

LIE TO ME: A video Analysis of Non-Verbal Communication Between Female Students in a Game of Deceit.



“We need to observe, and we need to do it well, with imagination, with boldness, and with dedication. If we do not observe, we shall never see what is there. If we never see what is there, we shall never see patterns, there will never be the kind of theory that we can build with.” (Gottman, 1986: 200)

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Word Count: 11081

Acknowledgments

I owe a considerable amount to a few people; this research would not have been possible without them.

Professor Saadi Lahlou's encouragements and incredible ideas inspired me beyond expectation. His availability, advice and knowledge guided my journey through the experimental world. I am so grateful for having had the opportunity to study under you.

Steve Gaskell and Steve Bennett, also known as 'the Steves', were fantastic. The technical arrangements of my experimental setting as well as the endless capturing of my videos were flawless.

The quantitative analysis could never have been done without the precious help of Dr. Sally Stares; she is the kindest and brightest teacher I have ever had. As I fell in the rabbit hole of statistics, she was the only one who could help me make sense of my data. Words cannot describe what I owe to you!

Finally, last but not least, I wish to thank all my participants for sharing with me their time and for participating in quite an unusual experiment. Thank you for making my research enjoyable!

This work is dedicated to my mother.

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Abstract:

This paper reports on an experiment exploring the relationships between Non-Verbal Communication and the act of lying and telling the truth. Lying has become a social competence, that for example enables one to 'keep face' during embarrassing situations or to manipulate others to obtain personal gains. This aptitude is dependent on several variables; some are based on the spoken language. However, the most important ones are based on the control and use of body language and more specifically facial movements. Fourteen participants took part in an experiment in order to demonstrate a relationship between the insecurity that exists when telling a lie and the act of constructing a reality. It was found that the participants blinked more frequently when they were lying. However, large differences were observed between the different participants. In addition, the participants had a significant tendency to believe the other participant was lying to them, and felt a considerable discomfort when lying or being lied to. It was also found that some of the participants invented situations and scenarios of their own accord during the experiment.

Key words:

Lying, Truth, Video Experiment, Game, Blinking, Gaze, Judgments, Decisions, Reality

1. Introduction

Within the field of communication a particular aspect has not obtained the scrutiny and the recognition that it is due. Non-Verbal communication is perhaps the most important communicative tool that one can learn to use, observe and interpret. Mehrabian's equation for the transmission of emotional messages in a brief interaction between strangers show that the total affect depends more on facial expressions (55%), than vocals (38%) and verbal's (7%) (Gottman, 1979). Miller (1972:359) argued that "verbal communication takes precedence in human discourse and that Non-Verbal Behaviour (NVB) achieves most of its communicative significance in the context of syntactically organised utterances", underlining the importance of Non-Verbal communication. Several daily occurrences such as being deceived, communicating friendship or persuading others are intrinsic to the use of bodily communication. This research is centred around the work of the most recognized theorist on deception, Paul Ekman. Even though his perspective on nonverbal cues which permit the detection of lies has received support from practitioners and academics in recent years, there is still no consensus within the literature. Charles Darwin (1999), a pioneer in the field of facial behaviour and emotions, he developed theories that have just recently been proven and others that were groundbreaking for his time. His studies of the human face and body language are still core to Ekman's new theories.

In this study, a game was created which placed two female students in a situation where they had to lie to each other. Because facial emotions such as anger or surprise are shown only in high stake lies (Ekman, 2009), our study focused on more observable NVBs. More specifically, the researcher was interested in the behaviours such as blinking, gaze directions as well as the use of

impression management (i.e. the attempted control of the perceptions other people form). The configuration of our experimental setting was influenced by Vertegaal et al.'s (2000) critiques of most video-mediated communication systems that do not use enough cameras in order to obtain a global picture. We, therefore, used more than one camera. They were situated at the level or slightly lower level than the eyes of the participants to capture entire facial expressions.



Image 1: Screen shot of experiment 7

This research attempts to study the interpretation given to non-verbal behaviours in a game of deception. Since each participant was asked to guess if the other was lying or telling the truth, we explored how they made judgments in a suspicious setting. Focusing first on the cultural and emotional perspectives that surround the act of deception, this paper then explores previous studies and experiments that led to several discoveries on deceptive cues. The specific approach of this paper is its closeness to the concepts of personality and in particular, interpersonal reality. We shall then explain the methodology of this research including the procedure and reasoning

behind the structure of the experiment, the technical specifications, the recruitment of participants and the dependent variables we used for the statistical analysis. In the following section we look at the statistical findings and the relationships between blinking, the games, the gaze towards the screens and the certainty of the judgments in association to lying. Following each experiment, the researcher questioned the participants on their observations and thoughts about deception, these findings are detailed in the subsequent section. Our findings are then discussed in relation to the past research on deception and emotion. Essentially, we will look at the relationship between gaze and reality, the use of the screens to make judgments, the insecurity that is imbedded with deception and lastly the construction of myths and realities concerning lies. Ultimately, it is concluded that, despite the small sample size, this pilot brought some new perspectives to the general theory on deception and contributes to a further understanding of this important social phenomenon.

2. Literature review

2.1 Lying- a cultural and emotional perspective

Previously, anthropologists and psychologists believed that emotional expressions were the product of learning, and therefore different in each culture (Birdwhistell quoted in Ekman, 2007). Ekman recognizes some veracity to such theories as Birdwhistell discovered ‘display rules’ which Ekman interpreted as socially acquired and based on culturally different rules of management of expressions. The first indication that emotions are universal was the fact that no new expressions were observed by Ekman when he studied isolated groups of people such as in Papua New Guinea. Ekman developed his theory on the assumption that there are seven

universal emotions: anger, sadness, surprise, fear, happiness, contempt, disgust. On the other hand, Wierzbicka (1999) argued that words such as anger are too specific for certain feelings and that some cultures might not have such basic and neutral words in their language. She believes that such messages can only be represented in terms of universal culture-independent concepts. She replaces the categorical word of for example happiness with the expression: 'I feel something good now'. It could however be argued that Ekman (2009) who is clearly aware of this aspect, developed for example a theory to read more than eighteen different smiles including their use as a deception tool. The context is primordial for Ekman and thus the use of 'English lexical categories' such as happiness are just a first step towards their real interpretation and hence making Wierzbicka's argument irrelevant.

The body is described by Gottman (1979) as far less reliable than the voice or the face to interpret thoughts and emotions. He argued that certain cultures and ethnic backgrounds as well as lifeworlds (a shared world where subjects live together) influence the use of gestures, and illustrates this argument with the example of the signification of hand gestures for Italians. Likewise, Argyle (1972) believed that there are many ways of standing, sitting or lying depending on the culture, however, these have a universal meaning to some extent. Based on Mehrabian's (1968) findings Argyle explained that some postures can be perceived as a friendly, hostile, superior or inferior attitude. Furthermore, he argued that there can be 'leakages' when anxiety does not affect the face, but can be seen in posture as it less well controlled than the face and voice (Ekman, 1969; Argyle 1972). Gottman (1972) explained that

Cultural Stereotyped Impression of Static Facial Features

Feature	Quality	Impression
Shape of face	<ol style="list-style-type: none"> 1. Vertical oval 2. Square 3. Horizontal oval 	<ol style="list-style-type: none"> 1. The indoor type 2. The rugged type 3. Tolerant, happy
Eyes	<ol style="list-style-type: none"> 1. Can't see whole iris 2. Can see whole iris 3. Eyes far apart 4. Eyes close together 5. Small eyes 6. Large eyes 7. Turned down lines 8. Extra white between iris and lower eyelid 9. Shifty eyes 10. Eyes slant downward to outer corner 11. Can see much of upper eyelid 12. Can't see much of upper eyelid 13. Lines in corners of eyes fan out symmetrically 14. Lines in corners of eyes fan down toward mouth 15. Lines from nose grooved and pronounced down around mouth 	<ol style="list-style-type: none"> 1. Emotionality 2. Hidden emotionality 3. High tolerance 4. Low tolerance 5. Feelings deeply buried 6. Expressiveness 7. Melancholy 8. Weighed down with problems 9. Deceitful 10. Critical: The inspector 11. High action & impulsive & low analytical 12. Analytical 13. Laugh lines, happiness, humor 14. Appreciation for rhetoric 15. Talker (lawyer type)
Lips and lines	<ol style="list-style-type: none"> 1. Tight, thin lips 2. Full lips 3. Mouth drops at corners 4. Mouth and eye lines down 5. Mouth turned up at corners 	<ol style="list-style-type: none"> 1. Efficient, business-like, not wasteful, concise, & terse 2. Generous, sensuous 3. Sour puss, pessimistic 4. Depression 5. Optimism
Brow	<ol style="list-style-type: none"> 1. Furrowed horizontally 2. Furrowed vertically 	<ol style="list-style-type: none"> 1. Worried 2. Suspicious
Nose	<ol style="list-style-type: none"> 1. Hawk nose convex 2. Concave nose 	<ol style="list-style-type: none"> 1. Good general and administrator 2. Nurturant, helpful
Arc of eyebrow	<ol style="list-style-type: none"> 1. High upsweep 2. Down sweep 3. Eyebrows close to eyes 4. Eyebrows far from eyes 5. Ledge above eyebrows 	<ol style="list-style-type: none"> 1. Dramatic 2. Esthetic 3. Affable 4. Discriminative, critical 5. Methodical, concern for detail

Figure 1: Argyle, 1988: 57

coders of facial expressions must be aware of cultural stereotypes they possess due to impression formation, such as seeing a man with a horizontal oval shape of face and believing he would be a tolerant and happy man (cf. Figure 1).

Concerning facial expressions, two debates have emerged. The first views human faces as ‘read outs’ of inner emotions (cf. Ekman 1972, 1989, 1994) or as ‘social signs’ (Fridlund, 1997). On the other hand, Wierzbicka (1997) defends a *juste milieu* between the ‘emotional expression approach’ and the ‘social communicative approach’. Furthermore, she argued that faces can and should be read within all cultures in order to attain successful communication. Wierzbicka argued that to establish the meaning of a smile or frown (speech, tone, behaviour), one has to think of how people feel when they see this. This is comparable to the research on ‘mirror neurons’, where Rizzolatti et al. (2004: 169) argues that “if we want to survive, we must understand the actions of others” by looking and learning from this observation. Facial expressions for worry, concentration and anger are very similar and categories should exist in order to analyse them. For her, all languages have specific words to describe how someone is feeling based on certain thoughts. Furthermore, the difference in languages could be explained by the idea that a certain culture has more words to describe matters of importance. The Inuit have more than fifty ways of qualifying snow, so the same could be said about cultures regarding feelings (i.e. more words to describe specific feelings).

There have been many disputes about the origin of facial expressions and their relationships to culture and society. Our particular interest in this argument is based on Ekman’s analysis of emotions and deception (i.e. how to fake or replace one emotion by another, which will be discussed later in this paper). Moreover, for our research it is crucial to understand how facial and bodily expressions are interpreted theoretically to compared to our participants’ perceptions.

2.2 Experimental approaches to decipher cues of deception

Having previously seen how emotions are universal, we will now see how emotions can be read to observe deception, and specifically what cues to look for. Ekman (2007) advocated that humans are not capable of easily initiating or terminating emotions consciously. Hence, the question raised in association to the ability to control emotions in *The Nature of Emotion* edited by Ekman (1994) is the degree of emotional regulation that is in effect. It has been shown by many scholars that liars have more difficulties controlling their behaviours when devising spontaneous lies, and that intense preparation is associated with a greater number of changes in posture (Biland et al, 2008). Contrarily, Mann, Vrij & Bull (2002) found that liars may not exhibit nervous behaviours because they are probably simultaneously experiencing other processes, particularly increased cognitive load and/or attempted behavioural control.

Several laboratory experiments have been done concerning deception where participants are asked to lie about personal facts, films, pictures, feelings about a person or object, or to cheat / steal and lie about it. Mann, Vrij & Bull (2002) argued that these experiments were not reliable enough as they asked participants to simulate real-life settings and were doing so for the sake of the experiment. To rectify this, Mann, Vrij & Bull (2002) observed criminal interrogations in order to study high-stake lies in a real-life context. It could however be argued that because the criminals had already been interviewed by the police, they and thus had previous experience in lying to the police, and might have found a thrill in being in that position. Ekman described duping delight as a sheer pleasure depending on taking risks and having control over others. This is relevant in my experiment as the participants will know if they succeeded in cheating the other. We would expect our participants to either show delight or fear depending on their results during the game. Moreover, our participants will not be asked to re-create a real-life situation but solely to play a game.

