credible by their peers (Eagly et al., 1991; Hartwig & Bond, 2011). It was also hypothesized that the Honest Linguistic Style would be perceived as more credible, honest and trustworthy within the sample of our participants (Hartwig & Bond, 2011). The final hypothesis made was that the highly physically attractive individuals within the study would use the Honest Linguistic Style more when lying and when telling the truth; this high usage would be equal to a high percentage use of the Honest Linguistic Style compared to the overall communication length of 100%.

Method

Participants

Participants were 99 (64 females and 35 males) university students enrolled in a ten week “Psychological Assessment” research practicum for which they received academic credit. Enrollment in the course was unrestricted relating to class standing and major. Approximately 15 to 21 students enrolled per term. The majority of the participants identified themselves as white and reported English as their primary language. Ages ranged from 18 to 54 with a mean of 22.2 years old. All participants were treated in accordance with the “Ethical Principles of Psychologists and Code of Conduct” (American Psychological Association, 2002).

The research practicum met four times per week with each meeting lasting 50 minutes; this weekly routine occurred for all ten weeks of the course. The meetings consisted of participants completing a battery of psychological measures and activities all related to interpersonal behavior and skills. Only the relevant measures will be discussed in this paper. Participants were also required to meet once per week outside of the classroom at a location of their choosing. These meetings were not supervised by an experimenter but the participants were given various instructions to follow each week. The activities required of them to do were representative of typical group work like playing a game, taking a road trip, cleaning and eating a meal together. The outside activities were also designed around the idea that participants would become acquainted with each other. Compared to other studies, our participants were more acquainted with one another after completing the practicum.

Deception Task

Several weeks later in the term, participants were instructed to write out truthful and deceptive communications seven days prior to the deception task and were told they could

practice as often as they would like before delivering their statements in front of the camera and their other group members. The participants delivered an attitudinal statement in which they expressed an attitude (favor or disfavor) toward an object, person, activity or place. The participants also delivered an autobiographical set of statements that focused on a previous experience that occurred in their past like a family vacation (See Appendix B for their instructions). Their final task involved generating truth and deceptive statements spontaneously with no preparation (e.g., *What do you plan to do after graduation? What would you want to have for your last meal?*). Only the autobiographical statements were analyzed for this study meaning that only the videos where participants were lying and telling the truth about a previous event were used.

The day of filming, participants were assigned an order of delivery and then were given cards indicating if they would be giving their truth or lie first (See Figures 4, 5, and 6). The statements were given in the following order: attitudinal, autobiographical and spontaneous. Each participant delivered their first attitudinal statement, paused after that the other group members could decode their deceptive behavior, gave their second statement and paused for the second rating and then left the “stage”. After all of the participants in the group went through their first set of statements the same procedure was followed for the next two communication types.

LIWC Preparation

The video recorded statements were viewed by trained research assistants and word for word transcripts were generated from each of the video clips. Included in these transcripts were

also non-linguistic speech aspects such as pausing. The transcripts were prepared according to the specification described in the Linguistic Inquiry and Word Count (LIWC) software manual (Pennebaker Conglomerates Inc., 2007). Transcripts were proofed by a separate group of trained assistants and conversations took place between the original transcriber and the proofer if any discrepancies occurred in the text. Transcripts were then saved into an accessible format for the LIWC program and analyzed for content by the software.

After the LIWC software program evaluated each transcript, the results were formatted into a Microsoft Excel spreadsheet and they were presented as fractions out of a sum total of one. If for example, a sample text had 50 words total that were categorized by the LIWC, and 4 of these words were categorized as “other references”, then the spreadsheet would show a value of 0.08 in the spreadsheet. These results were then assessed using the previously explained Honest Linguistic Style pattern and resembled the following:

Figure 1: Honest Linguistic Style Pattern

HLS= Logical Structure+ Details + SelfRefs- OtherRefs –Ambivalence – Speech Disturbances
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The logical structure component of this formula was calculated using the cognitive mechanisms category. The details category was a composite variable and added together the number and perceptual processes categories. The self and other reference components of the formula are categories that are both found in the LIWC dictionary and are called personal and other pronouns. Ambivalence was also a composite variable and was calculated by adding together the categories of negations and tentativeness. Finally, speech disturbances are called nonfluencies within the LIWC category and are deemed appropriate only for spoken communication like the kind found in the present study.

