

## Processes Underlying Deception: An Empirical Analysis of Truth and Lies when Manipulating the Stakes

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### *Abstract*

*The aim of the present experiment was to examine to what extent participants experience attempted control, cognitive load and arousal when they lie and tell the truth under lower-stakes and higher-stakes conditions. We expected both differences and similarities between truth tellers and liars. We expected that participants would experience these processes to a higher degree when they lied compared to when they told the truth (differences), but we also expected that both liars and truth tellers would be keen to make a convincing impression; and that raising the stakes would affect liars and truth tellers in a similar way (similarities). A total of 128 participants lied and told the truth during an interview (lying and truth telling was counterbalanced). Stakes were manipulated by informing half of the participants that their interviews would be recorded on videotape and would be analysed and evaluated by police officers. The predictions were supported. Copyright © 2005 John Wiley & Sons, Ltd.*

**Key words:** deception; attempted control; cognitive load; arousal; stakes

### INTRODUCTION

Although alternative theories explaining deceptive behaviour exist (see DePaulo *et al.*, 2003, for an overview), Zuckerman, DePaulo and Rosenthal's (1981) three-factor model is amongst the most popular (Vrij, 2000, 2004).<sup>1</sup> The core of the three-factor model is that liars show signs of deceit as a result of experiencing emotions or cognitive load or because they attempt to appear convincing. Liars might experience emotions, for example, fear of not being believed; might have to think hard to come up with a plausible and convincing answer, especially when the lie is not rehearsed or well planned; and might deliberately try to control themselves in order to make an honest and convincing impression. Perhaps

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<sup>1</sup>In addition to the three factors, Zuckerman *et al.* (1981) included a fourth factor in their theoretical model, labelled 'arousal'. We left this factor out because, as Zuckerman *et al.* (1981) themselves acknowledge, it shows an overlap with the emotion factor.

with the exception of Vrij, Semin and Bull (1996), researchers have never examined whether liars actually do experience these processes more than truth tellers. The processes are typically used *post hoc* to explain the differences that emerged in responses between liars and truth tellers.

In this respect, the present experiment is a replication of Vrij *et al.* (1996) and it was expected that participants would experience more emotions, would have to think harder and try harder to make a convincing impression when they lied compared to when they told the truth (Hypothesis 1). Moreover, the present study differed in two important aspects from Vrij *et al.* (1996). First, the prevalence of the three processes within liars and within truth tellers was also examined. Second, the impact of raising the stakes on experiencing the three processes was investigated.

Regarding the prevalence of the three processes, it is widely assumed that liars, most of all, will be nervous. When reviewing the literature regarding the cues that laypersons associate with deception, Strömwall, Granhag and Hartwig (2004, p. 230) conclude that 'people believe that a liar will feel nervous and act accordingly'. When they review the views held by practitioners (people working in the legal field) about cues to deception, Strömwall *et al.* (2004) conclude that, overall, practitioners did not differ in their beliefs from laypersons. In their influential manual about police interviewing, Inbau, Reid, Buckley and Jayne (2001) point out that liars feel more uncomfortable than truth tellers, which results in liars being more likely to cross their legs, shift in their chair, and perform grooming behaviours. Yet, DePaulo *et al.*'s (2003) comprehensive meta-analysis regarding how liars actually behave, and Mann, Vrij and Bull's (2002) analysis of behaviours shown by suspects during their police interviews show no support for the assumption that liars, above all, appear nervous. One explanation for these discrepancies is a neglect of the importance of impression management (Vrij, Mann & Fisher, 2004). DePaulo *et al.* (2003), in particular, have emphasised that both liars and truth tellers gain from being believed, and will attempt to appear convincing. We therefore predict that the attempted control process will dominate both when participants lie and when they tell the truth (Hypothesis 2). (We expect attempted control to be more dominant when lying than when telling the truth, see Hypothesis 1, because liars take their credibility less for granted than truth tellers, DePaulo *et al.*, 2003.)

Another explanation for the discrepancy is that of the stakes. Inbau *et al.* (2001) refer to police interviews where the stakes (positive consequences of being believed and negative consequences of not being believed) are high. This fundamentally differs from most deception research, including the present experiment, where the stakes are rather low. Perhaps liars' nervousness will only dominate in high-stakes situations. We are not certain of this. Indeed, when the stakes are raised liars are likely to become more tense, but so are truth tellers. In the present experiment, the stakes were manipulated and we expected that participants would become more tense in the higher-stakes situation, both when lying and when telling the truth (Hypothesis 3).

## METHOD

### Participants

The sample consisted of 128 Italian students (9 male, 119 female), aged between 21 and 37 years ( $M = 23.6$  years;  $SD = 2.6$  years) from the Psychology Faculty of 'La Sapienza' University in Rome, Italy.