Sulger (1986) enunciated three crucial principles. The first is that there is no single verbal communication; it is always accompanied by a form of non-verbal communication. The second principle is that non-verbal communication may exist solely. Finally his third principle is that even in silence there is non-verbal communication. Similarly to Barthes and Saussure, Leach (1972) found that all customary acts which convey meaning as ‘symbols’ can be classed as ‘paralinguistic’ and have signify meanings far from the concrete issues of the immediate context. The signifier and its signification exist ‘off stage’ and permit a deeper interpretation of the NVB. For example, arms or hands are joined or crossed as a sign of protection when exposed, threatened or in a moment of tension (Sulger, 1986). Furthermore, all crossing gestures identify a situation of auto-defence where the person is feeling uneasy. Sulger (1986) explained the need to touch ourselves in order to believe in ourselves, to feel comfortable and reassured.

To summarize, deception has been researched mostly in laboratory experiments. Some researchers have attempted to use ‘real-life’ data, however, this data is often flawed in regards to its representativeness. For example, criminals have been closely observed in various experiments; but given that they are not necessarily well-adapted to social norms, such research does not reflect typical human behaviour. Nevertheless, the research demonstrates how NVB can reveal some of our true feelings and thus serve as leakage for the truth.

2.3 Typical non-verbal behaviour observed when lying

Hinde (1972) describes two views of facial expressions and gestures. The first claims that they are ‘inborn’ or ‘innate’ whilst the other claims that they are liable to change, coincidental or culturally imposed. Mann, Vrij & Bull (2002: 372) argued that “the most reliable indicator of deception is likely to be a change from normal behaviour within a particular individual”.

Furthermore, Zuckerman and Driver (in Argyle, 1988) following the meta-analysis of forty-five studies on lying and deception argued that participants showed pupil dilation, raised pitch, and speech hesitation as well as shorter utterances. Even though on the other hand, they control their blinking, gaze, body and head movements. Hence, Zuckerman et al. believed that less head movements and less blinking were signs of lying and deception. Thus, and contrary to public belief, previous research on deception found that most people decrease non-functional movements, becoming unnaturally still, and that there is no relationship between eye contact and lying (Mann, Vrij & Bull, 2002).

According to Vertegaal (2000), direct eye contact is used to regulate social distance and too much direct gaze will make people feel uncomfortable. Being able to detect that the other is saying 'I am starting to feel uncomfortable' is very important in social interactions as the other would rarely say what he/she thinks. Generally, when two people are engaged in a conversation they look at each other for durations between two and seven seconds with a total direct-eye contact of thirty to sixty percent of the discussion (Maisonneuve, 1971). Furthermore, Maisonneuve argued that eye contact should be considered a communication medium, to the same extent as speech or other non-verbal behaviour. Maisonneuve and Vertegaal encourage us to look further in the use of gaze as a social deceptive tool. As we have seen previously with Ekman, Biland refers to Zuckerman et al (1981) to illustrate the non-verbal arousal that follows the act of deceit, which includes pupil dilation or the increase in blinking. Zuckerman argued that a liar finds it difficult to maintain eye contact and gives evasive answers, but such observations seem quite basic. For Zuckerman, spontaneity is central to the detection of lies: the problem with this approach is that it is clearly not context related. For example, if a suspect is being interviewed, he might be afraid of getting blamed for a crime he did not commit and thus avoid

eye contact or even give the most factual answers possible. It could be argued that such methods are too specifically related to personality; we expand on this perspective in our discussion.

Our initial hypothesis was that there are NVB changes when one is lying in contrast to what can be called ‘normal behaviour’ when one is telling the truth. It was here discussed how previous experiments have researched aspects such as eye contact, voice levels and body movements in relation to lying.

2.4 Different coding used in past research

Much criticism of early social psychology regarded sampling, claiming that that it was unrepresentative or unlike real life. We will therefore briefly discuss the main critics in order to establish a preferred methodology. Argyle (1988) argued that it is possible to arouse real emotions and behaviours in laboratory conditions. Hence, we chose to observe students in a laboratory setting.

Gottman (1986) argued that in order for a coding scheme to work well, it has to fit the researchers ideas and questions. Accordingly, instead of reusing a coding scheme from previous work, we adapt it to fit our questions. Moreover, he claimed that a coding scheme should be as simple as possible, which we also follow. Ekman and Friesen (1975) focused on three areas of the face, the brows, the eyes and the lower face, whilst Gottman’s coding system is based on either *affect* or *context* to code non verbal behaviour. The affect codes are for a speaker’s non verbal behaviour and the context codes are used for the listener. Biland et al (2003) coding scheme was based on the one developed by Ekman et al; they found that the number of behaviours observed was significantly higher in deceitful interaction and highest for the spontaneous lies condition, mostly an increase in fake smiles and embarrassment smiles. In order to obtain new information our study’s design is based on some of the same principals with

however different tools and different NVBs. Gottman (1986) explained that socially constructed codes (based on the observation of expressions such as sadness) require considerably more sensitivity to observations and more inferences in order to understand the 'language' of affect and thus, have to be experts on cultural informants about emotion.

2.5 Lying a personality and reality perspective

De Paulo et al (in Biland et al, 2003) have taken into account that the person who intends to deceive will often change his or her discourse by observing and 'reading' his interlocutor. Their approach marks a rare distinction in establishing the act of deceit as interpersonal communication. Thus, if the interlocutor is nervous, this might influence the other to either also become nervous or on the other hand try to calm the first. Such behaviour will of course result in different speech patterns, vocal pitch, and gestural behaviour. Hence, being able to read navigational cues (Goffman, 1959) is a useful tool for someone trying to deceive. Here we are also aware of how the situational context will explain what NVBs are or are not linked with the act of deceit, or in other words, how having a low pitched voice will in some contexts be a sign of deceit or on the contrary of honesty and empathy. One of the most important intentions of this paper is to underline the importance of being able to read NVBs. The ability to navigate within different social circles is dependent on the ability to read and persuade people based on non-verbal communication.

"A personality is nothing more than the sum total of what a person is" (Holmes & Holmes, 2002: 37). These are a person's set of values and attitudes (such as views on parenthood, social, cultural and personal experiences). Moreover, personality refers to stable patterns of behaviours or traits that predispose an individual to act in certain specific ways. "Thorndike (1920) defined *social intelligence* as an individual's ability to understand and manage others, as well as a

general tendency to act wisely in human relations” (Chamorro-Premuzic & Furnham, 2005). Holmes & Holmes establishes five personality components that make someone behave differently than others: biology (intelligence and genes), culture (rules and values and other sub-cultures), environment (social status, opportunities), common experiences (daily occurrences, school, cultural identity, loyalty and honesty), and unique experiences. The relationships between personality and aptitudes to deceive have not been observed previously. Even though people’s introversion or extroversion have been correlated to smiling and laughing and direct gaze (Argyle, 1988), which as we have seen are related to deceptive cues. Argyle also argued that there is more gaze when the participants know each other.

After having made an atlas of facial expressions, i.e. the different use of facial muscles and their level of contraction, Gergerian and Ermiane (1978) matched types of gazes with character modalities. As our study is based on the simulation of a dialogue of persuasion, it is understandable that personality will affect the rhythm of the dialogue. Extraversion is defined by Gergerian and Ermiane as a “tendency, a disposition or modality by which an individual is at times or habitually disposed to enter in contact with external world and to live in the present reality” (Gergerian & Ermiane, 1978: 168). On the other hand introversion is a “tendency by which an individual is at times or habitually disposed to remain without contact with the external world and to live outside the present reality” (Chamorro-Premuzic & Furnham, 2005). Will (personal value) or Affection (social value) are two main classification types for Gergerian and Ermiane that differentiate levels and modalities of extraversion. Their research shows that some personalities can be identified based on gaze (depending on the planes such as superior, inferior, or horizontal and their orientation such as forward or sideward) and facial expressions, which could mean that non verbal behaviour for lying or truth telling are associated with personality.

Descartes (in Stroud, 2008) argued that the world was divided by the physical world and the world of minds (bodies versus thinking things). Objects or bodies had to occupy space, thus in our experiment the screens are part of the physical world, whilst the ideas that are created from their interpretation belong to the world of minds. We consider that those two worlds are not independent and unrelated; there are relations between the screens, the lies and the significance of lying. In the same way, there is a relationship between colours, beauty, virtue and other forms of value due to the link between the physical and the world of minds as discussed by Thompson (2005). Though our experiment was not constructed specifically to examine the possible relationship between personality and NVB related to lying, it raises the question for future research.

“Routines, rules, standards of conduct, values to uphold are thus by-product of group interaction. Such a superstructure of rules, standards, and values is referred to generically as the social norms of the group” (Sherif & Sherif, 1956:237). Even though Sherif and Sherif (1956) concentrate on the formation of norms by examining their origin, such as the social origins of values, standards and aspirations, we concentrate here on the formation of a shared virtual reality and the rules and standards that exist in such situations. Gergerian and Ermiane (1978) state that a dominant extravert remains entirely in contact with what surrounds him and lives in the present and in reality. This relates directly to our experiment which observes how a participant succeeds in making a decision on the veracity of a given statement based on NVB, and more precisely on the observation of gaze directions or how much one can read from the others participants’ behaviour. Most theories in social psychology have shown how everyone attempts to conform to the social group. Asch (1987)¹ and Sherif et al (1956) found that reality is defined by the group and thus

¹ Cf. the Asch paradigm, also known as the ‘line’ judgment task (Asch, 1987)

the influence of the group determines what the truth is, this perspective will be investigated further in our discussion.

This literature review began by looking at the cultural and emotional perspective of facial expressions which led to Ekman's main discoveries on deception. We naturally continued by examining the setting, methodology and results of previous experimental research to finally investigate the relationships of personality and reality that will influence our experiment. The prior section established how NVBs permit to predict the behaviour of others and to navigate through different situations. We needed to understand how personality could affect our results, or at least the rhythm of the dialogues, due to the interpersonal aspect of the experiment. The perspective of physical world as well as group reality was investigated to prepare for our findings and its association to deception.

3. Research question

The intention of this study was to observe the behaviour of participants when lying or telling the truth and how successful the participants were in detecting the veracity of the statements. Our first hypothesis is that there is a difference in Non-Verbal Behaviour (NVB) when participants are lying or telling the truth. The second hypothesis is that players will make a judgment based on these observations, specifically on the looks given to the computer screen or the projector screen which will influence their judgments.

4. Method and procedure

4.1 Methodology

In our experiment, two female students were to face each other and play a game where one had to either tell the truth or lie to the other. One player would try to discover if the other was lying or telling the truth and would place a bet (further description of the experiment is provided later). Several variables were observed in this experiment to assert these hypotheses, such as changes in head orientation as well as gaze and, more specifically, blinking. This project was inspired by Ekman's '20 dollars for a lie' experiment as well as Biland et al's (2008) experiment exploring the effect of lying on intentional versus unintentional facial expressions. There are no strict guidelines as to how laboratory video projects should be conducted; methods and techniques can vary greatly depending on the projects (Gottman, 1979). However, the analysis of the experiment in this study followed Gottman's (1979) logic of observing highly reliable aspects of behaviours made by the participants. And as suggested by Gottman (1979), all the videotapes were viewed once entirely before coding.

The statistical analysis for this laboratory experiment is employing a two-factor within-subjects design. Three response variables (blinks, screen, projector) from experimenter observations, and two explanatory variables with two levels each: truth and lie tasks; card and painting games (also known as game 1 & game 2).

4.2 Material and technical specifications

Vertegaal (1999) establishes the pros and cons of the use of video cameras in social research such as its relatedness to the real-world and temporal nature; the cons might include problems such as the necessity for heavy bandwidth, the difficulty of the conversion from generic video

output to machine readable format and finally the difficulty of achieving a seamless integration of spatial Conversational and Workspace Awareness Properties. We have therefore resorted to using many cameras in order to avoid such issues.

Two High Definition cameras were used to film solely the facial expressions of both participants, and one High Definition camera was used to obtain a lateral perspective of the experiment and to provide information in regards to the physical movements and the direction of the head compared to gaze directions. The video camera model used was a ‘SONY HDR-HC1E PAL’ using ‘HDV Camera’ format and two ‘SM81 Shure’ microphones in combination with a ‘Behringer UBX 1803’ mixer. Before each experiment, two LSE technicians² helped with the installation of the setting and were involved in capturing and editing the recordings from the tape to a hard drive after the sessions. Furthermore, because the experiment was recorded in Real-Time, the action of capturing required three hours per camera per experiment. Thus, there was a total capturing time of sixty-three hours. The program used to edit the three video recordings on a multiscreen layout was Final Cut Pro.