Each participant was given an overall Honest Linguistic Style score that was the averaged score between their autobiographical truth and autobiographical lie statements. A high honest style in an autobiographical sentence would appear as follows:

***Last summer I** went on vacation to France with my entire family. When we were there we climbed the **stairs of the Eiffel Tower** and ate lunch at the restaurant inside it. We also visited the bridge with all of the **locks** on it and my parents bought a lock and wrote our names on to symbolize our eternal love as a family. I remember my brother ended up getting his backpack taken on the train but fortunately he only had **spare clothes** inside of it and we were headed back to our flat when it happened.*

A low honest style in an autobiographical statement would look like the following:

*One time my family went on vacation to London and we saw tons of tourist sites. **I liked** the Big Ben clock **uhm** because it was huge and had guards outside of it. The rest of the trip was **pretty good I guess** because when we got there we **uh** saw the Queen's castle **and before that** we tried some really delicious British beer and cheese.*

Measures and Materials

Physical attractiveness ratings were collected from a small set of judges who were unacquainted with the participants. As part of the larger research project, the participants were recorded delivering very brief scripted communications. Some examples of these are:

1. "Hey, there's no more peanut butter?"
2. "Did you put all the dishes in the dishwasher?"

3. *“Wow, what a surprise!”*

These video clips ran for 5 seconds on average and showed the entire body and face of the participant. Judges viewed 9 separate statements from each of the participants in the study and rated their attractiveness based on their impression during these clips. Two male and two female judges watched the entire set of these videos. Judges were allowed to change their ratings once they had viewed other clips of the participant.

Procedure

Physical Attractiveness Ratings

After the emotional communication task was recorded, these videos were shown to a separate set of raters. Physical attractiveness, called sexy/hot to our raters, was calculated across a separate set of 5 judges that were rating the same participants but who were not aware of the first hypothesis. As they watched these short video clips, these raters used the sexy/hot rating scale from 1 to 72 with 36 being the midpoint or average sexy/hotness of the target they viewed. An overall sexy/hot score for each participant was created by averaging all 5 judges' ratings. Three participants were excluded from the analysis because of prior acquaintance between the judge and the participant on the video being rated. The mean ratings for sexy/hot were 37.93 with a standard deviation of 14.45. Ratings ranged from 1.00 to 63.67.

Credibility Ratings

Only the autobiographical statements were judged for credibility in this study because they did were the most rich in detail and the lies and truths were on further ends of the deception spectrum. Another small group of judges were used to obtain credibility ratings from the deception task videos. There were five judges, three males and two females, who were trained in perceiving credibility as a function of a person's honesty and trustworthiness when delivering either a truthful or deceptive communication. These judges were not aware of the physical attractiveness ratings each of the participants received and were not asked to judge the physical appearance or attraction of these targets. In addition, judges were not made aware of the truthful or deceptive nature of each video but were told that the stories were told in pairs and that one was a lie and the other was a truth. Similarly, the judges were not made aware of the research hypothesis for this study. The judges watched each video clip and rated whether the story was a lie/truth as well as how much truth was in each statement the participant delivered. The percentage scale of truth was from 0% (no truth at all) to 100% (entirely true) and the judges indicated their rating using a tick mark on the percentage bar given. Credibility was averaged for each statement type across both the true and false stories and across all raters. This left each participant with an overall credibility score for each statement type.

Figure 2: Credibility Rating Sheet

Clip 1	LIE	TRUTH	(Circle one)
--------	-----	-------	--------------

0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
Nothing is true											Everything is true									

How confident are you in your truthfulness rating?	Guessing			Confident	
	1	2	3	4	5

Results

Means and standard deviations for all measures are reported in table 1. Credibility of a participant was calculated using all 5 judges ratings of the participant across their truth and lie autobiographical communication. Both statements were judged on a scale of 0% truth in the statement to 100% truth in the statement and these scores were averaged together across all raters to create an overall credibility score for each of our 99 participants (64 females and 35 males). Mean scores for credibility were 56.99 with a standard deviation of 5.03. Scores ranged from 40.42 to 67.08.