## Experimental setting

The experiment was carried out in the Social Psychology Laboratory of the Department of Developmental and Socialization Processes Psychology at Rome's 'La Sapienza' University. Three rooms were used in order to conduct the experiment: A reception area, a video-recording room and an adjacent room where the experiment itself took place. This latter room had a unidirectional mirror behind which a video camera was aimed at the participant. Two chairs were placed in the middle of the room, one for the participant and the other for the interviewer, so as not to hinder the view for the video camera. A backpack, containing an object (either a book, pencil case or video cassette) was placed next to the participant's chair. Objects were chosen according to their familiarity, simplicity and ease to remember, and were varied so that different participants would see different objects.

## Procedure

After the students were recruited, they had to undergo two experimental sessions, one in which they were asked to tell the truth and one in which they were asked to lie (the order was counterbalanced). Thus, out of a sample of 128 participants, 256 accounts were obtained.

The participants met the experimenter in the reception area and were then led to the laboratory where they were asked to sit down and make themselves comfortable. The experimenter would then ask each participant to pick up the object in the backpack and examine it closely. The experimenter then gave the following instructions: 'We're carrying out an experiment to try to understand how good people are at deceiving. You will be interviewed twice by an interviewer about the object you found in the backpack and the person who gave it to you. In one condition you'll be asked to state what you actually saw in the backpack and that I gave you the object. In the other interview you'll be told to lie, making up another object and saying that someone else gave it to you. The interviewer is not aware of the content of the backpack and does not therefore know whether you are lying or telling the truth.'

In the truth condition, participants were simply told to describe the object and the person who gave it to them. In the deception condition, they were asked to lie about both object and person. Stakes were manipulated by informing half of the participants that their interviews would be recorded on videotape and would be analysed and evaluated by police officers (DePaulo, Stone & Lassiter, 1985).

All 128 subjects underwent a structured interview (adapted from Vrij *et al.*, 1996), which was the same for both truth and deception conditions. During the interview the interviewer (a different person from the experimenter) adopted an attitude of indifferent and obliging acceptance, so as to maintain modest levels of emotional anxiety in participants; the following 14 questions were asked:

- (1) What's in the backpack?
- (2) Can you give me an accurate description of the object?
- (3) Are you telling the truth?
- (4) Are you sure about what you're telling me on the object?
- (5) Aren't you forgetting to tell me anything about the object?
- (6) Who gave you this object?
- (7) Can you give me a detailed description of this person?

- (8) Can you give me a detailed description of all the interactions you had with this person?
- (9) Are you sure about the information you're giving me about this person?
- (10) Aren't you forgetting to tell me anything about this person?
- (11) I don't believe you!
- (12) You're lying!
- (13) Are you absolutely sure you told me the truth?
- (14) Could you now repeat what you said?

After this interview, the second interview took place. Following the second interview, participants were asked to fill out a questionnaire concerning attempted control, cognitive load and emotions. Answers could be given on 7-point Likert scales rating from (1) certainly not to (7) very much. Three questions dealt with attempted control: (1) 'Were you careful to control your behaviour when you lied?', (2) 'Did you think about how to behave when you lied?', and (3) 'Did lying require control of your behaviour?' (Cronbach's alpha = 0.62). Three questions referred to the emotional state: (4) 'Were you aroused when lying?' (e.g. did your heart beat faster?), (5) 'Did you feel guilty when lying?', and (6) 'Were you anxious when lying?' (Cronbach's alpha = 0.69). The following three questions measured cognitive load: (7) 'Did lying require high mental effort?', (8) 'Was it mentally demanding for you to lie?', and (9) 'Did you often think about the fact that you were having to lie?' (Cronbach's alpha = 0.84).

Similar questions were asked for the experiences when telling the truth, replacing the word 'lying' with 'truth-telling': attempted behaviour control (Cronbach's alpha = 0.65); emotional state (Cronbach's alpha = 0.84); and cognitive load (Cronbach's alpha = 0.63).

## Data-analysis

After having checked that the order in which the interviews were conducted (truth first *v* lie first) exerted no main effect or interaction effects, this factor was dropped from the analysis. Data were analysed utilising a 2 (veracity)  $\times$  2 (stakes)  $\times$  3 (processes) mixed design with veracity and processes as within-subjects factors and accountability as a between-subjects factor.

