

## Telling and Detecting Lies in a High-stake Situation: the Case of a Convicted Murderer

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### SUMMARY

All deception studies published to date have been laboratory studies. In such studies people lied only for the sake of the experiment, consequently the stakes were usually low. Although research has shown that most spontaneous lies told in real life are trivial, such studies tell us little about lies where the stakes are high (such as police/suspect interviews). In Study 1, we discuss the behaviour of an actual suspect while he was interviewed by the police in a murder case. Although the man initially denied knowing and killing the victim, substantial evidence obtained by the police showed that he was lying. On the basis of this evidence, the man confessed to killing the victim and was later convicted for murder. To our knowledge there has been no other study published that has analysed the behaviour of a liar in such a high-stake realistic setting. The analysis revealed several cues to deception. In Study 2, we exposed 65 police officers to six fragments (three truthful and three deceptive) of the interview with the murderer and asked them to indicate after each fragment whether the man was lying or not. The findings revealed that the participants were better at detecting truths (70% accuracy) than lies (57% accuracy). We also found individual differences among observers, with those holding popular stereotypical views on deceptive behaviour, such as 'liars look away' and 'liars fidget' performing least effectively as lie catchers. Copyright © 2001 John Wiley & Sons, Ltd.

Several meta-analyses have provided evidence that deceiving others is correlated with more speech disturbances, a higher-pitched voice, and longer pauses (DePaulo *et al.*, 1985; Vrij, 1998; Zuckerman and Driver, 1985; Zuckerman *et al.*, 1981). More recent studies have found that deception, especially when liars are highly motivated, is associated with a decrease in hand, foot and leg movements (Akehurst and Vrij, 1999; Davis and Hadiks, 1995; DePaulo, 1992; Ekman, 1989; Ekman *et al.*, 1991; Höfer *et al.*, 1992; Vrij, 1995; Vrij *et al.*, 1996).

By way of explaining these findings, three main theoretical frameworks are usually offered: the emotional framework, the cognitive framework, and the attempted control framework (Burgoon *et al.*, 1989; DePaulo, 1988, 1992; DePaulo and Kirkendol, 1989; DePaulo *et al.*, 1985; Ekman, 1989, 1992; Ekman and Friesen, 1972; Goldman-Eisler, 1968; Knapp *et al.*, 1974; Köhnken, 1989, 1990; Riggio and Friedman, 1983; Vrij, 1998; Zuckerman *et al.*, 1981). While all three frameworks emphasize different aspects of deception, they are not mutually exclusive and all three can occur simultaneously in one lie.

The increase in pitch of voice and speech disturbances can be explained by the emotional framework. This framework proposes that deception causes physiological

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reactions, such as high blood pressure, increased heart rate, and an increased respiration rate. The physiological reaction is the consequence of arousal that is associated with deception. The arousal is the result of emotions experienced during deception. Deception may result in three different types of emotion, namely guilt, fear or excitement (Ekman, 1992). Liars may feel guilty, as a result of being aware of doing things which they are not allowed to do; or they may be afraid of getting caught. Finally, they may feel excited by having the opportunity of fooling someone.

An increase in speech disturbances can also be explained by the cognitive framework. This framework further provides an explanation for an increase in pauses and a decrease in hand, leg and foot movements. The cognitive framework emphasizes that deception may be a cognitively complex task. It is often more difficult to fabricate a plausible and convincing lie that is consistent with everything the observer knows or might find out than it is to tell the truth. Evidence has demonstrated that people engaging in cognitively complex tasks make more speech disturbances, speak more slowly and wait longer before giving an answer (Goldman-Eiser, 1968). They also make fewer hand and arm movements (Ekman and Friesen, 1972). It is suggested that the decrease in hand and arm movements is based on the fact that a greater cognitive load results in a neglect of body language, reducing overall animation (Ekman and Friesen, 1972).

A decrease in movements can also be explained by the attempted control framework. This framework emphasizes that liars tend to control their behaviour, both in order to avoid giving possible non-verbal indicators of their deception and to enhance the credibility of the impression they make on others. Paradoxically, deceivers' very attempts to control their behaviour serve as cues to deception. The controlled behaviour will appear as planned, rehearsed, and lacking in spontaneity. Therefore, by believing that unnecessary non-functional movements will make them appear suspicious (Vrij and Semin, 1996), liars will move very deliberately and tend to avoid movements which are not strictly essential. This results in an unusual degree of rigidity and inhibition. Although both the attempted control and the cognitive load framework predict a decrease in movements during deception, the explanations are different. According to the attempted control framework a decrease in movements is caused by an overcontrol of movements. The cognitive load framework on the other hand, does not contend that liars try to control their behaviour, rather the decrease in movements is held to be the result of a neglect of body language.

Perhaps the most striking finding in previous research is that liars don't seem to show behavioural cues such as gaze aversion and fidgeting. This is striking, because there is a strong and widespread belief among people that liars do show these behaviours (see DePaulo, 1992; DePaulo *et al.*, 1985; Vrij, 1991, 1998; Zuckerman and Driver, 1985; Zuckerman *et al.*, 1981, for reviews concerning people's beliefs about behavioural cues to deception). These beliefs are not only held by lay people, but also by professional lie catchers, such as police detectives (Vrij and Semin, 1996).