4.3 Participants

The researcher decided to concentrate solely on women in order to avoid gender interaction effects and based on the precedent of Biland et al (2008) who focused only on women for their experiment which verified that their facial expressions changed between truthful interaction and deceitful ones. In addition, Hall (quoted in Costanzo, 1991) argued that women are more skilled at observing and detecting nonverbal cues (NVC) based on evolutionary principals. This study was approved by the LSE ethics committee; and all participants provided informed consent prior

² Steve Bennett, Institute Superintendent Technician and Steve Gaskell, Workshop Technician.

to participation (cf. appendix B). They were all female LSE students without any other specific criteria. In order to reduce variation in behaviour we decided to avoid students who might only show emotions in the private sphere (i.e. of East-Asian culture as argued by Ekman). All participants had a shared ‘western’ background in order for them to have a similar understanding of NVBs (cf. table 1). Subjects believed we were interested in how people make decisions concerning lies. They were only informed of the true purpose of the experiment after the end of the games and before the debriefing that were held after the experiment.

Table 1: Demographic and general information on the experiments

Participant	0A	0B	P1	P2	P3	P4	P5	P6
Experiment	Trial		1		2		3	
Date of experiment	20/03/2009		10/06/2009				12/06/2009	
Duration of experiment & debriefing	58 min		43 min		44 min		37min	
Age (years)	23	27	22	24	22	21	22	21
Gender	female	female	female	female	female	female	female	female
Time in Europe (years)	23	29	11	1	22	21	22	21
Nationality	French - British	German - French	French - Columbian	Canadian	British	British	British	Greek
Ethnicity	Caucasian	Caucasian	Caucasian	Indian	Caucasian	Caucasian	Caucasian	Caucasian
Area of Study	BPP Law School	MSc Social & Public Communication	MSc Accounting & Finance	MSc Gender	BSc Government	BSc Government	BSc Government & History	BSc Management

Participant	P7	P8	P9	P10	P11	P12	P13	P14
Experiment	4		5		6		7	
Date of experiment & debriefing	12/06/2009				18/06/2009			
Duration of experiment	40 min		40 min		63 min		52 min	
Age (years)	23	22	22	20	25	20	20	25
Gender	female	female	female	female	female	female	female	female
Time in Europe (years)	23	6	12	1	25	20	20	5
Nationality	Portuguese	Greek	French - American	American	Austrian	French	British	Slovakian
Ethnicity	African-American	Caucasian	Caucasian	African-American	Caucasian	Caucasian	Caucasian	Caucasian
Area of Study	MSc Public Administration	MSc Media and Communication	Msc Political Theory	BSc Political Science	Msc Organisational and Social Psychology	BSc Social Anthropology	BA International History	Msc European Political Economy

4.4 Procedure

Two pilot studies were conducted to insure that the final experiment would effectively test the hypothesis. The games and the rules were changed following the test experiments because it was observed that if we did not clearly stipulate that the mission was to convince the second player, the first attempted to mislead the other player (during the final experiment, some participants did still try to mislead the other). For example one might smile or stutter a lot in order to make the other one believe she was lying. Many players kept trying to figure out the probability of getting better cards, thus the test trial underlined how important it was that the players should know before playing that there is no probability involved in the games because the cards had been chosen arbitrarily by the experimenter.

A mission was given to the players to make them feel more involved and less confused. Furthermore, there needed to be a test round to allow the players to understand the game, and to eliminate most of the apprehension and stress which was observed (uncomfortable smiles in the control group). Finally, by having only one computer screen, the players had to switch places at the end of each round; during the second pilot study it was noted that this increased the game sensation.

Final structure: In order to allow the participants to feel comfortable and to encourage the players to interact, we placed them in what Sulger (1986) called ‘the social zone’, defined by two full arm distances (the junction of both ‘personal zones’). Sulger argued that the closer you get to the interlocutor the more you unconsciously reduce the distances, get rid of any possible obstacles, and the more the message is warm and affective rather than rational. Also, Argyle (1988) believed that it is desirable for laboratory research that the room should resemble an ordinary room as much as possible with for example comfortable chairs or a carpet. It is undeniable that

our subjects were aware of being in an experiment, which might be a limitation to our study, however it could also be argued that this feeling increased the importance of the game, the success and failure of lying or convincing the other player. The participants faced each other at a distance of 1 to 1.5 meters, in a typical classroom (rearranged for the experiment) cf. Figure 2. They sat on chairs without armrests and the researcher/experimenter was sitting turning his back to the participants when asking them for decisions; and for the four last experiments moving to the adjacent room looking through the one sided mirror during each round.

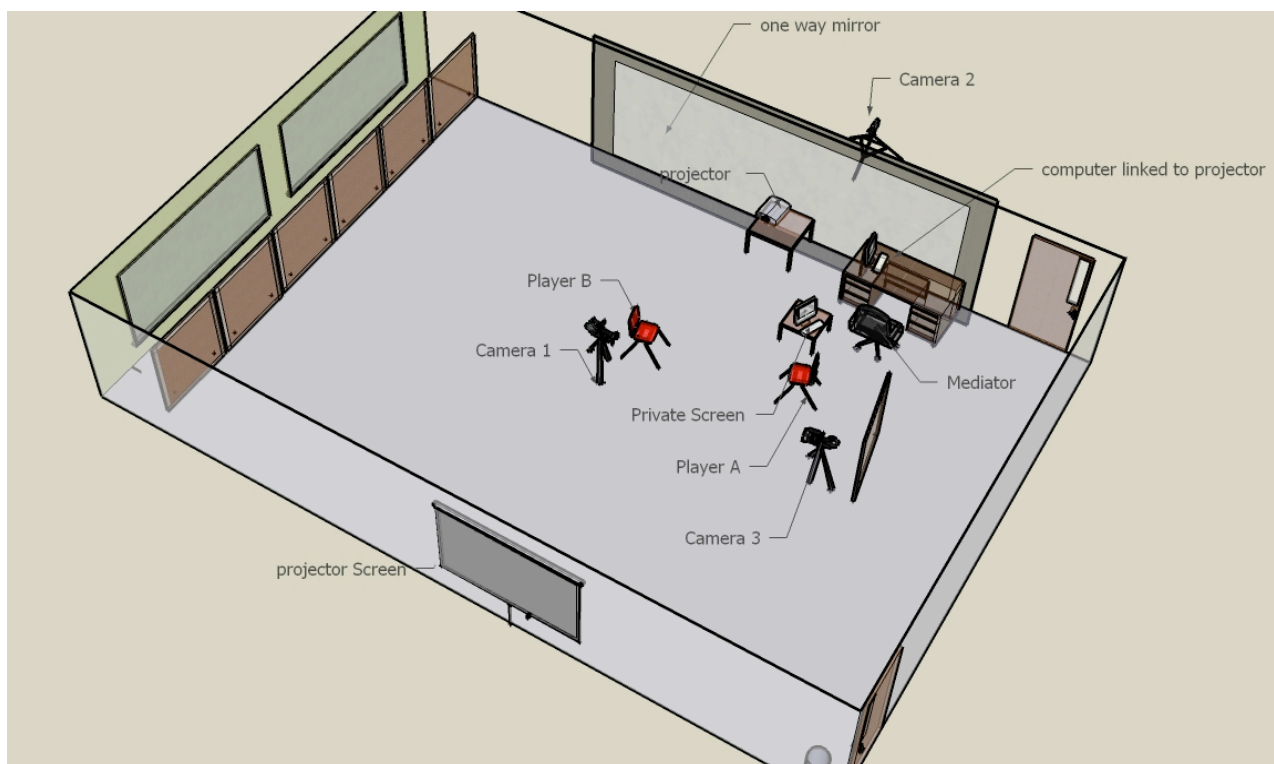
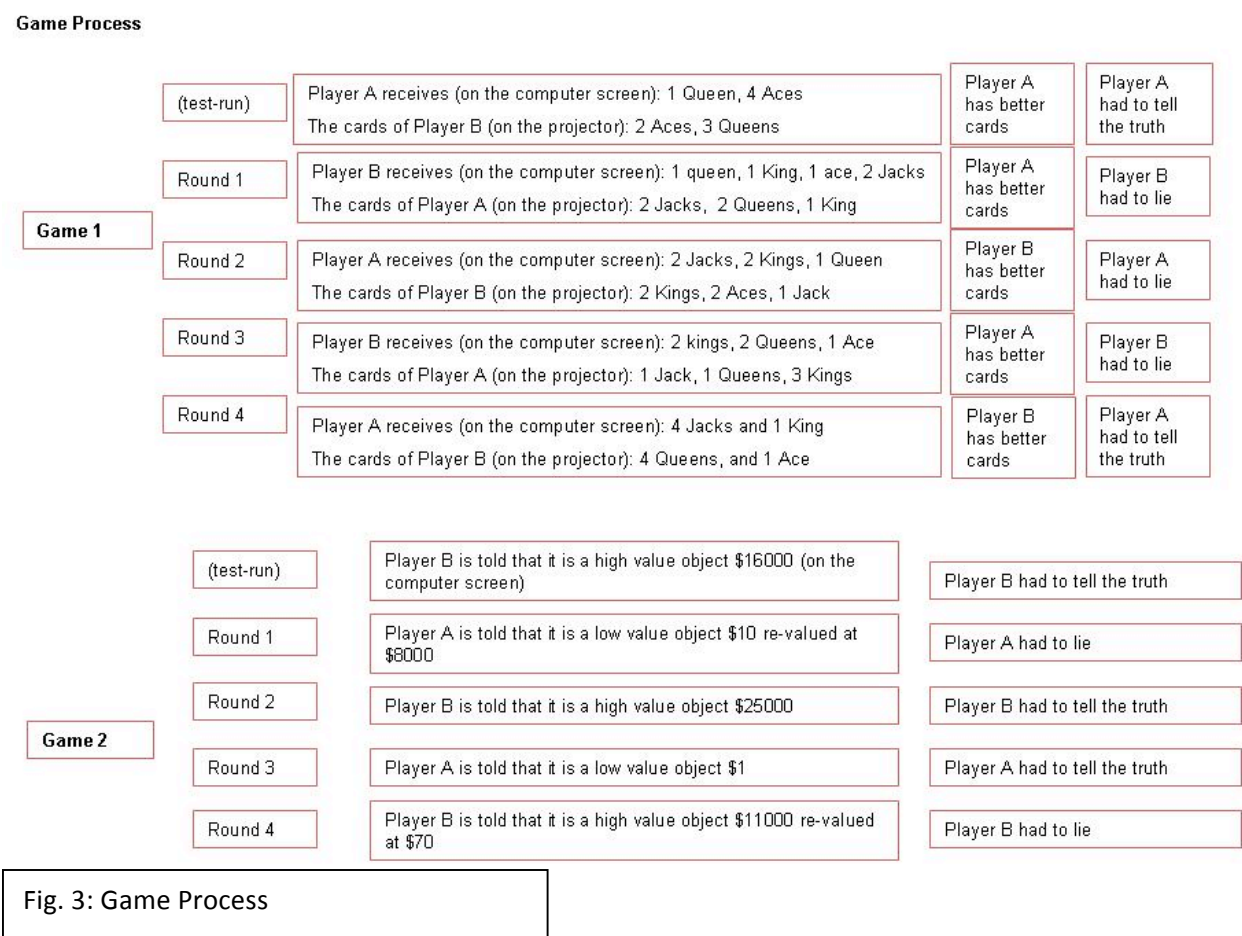


Figure 2: 3D perspective of the experiment

It was noted that this had a positive impact on participants' involvement and discussions in the game. The rules and the slides used in the experiment are shown in appendix D. The experiment was divided in two main games: the first was inspired by poker, each round having the two players discussing their cards. (The player with a mission will be referred to as the active player, whilst the other player trying to guess if the active player was telling the truth or lying will be

referred to as the passive player). The active player had to convince the passive one that her cards were either better or worse; she could only lie or tell the truth.



Each game had five rounds (including a test run), each lasting approximately two minutes. The second game involved both players discussing the real or fake value of an art piece (found on <http://www.ebay.com/>; and could be bought immediately). During the analysis, it was noted that because player B never tells the truth in Game 1 we were only able to run certain analyses with only half of the participants. Figure 3 provides a detailed description of the game process.