Honest Linguistic Style was calculated for each participant using a z-scored version of the algorithm. Each category of the Honest Linguistic Style was z-scored and then added or subtracted based on the equation mentioned above. The scores represent the Honest Linguistic Style. Both the truth and lie statements in the autobiographical condition were calculated and then averaged together to create an overall score for each participant. The mean z-score for the Honest Linguistic Style was 0.05 with a standard deviation of 2.14. The scores ranged from -6.06 to 5.47.

It was hypothesized that those who were judged as more credible by one set of perceivers would also be judged as more sexy/hot by a separate set of perceivers. This hypothesis was unsupported. The correlation between credibility and sexy/hotness ($r = .07$) was not significant. The second hypothesis was that the Honest Linguistic Style would be perceived as being more

credible, honest and trustworthy within the sample of participants. This hypothesis was also not supported by the data. There was not a significant correlation between the Honest Linguistic Style and credibility ($r = .08$). Thirdly, it was hypothesized that highly physically attractive individuals would use the Honest Linguistic Style more when lying and when telling the truth compared to less physically attractive individuals. The data did not support this hypothesis either. There was not a significant correlation between the highly attractive individuals and the use of the Honest Linguistic Style at a higher rate ($r = .11$).

An analysis of variance (ANOVA) was conducted to assess whether the sex of the target had any significant impact on their linguistic style or how physically attractive they appeared to others. Females were judged as more attractive ($M = 43.29$) than were males ($M = 35.37$) and this difference was significant ($F(1,94) = 16.34, p < .0001$). Females also used the Honest Linguistic style more ($M = 26.90$) than males ($M = 23.81$) and this difference was significant ($F(1,97) = 7.69, p < .01$).

Figure 3: ANOVA TABLES

ANOVA table for Sexy/Hot Ratings

	df	SS	MS	F	Sign.
Within	1	2935.88	2935.88	16.34	0.0001
Sex	94	16892.94	179.71		
Total	95	19828.82			

ANOVA table for Honest Linguistic Style

	df	SS	MS	F	Sign.
Within	1	215.19	215.119	7.69	0.0067
Sex	97	2715.53	27.995		
Total	98	2930.72			

Discussion

Contrary to the proposed hypothesis, there was no evidence that perceptions of a target's credibility were correlated with their sexy/hotness. The second hypothesis was also not supported by the data. There was no evidence to show a relationship between the use of the Honest Linguistic Style and the perception of this style as being more credible. This result may have been due to the theoretical approach taken by the researcher when the linguistic style was created and the categories were chosen. Instead, a more empirical approach may have yielded stronger categories. For example, a specific Honest Linguistic style was proposed by Newman and colleagues used the LIWC program to assess the actual linguistic category use in honest and deceptive texts and found a different set of categories that liars and truth tellers used (Newman et al., 2003). This study found that liars used fewer self-references, fewer other references, fewer

exclusive words, more motion verbs and more negative emotion words (Newman et al., 2003). In addition, the yielded result may have been influenced by the fact that judges were not asked about a participant's credibility based on their written statements but instead were asked to consider all of the target (i.e. their nonverbal behavior, their dress, etc.) when rating their credibility.

There was no relationship found between highly attractive individuals and their usage of the Honest Linguistic Style. Individuals perceived as highly attractive were no more likely to use the Honest Linguistic Style at a higher percentage than their unattractive counterparts. Again, the creation of the Honest Linguistic Style was based on a theoretical framework over an empirical one and could have diluted the linguistic style overall based on the inclusion or exclusion of categories from the LIWC dictionary. For example, our study did not look at motion words or negative emotion words; both of which characterized deceptive communication in the study by Newman (Newman et al., 2003).