One possible reason why liars in experimental studies don't show clear patterns of nervous behaviour<sup>1</sup> is that they are simply not nervous enough during these experiments. In order to raise the stakes, lying is often introduced as an important skill,

<sup>1</sup> When we mention nervous behaviour we refer to behaviour such as gaze aversion, fidgeting, stuttering and so on, and not to micro facial expressions of emotions (Ekman, 1992). Analysing such microbehaviours would necessitate extremely high-quality video footage of the face, which was not available in this particular study. We will refer to this in the discussion.

and successful liars are promised money or other rewards. Although this results in raising the stakes to some extent (probably comparable to the stakes in most real-life situations, see DePaulo *et al.*, 1996), such studies do not tell us much about lying in high-stake situations, such as police interviews (Ekman, 1992; Frank and Ekman, 1997; Vrij *et al.*, 1997; Vrij and Semin, 1996; Vrij *et al.*, 1996). It may be the case that behavioural cues to deceit differ in low- and high-stakes situations, that is, liars will show the nervous behaviours which observers expect them to show when the stakes are high but not when the stakes are low. In order to investigate this, observation of liars in realistic high-stake situations is necessary and the present study addresses this issue. We analysed the behaviour of a man while he was interviewed by the police about a murder (the interviews were videotaped which enabled us to analyse the man's behaviour afterwards). Because of the nature of his crime, the murderer was aware that his conviction would most likely result in a sentence of life imprisonment. Although the man initially denied knowing and killing the victim, substantial evidence (for instance, a hair of the victim was found in the man's car) obtained by the police showed that he was lying. On the basis of this substantial evidence, the man confessed to killing the victim and was later convicted of murder. To our knowledge no other study has been published where the behaviour of a liar in such a high-stake and realistic setting has been analysed.

We did not have and will not get the opportunity to interview the murderer about how he felt during the interview and about the reasons for his behaviour. It is therefore unknown to what extent he felt nervous, tried to control himself and found it cognitively difficult to lie. In order to obtain some information about these issues, we exposed police officers, who did not know the man and who knew nothing about the case, to the fragments of the interview which we had analysed and asked them to indicate to what extent they perceived the man to be tense, controlling his behaviour, and having to think hard. Moreover, we asked these police officers to indicate after each fragment whether the man was lying or not. In studies concerning the detection of deception, observers are typically given videotapes or audiotapes and asked to judge whether each of a number of people is lying or telling the truth. The percentages of lie detection (or the accuracy rate), in most of these studies ranges from 45% to 60%, when 50% accuracy is expected by chance alone (DePaulo *et al.*, 1985; Kraut, 1980; Zuckerman *et al.*, 1981). Most studies are conducted with lay people (college students) as observers, but in some studies professional lie catchers, such as customs officers (Kraut and Poe, 1980), Secret Service agents (Ekman and O'Sullivan, 1991) and police detectives (DePaulo and Pfeifer, 1986; Ekman and O'Sullivan, 1991; Köhnken, 1987; Vrij, 1994; Vrij and Graham, 1997) participated. These studies have shown that the accuracy rates of professional lie catchers also usually fall in the 45–60% range, although there are some exceptions. For example, Ekman and colleagues (Ekman and O'Sullivan, 1991; Ekman *et al.*, 1999) found that agents of the Secret Service and a group of federal officers (mostly CIA agents) with a special interest and experience in deception obtained slightly higher rates of 64% and 73% respectively. However, detection of deception studies suffer from the same limitation as the studies concerning behavioural cues to deception; the stakes are usually not high for the liars and this may be a reason why the accuracy rates are usually low. That is, it will be difficult for observers to detect lies under these circumstances, as it is unlikely that liars will show clear behavioural cues to deception in situations on which the stakes are rather low (Ekman, 1993; Ekman and Frank, 1993; Vrij, 1998). The advantage of

our study compared to many previous studies is that observers were exposed to high-stake lies, which makes this study, in our view, a more realistic test of people's ability to detect lies on the basis of behavioural cues.

In the vast majority of studies, the accuracy rates of the group observers as a whole is reported. Ekman and O'Sullivan (1991) and Vrij and Graham (1997), however, looked at individual differences between observers and found large differences among them. Some observers are really good at detecting deceit (with accuracy rates over 80%), whereas others were really poor (with accuracy scores below 30%). On the basis of these findings, we did not necessarily expect our observers to be better lie-detectors than the observers in previous studies. It may indeed be the case that the murderer in our study would show some clear signs of deception, perhaps clearer signs than most liars show in other studies, due to the fact that he was lying in such a high-stake situation. However, we did not expect all observers to benefit from this situation. Instead, we hypothesized that we would find individual differences among observers, with those who hold popular stereotypical views on deceptive behaviour, such as 'liars look away' and 'liars fidget' as the worst lie catchers.

## **STUDY 1: THE BEHAVIOUR DISPLAYED BY THE MURDERER**

### **The murder case**

A person went missing and was found dead a couple of days later. It was clear that the person was murdered. Several witnesses told the police independently of each other that they had seen a man speaking to the victim a couple of days before the body was found. On the basis of their descriptions, the police were able to create an artist's impression of the man. After a couple of months, a man was arrested and brought for interviewing to a police station. Apart from the fact that he showed a clear resemblance to the face in the sketch, there were other reasons that led the police to believe that he was involved in the crime.

