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## Interviewing to detect omission lies

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## Abstract

Interviewees sometimes deliberately omit reporting some information. Such omission lies differ from other lies because all the information interviewees present may be entirely truthful. Truth tellers and lie tellers carried out a mission. Truth tellers reported the entire mission truthfully. Lie tellers were also entirely truthful but left out one element of the mission. In truth tellers' statements, only the parts that lie tellers were also asked to recall were analysed. Interviews were carried out via the Cognitive Credibility Assessment, Reality Interview, or standard interview protocol. Dependent variables were the details, complications and verifiable sources interviewees reported. A questionnaire measured three deception strategies: 'Tell it all', 'keep it simple' or 'paying attention to demeanour'. Lie tellers reported fewer details, complications and verifiable sources than truth tellers and reporting these variables was negatively correlated with the 'keep it simple' and 'demeanour' strategies. The type of interview protocol did not affect the results.

## KEYWORDS

cognitive credibility assessment, complications, deception, lying through omissions, reality interviewing

## 1 | INTERVIEWING TO DETECT OMISSION LIES

People lie in various ways. For instance, they can lie through making up a story (outright lies; DePaulo et al., 1996) or by embedding deceptive elements in an otherwise truthful story (embedded lies; Leins et al., 2013). Most verbal deception research deals with those two types of lie (Leins et al., 2013; Vrij, 2008). However, practitioners frequently tell us they are also interested in a third type of lie, omission lies, where someone deliberately omits information. Examples are interviewees truthfully reporting their shopping activities during an afternoon but deliberately leaving out a visit to one particular shop or interviewees truthfully reporting a meeting they had with another person but deliberately leaving out one topic they discussed. Omission lies differ from memory errors or communication errors because the information is left out deliberately. When caught out in telling an omission lie, a lie teller

can pretend that the omission was not deliberate, for example, 'I forgot about that'. Since 'forgetting' is often seen as less serious by receivers than is fabricating (Levine, 2001; Levine et al., 2003), omission lies are lie tellers' favourite type of lie (Metts, 1989), although they often fail to anticipate the emotional cost associated with it (Peer et al., 2014). Omission lies differ from other types of lie because the information that interviewees do present may be entirely truthful.

The Strategic Use of Evidence (SUE) interview protocol (Granhag & Hartwig, 2015; Hartwig et al., 2014) in which the investigator gradually presents available pieces of evidence to the interviewee can sometimes help with detecting omission lies. If an investigator possesses CCTV footage showing that the interviewee entered a particular shop that afternoon that the interviewee did not mention, the possibility arises that the interviewee lied through omitting information. However, SUE cannot be used in all circumstances to detect omission lies. If CCTV footage shows that the interviewee had a meeting with the other

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person, SUE cannot reveal that the interviewee may have lied through deliberately omitting specific details about that meeting.

What someone says can be entirely truthful when lying through omitting information. We are aware of only two experiments in which the truthful information interviewees report is used to detect possible omission lies (Leal et al., 2020; Leal et al., 2022). A third experiment also used an omission lies paradigm but did not focus on veracity cues and did not include truth tellers (Dando & Ormerod, 2020). In the present experiment, we build upon the two Leal et al. experiments by systematically examining (i) the strategies interviewees use when they lie through omitting information and (ii) the effect of two verbal interview protocols on the ability to gather information and detect deceit in omission lies: Cognitive Credibility Assessment (CCA; Vrij et al., 2017; Vrij, Mann, et al., 2021) and Reality Interviewing (RI; Bogaard et al., 2019; Colwell et al., 2007). Examining strategies is important because strategies are largely responsible for the different verbal responses truth tellers and lie tellers provide (DePaulo et al., 2003; Granhag & Hartwig, 2008). Examining the efficacy of interview protocols is important because they are believed to enhance verbal differences between truth tellers and lie tellers (Vrij & Fisher, 2016; Vrij & Granhag, 2012).

### 1.1 | Strategies used and verbal cues displayed when lying through omitting information

In Leal et al.'s experiments truth tellers and lie tellers attended (Leal et al., 2020) or witnessed (Leal et al., 2022) a meeting. Truth tellers were asked to recall the entire meetings truthfully whereas lie tellers were asked to recall some elements truthfully but to leave out other elements. In truth tellers' statements, only the parts that lie tellers were also asked to recall were analysed. In other words, truth tellers and lie tellers were entirely truthful and discussed the same elements of the two meetings. Yet, in both experiments truth tellers reported more complications than lie tellers.