It should be noted that in the current literature for both human and computer judges, there is a clear delineation between the ability of judges to identify cues of deception and their ability to identify cues of truthfulness (Bond & DePaulo, 2008). There is no correlation between an individual's ability to perceive deception and their ability to perceive honesty; although there is a shift in confidence as people are most likely to report knowing when a story is a lie compared to a truth (Bond & DePaulo, 2008). It also appears in the research that people have an inclination to trust others automatically and that trustworthiness and credibility may be based on a process of calculating demerits to subtract from an already high rating of trustworthiness (Toma & Hancock, 2012). My study also chose to look strictly at credibility and not dishonesty or even honest situations for that matter.

The finding that females use the Honest Linguistic Style at a higher percentage of their overall communication than males was unexpected but supported by previous research. Newman and colleagues found a distinct feminine linguistic style of speech and many of these same categories map onto the Honest Linguistic Style that was created for this research project (2003). Such categories that characterize the Feminine Linguistic Style are more self and other references and more details (Newman et al., 2003). These three categories are also seen in the Honest Linguistic Style the present investigation used. In this study, as in past research, females are interpreted as displaying a tendency to be more aware than males of themselves and others in social situations and they included more information in the stories they were telling (Newman et al., 2003).

In future research, a multi-faceted approach to the Honest Linguistic Style is needed in order to assess the categories that make up honest speech and writing. A blend of both the empirical and theoretical models may be necessary to get at the core of honest speech and identify linguistic patterns as they appear in both kinds of literature. Deceptive communication may also have its own language pattern and, although these will be harder to identify, more research is needed in this area to understand the differences between truthful and deceptive speech patterns. Similarly, the language or text being analyzed should also be assessed by human coders to account for both contextual words and popular colloquialisms or references.

Physical attractiveness should also be looked at from a multi-faceted perspective such that all of attraction should be considered by perceivers; this includes attractiveness of body, face, voice, natural beauty, etc. Attraction is based on more than just sexy/hot perceptions and although lust-driven feelings are often associated with attraction there may be more at play than just one variable. For example, attraction may be related to a person's desire to pro-create or

their want of a long term relationship. Other impressions are also related to attractiveness such as competence, intelligence and the ability to be a good parent; all of which could influence a person's overall perception of another individual's attractiveness. In addition, physical attraction is also based on acquaintance with a person because of an established relationship and knowledge by both parties about one another's personalities, attitudes and values. Perhaps, in future studies a more holistic approach should be taken by the researchers to look at physical attractiveness, credibility and linguistic patterns as they interact between a target and a perceiver once they know each other on a deeper level to ensure that first impressions are not influencing everything about the interaction.

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Figure 4: Deception Task Set-Up