Two experienced male police officers interviewed this man extensively. All interviews were conducted by the same two officers and the man's lawyer was present during all interviews. During the first interview, he was asked to describe what he had done during a particular day (specifically the day the victim went missing). Although the interview took place several months after the victim went missing, the man was capable of giving a very detailed description of his activities during that day. He told the police that he was prepared for the fact that he might be a suspect and he had therefore checked his diary to find out what he had done during that day (even an innocent suspect could have known what day the person went missing, as the media reported considerably about the missing person during that day and the days immediately after). The police checked every single detail the man had provided. Several independent witnesses (including his employer) could confirm his story about his activities during the morning, but no confirmation could be obtained about his alleged activities during the rest of the day. This made the man even more suspect. An intensive investigation started. Meanwhile, the man consistently denied having killed the victim, he even claimed that he had never met the victim. After a couple of weeks, substantial evidence was found which made clear that he was the murderer. A hair, found in the man's car, was confirmed to have come from the victim. Additionally, fibres of the cloth in which the dead body was wrapped were found in his car. On the

basis of this substantial evidence, the man admitted to having killed the victim, and gave a detailed description of what had happened. He was later convicted for murder by a criminal court and sentenced to imprisonment for the remainder of his natural life.

However, even during his confession, the murderer did not tell the whole truth. He told the truth about how he drove from his house to the location where he met the victim: independent witnesses could confirm this part of the study. But it is also evident that he lied about how he met the victim. Several independent witnesses claimed to have seen him at a particular location. Additionally, an object which belonged to the man (ownership of which he admitted) was found at that particular location. Despite this substantial evidence, the man continued to deny ever having visited the location, insisting that although he has been near that location, he has never actually entered there.

The murderer was a West European Caucasian man, in his forties. He had little education and had a blue-collar occupation in which he was employed at the time. He had a girlfriend but lived alone.

### **The six fragments used in this study**

All the parts of the interview about which we were certain that he was lying or telling the truth have been analysed. Two fragments, one lie and one truth, were derived from the interview before the confession. The lie, which lasted 67 seconds, consists of a description of his activities during the afternoon and evening of the same day. He told the police about several things he had done in his home town. In reality, he took his car and drove to another city where he met the victim. He killed the victim later on that day. The truth consists of a description of his activities during the morning that the victim went missing. As stated previously, witnesses could confirm this part of the study. This description lasted 61 seconds. We know for sure that the suspect also told the truth when giving his personal details, but we did not include this truth in our analyses. This is because in order to make a fair comparison between truths and lies, the content of the truth should be comparable to the content of the lie. Obviously, talking about personal details, such a name and address, is completely different from talking about the crime of which you are suspected.

Four fragments, two lies and two truths, were derived from his confession. In the first truthful fragment, which lasted 26 seconds, the man gave a detailed description of how he drove from the exit of the motorway to the place where he met the victim. Witnesses could verify this part of the story. The second truthful fragment, which lasted 27 seconds, was similar in content to the first, but more detailed. His first lie during his confession regarded the time he left a friend's house at his home town the day he killed the victim. In reality, he left the friend's house a couple of hours earlier than he claimed. Witnesses saw him with the victim at the time he was said to have been at his friend's place. This is an important lie because he had to account for a couple of hours (namely the hours he visited the location which he has denied ever visiting). This lie took 16 seconds. The second lie during the confession related to where he met the victim. This lie lasted 32 second. As described above, there is compelling evidence that he met the victim at a location which he denies having visited.

Hence, although we have several hours of videotapes, only a few minutes could be

used in this study, due to the fact that the 'ground-truth' of most parts of the interview could not be established. For instance, the murderer gave a detailed description of the talks he had with the victim, and how he killed the victim. There is, however, no possibility of verifying the truthfulness of this part of his story.

### Dependent variables

Once appropriate sections of the original videotapes had been selected (6 in total), these were copied onto another tape. Blank spaces of 30 seconds in length were added between each of the six selected fragments of footage. Additionally, two observers coded the behaviour of the murderer independently, and Pearson correlations were conducted between the two sets of data from the two coders to detect any differences in judgement. The observers did not know when the murderer was lying and when he was telling the truth. They were using a coding system which was used by us previously (Vrij, 1991, 1995; Vrij *et al.*, 1996, 1997). The following twelve behaviours were coded (the ah and non-ah speech disturbances were scored on the basis of a typed verbatim text):