## RESULTS

In order to test Hypotheses 1 to 3, an ANOVA utilising a 2 (Veracity)  $\times$  3 (Processes)  $\times$  2 (Stakes) mixed design was carried out. The analysis revealed significant main effects for Veracity,  $F(1, 126) = 273.92, p < 0.01, \eta^2 = 0.69$ ; Processes,  $F(2, 125) = 40.29, p < 0.01, \eta^2 = 0.39$ ; and Stakes,  $F(1, 126) = 4.10, p < 0.05, \eta^2 = 0.03$ ; and significant interaction effects for Veracity  $\times$  Processes,  $F(2, 125) = 22.00, p < 0.01, \eta^2 = 0.26$ ; and Processes  $\times$  Stakes,  $F(2, 125) = 3.50, p < 0.05, \eta^2 = 0.05$ . The Veracity  $\times$  Stakes,  $F(2, 125) = 0.002, ns$ , and Veracity  $\times$  Processes  $\times$  Stakes,  $F(2, 125) = 1.18, ns$ , interaction effects were not significant.

Regarding the Veracity main effect, participants reported that they experienced emotions, cognitive load and attempted control (combined) more strongly when they lied ( $M = 4.71, SD = 1.1$ ) than when they told the truth ( $M = 2.51, SD = 1.0$ ). Hypothesis 1 predicted that participants would experience each of the three processes more strongly

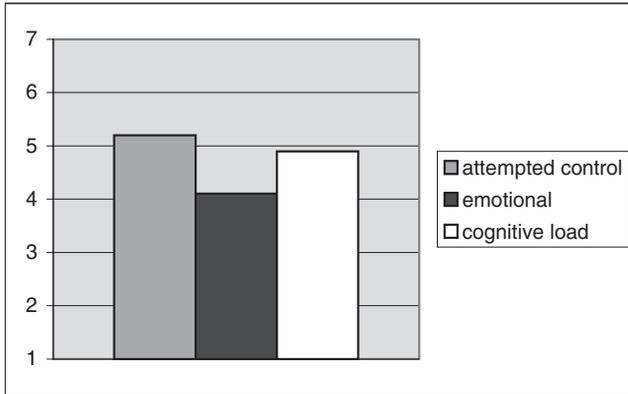


Figure 1. Mean scores for attempted control, emotional and cognitive load as a function of Lie. A 7-point scale ranging from (1) certainly not, to (7) very much.

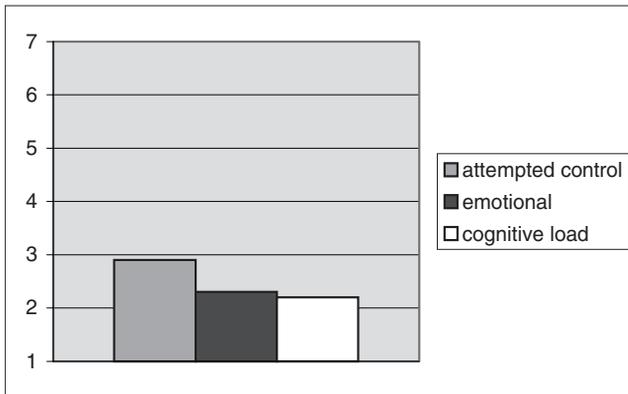


Figure 2. Mean scores for attempted control, emotional and cognitive load as a function of Truth. A 7-point scale ranging from (1) certainly not, to (7) very much.

when they lied compared to when they told the truth. The Veracity  $\times$  Processes interaction revealed that this was indeed the case. See also Figures 1 and 2. Participants reported being more tense when they lied ( $M = 4.12$ ,  $SD = 1.4$ ) compared to when they told the truth ( $M = 2.35$ ,  $SD = 1.3$ ),  $F(1, 127) = 106.82$ ,  $p < 0.01$ ,  $\eta^2 = 0.46$ ; they reported that they had to think harder when they lied ( $M = 5.13$ ,  $SD = 1.1$ ) compared to when they told the truth ( $M = 2.93$ ,  $SD = 1.3$ ),  $F(1, 127) = 235.21$ ,  $p < 0.01$ ,  $\eta^2 = 0.65$ ; and they reported that they tried harder to make a convincing impression when they lied ( $M = 4.90$ ,  $SD = 1.4$ ) compared to when they told the truth ( $M = 2.24$ ,  $SD = 1.1$ ),  $F(1, 127) = 280.81$ ,  $p < 0.01$ ,  $\eta^2 = 0.69$ .

The Processes main effect indicated that, overall, the attempted control process was most dominant ( $M = 4.03$ ,  $SD = 0.90$ ), followed by cognitive load ( $M = 3.57$ ,  $SD = 0.9$ ) and being tense ( $M = 3.23$ ,  $SD = 1.0$ ). Hypothesis 2 predicted that attempted control would be most dominant in both liars and truth tellers. The Veracity  $\times$  Processes interaction showed that this was indeed the case. Pairwise comparisons in liars revealed significant

differences between all three processes, indicating that attempted control was the process experienced to the greatest extent, and tenseness was the process experienced to the least experienced extent (see also Figure 1). Pairwise comparisons in truth tellers revealed that attempted control was the most experienced process, to a significantly greater degree than cognitive load and being tense. The latter two did not differ significantly from each other (see also Figure 2).