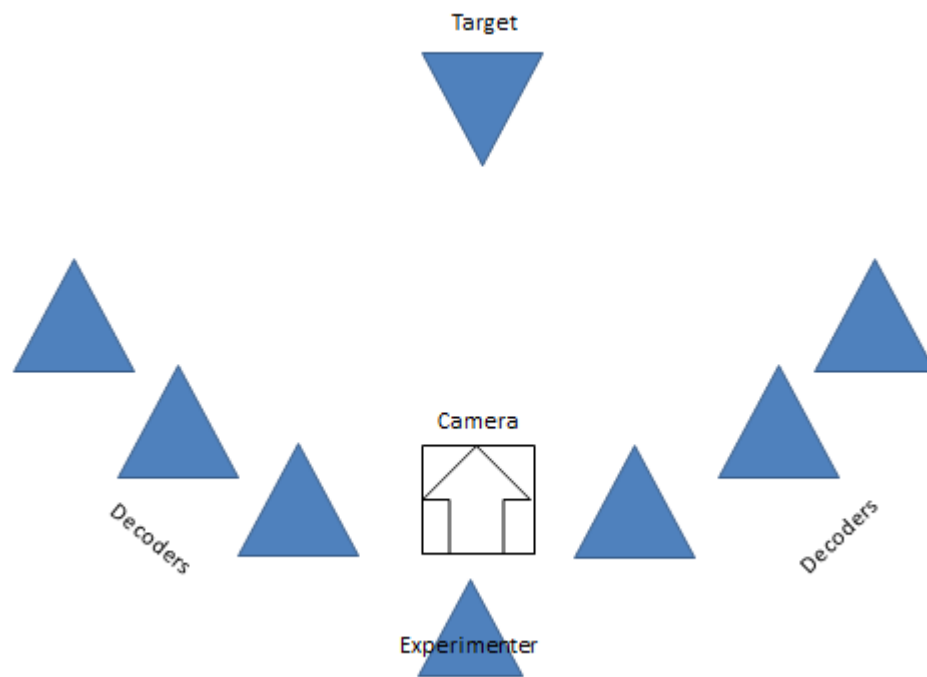


Figure 5: Sample Participant Deception Task



Figure 6: Secondary Sample Participant Deception Task



APPENDICES

Appendix A

LIWC Categories used in the 2007 program dictionary

Table 1: LIWC2007 Output Variable Information

<i>Category</i>	<i>Abbrev</i>	<i>Examples</i>	<i>Words In Category</i>	<i>Validity (Judges)</i>	<i>Alpha: Binary/Raw</i>
Linguistic Processes					
Word count	wc				
words/sentence	wps				
Dictionary words	dic				
Words>6 letters	sixltr				
Total function words	funct		464		.97/.40
Total pronouns	pronoun	I, them, itself	116		.91/.38
Personal pronouns	ppron	I, them, her	70		.88/.20
1st pers singular	i	I, me, mine	12	.52	.62/.44
1st pers plural	we	We, us, our	12		.66/.47
2nd person	you	You, your, thou	20		.73/.34
3rd pers singular	shehe	She, her, him	17		.75/.52
3rd pers plural	they	They, their, they'd	10		.50/.36

<i>Category</i>	<i>Abbrev</i>	<i>Examples</i>	<i>Words In Category</i>	<i>Validity (Judges)</i>	<i>Alpha: Binary/Raw</i>
Impersonal pronouns	ipron	It, it's, those	46		.78/.46
Articles	article	A, an, the	3		.14/.14
Common verbs	verb	Walk, went, see	383		.97/.42
Auxiliary verbs	auxverb	Am, will, have	144		.91/.23
Past tense	past	Went, ran, had	145	.79	.94/.75
Present tense	present	Is, does, hear	169		.91/.74
Future tense	future	Will, gonna	48		.75/.02
Adverbs	adverb	Very, really, quickly	69		.84/.48
Prepositions	prep	To, with, above	60		.88/.35
Conjunctions	conj	And, but, whereas	28		.70/.21
Negations	negate	No, not, never	57		.80/.28
Quantifiers	quant	Few, many, much	89		.88/.12
Numbers	number	Second, thousand	34		.87/.61
Swear words	swear	Damn, piss, fuck	53		.65/.48
Psychological Processes					
Social processes	social	Mate, talk, they, child	455		.97/.59

<i>Category</i>	<i>Abbrev</i>	<i>Examples</i>	<i>Words In Category</i>	<i>Validity (Judges)</i>	<i>Alpha: Binary/Raw</i>
Family	family	Daughter, husband, aunt	64	.87	.81/.65
Friends	friend	Buddy, friend, neighbor	37	.70	.53/.12
Humans	human	Adult, baby, boy	61		.86/.26
Affective processes	affect	Happy, cried, abandon	915		.97/.36
Positive emotion	posemo	Love, nice, sweet	406	.41	.97/.40
Negative emotion	negemo	Hurt, ugly, nasty	499	.31	.97/.61
Anxiety	anx	Worried, fearful, nervous	91	.38	.89/.33
Anger	anger	Hate, kill, annoyed	184	.22	.92/.55
Sadness	sad	Crying, grief, sad	101	.07	.91/.45
Cognitive processes	cogmech	cause, know, ought	730		.97/.37
Insight	insight	think, know, consider	195		.94/.51
Causation	cause	because, effect, hence	108	.44	.88/.26
Discrepancy	discrep	should, would, could	76	.21	.80/.28
Tentative	tentat	maybe, perhaps, guess	155		.87/.13
Certainty	certain	always, never	83		.85/.29