4.5 Dependent Variables

The researcher coded the three behaviours as listed below, as well as the guesses by the passive player and the level of conviction (bet) of the second participant. The researcher verified at the

end of each round if the player had been lying or telling the truth in order to determine if the other player guessed correctly or incorrectly. Points, in poker chips, were given at the end of each round in accordance to the bet: to the passive player if she guessed right and to the active player if the passive player guessed wrong (which increased the game sensation). The behaviours observed were:

- *Blinking*: frequency of eye blinks³
- *Informational gaze directions*: frequency of looks towards either (a) the computer screen⁴ or (b) the projector screen⁵

Each of the coded behaviours were transformed into a specific statistical format so that the truths and lies may be directly compared. Furthermore, the total frequency of blinks, and screen or projector gazes of truthful/lying interactions for each participant was divided by the total length of the rounds and multiplied by 60 to give a ‘per minute’ of footage frequency (cf. Table 2).

Table 2: Example of the SPSS table for one pair

Statistical table 1										
EXPERIMENT	GAME	ROUND	PLAYER	TRUTH OR LIE	GUESS Right or Wrong	BET PERCENT	TIMEINSEC	MEAN BLINKS	MEAN PROJECTOR	MEAN SCREEN
1	1	0	1	1 (TRUTH)	999(MISSING)	999	999			
1	1	1	2	2 (LIE)	1 (RIGHT)	100	128	27,19	6,56	1,41

5. Statistical Results

Several statistical analyses were done to interpret the data. It was necessary to use repeated measures or paired sample analyses because the response variables were clustered within

³Recorded Example: http://193.49.16.200/diver_lite/diver_lite_clip_share_2.php?pane_unique_id=966191

⁴ http://193.49.16.200/diver_lite/diver_lite_clip_share_2.php?pane_unique_id=7398377

⁵ http://193.49.16.200/diver_lite/diver_lite_clip_share_2.php?pane_unique_id=7862855

participants, i.e. the fact that each response was measured twice for each player (once when lying and once when telling the truth). Due to the problem of the design not being fully crossed (i.e. in the card game, the second player only lied, and did not tell the truth), the sample size for two-factor ANOVAS was very small (N=5), even though only one is reported below, results should be taken with caution. The most notable results are provided from paired samples t-tests conducted for each response variable separately, and by simply analysing the paintings game (N=13). Crosstabulations were also computed in order to observe relationships between the participants' guesses and the scenarios of the game. Though numerous tests were conducted, we only reported the tests with statistically significant results.

5.1 Is there a relationship between blinking and lying?

Blinks in Game 2	Truth Mean	Lie Mean	Confidence interval of the difference		t	df	p
N=13	21.0	25.3	Lower 0.4	upper 8.3	1.96	12	0.074

The t-test for game 2 showed a significant difference between lying or telling the truth with regard to blinking: $t(12)=1.96$; $p=0.074$. Lying was associated with an increase of 4.3 more blinks per minute on average, with a 90% confidence interval of 0.5 to 8. Wong⁶ advised to use a p-value of 10% for a small sample size in a pilot study.

⁶ This was advised in a personal communication with Dr R. Wong, professor at the Hong Kong University who obtained his PhD at the London School of Economics in 2008

5.2 Is there a relationship between the Game & Screen-gaze & Lying?

Some of the data were analysed using a MANOVA (cf. Appendix C) with the game (cards/paintings) as the one (within subjects) factor and the condition of truth and lying as another, and finally with the three behaviours as dependent variables. At a multivariate level, the analysis was significant for the looks towards the screen with $F(1.4)=9.15$; $p=0.039$ and the projector with $F(1.4)=8.05$; $p=0.047$. However the number of blinks were not related to the games with $F(1.4)=0.55$; $p=0.501$.

Mean of gaze within games; N=5

screen truth game1	screen lie game1	screen truth game2	screen lie game2
5.02	5.17	2.26	2.68
projector truth game1	projector lie game1	projector truth game2	projector lie game2
3.59	3.45	6.91	6.07

This shows that the participants looked more at the screen in game 1 than in game two and inversely they looked more at the projector in game 2 than in game 1.

5.3 What are the chances of guessing right or wrong?

Crosstabulation 1

			Scenario Truth or Lie		
			TRUTH	LIE	Total
Passive Player made the right or wrong guess	RIGHT	Count	7	21	28
		% within Scenario Truth or Lie	29.2	65.6	50.0
	WRONG	Count	17	11	28
		% within Scenario Truth or Lie	70.8	34.4	50.0
	Total	Count	24	32	56
		% within Scenario Truth or Lie	100.0	100.0	100.0

Crosstabulation 1 shows clearly that overall in the entire game, 50% answers were correct and 50% were incorrect.

5.4 How often did the players think that the other was lying?

Crosstabulation 2

			Passive Player guess: Truth or Lie		
			Truth	Lie	Total
Scenario Truth or Lie	TRUTH	Count	7	17	24
		% within Scenario Truth or Lie	29.2%	70.8%	100.0%
	LIE	Count	11	21	32
		% within Scenario Truth or Lie	34.4%	65.6%	100.0%
	Total	Count	18	38	56
		% within Scenario Truth or Lie	32.1%	67.9%	100.0%

Crosstabulation 2 is showing that approximately 70% of the time the participants making a judgement believed the active player was lying (38 times out of 56 guesses). When the active player was telling the truth, the passive player guessed approximately 71% of the time that the other player was lying (17/24). Additionally, when the active player was lying, the passive player guessed 65.6% of the time that the other player was lying (21/32).

5.5 Is there a relationship between the certainty level and the NVBs?

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	p
		B	Std. Error	Beta		
1	(Constant)	49,439	10,684		4,627	,000
	MEANBLINKSMIN	-,089	,225	-,055	-,398	,692
	MEANPROJECTORMIN	,198	1,011	,028	,196	,845
	MEANSCREENMIN	2,827	1,281	,317	2,206	,032
	passive_guess_rw	-3,816	5,468	-,097	-,698	,488
a. Dependent variable: Bet						

R²: 0.093

The linear regression for *bet* shows that the passive participant's certainty and conviction has a statistically significant association to the number of looks towards the screen given by the active player $t(1)=2.21$; $p=0.032$. For every extra look at the screen per minute, expected certainty goes up by 2.8 points. Though statistically significant, this is a substantively small effect.

6. Qualitative Results

A short questionnaire was given to the participants in order to allow them to take some time and think about the experiment (cf. Appendix A). This was done before starting a semi-structured group debriefing based on the questionnaire, where both participants engaged in a discussion led by the experimenter. The following section is detailing those findings.

6.1 Feelings towards the experiment

Nine participants wrote that the experiment was fun, interesting and very challenging. For example, P2 wrote: 'This was fun!!!'. A particular change occurred during the process of the game. Participants who felt confident about their judgments in the beginning started to doubt their ability to distinguish lies and truths (P2,4,7). They were under the assumption that they would and could clearly distinguish both; thus some participants were surprised at how 'bad' they were at detecting lies in contrast to how confident they felt. 'When I was most confident, I was wrong' (P7: 39min15). Player 11, on the other hand became more confident in her ability to lie as the game evolved. It should also be noted that three participants said that they were bad liars and had the feeling that they always 'get caught out' when they lied. Some participants made obvious mistakes and most of the time burst out laughing. Ekman (2009) refers to such events as 'leakages'. A few mentioned that they felt confused during the experiment, which seems normal due to the unusual nature of participating in an experiment of this kind.

Different aspects about lying surfaced during the group discussions. Most important is the fact that all participants tried to use some non-verbal-method to detect lies, showing that they understood that words can be deceiving but that the body produces involuntary deception cues. We discovered that there were participants who felt that lying was a 'naughty' thing for which they should feel ashamed; these participants experienced feelings of stress. On the contrary, there were other participants who felt lying could be beneficial and could actually serve to avoid hurting the people around them by using what they called white lies. Furthermore, it should be noted that some participants felt stressed by the cameras and the situation but more importantly by the act of lying (P3,8,10,12), whilst others completely forgot about the laboratory settings and enjoyed playing a game of deceit (1,2,4,13).

6.2 Tools to detect lies: from speech to NVB

In their attempt to detect lies, participants used several methods from asking repeatedly for details of the cards in the first game to asking directly if the player was telling the truth and even using emotional blackmail: ‘you’re not trying to embarrass me?’ (P4: 21min25), ‘we’re on camera, don’t worry I won’t ask what your most embarrassing moment was.’ (P2: 04min54). Most interestingly, the participants went from simulating a poker game to inventing social situations where they would have to negotiate or buy the art piece in the second game. They used questions such as ‘how much would you bet if you had those cards?’ (P11: 10min03), to ‘in the apprentice, would you have chosen the rug?’ (P12: 24min26) or ‘It’s a present for a friend’ (P1&2: 33min26), and several other examples can be found in the interactions of P4,5,7, 8.

Speech wise, providing the wrong information and/or forgetting details were clear ‘giveaways’ of the veracity of the statements. One of the most important factors for the participants was the response time needed by the active player (the longer it was the more they associated it with lying) as well as speech pauses. Body language, touching themselves (self-manipulation) and laughing were also often interpreted as an indication of lying. Some decisions concerning the truthfulness were based on the voice, its stability and constancy as well as the pitch level (a deeper voice was associated with truthfulness). In contrast, a wavering, lighter voice was associated with lying. Interestingly, P12 mentioned that the happiness level of the other player also influenced her choice, when the other player seemed happy she believed she was telling the truth. While initially P12 believed smiling was a sign of lying, she later felt that smiling indicated telling the truth.

Some players were looking for patterns and inconstancies such as discomfort, shifting awkwardly, being nervous, self-manipulation, and laughing with embarrassment. All are once

again relying on the assumption that lying should be an uncomfortable experience. Smiling was often repeated by the participants as a major tell, ‘in the beginning it was difficult to keep a straight face when I was lying’ (P2: 40min38). However, some participants said that they also smiled when telling the truth due to the stressful situation, being scrutinized and put under pressure. Eye-contact was the second most noted NVB by the participants. One believed she was looking up to the right when lying (P12), or that the other was lying if she held eye contact for too long (P3), whilst others believed that breaking eye contact during a conversation was a sign of lying. Player 13 wrote that when she was lying she tended to keep direct eye contact and tried to prepare responses in advance (especially with the card game). It should be noted that within Neuro Linguistic Programming, it is believed that the eye direction is related to memories or imagination: when one looks up-left it is believed that one is ‘constructing images or sounds’ whilst looking up-right is associated with ‘remembering voices or images’, thus allowing a gaze to be used as a method to observe deception (Bandler, Grinder, & Andreas, 1990).

Participants explained during our debriefings that gazes toward the screen and the projector were also associated with either lying or telling the truth for some of the participants (P8: 37min17). P4 found herself looking more at the computer screen when telling the truth in order to make sure she was saying the right thing and P1&11 thought the other player was lying if she didn’t look at the screen whilst P5 associated a high frequency of looks towards the computer screen with lying.

7. Discussion

The first conclusion we can draw from the qualitative findings is that people could learn a lot about others if they observed them more when they communicate. Many different observations

were made by our participants; however their success rate in making the correct judgment did not surpass the chance level. Theory states that successful communication is dependent mostly on non-verbal communication, thus making the ‘right’ interpretation of non-verbal communication a priority. Moreover, from our group debriefings we noticed that there are some clear misconceptions on how to differentiate lies and truths. In this discussion, we will look more closely at how people make decisions, why they lie, what insecurities stand behind decision making and lying, and what are the myths and realities of deception.

7.1 Gaze: From information to reality

Gaze is defined by Gergerian and Ermiane (1978) as directions taken by the eyeball while shifting within the orbit. They found three different significations for such movements (information, interfacial and expressive gazes). *Information gazes* are “the different directions taken by the eye to look or to follow objects. They inquire about what surrounds us in order to inform us about it. According to their frequency we can say how the subject is communicating with the external world” (1978: 177). These can also be recognized by the fact that the head moves towards the object looked at, as it was seen in our experiment. Participant 14 said that ‘I thought she was looking at the projector when she was lying and that she was telling the truth when she was looking at the computer screen because it made sense’. *Interfacial gazes* are defined by an eye movement to look at the other person’s own gaze or at different parts of their face. Finally, the *Expressive gazes* translate muscular expressions and indicate to what extent one is “in contact with the present and reality”. This led us to looking at relationships between truth and reality.

Understanding these concepts will allow us to interpret the gaze towards the passive players and towards the screen. A combination of Information gazes, Interfacial gazes and Expressive gazes were used by the participants in our experiment to make decisions. The basis for these concepts will be developed further in the following section. This is additionally coherent with our second hypothesis which claimed that the participants would make a judgment based on their observations, specifically the looks given to the screens.