- Gaze aversion: number of seconds in which the suspect looked away from the interviewing policemen (2 coders,  $r = 0.95$ ,  $p < 0.01$ )
- Smiling: frequency of smiles and laughs (2 coders,  $r = 1.00$ ,  $p < 0.01$ )
- Illustrators: frequency of arm and hand movements which were designed to modify and/or supplement what was being said verbally (Ekman and Friesen, 1969) (2 coders,  $r = 1.00$ ,  $p < 0.01$ )
- Self-manipulations: frequency of scratching the head, wrists etc. Rubbing one's hands together were not coded as self-manipulations but as hand and finger movements (2 coders,  $r = 1.00$ ,  $p < 0.01$ )
- Frequency of hand and finger movements. Movements of the hands or fingers without moving the arms (2 coders,  $r = 0.99$ ,  $p < 0.01$ )
- Head movements: frequency of head nods and head shakes (2 coders,  $r = 0.86$ ,  $p < 0.01$ )
- Trunk movements: frequency of clearly visible movement or turning of the body, e.g. moving position in seat (2 coders,  $r = 1.00$ ,  $p < 0.01$ )
- Number of pauses: frequency of noticeable pauses in speech (2 coders,  $r = 0.98$ ,  $p < 0.01$ )
- Length of pauses: total length of pauses in speech rate (2 coders,  $r = 0.99$ ,  $p < 0.01$ )
- Speech rate: measured with a 3-point scale, (1) = slow speech, (2) = moderate speech, and (3) = fast speech (2 coders,  $r = 1.00$ ,  $p < 0.01$ )
- Ah disturbances: frequency of saying 'ah' or 'mm' between words (2 coders,  $r = 1.00$ ,  $p < 0.01$ )
- Non-ah disturbances: frequency of word and/or sentence repetition, sentence change, sentence incompleteness, and slips of the tongue (2 coders,  $r = 0.91$ ,  $p < 0.01$ ).

The correlations show evidence of a strong consistency between the two coders, but say little about their actual agreement in judgments, that is, the number of times the two coders came up with exactly the same scores. A total of 72 agreements were possible (12 behaviours were scored each six times). On 51 occasions (72% of the cases) the coders had a total agreement. Disagreements occurred particularly with regard to gaze aversion (five disagreements out of six occasions), head movements

Table 1. The behaviour of a murderer before and during his confession

Behaviour	Before confession		During confession	
	Truth	Lie	Truth	Lie
Length (in seconds)	61	67	53	48
Gaze aversion <sup>a</sup>	26.56	44.33	47.55	12.50
Smiling <sup>b</sup>	0.00	0.00	0.00	0.00
Illustrators <sup>b</sup>	1.97	1.79	6.79	0.00
Self-manipulations <sup>b</sup>	0.00	0.00	0.00	0.00
Hand/finger movements <sup>b</sup>	0.98	1.79	3.96	0.00
Head movements <sup>b</sup>	19.18	17.01	16.98	16.88
Trunk movements <sup>b</sup>	0.00	0.00	0.00	0.00
Pauses <sup>b</sup>	5.90	6.27	4.53	8.13
Pauses <sup>a</sup>	10.33	22.84	4.53	15.63
Speech rate <sup>c</sup>	2.00	1.00	3.00	2.00
Words (total number)	104	112	144	86
Ah disturbances <sup>d</sup>	11.54	8.04	3.47	3.49
Non-ah disturbances <sup>d</sup>	7.69	14.29	8.33	11.63

<sup>a</sup>The reported means represent the length in seconds on a per-minute basis.

<sup>b</sup>The reported means represent the frequency of occurrence on a per-minute basis.

<sup>c</sup>Measured with a 3-point scale (1 = slow, 3 = fast).

<sup>d</sup>The reported means represent the frequency of occurrence per 100 words.

(four disagreements out of six occasions), length of pauses (five disagreements out of six occasions) and non-ah speech disturbances (six disagreements out of six occasions). In all cases, however, there was a total consistency in these disagreements, as one coder consistently had somewhat higher scores than the other. We therefore concluded that the overlap in judgement between the two coders was satisfactory.

The behavioural scores were based on the average scores of the two coders. The reported duration and frequencies of all categories of non-verbal behaviour were corrected for the length of the fragments or for the number of spoken words. Patterns listed from gaze aversion to length of pauses were calculated on a per-minute basis; patterns for ah and non-ah disturbances were calculated per 100 words.

## Results and discussion

A distinction has been made between truths and lies before and during the confession (see also Table 1). A few differences emerged between the truthful and deceptive accounts before the confession. While lying, the murderer showed more gaze aversion, had longer pauses, spoke more slowly and made more non-ah speech disturbances than when he was telling the truth. This behavioural pattern is typical for somebody who has to think hard. Apparently, it was more difficult for the suspect to lie than to tell the truth.

Also several differences between truth telling and lying emerged in the confession-interview. While lying he showed less gaze aversion, had longer pauses, spoke more slowly, and made slightly more speech disturbances. Again, the slow speech, longer pauses and increase in speech disturbances can be interpreted as a sign that he had to think very hard while lying. Looking at the police officer when he was lying may be

interpreted as an effort to convince the officer that he was telling the truth, in other words, an indication that he tried to control his behaviour. In sum, the behavioural pattern showed by the murderer provides some evidence that he had to think hard and that he tried to control his behaviour.

The fact that the suspect apparently had to think hard during deception may be surprising, as he had enough time to prepare himself for the interviews (as mentioned above, he knew he was a suspect, and already expected to be interviewed). It is possible that the suspect is not very bright, thus not fully taking advantage of the preparation time that was available to him. As Ekman and Frank (1993) have pointed out, preparation probably does not benefit liars who are not so clever.

In summary, the suspect showed similar deceptive behaviour before and during the confession, with the exception of gaze aversion. He showed more gaze aversion while lying before the confession and less gaze aversion when lying during the confession. This might be attributed to the style of questioning in the interview. Before the confession he was asked in an open question to describe his activities during that particular day, but during the confession he was confronted with a disbelieving police officer, and so had to convince the officer of his story.