<i>Category</i>	<i>Abbrev</i>	<i>Examples</i>	<i>Words In Category</i>	<i>Validity (Judges)</i>	<i>Alpha: Binary/Raw</i>
Inhibition	inhib	block, constrain, stop	111		.91/.20
Inclusive	incl	And, with, include	18		.66/.32
Exclusive	excl	But, without, exclude	17		.67/.47
Perceptual processes	percept	Observing, heard, feeling	273		.96/.43
See	see	View, saw, seen	72		.90/.43
Hear	hear	Listen, hearing	51		.89/.37
Feel	feel	Feels, touch	75		.88/.26
Biological processes	bio	Eat, blood, pain	567	.53	.95/.53
Body	body	Cheek, hands, spit	180		.93/.45
Health	health	Clinic, flu, pill	236		.85/.38
Sexual	sexual	Horny, love, incest	96		.69/.34
Ingestion	ingest	Dish, eat, pizza	111		.86/.68
Relativity	relativ	Area, bend, exit, stop	638		.98/.51
Motion	motion	Arrive, car, go	168		.96/.41
Space	space	Down, in, thin	220		.96/.44
Time	time	End, until, season	239		.94/.58

<i>Category</i>	<i>Abbrev</i>	<i>Examples</i>	<i>Words In Category</i>	<i>Validity (Judges)</i>	<i>Alpha: Binary/Raw</i>
Personal Concerns					
Work	work	Job, majors, Xerox	327		.91/.69
Achievement	achieve	Earn, hero, win	186		.93/.37
Leisure	leisure	Cook, chat, movie	229		.88/.50
Home	home	Apartment, kitchen, family	93		.81/.57
Money	money	Audit, cash, owe	173		.90/.53
Religion	relig	Altar, church, mosque	159		.91/.53
Death	death	Bury, coffin, kill	62		.86/.40
Spoken categories					
Assent	assent	Agree, OK, yes	30		.59/.41
Nonfluencies	nonflu	Er, hm, umm	8		.28/.23
Fillers	filler	Blah, I mean, you know	9		.63/.18

Words in category refers to the number of different dictionary words that make up the variable category. **Validity judges** reflect the simple correlations between judges' ratings of the category with the LIWC variable (from Pennebaker & Francis, 1996). **Alphas** refer to the Cronbach alphas for the internal reliability of the specific words within each category. The binary alphas are computed on the occurrence/non-occurrence of each dictionary word whereas the raw or uncorrected alphas are based on the percentage of use of each of the category words within the texts. All alphas were computed on a sample of 2800 randomly selected text files from our language corpus.

The LIWC dictionary generally arranges categories hierarchically. For example, all pronouns are included in the overarching category of function words. The category of pronouns is the sum of personal and impersonal pronouns. There are some exceptions to the hierarchy rules:

Common verbs are not included in the function word category. Similarly, common verbs (as opposed to auxiliary verbs) that are tagged by verb tense are included in the past, present, and future tense categories but not in the overall function word categories.

Social processes include a large group of words (originally used in LIWC2001) that denote social processes, including all non-first-person-singular personal pronouns as well as verbs that suggest human interaction (talking, sharing).

Perceptual processes include the entire dictionary of the Qualia category (which is a separate dictionary), which includes multiple sensory and perceptual dimensions associated with the five senses.

Appendix B

Deception Task Instructions for Participants.

PSY 401

Due Insert Date Here(Tuesday Week 2)

****Please email to Insert T.A .Email Here by 5pm on Insert Date Above Here****

Instructions for Deception Task:

Statement: Autobiographical (a personal event, story, or opinion)

Come up with a truth and a lie for something that you have emotion attached with. These statements should be longer, about 50-100 words.

Examples could include:

Describe your first kiss.

Recall an event that really angered you or a time you felt
overjoyed.

Explain why you personally identify with a specific superhero
(or villain)

Write your statements on the attached page in the appropriate space (you may also type your answers and turn them in on a separate sheet of paper).

Your true answers must be **completely true** and the **majority and essence of your lie must not be true.**

Your truth and lie must be on the same subject. So if, for example, you talk about your favorite sport, you must then lie about what your favorite sport is.