A complication is an occurrence that affects the storyteller and makes a situation more complex ('Initially we did not see our friend, as he was waiting at a different entrance'). Truth tellers typically report more complications than lie tellers in outright or embedded lies (Vrij, Palena, et al., 2021), but apparently also in omission lies. To explain this finding, Leal et al. (2020) and Leal et al. (2022) refer to the deception strategies literature where it was found that lie tellers prefer to keep their stories simple whereas truth tellers are willing to tell it all (Hartwig et al., 2007). Complications are often not about key aspects of an experience, and the story can be well understood without reporting complications (Vrij et al., 2018). Take as an example someone describing the purchase of cashew nuts in a shop. All sorts of complications that happened in the shop (someone's trolley blocked one entry of the aisle, so the person had to walk to the other entry to reach the cashew nuts; one checkout was out of order, so the person had to use another checkout) are not necessary to understand what the person bought. If lie tellers are inclined to keep their stories simple, they may be inclined to leave out such complications. If truth tellers are willing to tell it all, they may include such complications in their recalls.

Leal et al. (2020) did not examine strategies interviewees may use to make a credible impression; and Leal et al. (2022) measured such strategies via a single open-ended question in the post-interview questionnaire. These self-reported strategies hinted at truth tellers more than lie tellers aiming to 'tell it all', whereas not many lie tellers mentioned employing a 'keep it simple' strategy. However, these open-ended answers may not give a complete picture of the strategies the interviewees were using, because some participants may have used a strategy without reporting it when answering the open-ended question. To overcome this issue, participants in the present experiment completed a strategy questionnaire.

Truth tellers typically report more details than lie tellers when telling outright and embedded lies (Amado et al., 2016; Gancedo et al., 2021; Verschuere et al., 2021), which is in alignment with the 'telling it all' and 'keeping it simple' strategies. These two strategies should have also resulted in lie tellers reporting fewer details than truth tellers in Leal et al. (2020) and Leal et al. (2022) omission lies experiments, but that is not what they found. No differences emerged in Leal et al. (2020), whereas lie tellers reported more details than truth tellers in Leal et al. (2022). To explain this atypical effect, Leal et al. (2022) noted that lie tellers, because they typically take their credibility less for granted than truth tellers, were perhaps more motivated than truth tellers to report details to sound convincing. The conflicting results for details in Leal et al. (2020) and Leal et al. (2022) shows that it is yet unclear how truth tellers and lie tellers differ from each other in reporting details in omission lies.

### 1.2 | Interviewing to detect deception: Cognitive credibility assessment and reality interviewing

We examined the efficacy of two interview protocols to detect omission lies: Cognitive Credibility Assessment (CCA) and Reality Interviewing (RI). Both protocols revealed verbal differences between truth tellers and lie tellers in outright and embedded lies (Vrij, 2018; Vrij & Fisher, 2016). Observers informed about these protocols can detect such lies with almost 76% accuracy (Mac Giolla & Luke, 2021).

The CCA interview protocol consists of five stages (Vrij, Mann, et al., 2021). Stage 1 (Initial Free Recall Stage) is an initial request to interviewees to report all they can remember about the alleged event. In Stage 2 (Model Statement Stage) interviewees listen to a Model Statement—an example of a detailed account of a topic unrelated to the interview—which is followed by another request to report all they can remember about the alleged event. In Stage 3 (Reverse Order Stage) interviewees are asked to report the alleged event for a third time, but now in reversed chronological order. Thus, they are asked to start the recall at the end of the alleged event and talk through the event until the beginning of the event. In Stage 4 (Sketching Stage), interviewees are asked to visualise a specific moment of the alleged event. They are then requested to sketch and verbally report at the same time what they could see, hear and smell. In Stage 5 (Checkable Sources Stage), interviewees are asked to describe the alleged event for a final time, but this time to include sources that investigators can check (named witnesses, receipts, CCTV footage, photos) to verify their statement.

The Reality Interview (Bogaard et al., 2019; Colwell et al., 2007) also consists of five stages. Stage 1 (Initial free recall Stage) is an initial request to interviewees to report all they can remember about the alleged event. In Stage 2 (Mental reinstatement of the context Stage), participants are asked to report the event again, but this time to think about and include all associated details such as sights, sounds, smells, emotions, thoughts at the time, or anything else they remember from the time of the event. In Stage 3 (Other Perspective Stage), participants are asked to recall the alleged event from another perspective: 'If someone else had been present, what would they have seen?'. In Stage 4 (Reverse Order Stage), participants are asked to report the event in reversed chronological order, same as Stage 3 in CCA. In Stage 5 (Final free recall Stage), participants are asked a final time to describe in as much detail as possible the alleged event. The Reality Interview also contains nine multiple choice questions (each with two alternatives) which are embedded in between these stages. For example, 'If a police officer had been present, would they have noticed something wrong?'. These so-called inferential block multiple choice questions are included to force the participant to think deeper about the event. Answering each question with 'No' would be the simplest option because it is less likely to lead to a follow-up question. Answering 'No' would thus be in alignment with lie tellers' strategy to keep it simple.