Previous deception research has revealed a decrease in non-functional, subtle movements of hands and fingers during deception. The murderer's behaviour does show some limited support (namely during the confession interview) for this finding. But perhaps more important is that, even in this high-stake situation, we found no evidence at all for the widespread belief that people fidget when they are lying.

Both the truth and the lie which we have analysed during the confession consisted of two different fragments. This enables us to find out whether the murderer's behaviour changed throughout lying and throughout telling the truth. Table 2 provides the behavioural data for each of the six fragments. Fragments 1 and 2 refer to the lie and truth before the discussion and are already discussed. Fragments 3 to 6 refer to the lies and truths during the confession. By comparing fragment 3 with fragment 6 (both lies) only two obvious differences emerged: the man made more head movements and displayed more gaze aversion in fragment 3 compared to fragment 6. A comparison between fragments 4 and 5 (both truths) revealed only two obvious differences: he made more gestures and more hand and finger movements in fragment 5 than in fragment 4. In sum, we may conclude that the murderer's behaviour throughout both confession truths (fragments 4 and 5) and throughout both confession lies (fragments 3 and 6) was very consistent.

## **STUDY 2: POLICE OFFICERS' IMPRESSION ABOUT THE MURDERER'S BEHAVIOUR AND THEIR ABILITY TO DETECT HIS LIES**

### **Method**

#### *Participants*

A total of 65 police officers from various police stations in West Sussex (England) participated in the experiment, 59 were male and 6 were female. The mean age was 30 years (with a range of 22–52 years) and mean length of service was 6 years (with a range of 1–29 years). Their average self-rating of experience of interviewing suspects was 4.42 on a 7-point Likert scale ( $SD = 1.44$ , where 1 = little experience and 7 = a

Table 2. The behaviour of a murderer during the six fragments

Behaviour	Fragments					
	1 (Truth)	2 (Lie)	3 (Lie)	(4) Truth	(5) Truth	(6) Lie
Length (in seconds)	61	67	16	26	27	32
Gaze aversion <sup>a</sup>	26.56	44.33	30.00	43.85	51.11	3.75
Smiling <sup>b</sup>	0.00	0.00	0.00	0.00	0.00	0.00
Illustrators <sup>b</sup>	1.97	1.79	0.00	0.00	13.33	0.00
Self-manipulations <sup>b</sup>	0.00	0.00	0.00	0.00	0.00	0.00
Hand/finger movements <sup>b</sup>	0.98	1.79	0.00	0.00	7.78	0.00
Head movements <sup>b</sup>	19.18	17.01	28.13	16.15	17.78	11.25
Trunk movements <sup>b</sup>	0.00	0.00	0.00	0.00	0.00	0.00
Pauses <sup>b</sup>	5.90	6.27	7.50	4.62	4.44	8.44
Pauses <sup>a</sup>	10.33	22.84	16.88	3.46	5.56	15.00
Speech rate <sup>c</sup>	2.00	1.00	2.00	3.00	3.00	2.00
Words (total number)	104	112	23	64	80	63
Ah disturbances <sup>d</sup>	11.54	8.04	4.35	3.13	3.75	3.17
Non-ah disturbances <sup>d</sup>	7.69	14.29	13.04	9.38	7.50	11.11
Accuracy (in percentages)	77	66	52	55	79	52

<sup>a</sup> The reported means represent the length in seconds on a per-minute basis.

<sup>b</sup> The reported means represent the frequency of occurrence on a per-minute basis.

<sup>c</sup> Measured with a 3-point scale (1 = slow, 3 = fast).

<sup>d</sup> The reported means represent the frequency of occurrence per 100 words.

lot of experience). Official permission to approach stations to ask for participants was obtained from the Chief Constable of West Sussex.

### Procedure

Groups of 4–10 participants were tested at a time. Sessions were held between 5.30 and 7.30 am on Sunday mornings as there was less chance of being interrupted at this time. The experimenter gave the following description:

The video you are about to watch is an actual police interview with a man suspected of murder. The dialogue is in ... [language which the man spoke. We are not allowed to reveal this language in order to guarantee the suspect's anonymity. None of the English-speaking participants could understand the man]. It is not important that you can't understand the man, as the aim of the experiment is to discover if you are able to tell from non-verbal cues, and speech intonations (not speech content) whether a person is lying. This tape consists of 6 fragments of footage which vary quite widely in length (unavoidable unfortunately) with a 30-second break between each fragment. The length of each clip has nothing to do with whether or not he is telling the truth. In some fragments the subject is lying and in others he tells the truth. The fragments were taken from various parts of the interview, either before or during the confession. I am asking you to complete the questions for each fragment of the video during the breaks provided.

They were also informed where the suspect would be sitting and where the two detectives would be sitting, one of whom is off-screen. It was physically pointed out where the other officer was sitting. This is clearly important as the suspect sometimes looks at him. This may not have been immediately obvious to the participants and may have falsely led them into believing that the suspect is averting his gaze from the police officer who is in sight.

Before the experimenter started the video, she asked the participants to write down in the questionnaire what he or she considered to be the three most obvious non-verbal cues that betray a liar. All participants saw the fragments in the same order. This might be considered a limitation as it may lead to contrast effects. For example, the suspect might be rated as (more) tense in one fragment as a consequence of him being judged as not tense at all in the preceding fragment.