7.2 Making judgments based on observations

It was regrettable that we did not obtain sufficient information on the screen gazes in game 1, as we strongly believed that there is a relationship between telling the truth and verifying that we are telling the truth. It is, in other words, important for a person to verify that what they think and believe is the truth (looking more at the screen). When the participants had to lie, we observed that they were constructing a new reality by inventing their cards. Even when telling the truth, they were sometimes discussing their bet as if they were in a casino (for example in experiment 5). Since they were not bound to strict guidelines, the players could avoid looking at the screen and invent their new world. This perspective will be expanded upon in the last section of our discussion. We saw that the participants looked more at the screen in game 1 (mean of 5,1) than in game two (mean of 2,47). And inversely with the projector in game 2, participants looked more at the projector in game 2 (mean of 6,5) than in game 1 (mean of 3,5). This could be interpreted as the participants using the image in game 2 to invent stories and scenarios, whilst in game 1 the participants kept looking back at the screen to remember their cards. As some players mentioned, they believed that if the player didn't look at the screen when questioned about the cards, they must have been lying. The action of looking at the computer screen became an important factor for making decisions. We also found that the number of looks towards the

computer screen had an impact on how convinced participants were of their decisions. Furthermore, lying was described by some of our participants as an act of memory; for example, Player 1 said: “I think you are lying [...] you are trying to remember the price whereas it should be on the screen”, thus looking away from the screen became a deception cue. However, it also became a way of faking a lie. Additionally, participants’ reading of the interactions was most of the time suspicious and participants had a significant tendency to believe that the other was lying (71% of the time). Ekman argued that suspicious people should be terrible lie catchers, and in similar fashion our experiment showed that most people were prone to disbelieving and suspecting deceit in a situation where deceit was sought after. Finally, in our experiment we found that female students (untrained at observing NVBs) have a 50/50 chance to detect the difference between lies and truths, which is no more than the probability you would obtain with a simple coin toss.

The former section illustrated how participants made judgements based on their observation of the other, more specifically the use of the screens and memory. Moreover, it was found that this observation did not allow them to increase their chances of guessing correctly. This is perhaps mainly due to their lack of knowledge on interpreting what they saw.

7.3 Insecurity and high stake lies

As we have seen Ekman distinguishes between small stake lies and high stake ones, and we attempted to create a situation of high stake lies by promising that the winner of the game would obtain a £300 lottery ticket. The issue we were confronted with was that such a gain was perceived as being quite unrealistic or unlikely to realize itself because there was no guarantee for them to win the £300. However, it was undeniable that the fact of winning at the game or

more precisely not losing was quite motivating; for example player 14 (47min41) said “I am not competitive I just did not want to lose”. In addition, the existence of a reward likely enhanced the desire not to lose. Moreover, deception is known academically as quite controversial due to its very specific nature, principally in relation to its intrinsic differences: from the general context to the individual, high stake lies to low stake ones, male to female, or Asians ethnicities to African-American ones. Our experimental game could not fully create a high stake situation; however, it amplified the motivation to be successful in deceiving the other.

Lying was often interpreted as a negative action and resulted in discomfort and pressure. Moreover, some felt that having to doubt others was a difficult and stressful task that led to different NVBs. For example when people are emotionally aroused, blinking can involuntarily increase. Pupil dilation and blinking are argued to be valuable leakage when placed in relationship to the context and other emotional evidence which tend to show that the person is lying, and are not due to the fear of being wrongly judged (Ekman, 2009). Ekman argued that lying increased the emotional arousal and thus increased behaviours such as blinking, others had however argued that because the liar is attempting to control her emotions, their study had showed a decrease in blinking. All we can say is that following our experiment, we observed that when female students lie they blink more often than when they tell the truth. Sherif's (1935) autokinetic effect experiment showed that in an ambiguous situation, a person will look to others for guidance and reassurance: this is known as informational conformity. Sherif and Sherif (1956) believed that the psychological state of anxiety or insecurity always involve ego reference which was in line with their prior work on the autokinetic situation. They found in their experiment, the more the situation was uncertain, the greater was the tendency towards convergence of judgements in the social situation. Similarly, during our experiment we observed

that the participants established a norm of betting based on previous interactions and bets. Such behaviour was surprising and unexpected given our initial hypotheses. We observed that there was a clear tendency to reach standard judgments within unstructured interactions. Asch (1987) showed how within a group, an individual could become convinced that a lie was the truth (conformity and group consensus) and how reality is defined by the consensus formed by the community.

What we call a general truth, i.e. reality, is based on the perception of the world by the self and the communication with others. Furthermore, in order for one to define what is real or truthful, one will have to use reference points such as 'real world objects' that can be touched and seen or other people as we saw in the literature review. In our experiment, the screen and projector as well as the active player were used as these 'real world objects' that gave information towards the veracity of the verbal exchange. We previously discussed how our participants were telling stories and creating scenarios. These narrations were in continuous progression and thus resulted in a process of constructing reality (Andrews et. al, 2000). Even though, this reality was not initially believed, some of the participants got intensely involved in the reality they constructed. During some of the rounds, this led to confusion concerning what was the truth and what was false. The (re) construction of reality was so strong that it removed them from the situation (or reality) that the researcher had fabricated. Several hypotheses could explain these findings. First, it could be that the closeness to truthful facts about the participants and the more colourful the scenarios were, the more real the invented scenarios became. Inversely, it could also be explained because the participants were not personally attached to the information given. It is very interesting that our participants lost track of a simple mission, such as to tell the truth or to lie. Another possibility, is that under pressure, the insecurity and uncertainty led to a sense-

making process to cope with the unknown (Boje, 2008). In other words, an explanation could be that the participants were not able to distinguish the difference between what was originally a lie and was now remembered as the truth due to the juxtaposition of both realities based on Boje's theory on sense-making. These unexpected findings and hypotheses should be explored further in future research.

Many studies have been done on the judgment approach, determining whether observers can make accurate inferences about emotions from viewing facial behaviour (cf. Ekman et al, 1972: 103); our study is solely replacing facial behaviour with NVBs. The findings of this research show how this experiment brought a new perspective on high stake and low stake lies, as it observed lies in a gaming situation. There was also a definite strain on the participants due to the task of lying, as was reflected by their increased blinking and their tendency to adopt a 'conformed behaviour' when betting.

7.4 Myths and realities

From getting out of a cumbersome situation, avoiding hurting a loved one, selling a product, inventing stories to preserve a child's innocence, lying is a 'social lubricant' (Virj in Fiedler, 2007). People know what lies are; they use them on a daily basis yet most still feel guilty doing so. The concept of white lies has reduced this feeling, because it is believed that these lies are for the benefit of others. Motives for lying are various, though P13 & 14 identified some main groups of liars such as parents, friends and salesmen. Coincidentally, all the motives given were the same as Ekman's (2009)⁷. We saw in the literature review, the best way to discover if someone is

⁷ A detailed comprehensive list of motives for lying is given by Ekman, 2009: 329.

lying is to observe changes in ‘normal’ behaviour. Some participants explained, they tried to establish a norm of behaviour based on the other in terms of sex, age, social class, occupation and personality traits. Furthermore, their interpretation of an emotional state would differ depending on how well the participants knew each other (Argyle, 1972). During our experiment, this was observed for example by the participants trying to know where the other was from, what they were studying, if they had previous experience in games. Moreover, Ekman (2009) argued that the only way of detecting deceit is to base judgments on a change in the behaviour, and to avoid basing decisions on the use of illustrators, body manipulators, speech errors, speech pauses, showing signs of fear or asymmetrical signs. Being able to tell if someone is controlling their emotions and what emotions are really felt would give knowledge and power to the observer. For example player 2 said that when lying “it was difficult to keep a straight face [...] making it very transparent”. Impression Management is a key area discussed by our participants, thus Goffman’s theory of navigational cues and the ability to control ones expressions are very useful tools. Ekman (2009) gives the following explanations: to uncover a fake smile, one should observe no movements in the corners of the eyes and the cheeks should not be raised by the muscle’s action, which usually narrows the eye aperture.

“We see joy and grief in the ‘brightening’ and ‘darkening’ of the face. The grasp of these changes quickens our understanding of others and increases the speed and subtlety of social interaction” (Asch, 1987: 183). Keating et al (in Argyle, 1988) found that smiling was interpreted as happiness in the eleven cultures he studied. It is interesting that most of our participants associated smiling with deceit. For example player 3 said: “I thought she was lying when she has that funny half smile but she is trying not to laugh”. However, we observed that they often were hesitant with their interpretations of smiles. Furthermore, Ekman (2009) argued

that smiles are the most complicated and underrated facial expressions. The fabrication of sadness or anguish can be observed when the inner corners of the eyebrows aren't raised; or the fabrication of fear would not include raised and drawn together eyebrows (Ekman, 2009). Anger should always include a tightened red margin in the lips. "There are thousands of facial expressions, Many [...] like body-movement illustrators, emphasize speech or provide syntax" (Ekman, 2009:127). If one ever desires to be able to tell the difference between lies and truths, he or she will need to be able to interpret these expressions and place them in the correct context. It could be argued that the face is a mirror to the soul, or maybe simply to what is really thought (cf. Image 2). During the following verbal exchange, player 0A had the following facial expressions as the other player guessed her cards:

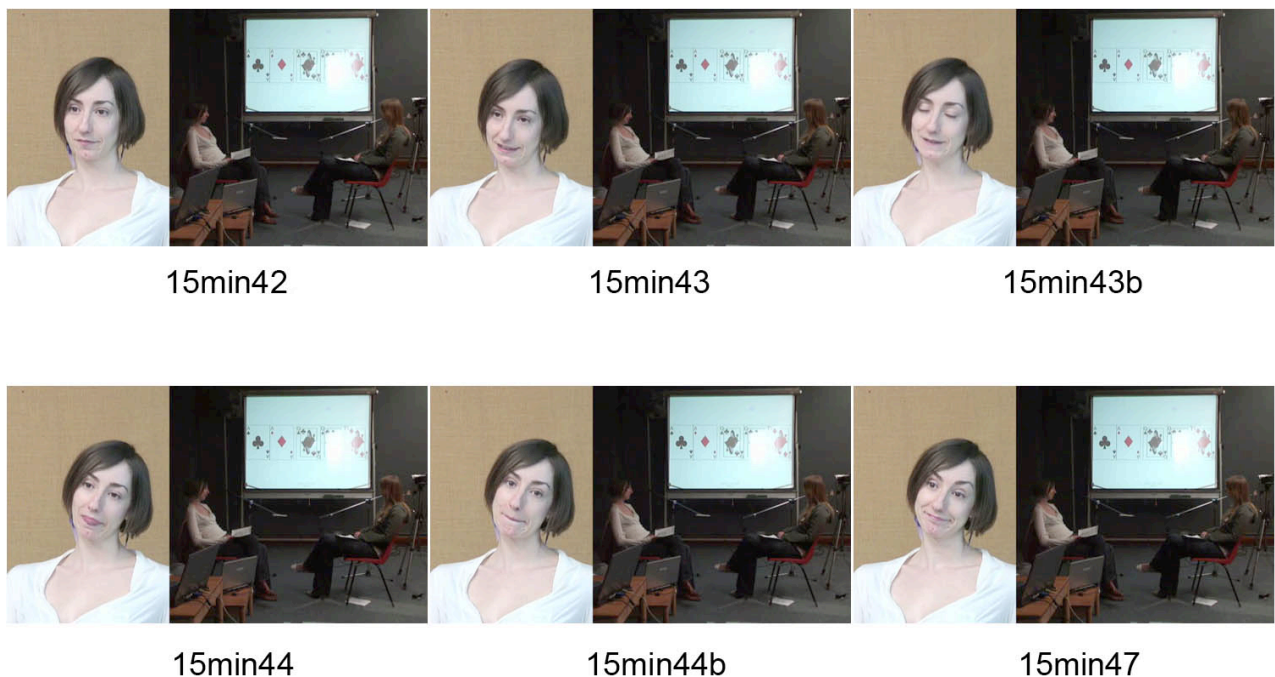


Image 2: (15min42: neutral expression; 15-43: start to nod; 15-43b: the end of the nod; 15-44: stick her tongue out; 15-44b: bit her lip; 15:47: bring her chin up)

This illustrates perfectly what Ekman calls deception cues (Ekman, 2009). Her chin is up and she is biting her lips, also known as representative cues for anger, and we observe unconscious behaviour such as sticking her tongue out which is associated with repressed emotions of anger.