Both interview protocols have links with the Cognitive Interview, an interview protocol developed to facilitate memory recall in cooperative witnesses (Fisher & Geiselman, 1992; Memon et al., 2010; Satin & Fisher, 2019). For example, the Free Recall, the Sketching instruction, the Reverse Order recall instruction and the Perspective Taking instruction are all derived from the Cognitive Interview. The two protocols focus on different verbal veracity cues: CCA focuses on complications and verifiable sources (sources through which the reported activities can be checked, such as witnesses, CCTV footage and receipts; Vrij, Mann, et al., 2021), whereas RI focuses on external details (perceptual information), contextual details (temporal and spatial details) and internal details (feelings; Colwell et al., 2007). Truth tellers are thought to report more complications, verifiable sources, external details, contextual details and internal details than lie tellers. We examined these variables in the present experiment.

In the present experiment, we also included a control condition in the experimental design in which an initial request to report the alleged event in as much detail as possible is followed by a second request to report the alleged event in as much detail as possible. We expected CCA and RI to elicit more information than the control interview, because in CCA and RI memory enhancement techniques are used and more effort is made to encourage interviewees to talk. This should make it more likely that verbal veracity indicators would occur because words are the carriers of such indicators (Vrij et al., 2007). Due to the overlap between the two protocols, we did not formulate a hypothesis about the relative efficacy of the two protocols in eliciting verbal veracity cues.

### 1.3 | Hypotheses

We tested the following three pre-registered hypotheses ([https://osf.io/7c5e4/?view\\_only=c29bdfb26a814d75842cc56b4a7a71fd](https://osf.io/7c5e4/?view_only=c29bdfb26a814d75842cc56b4a7a71fd)): Truth

tellers will provide more external details, internal details, contextual details, verifiable sources and complications than lie tellers (Hypothesis 1, Veracity main effect).<sup>1</sup> Both CCA and RI will be more diagnostic in differentiating truth tellers from lie tellers than the control interview, particularly in terms of reporting complications (because complications resulted in the clearest Veracity differences in omission lies research to date) (Hypothesis 2, Veracity X Type of Interview interaction effect). In the 'inferential block' multiple choice questions (part of RI), lie tellers will keep their answer simpler than truth tellers by saying 'No' more frequently (Hypothesis 3, Veracity main effect only measured in the RI condition).

## 2 | METHOD

### 2.1 | Ethics

A favourable ethical review decision was given by the University of Portsmouth Science and Health Faculty Ethics committee (SHFEC 2021-091) and by the ethics committees of CREST (November 2, 2021).

### 2.2 | Participants

A G\*Power analysis revealed that we needed to recruit at least 180 participants ( $n = 30$  per cell) to ensure enough power (95%), strict alpha level of 0.01, and a medium to large effect size ( $f = 0.030$ ), based on previous similar research in the verbal deception area.

A total of 195 participants were initially recruited but eight were dropped from the sample because they did not speak to the secret agent, did not carry out the mission as instructed or did not turn up for the interview. Another four lie tellers were dropped because they referred to the task, which they were instructed to omit. Therefore, the final sample included 183 participants (57 males, 123 females, two did not mention their gender). Their average age was 23.83 ( $SD = 8.49$ ). The mode score of education was A-levels ( $n = 112$ ), which was the highest level of education for 61.2% of the sample. Most participants ( $n = 85$ ) reported to be white British; others were white European ( $n = 31$ ), Asian ( $n = 26$ ), black British ( $n = 9$ ), African ( $n = 9$ ), Arab ( $n = 3$ ), mixed ( $n = 11$ ) or other ( $n = 9$ ).

A total of 95 participants were randomly allocated to the truth condition and 88 to the lie condition. A total of 62 participants were randomly allocated to the CCA condition, 58 to the RI condition and 63 to the control interview condition. Cell sizes varied from 28 to 35.

### 2.3 | Design

The experiment followed a 2 (Veracity: truth vs. lie)  $\times$  3 (Interview: CCA vs. RI vs. control) between-subject design with external details, internal details, contextual details, verifiable sources, and complications as dependent variables. These are the dependent variables typically examined in CCA and RI interviews.