#### *Independent variables*

Two independent variables were introduced in this experiment, namely whether the murderer was lying or not and whether the clips were taken from the interviews before and during his confession.

#### *Dependent variables*

After each fragment, the participants were requested to answer the following four questions: (1) Is he lying? (yes or no); (2) Is he tense? (7-point Likert scale, ranging from (1) definitely not to (7) definitely); (3) Is he controlling his behaviour? (7-point Likert scale, ranging from (1) definitely not to (7) definitely); and (4) Is he having to think hard? (7-point Likert scale, ranging from (1) definitely not to (7) definitely). Finally, after seeing each fragment they were asked to write down which behavioural cues had prompted them to make their decision.

## **Results and discussion**

### *The impression the murderer made*

In order to find out what impression the murderer made on the participants (being tense, trying to control himself or having to think hard) several *t*-tests were conducted. Separate *t*-tests were conducted for lying and truth-telling and the results are provided in Table 3.

Table 3 shows that when the murderer was *lying*, the most prevalent impression given to the police officers was that he was having to think very hard. When he was *telling the truth*, he mainly gave the impression that he was trying to control himself.

Table 3. The impression the murderer made during the police interviews

Interview	Impression		
	Tense	Controlled	Thinking hard
When lying	4.35 <sup>a</sup>	4.47 <sup>a</sup>	4.84 <sup>b</sup>
When telling the truth	3.47 <sup>a</sup>	4.63 <sup>b</sup>	3.57 <sup>a</sup>

Note: Only means with a different superscript differ significantly ( $p < 0.05$ ) from each other.

These findings underline our previous conclusion that, despite the fact that the stakes were high, nervousness was not the dominant impression given during the interviews.

In order to find out whether the impression the murderer made differed between (a) truth telling and lying between (b) before and during the confession, three ANOVAs were carried out (one ANOVA for each of the dependent variables) with a 2 (Deception: yes or no)  $\times$  2 (Confession: before or during) factorial design.

The ANOVA regarding making a tense impression revealed one significant effect, namely a main effect for Deception. The murderer made a more tense impression when he was lying ( $M = 4.35$ ) than when he was telling the truth ( $M = 3.47$ ),  $F(1,64) = 39.65$ ,  $p < 0.01$ ). Hence, although a nervous impression was not predominant throughout the interview, these findings show that he did appear more nervous while lying than when telling the truth, giving some support to people who claim that liars act nervously. The results of Table 1 give an explanation for this finding. We explained the behavioural differences between the murderer's truth telling and lying as an indication that he had to think hard. However, some of the behavioural cues on which we based this decision, such as an increase in speech disturbances, are indicators of nervousness as well. It may be that the police officers therefore had the impression that he was more tense when lying.

The ANOVA regarding controlling himself revealed a significant main effect for Confession,  $F(1,64) = 10.64$ ,  $p < 0.01$  and a significant Deception  $\times$  Confession interaction effect,  $F(1,64) = 11.49$ ,  $p < 0.01$ . The Deception  $\times$  Confession interaction effect reveals that when the murderer was *telling the truth* he gave the impression that he was controlling himself more before the confession ( $M = 5.26$ ) than during the confession ( $M = 4.31$ ),  $F(1,64) = 20.64$ ,  $p < 0.01$ , whereas no difference in controlling himself between before and during the confession emerged when he was *lying* ( $M = 4.52$  versus  $M = 4.44$ ),  $F(1,64) = 0.18$ , *ns*. Mean scores concerning the Confession main effect show that the murderer gave the impression that he was controlling himself more before the confession ( $M = 4.89$ ) than during it ( $M = 4.37$ ).

The ANOVA regarding thinking hard revealed a main effect for Deception,  $F(1,64) = 65.87$ ,  $p < 0.01$ , and a main effect for Confession,  $F(1,64) = 25.19$ ,  $p < 0.01$ . No Deception  $\times$  Confession interaction effect was found. Mean scores regarding the Deception main effect show that the man gave the impression that he had to think harder when he was lying ( $M = 4.84$ ) than when he was telling the truth ( $M = 4.21$ ). This supports the conclusion we drew earlier when discussing the murderer's behaviour. Mean scores concerning the Confession main effect show that the murderer gave the impression that he had to think harder before the confession ( $M = 4.76$ ) than during it ( $M = 3.93$ ).

#### *Accuracy rates*

The overall accuracy rate in the experiment was 64%, which was significantly above the level of chance,  $t(64) = 5.07$ ,  $p < 0.01$  and slightly higher than what is usually found in deception studies. In order to explore differences in accuracy rates between (a) deception and truth telling and between (b) before and during the confession, an ANOVA was conducted utilising a 2 (Deception: yes or no)  $\times$  s (Confession: before or during) factorial design. The analysis revealed a significant main effect for Deception,  $F(1,64) = 7.99$ ,  $p < 0.01$  and a main effect for Confession,  $F(1,64) = 5.91$ ,  $p < 0.05$ . Mean scores revealed that the participants were better at detecting truths (70%

accuracy) than lies (57% accuracy). In fact, the accuracy rate regarding detecting lies did not even succeed the level of chance,  $t(64) = 1.87$ ,  $p = 0.066$ . Moreover, participants were better at detecting truths and lies before the confession (72%) than during it (60%). Both accuracy rates were above the level of chance ( $t(64) = 5.08$ ,  $p < 0.01$  and  $t(64) = 3.07$ ,  $p < 0.05$  respectively).