Biland et al (2008) & Sulger (1986) give a clear review of the several techniques that have been used in order to identify a possible lie or to analyse NVBs. For example, a true story should rely on sensory information, whilst a story which has been invented uses internal cognitive details (Masip et al, 2002 quoted in Biland et al, 2008). Similarly to Ekman, Biland et al recognize how the liar might feel conflicting emotions such as the fear of getting caught (quicker speech, higher vocal tones, louder voice, more pauses and a greater number of speech errors), guilt (low-pitched voice, downwards looks, and slow speech) or the dupery delight (acute voice, rapid speech, and higher number of illustrative gestures and fake smiles). However raised pitch is not a sign of deceit but of fear, anger or excitement, which can or not be directly related to lying. Because all these emotions can be apparent when lying, arguably, this is what makes detecting lies a very sensitive matter and very context dependent. In our experiment, when the active player was trying to convince the other player too strongly, the eagerness of speech was noted by several players as a sign of lying. The timing, including preparation became the most reliable cue to observe deceit. Some common rumours have been spread concerning lies: a liar does not look you in the eye, or cannot hold still and fiddles with anything. Thus, the general idea is that a good liar should do exactly the opposite in order to be believed. Parts of the global theory have been taken out of context and are now misused by most. A common belief is that a good liar has to become an actor. It is undeniable that acting is all about timing, which is identical to the ability to fake surprise or any emotion convincingly. Moreover, it should be noted that the best actors train for their roles and live their new identities often for months. For example Jim Carrey in *Man on the Moon* (Forman, 1999) refused to be called by his real name during the entire production; he insisted on being called Andy Kaufman at all times on and off the set. Such preparation in making a lie seem more convincing is comparable to our participants who

attempted to prepare answers in order to convince the other participants of their lies. Another famous example is during the production of *Frost Nixon* (Howard, 2008) when all of the actors remained in character even while off-camera. The purpose of these methods is to make actors believe they are who they pretend to be. From the deception of playing a role, they have created a new reality which becomes their reality. These methods of acting are close to what is known as the Stanislavski's system. On the other hand, the Meisner technique sees "Acting [as] the ability to live truthfully under imaginary circumstances" (Silverberg, 1994: 9). During an interview with J. Fennell (2009) a teacher of the Meisner technique, when we asked about the truth behind an actor interpreting a role, she explained that as an actor "it's always you, I've only got my body, if I want to be you and if I put on your shirt, your trousers and your shoes, and talk like you, I am me". A Meisner actor is always acting the truth and his or her reality based on the observation of what surrounds him. However, this presents another fascinating discussion on the virtues of reality and truth in professional acting or professional deception which should be explored in the future.

The discussion in this research developed a repertory of the main cues and misconceptions that exist when attempting to detect lies based from what our participants observed and what they should have observed. More importantly, we investigated what they thought were deception cues and their real significance. We delved into and discussed the link between constructed reality, gaze and the insecurity that exist when lying. Moreover, we explored how some theories about lying have been removed from their context and are now misunderstood and biased, such as believing that a simple look up to the left would mean that the other is imagining a fake answer.

These methods for observing deception are valid, however it could be claimed that only experienced practitioners can make informed decisions.

8. Limitations

During the test trial, we noted that the participants were sometimes confused by their mission and what their cards actually represented; this might be related to their previous knowledge and familiarity with card games such as poker. This led us to clearly state what their mission was. In the second game, participants were relying too much on the additional information given during the trial about the art pieces, and sometimes they were not able to distinguish between truthful and fake information - even though it was mentioned - thus we decided to only give them a right and a false price (when in the lie scenario). We should also mention that some participants were able to discuss and play for two minutes, however, some were not able to talk for more than a minute and a half. The combination of the task and the order of the task could be changed in further research to randomize the results. It would also be beneficial to have more than 5 rounds for each game in order to be able to have more results per participants for each condition.

Some rounds were discounted in the statistical analysis when the active player made a clear mistake that gave away the veracity of the statements and was mentioned by the passive player. Some rounds were also not taken into account when the active player did not properly understand what she was supposed to do. It is undeniable that the previous relationships between some participants might influence their ability to 'read' each other. However it was believed that this would not affect their ability to control their behaviour. It was also observed that it was easier for some duos to discuss; a possible reason could be their type of personality. For example

if they were either introverts or extroverts (cf. figure 4).

Personality dimensions and bodily communication	
Every non-verbal channel is correlated to some extent with aspects of personality, and this has been documented in earlier chapters. Some of the main effects are summarized in Table 17.2.	
Table 17.2 The main personality correlates of NVC	
Facial expression	smile – affiliative, extroverted non-smile – dominance
Voice	
amount of speech	extroversion
pitch	extroversion, assertiveness
loudness	dominance, type A
speech errors	anxiety
silent pauses	introversion, anxiety
rate of speech	extroversion, anxiety
interruptions	dominance
Spatial proximity	mental disturbance (–), extroversion, self-confidence, dominance (–)
Gaze percentage	extroversion, neuroticism (–)
looking while talking	dominance
Bodily movements	
self-touching	anxiety
relaxation	dominance, anxiety (–)
Judgement accuracy	self-monitoring, physiological reactivity (–), experience of acting and social occupations
Expressiveness	extroversion, neuroticism (–), self-esteem, dominance, social skills

Figure 4: Argyle, 1988: 269

Most experiments conducted in laboratories try to recreate a ‘real life situation’, however it was necessary to keep two video cameras and microphones within the room in order to be able to film the faces of the participants in high definition, therefore we could not satisfy this consideration. Following the game and after a discussion with the participants, it became evident that most participants became unaware of the cameras and were concentrated on not losing the game. It is also likely that the type of lie and the situation were not sufficient enough to create a high stake lie, as the risks of not winning were without feared consequences. Furthermore, the pairing of participants led to several issues. Some of the participants could have been particularly observant and would have been especially good at detecting lies or truths (hence, the need for a

large sample). In order to avoid such a situation, a recurrent ‘passive player’ could have been used, however this ‘passive player’ could gain more knowledge each time and she would gain accuracy at detecting lies. During the experiment, when the ‘active player’ was supposed to tell the truth, she might have been tempted to act as if she was lying to confuse the ‘passive player’ and win the round. However, it was observed that this type of duping was very rare, possibly due to the instruction of having to convince the other player that she was telling the truth and that she could only tell the truth. Moreover, the researcher acknowledges that 14 participants is not a large sample, and that to have gathered data from more participants would have been desirable. However, the limited availability of students during the final exam period (end of summer term) as well as the time consuming nature of acquiring data and coding NVBs prevented the researcher from obtaining more material.

9. Conclusion

Previous research has convincingly demonstrated that no single pattern of behaviour is uniquely related to deception and that a liar is unable to completely control all his or her deception cues (Ekman, 2009). The first interpretation of our findings is that the discomfort and anxiety that arise from deception is deeply related to insecurity. This current paper shows that these feelings and emotions led to an increase in certain non-verbal behaviours, such as blinking in contradiction to some previous theories. Even though the gazes towards the screens did not give any statistical results, the participants explained that the act of looking at the screens was related to lying or telling the truth. The researcher believes that with a larger sample and a reward system that rewards the person telling the truth in a game of high stakes (i.e. large guaranteed

monetary gain depending on success) would generate statistically significant results. Such research could be very relevant to poker theories and game theories. The second part of our study developed on the idea that similar to actors who interpret roles and identities, which are not their own, with the intention of making the audience believe their lie is the truth. Our participants created acting situations in order to feel more comfortable with playing a game of deceit. To answer our research question, we found that there are NVBs associated with lying and that our participants did indeed make decisions based on their observations.

For future research, different self-manipulations and speech disturbances could be observed within a similar experiment. Lying to someone made most of our participants feel insecure and stressed, but all felt falsely confident in the beginning that they could distinguish lies from truths. Hence, it is inconceivable that non-verbal communication does not have a larger place in education based on its importance. As well as its different uses, such as convincing and influencing others, would be constructive and practical knowledge for everyday life.

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Appendix A:

Main questions used for the debriefing

- Did you observe any specific behaviour that you associated with lying or truth telling?
- How confident were you?
- Do you often lie?
- What does it mean to lie?
- In what context do you lie?
- Do you believe that lying can be useful in life?
- Did you feel stressed by the cameras?
- Did you feel stressed by the possibility for the winner of gaining the lottery ticket?
- Did you want to win the game?

APPENDIX B:

Consent Forms



STANDARD CONSENT FORM

TITLE OF PROJECT:

A study of Persuasion and Decision making

NAME OF PROJECT DIRECTORS:

Professor Saadi Lahlou

NAME OF RESEARCHER

(MSc Student)

ADDRESS:

The London School of Economics and Political Science, Houghton Street, London WC2A 2AE, UK

TELEPHONE:

NAME OF CONTRIBUTOR:

CONTRIBUTOR TELEPHONE:

LIST ANY PROCEDURES:

The research will be based on the videos of yourself and the results from the various discussions with the researcher. When this information has been gathered together, it will be put on a computer and used for a master dissertation report. Eventually, teaching departments will be able to look at the information gathered.

Sex:

Age:

Degree Title:

Department:

University:

- I agree to participate in this project.
- I have read this consent form and the Information Sheet and had the opportunity to ask questions about them.
- I agree to these results being used for education and research on condition my privacy is respected.
- I agree to the project using a video of me and though my face will be visible, I understand that my identity will be protected.
- I agree to be contacted by the researcher after the experiment.
- I understand that I am under no obligation to take part in this project.
- I understand I have the right to withdraw from this project at any stage.

Signature of Participant

Name of Participant:

Signature of person who sought consent:.....

Name of person who sought consent:

Date:.....

APPENDIX C: SPSS output

Relationship between Non-Verbal behaviour and lying

T-Test

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	blinks_truth_cards	21.7476	5	12.78964	5.71970
	blinks_lie_cards	24.4867	5	17.36039	7.76380
Pair 2	blinks_truth_painting	20.9704	13	9.22910	2.55969
	blinks_lie_painting	25.3122	13	15.26726	4.23438
Pair 3	screen_truth_cards	5.0174	5	1.81791	.81300
	screen_lie_cards	5.1685	5	2.29776	1.02759
Pair 4	screen_truth_painting	2.6582	14	1.67001	.44633
	screen_lie_painting	2.2777	14	1.78155	.47614
Pair 5	projector_truth_cards	3.5905	5	1.55995	.69763
	projector_lie_cards	3.4450	5	2.15221	.96250
Pair 6	projector_truth_painting	7.0631	14	2.37951	.63595
	projector_lie_painting	7.7738	14	2.17472	.58122

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	blinks_truth_cards & blinks_lie_cards	5	.960	.010
Pair 2	blinks_truth_painting & blinks_lie_painting	13	.902	.000
Pair 3	screen_truth_cards & screen_lie_cards	5	.794	.109
Pair 4	screen_truth_painting & screen_lie_painting	14	.728	.003
Pair 5	projector_truth_cards & projector_lie_cards	5	.755	.140
Pair 6	projector_truth_painting & projector_lie_painting	14	.424	.131

Paired Samples Test

		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	90% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
					Lower	Upper			
Pair 1	blinks_truth_cards - blinks_lie_cards	-2.73915	6.22635	2.78451	-8.67529	3.19700	-.984	4	.381
Pair 2	blinks_truth_painting - blinks_lie_painting	-4.34178	8.00108	2.21910	-8.29686	-.38671	-1.957	12	.074
Pair 3	screen_truth_cards - screen_lie_cards	-.15110	1.39793	.62517	-1.48387	1.18167	-.242	4	.821
Pair 4	screen_truth_painting - screen_lie_painting	.38054	1.27785	.34152	-.22427	.98535	1.114	13	.285
Pair 5	projector_truth_cards - projector_lie_cards	.14555	1.41356	.63217	-1.20213	1.49323	.230	4	.829
Pair 6	projector_truth_painting - projector_lie_painting	-.71065	2.44974	.65472	-1.87012	.44882	-1.085	13	.297

Chances to guess right or wrong

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
right / wrong guess * Scenario Truth or Lie	56	80.0%	14	20.0%	70	100.0%

right / wrong guess * Scenario Truth or Lie Crosstabulation

			Scenario Truth or Lie		
			TRUTH	LIE	Total
right / wrong guess	RIGHT	Count	7	21	28
		% within Scenario Truth or Lie	29.2%	65.6%	50.0%
	WRONG	Count	17	11	28
		% within Scenario Truth or Lie	70.8%	34.4%	50.0%
	Total	Count	24	32	56
		% within Scenario Truth or Lie	100.0%	100.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	7.292 ^a	1	.007		
Continuity Correction ^b	5.906	1	.015		
Likelihood Ratio	7.474	1	.006		
Fisher's Exact Test				.014	.007
Linear-by-Linear Association	7.161	1	.007		
N of Valid Cases	56				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 12.00.