## 2.4 | Procedure

### 2.4.1 | Recruitment

Participants were recruited via online advertisements and the university staff and student portals. The experiment was carried out face-to-face and participants were given £15 for taking part. At least 24 h before the experiment started, participants were emailed the participant information form and the consent form. When participants arrived for the experiment, they were given the opportunity to discuss these two forms with the experimenter and to ask any questions they might have. All participants then signed the consent form and received details about the mission.

### 2.4.2 | The mission

Our omission scenario differed in two important ways from the scenarios used in Leal et al. (2020) and Leal et al. (2022). In Leal et al. (2020), participants had a face-to-face meeting in which two topics were discussed. Lie tellers were asked not to discuss one of them. This means that lie tellers were asked to omit half of the meeting they attended. In the present experiment, the information lie tellers needed to omit was only a small part of the mission, making the omission manipulation more subtle. In Leal et al. (2022), participants witnessed a meeting amongst four people. Lie tellers were instructed to leave out the fourth person and to pretend that only three people were present. However, they could not leave out what the fourth person said during the meeting because without that person's contribution the conversation they were asked to recall would not make sense. Most lie tellers thus pretended that someone else in the meeting had made these remarks. This means that, apart from omitting information (the presence of the fourth person) they also had to fabricate some information (pretending that someone else had said what the fourth person had said). In the present experiment no fabrication was required.

The mission involved participants buying a product in a shop (to make them identifiable to the agent), walking to a café where they had a short encounter with an undercover agent and returning to the University building. During the encounter, the agent discussed with them details about a police anti-corruption unit and about a list of corrupt officers (see Appendix A for full details).

### 2.4.3 | Truth telling and lie telling instructions

After completing the mission, participants were allocated to the truth teller or lie teller condition. Truth tellers were told to truthfully recall everything that they experienced during the mission. Lie tellers were told that the person who will interview them cannot be trusted. It is therefore vital NOT to mention that the undercover agent discussed with them a list of corrupt officers. They were asked to be truthful about all other parts of the mission. For the full instructions to truth tellers and lie tellers, see Appendix B.

### 2.4.4 | Pre-interview questionnaire

When participants told the experimenter to be ready for the interview, they completed a pre-interview questionnaire. It measured background characteristics (age, gender, ethnicity, and level of education), preparation thoroughness, preparation time and motivation. Participants indicated their preparation thoroughness via three items (1 = *shallow* to 7 = *thorough*; 1 = *insufficient* to 7 = *sufficient*; and 1 = *poor* to 7 = *good*). The answers to the three questions were averaged (Cronbach's alpha = .90). For preparation time one question was asked: 'Do you think the amount of time you were given to prepare was' (1 = *insufficient* to 7 = *sufficient*). Finally, participants were asked how motivated they were to perform well during the interview on a 5-point scale ranging from 1 (*not at all motivated*) to 5 (*very motivated*).

### 2.4.5 | The interview

Participants were then interviewed via the CCA (CCA condition), RI (RI condition) or control interview protocol (control condition). All three conditions started with a request to report the mission in as much detail as possible. The participants' responses are labelled Phase 1 recall. Participants in the CCA and RI conditions were asked a further four recall questions and participants in the control condition one further recall question. The participants' responses to these further questions are labelled subsequent phases recall. See Appendix C for the full interview protocols.

### 2.4.6 | Post-interview questionnaire and debrief

After the interview, participants completed the post-interview questionnaire which measured the amount of cognitive load experienced during the interview, rapport with the interviewer, the perceived likelihood of having to write a statement and winning the prize draw, percentage of truth telling during the interview and strategies used during the interview.

To measure cognitive load participants answered the following three questions on 7-point Likert scales ranging from 1 = *totally disagree* to 7 = *totally agree*: 'I felt the interview required a lot of thinking' 'I felt that the interview was mentally difficult' and 'I had to concentrate a lot during the interview', Cronbach's alpha = 0.86. We measured rapport with the interviewer, because it is an important motivator for a productive interview (Brimbal et al., 2019). It was measured via the nine-item Interaction Questionnaire (Vallano & Schreiber Compo, 2011). It contains items such as smooth, bored, engrossed and involved, using 7-point scales ranging from 1 (*not at all*) to 7 (*extremely*), Cronbach's alpha = 0.82. Participants also rated what they thought the likelihood was of having to write a statement (on a 7-point Likert scale from 1 = *not at all likely* to 7 = *very likely*), winning the prize draw (on a 7-point Likert scale from 1 = *not at all likely* to 7 = *very likely*) and the extent to which they told the truth in the interview (on an 11-point Likert scale ranging from 0% to 100%).