Table 2 shows the accuracy rates for each of the six fragments. The table shows that it was particularly hard for the observers to detect both confession-lies (fragments 3 and 6). Both accuracy rates were almost at the level of chance of 50%.

Furthermore, we examined individual differences in accuracy rates. As was the case in previous studies, we found large individual differences: 11 officers (out of 65) performed particularly badly and made only one or two correct judgments, whereas 12 officers made five correct judgments and six officers correctly judged all six fragments. How can these individual differences be accounted for? First, we carried out Pearson correlations between accuracy rate and age, length of service and self-ratings of experience in interviewing suspects. All correlations were actually very low (0.10, 0.02, and 0.03 respectively) and not significant. Hence, the ability to detect lies did not correlate with any of these three variables. These findings support our previous findings (Vrij and Graham, 1997), but contradicts Ekman and O'Sullivan's (1991) findings who found that younger observers are better lie detectors than older observers. A possible explanation for this contradiction is the relatively low age and restricted age range of our observers (mean age was 30 years and only 13% of the participants were older than 40 years, whereas Ekman and O'Sullivan had a wider age range in their sample of professional lie catchers).

In our further analyses, we compared the 18 officers who were particularly good at detecting lies with the 11 officers who were particularly poor. First, no significant differences were found between the two groups regarding age, length of service and self-reported experience in interviewing suspects. Second, we hypothesized that the bad lie detectors would specifically rely upon stereotypes such as 'liars look away' and 'liars fidget' to make their judgements. We tested this hypothesis by looking at how many good and how many bad lie detectors considered, prior to seeing the videotape, gaze behaviour or fidgeting to be among the three most obvious non-verbal cues that betray a liar. The results give support to the hypothesis. Significantly more bad lie detectors (100%) than good lie detectors (83%) are said to rely upon gaze behaviour in order to catch a liar,  $\chi^2(1, n = 29) = 3.07$ ,  $p < 0.05$ , one-sided (although the results, of course, suggest that both groups of lie detectors seem to rely strongly on gaze behaviour). Also, significantly more bad lie detectors (45%) than good lie detectors (17%) are said to rely upon fidgeting in order to catch a liar,  $\chi^2(1, n = 29) = 2.78$ ,  $p < 0.05$ , one-sided. Interestingly, when we examined how often good and bad lie detectors indicated that they based their decision about whether or not the murderer was lying on gaze behaviour and fidgeting, no significant difference occurred. Both bad and good lie detectors mentioned gaze behaviour on average  $M = 3.00$  times. Fidgeting was hardly ever mentioned, in fact not at all by the bad lie detectors and on average only  $M = 0.16$  times by the good lie detectors,  $F(1,27) = 2.05$ , *ns*. This is, however, perhaps not surprising as Table 1 revealed that the man hardly fidgeted. In this particular study, it would have been helpful to the observers to pay attention to the man's speech rate, speech disturbances and speech pauses, as these were the behaviours which differed between truth telling and lying. As one may expect, the good lie detectors mentioned more often that they were

using such aspects to reach their decision ( $M = 1.72$ ) than the bad lie detectors did ( $M = 0.55$ ). This difference was significant,  $F(1,27) = 6.03$ ,  $p < 0.05$ . A look at the three behaviours (speech rate, pauses and speech disturbances), separately, revealed that only differences in mentioning speech rate approached significance,  $F(1,27) = 3.41$ ,  $p < 0.08$ . Bad lie detectors did not mention speech rate at all, whereas good lie detectors mentioned speech rate on average  $M = 0.33$  times.

## GENERAL DISCUSSION

One may well argue that previous studies concerning how liars behave suffer from the fact that the stakes were not particularly high for the liars, and therefore do not provide much insight into how liars behave in real-life high-stake situations. Our study differed from previous research in that we observed the behaviour of a liar in a real-life high-stake setting: namely during his police interview while he was accused of murder. To our knowledge, no other published study has examined such a realistic high-stakes situation. Although there was evidence that the man was more nervous when he was lying than when he was telling the truth, the general finding was that he did not exhibit nervous behaviours, despite the fact that there was so much at stake. Therefore this case study contradicts the widespread belief among even professional lie catchers that liars behave nervously. There are four possible reasons why the man did not behave nervously. First, in a previous study in which we investigated the relationship between nervousness and making hand and finger movements (Vrij *et al.*, 1996), we did not find a significant relationship between the two, that is, increased nervousness did not result in increased fidgeting. Hence, the relationship between nervousness and fidgeting seems not to be as evident as people may expect. Second, the suspect already had a criminal record and had previously been interviewed by the police on several other occasions. Therefore he probably realized that showing stereotypical deceptive behaviour (such as fidgeting and gaze aversion) would make the police suspicious, and so he probably tried to control his behaviour in order to make an honest impression. Third, the circumstances under which the man had to lie were difficult. At the beginning of the interviews, he was told by the police that he was their main suspect in this murder case. Therefore he could assume that the police would pay a great amount of attention to what he was saying and would verify all the information he gave in order to find out whether he was lying. Hence, it was important for him to think carefully about what he would say, as each little mistake could have severe consequences for him. Lying under these difficult circumstances probably requires a lot of cognitive energy. As a result, instead of deliberately trying to refrain from showing nervous behaviours, such as fidgeting, an absence of nervous behaviours may automatically occur as a result of neglect of body language, due to this cognitive load. Finally, we can assume that this man was highly motivated to conceal his lie. As previous research has shown, highly motivated liars often tend to show extraordinarily rigid, rehearsed and planned behaviour (the so-called motivational impairment effect (DePaulo and Kirkendol, 1989; DePaulo *et al.*, 1983, 1988). In their efforts to avoid displaying any behavioural cues to deception, the highly motivated liar often seems to think that the best strategy to achieve this is to refrain from showing any unnecessary movements. However, when making statements about the man's nervous behaviours it should be emphasized that we did not measure all