b. Computed only for a 2x2 table

Players scenario guesses

Crosstabs

Scenario Truth or Lie * passive_guess_truth_or_lie Crosstabulation

			passive_guess_truth_or_lie		
			Truth	Lie	Total
Scenario Truth or Lie	TRUTH	Count	7	17	24
		% within Scenario Truth or Lie	29.2%	70.8%	100.0%
	LIE	Count	11	21	32
		% within Scenario Truth or Lie	34.4%	65.6%	100.0%
	Total	Count	18	38	56
		% within Scenario Truth or Lie	32.1%	67.9%	100.0%

Tests of Between-Subjects Effects

Transformed Variable:Average

Source	Measure	Type III Sum of Squares	df	Mean Square	F	Sig.
Intercept	blinks	9542.427	1	9542.427	17.699	.014
	screen	286.149	1	286.149	39.392	.003
	projector	500.537	1	500.537	59.507	.002
Error	blinks	2156.615	4	539.154		
	screen	29.057	4	7.264		
	projector	33.646	4	8.411		

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.171 ^a	1	.680	.777	.453
Continuity Correction ^b	.015	1	.901		
Likelihood Ratio	.171	1	.679		
Fisher's Exact Test					
Linear-by-Linear Association	.168	1	.682		
N of Valid Cases	56				

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.71.

b. Computed only for a 2x2 table

Relationship between the certainty level and the NVBs and the correctness of the judgment

Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.319 ^a	.102	.030	19.490

a. Predictors: (Constant), passive_guess_rw, MEANPROJECTORMIN, MEANBLINKSMIN, MEANSCREENMIN

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2147.221	4	536.805	1.413	.243 ^a
	Residual	18993.688	50	379.874		
	Total	21140.909	54			

a. Predictors: (Constant), passive_guess_rw, MEANPROJECTORMIN, MEANBLINKSMIN, MEANSCREENMIN

b. Dependent Variable: bet

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	49.439	10.684		4.627	.000
	MEANBLINKSMIN	-.089	.225	-.055	-.398	.692
	MEANPROJECTORMIN	.198	1.011	.028	.196	.845
	MEANSCREENMIN	2.827	1.281	.317	2.206	.032
	passive_guess_rw	-3.816	5.468	-.097	-.698	.488

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.319 ^a	.102	.030	19.490

a. Dependent Variable: bet

Relationship between the Game & Screen-gaze & Lying

General Linear Model

Descriptive Statistics

	Mean	Std. Deviation	N
blinks_truth_cards	21.7476	12.78964	5
blinks_truth_painting	20.6321	7.56192	5
blinks_lie_cards	24.4867	17.36039	5
blinks_lie_painting	20.5060	10.16759	5
screen_truth_cards	5.0174	1.81791	5
screen_truth_painting	2.2624	.67460	5
screen_lie_cards	5.1685	2.29776	5
screen_lie_painting	2.6818	2.07716	5
projector_truth_cards	3.5905	1.55995	5
projector_truth_painting	6.9069	3.02005	5
projector_lie_cards	3.4450	2.15221	5
projector_lie_painting	6.0684	1.32243	5

Tests of Within-Subjects Contrasts

Source	Measure	lie	game	Type III Sum of Squares	df	Mean Square	F	Sig.
lie	blinks	Linear	df	8.535	1	8.535	.359	.581
	screen	Linear	df	.407	1	.407	.182	.692
	projector	Linear	df	1.210	1	1.210	.451	.538
Error(lie)	blinks	Linear	df	95.077	4	23.769		
	screen	Linear	df	8.935	4	2.234		
	projector	Linear	df	10.726	4	2.681		
game	blinks	lie * game	Linear	32.464	1	32.464	.547	.501
	screen	lie * game	Linear	34.343	1	34.343	9.149	.039
	projector	lie * game	Linear	44.102	1	44.102	8.053	.047
Error(game)	blinks	lie * game	Linear	237.288	4	59.322		
	screen	lie * game	Linear	15.015	4	3.754		
	projector	lie * game	Linear	21.906	4	5.476		
lie * game	blinks	Linear	Linear	10.262	1	10.262	3.133	.151
	screen	Linear	Linear	.090	1	.090	.879	.402
	projector	Linear	Linear	.600	1	.600	.439	.544
Error(lie*game)	blinks	Linear	Linear	13.102	4	3.276		
	screen	Linear	Linear	.410	4	.102		

APPENDIX D: Projector Slides

Rules of the games

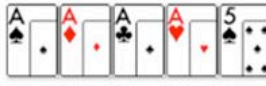





You have to **CONVINCE** the other player either by telling the truth or lying!

Game 1:

There will be 5 rounds, each of 2 minutes (including a test round).

Rule:

-At the beginning of each round you will see your cards and your mission on the projector or computer screen

Four of a Kind	
Full House	
Three of a Kind	
Two Pairs	
One Pair	
No Hand	

MISSION:

You can only lie or only tell the truth, you have to convince the other player that your cards are either better or worse than hers.

- 1 player will receive 5 cards (hidden) chosen by the mediator (there can thus be 10 kings, and probabilities do not apply); the other player will have 5 cards on the projector screen

-The player with hidden cards will have to only tell the truth or only lie, this will be indicated in the mission

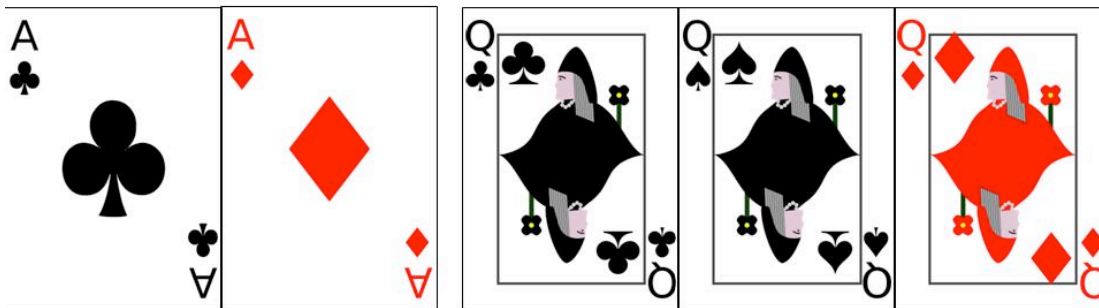
-You will have to discuss your 'hands'

-After 2 min the player who's cards are on the projector screen will have to place a bet.

Bet I believe you told me the truth / lied

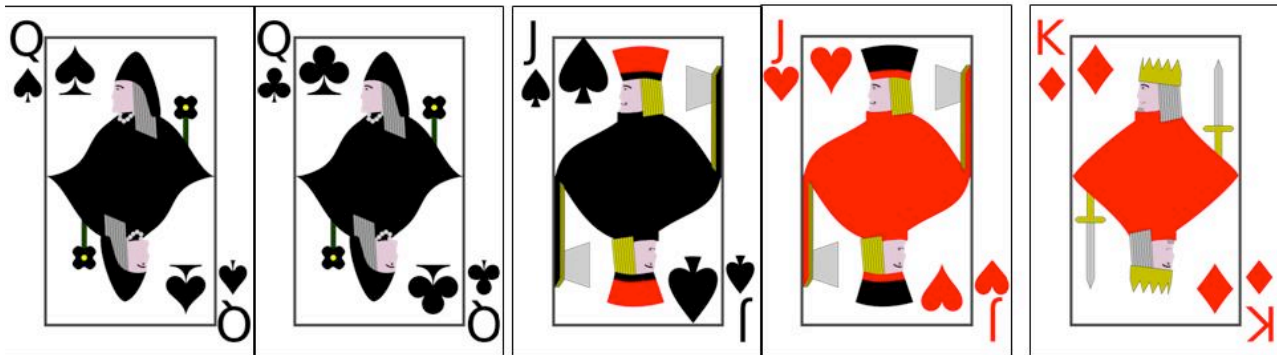
You will be able to bet up to a 100 points for each bet (in multiples of 10)

How sure / confident you feel should determine how much you bet. If you win, you gain the amount you bet. If you lose, the other player receives the amount.

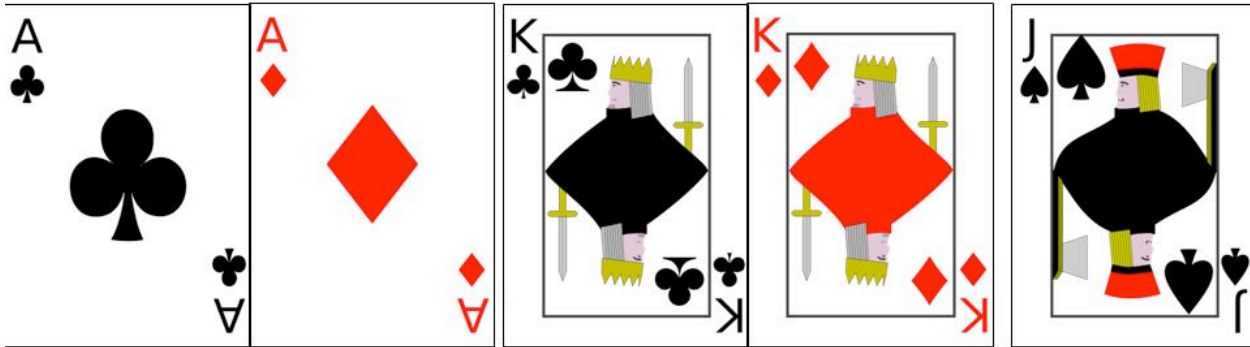


Game 1 – Test round
Player B

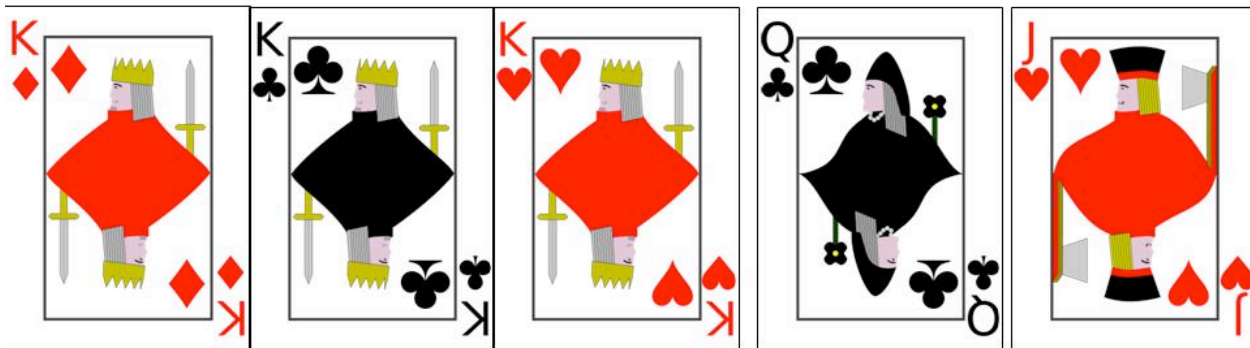
Please exchange places



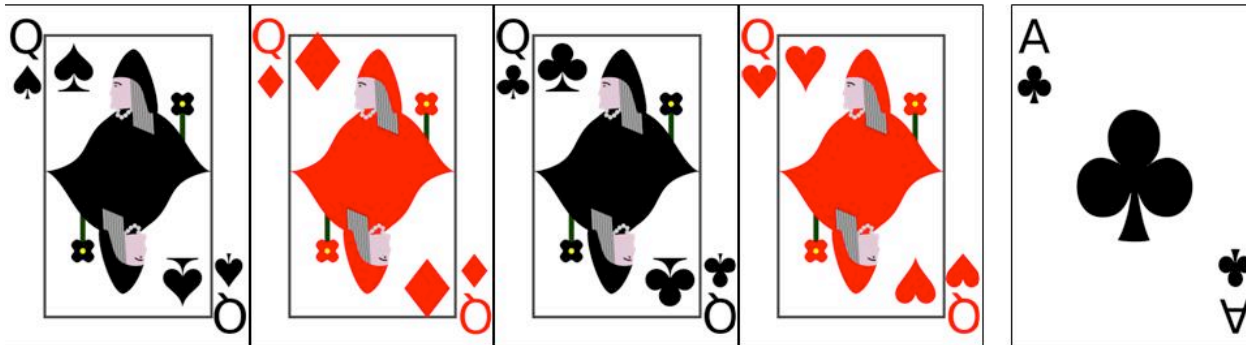
Game 1 – Round 1
Player A



Game 1 – Round 2
Player B



Game 1 – Round 3
Player A



Game 1 – Round 4
Player B

Game 2:

There will be 5 rounds, each of 2 minutes (including a test round).