The Stakes main effect revealed that participants reported having experienced emotions, cognitive load and attempted control to a higher degree in the higher-stakes condition ( $M = 3.74$ ,  $SD = 0.8$ ) than in the lower-stakes condition ( $M = 3.48$ ,  $SD = 0.7$ ). Hypothesis 3 predicted that Stakes would have the greatest effect on being tense. The Stakes  $\times$  Processes interaction effect supported this. Participants reported being significantly more tense in the higher-stakes condition ( $M = 3.49$ ,  $SD = 1.0$ ) than in the lower-stakes condition ( $M = 2.97$ ,  $SD = 0.9$ ),  $F(1, 126) = 9.98$ ,  $p < 0.01$ ,  $\eta^2 = 0.07$ . Stakes had no significant effect on cognitive load,  $F(1, 126) = 1.21$ , ns, or on attempted control,  $F(1, 126) = 0.38$ , ns. The non-significant Veracity  $\times$  Stakes interaction effect, reported above, implies that raising the stakes had the same effect on lying and truth telling.

## DISCUSSION

In the present experiment we hypothesised that liars would be more tense, have to think harder and put more effort in controlling themselves than truth tellers. This hypothesis was supported. Moreover, we expected similarities between liars and truth tellers. Since both liars and truth tellers typically gain from being believed, we expected that both liars and truth tellers would try to appear convincing. This hypothesis was supported. Finally, we predicted that raising the stakes would result in participants becoming more tense but we predicted that this would be the case for both liars and truth tellers. This hypothesis was also supported.

We believe that these findings have implications for how practitioners should perceive deception. Rather than focusing on the differences between liars and truth tellers, which typically happens in police manuals, the similarities between liars and truth tellers should be taken into account. Also, rather than mainly focusing on signs of tenseness, which is a popular approach emphasised in police manuals, it could be worthwhile to focus more on cues of attempted control and/or cognitive load.

Sceptics will point out that our experiment was a lower-stakes situation, which differs from high-stakes situations, and that in high-stakes situations signs of nervousness are reliable indicators of deceit. Indeed, as our results show, when the stakes get higher, being tense is likely to become more dominant. However, truth tellers will also become more tense, making signs of nervousness less diagnostic than people might expect. Second, in higher-stakes situations cognitive load and attempted control are also relevant. In high-stakes situations it becomes more important for liars and truth tellers to be believed, and therefore any attempts to control behaviour will also increase. At the same time, cognitive demand could increase, as the attempts to appear convincing (both in behaviour and speech) might become more strenuous.

Research supports this view that even in high-stake situations signs of nervousness might not be as prominent as one might initially expect. Mann, Vrij and Bull (2002) examined the behavioural responses of 16 suspects while they lied and told the truth during their police interviews about their alleged involvement in serious crimes including murder,

rape and arson. Results revealed that compared to when they told the truth, the suspects exhibited more pauses, fewer eye blinks, and (male suspects) fewer hand and arm movements when they lied. Popular indicators of nervousness such as fidgeting and gaze aversion did not emerge. The results suggest that the suspects' cues to deception were more likely to be the result of increased cognitive demand/attempted control than nervousness. The strongest evidence for this was the reduction in eye blinks during deception. Research has shown that nervousness results in increased eye blinking, whereas increased cognitive load results in a decrease in eye blinking (Mann *et al.*, 2002).

A limitation of the present study was that we measured the underlying processes via self reports. They may not be reliable. People are often not fully aware of their thought processes (Nisbett & Wilson, 1977). Also, perhaps participants reported feeling more anxious when lying because they expected that the experimenter wanted them to report this. Finally, one might wonder whether participants can accurately quantify the amount of mental effort required for a task. Some of these uncertainties could be taken away by analysing the participants' behaviour, and to examine whether they appeared more tense or experienced more cognitive load when they were lying. This sounds easier than it is. For example, experiencing cognitive load does suppress physiological tenseness levels momentarily (Leal, van Hoof & Vrij, 2005). Therefore, tense participants experiencing cognitive load may experience tenseness without showing signs of nervousness.

Deception research makes us believe that the participants' answers were, at least to some extent, reliable. The three underlying processes of deception (emotions, cognitive load and attempted behavioural control) were introduced by Zuckerman *et al.* (1981) as *post hoc* explanations to explain the behavioural differences that emerged between truth tellers and liars in their meta-analysis. In other words, they argued that the behavioural indicators that they found to occur more often in liars than in truth tellers, could be interpreted as indicators of tenseness, cognitive load and attempted control. This experiment supports their *post hoc* explanations.

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