types of behaviour. For example we did not measure microfacial expressions of emotions (Ekman, 1992), which Ekman has found to correlate with nervousness. Such measurements, however, would have required very high-quality close-up video footage of the face (as they usually last only a fraction of a second), which was not available to us in this case. While this may be an unavoidable shortcoming, we believe that our findings are still ecologically valid as the behaviours that we have studied are the behaviours that police officers would be able to observe, and would usually rely on to detect deceit.

One explanation for why previous studies have found that people are usually poor at spotting lies is that the lies they have to detect are usually very trivial. This experiment is radical in that we exposed our observers to high-stakes lies, namely the lies the murderer told the police during the interviews. The total accuracy rate (64%) was higher than is found in most studies, suggesting that professional lie catchers might be better lie detectors in their daily work situation than the outcomes of previous experimental studies suggest. However, this assertion is not true because a distinction between detecting lies and truths showed that the officers were particularly good at detecting truths (70% hit rate) but only slightly above the level of chance at detecting lies (57%). One obvious explanation for the low hit-rate in lie detection is that the present lie-detection task, in which officers were asked to make judgements about a videotaped interview, differs from the way they would detect lies in real life. When detecting lies ordinarily the officers would have more contextual information about the case than was available to them in this experiment. This background information (i.e. facts known about the case and the suspect) may be very useful in helping them to detect lies because it could be used to verify the story given by the suspect. However, such background information is not always available to a lie detector. Some situations require a snap veracity judgement, i.e. customs officers need to make a quick decision when deciding who to search, or a traffic officer needs to make a quick decision when deciding whether or not to breathalyse a driver. Also perhaps at the start of a major enquiry (before a likely suspect has been established) snap decisions would be used to eliminate or proceed enquiries with various suspects.

Even real-life lie-detection situations in which no background information is available differ from lie detection in this experiment in several ways. Although detecting lies in experiments is not necessarily more difficult than in real life (Zuckerman *et al.*, 1981; Vrij, 2000). For example, it is doubtful whether the fact that in experimental studies such as the present one, where observers are passive and therefore do not have the opportunity actually to interview the potential liars, is a limitation. In several studies researchers compared the accuracy scores of observers who actually interviewed potential liars with those who observed the interviews but did not interview the potential liars themselves (Buller *et al.*, 1991; Feeley and deTurck, 1997; Kalbfleisch, 1994; Stiff *et al.*, 1992). The results revealed that the observers were more accurate in detecting lies than the interviewers. These findings suggest that actually interviewing someone is a disadvantage, and not an advantage in detecting deceit. This is perhaps not surprising. First, interviewers need to concentrate on the interview itself. They, for instance, have to decide what to ask, how to phrase these questions, and at what moment in the interview they are going to ask these questions. Additionally, they put effort into their self-presentation, listening to the interviewee and their reply. This requires cognitive resources which cannot be devoted to the lie-detection task. Observers, on the other hand, do not have to bother about the flow of the conversation

and can fully concentrate, if they wish, on the lie-detection task. Second, the lower accuracy rates for interviewers may be the result of a truth-bias among interviewers: Interviewers show a greater tendency to believe a potential liar than observers (Feeley and deTurck, 1997; Granhag and Strömwall, 1998).

We will conclude with some remarks about the present study and some suggestions for further research. First, although the present study provides, in our view, valuable insight into how liars behave in real-life high-stakes situations, it definitely does not give the ultimate answer to this question. We have discussed the behaviour of only one particular liar, and it may be the case that his behaviour was exceptional and differs from how other liars behave when telling high-stakes lies. It could be that this liar is a particularly gifted one, and that he is able to control his behaviour very effectively when compared to others in a similar situation. Alternatively this liar could be a particularly poor one, and not a good example of typical deceptive behaviour. With only one example we just do not know. Behavioural analyses of more liars in high-stake situations are therefore welcome.

Second, in order to make studies concerning detecting deceit even more realistic, the stakes for lie detectors should be increased as well. For them, there is usually nothing at stake in experimental studies (apart from pride perhaps), and it is therefore possible that they are less motivated in experimental studies than in their daily work which may impair their performance.

Third, little is known about what makes someone a good lie detector. Our results revealed that avoiding stereotypical beliefs in detecting lies is a step in the right direction, but this is, of course, only the first step.

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