Rule:

At the beginning of each round one player will see her mission on the computer screen and an art piece on the projector screen.

MISSION: You can only lie or only tell the truth, and you have to convince the other player of the value of the art piece

Your mission card will tell you:

Either to lie or to tell the truth

It will give the real or fake price of the art piece.

You have to **CONVINCE** the other player

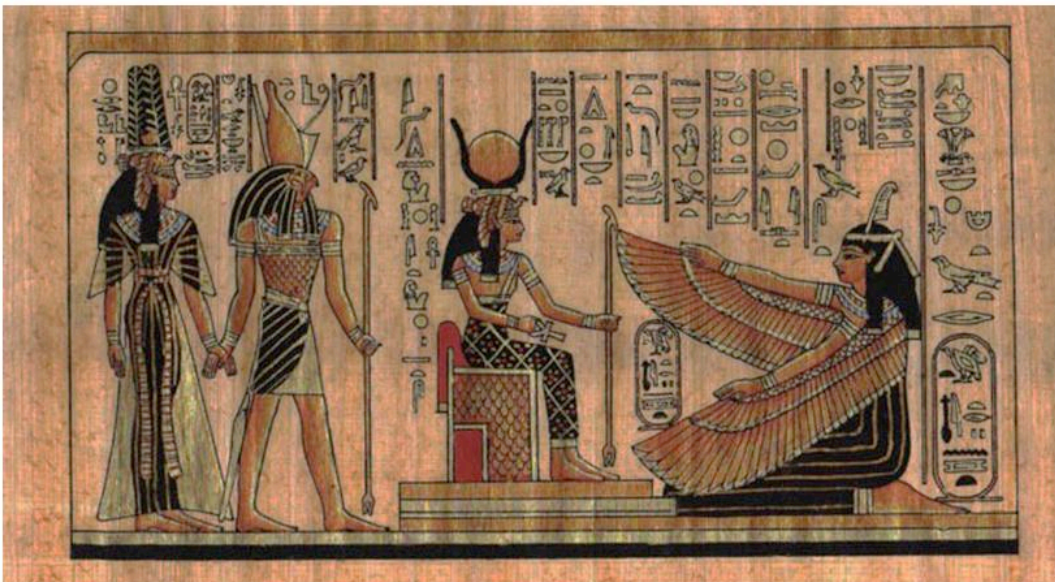
Bet : I believe you told me the truth / lied

You will be able to bet up to a 100 points for each bet (in multiples of 10)

How sure / confident you feel should determine how much you bet. If you win, you gain the amount you bet. If you lose, the other player receives the amount.



Game 2 – Test Round



Game 2 –Round 1



Game 2 –Round 2



Game 2 –Round 3



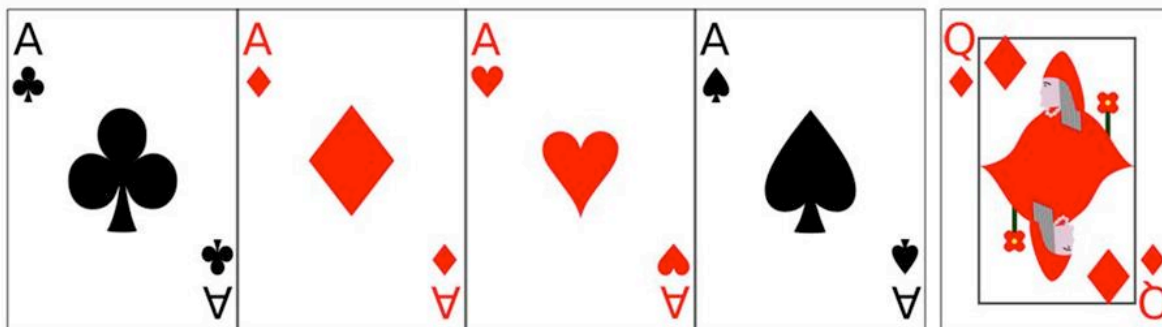
Game 2 -Round 4

The computer slides:

Player A

Your mission is to tell the TRUTH:

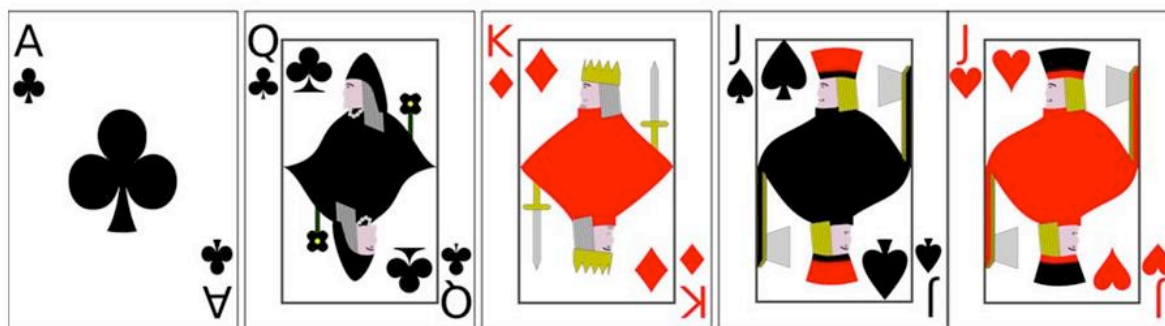
**You will have to convince the other player
that her cards are worse than yours**



Player B

Your mission is to LIE:

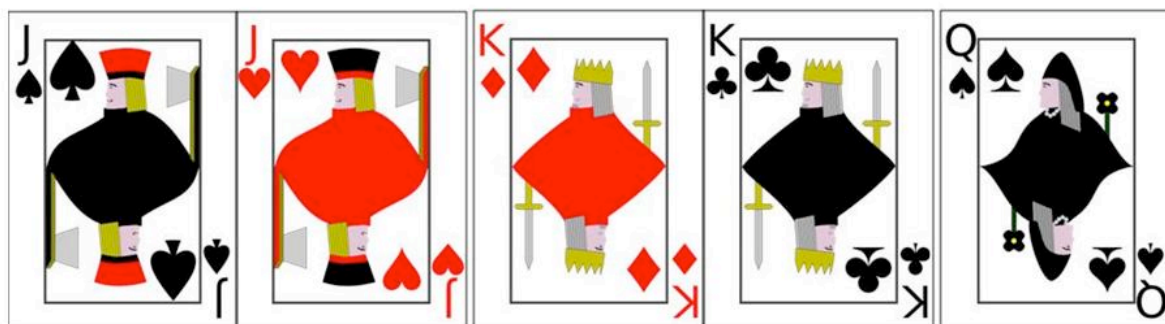
**You will have to convince the other player
that her cards are worse than yours**



Player A

Your mission is to LIE:

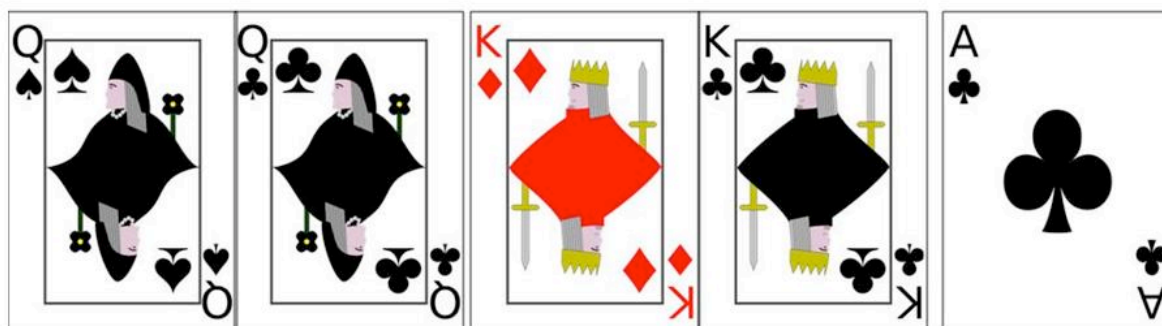
**You will have to convince the other player
that her cards are worse than yours**



Player B

Your mission is to LIE:

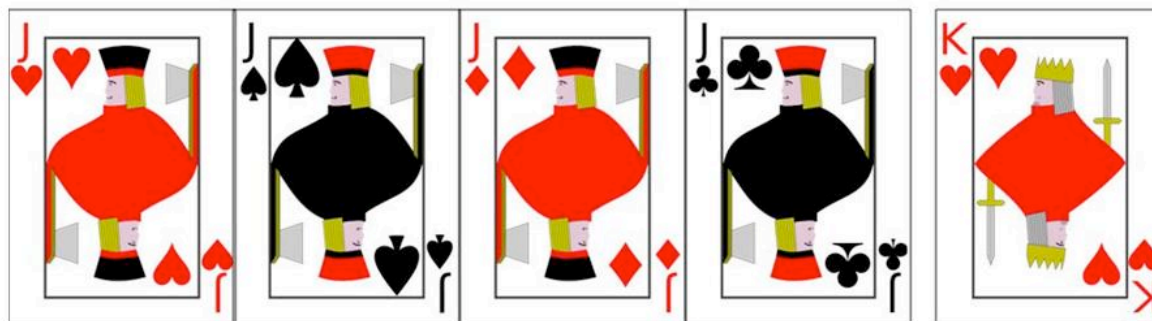
**You will have to convince the other player
that her cards are worse than yours**



Player A

Your mission is to tell the TRUTH:

**You will have to convince the other player
that her cards are better than yours**



Player B

Your mission is to tell the TRUTH:

**You will have to convince the other player
that your art piece is worth \$16000**

**Game 2:
test round**

Player A

Your mission is to LIE:

**You will have to convince the other player
that your art piece is worth \$8000 (real value: \$10)**

**Game 2:
Round 1**

Player B

Your mission is to tell the TRUTH:

**You will have to convince the other player
that your art piece is worth \$25000**

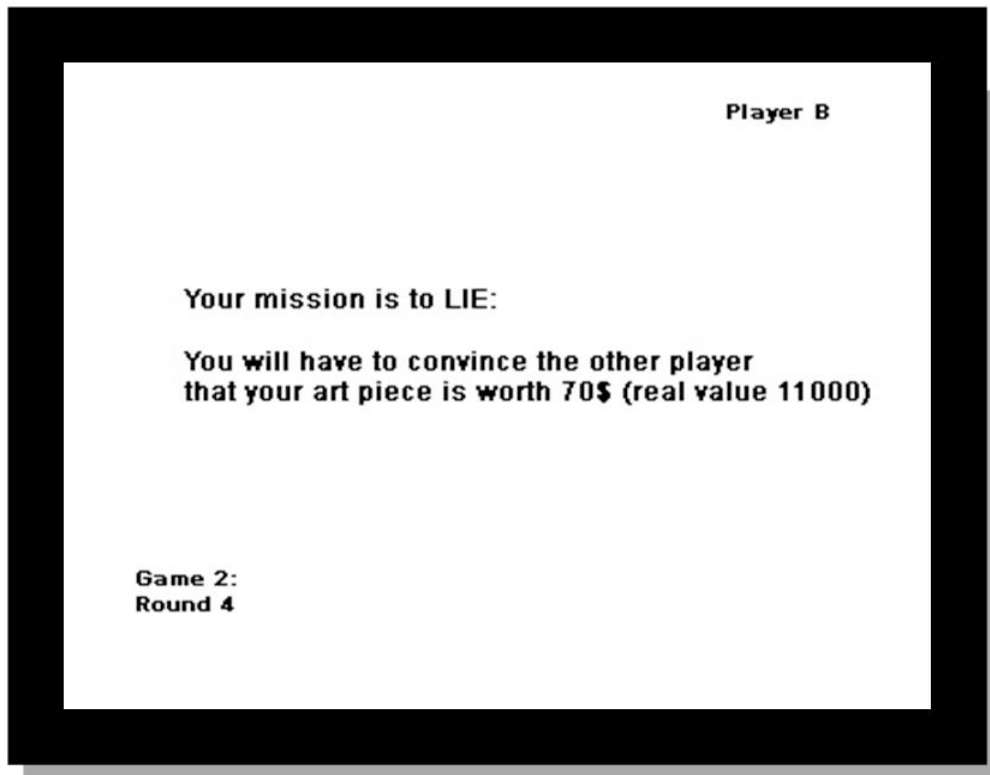
**Game 2:
Round 2**

Player A

Your mission is to tell the TRUTH:

**You will have to convince the other player
that your art piece is worth \$1**

**Game 2:
Round 3**



Appendix E: DVD