We developed a strategies questionnaire, the Deception Strategies Questionnaire (DSQ), consisting of 21 items representing the *tell it all* and *keep it simple* strategies as well as a *demeanour* strategy. Although we did not expect the *demeanour* strategy to be related to the dependent variables measured in the experiment, we included it in the questionnaire because it is a frequently cited strategy amongst truth tellers and lie tellers (Hartwig et al., 2007). Answers were given on 7-point Likert scales ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The *tell it all* strategy consisted of six items including: 'To also report details that I remembered but thought were insignificant' and 'To elaborate on specific details'. These six items were clustered into the *tell it all* index (Cronbach's alpha = 0.73). The *keep it simple* strategy consisted of eight items including: 'To keep the story simple' and 'To describe the event in more general terms'. These eight items were clustered into the *tell it all* index (Cronbach's alpha = 0.78). The *demeanour* strategy consisted of seven items including: 'To sound decisive and avoid hesitations' and 'To make the story sound unrehearsed and spontaneous'. These seven items were clustered into the *demeanour* index (Cronbach's alpha = 0.75). See Appendix D for the full list of strategies.

After completing the post-interview questionnaire all participants were told that they were believed by the interviewer, given details on how to obtain payment and were debriefed.

## 2.5 | Coding

The interview recordings were transcribed and the transcripts were used for coding. One rater, blind to the Veracity condition and hypotheses, was taught the coding scheme by the second author who has more than 25 years of experience in coding verbal indicators to deception. *External details* refer to information regarding the event in question that was gained from the senses. For example, the phrase 'He had a white shirt, a black tie, glasses and combed back hair' contains eight external details. *Contextual details* are descriptions of temporal or spatial relationships between objects and/or actors. The sentence 'I walked downstairs and then I made my way towards the Sainsbury's Local' contains two spatial details (downstairs and towards) and one temporary detail (then). *Internal details* refer to information regarding the subjective mood of the interviewee. The sentence 'I was embarrassed' contains one internal detail. *Complications* are occurrences that affect the storyteller and make a situation more complex (Vrij, Deeb, et al., 2021). Complications typically contain a cluster of details. The sentence 'There wasn't much room at this table, it was quite cramped' is one complication. *Verifiable sources* refer to information that can be checked, such as named persons, receipts and CCTV footage. In the transcripts, raters only coded new details and all repetitions were ignored.

A second rater also blind to the Veracity condition and hypotheses coded a random sample of 89 transcripts (48%). Inter-rater reliability between the two raters, using the two-way random effects model measuring consistency, was good for all verbal cues: external details (Single Measures ICC = 0.88), contextual details (Single Measures

ICC = 0.68), internal details (Single Measures ICC = 0.86), complications (Single Measures ICC = 0.91) and verifiable sources (Single Measures ICC = .85).

Two raters coded, independently from each other, the nine inferential block multiple-choice answers as a Yes (score of 0) or No (score of 1). The nine items were clustered and the scores could range from 0 (all Yes answers) to 9 (all No answers). The inter-rater reliability between the two raters, using the two-way random effects model measuring consistency, was good (Average Measures ICC = .90). The indices of the two raters were averaged and the average score is used in the analyses. This variable is used in the RI condition only.

## 3 | RESULTS

### 3.1 | Pre-interview questionnaire variables

A MANOVA with Veracity as only factor was carried out with the pre-interview questionnaire variables preparation thoroughness, preparation time and motivation as dependent variables. The multivariate Veracity effect was not significant,  $F(3, 179) = 0.77, p = .510, \eta_p^2 = 0.01$ . The mean scores for the total sample (rated on 7-point Likert scales) showed that participants were satisfied with their preparation thoroughness ( $M = 5.03, SD = 1.25$ ) and preparation time ( $M = 5.93, SD = 1.39$ ). Motivation to perform well in the experiment (measured on a 5-point Likert scale) was very high amongst participants ( $M = 4.57, SD = 0.62$ ).

### 3.2 | Post-interview questionnaire variables

A 2 (Veracity: truth vs. lie) X 3 (Interview Protocol: CCA vs. RI vs. control) MANOVA was carried out with the following five post-interview questionnaire variables as dependent variables: Cognitive load, percentage truth telling, likelihood to having to write a statement, likelihood of winning the prize draw and rapport. At a multivariate level the analysis revealed significant main effects for Veracity,  $F(5, 173) = 35.87, p < .001, \eta_p^2 = 0.51$ , and Interview Protocol,  $F(10, 346) = 6.13, p < .001, \eta_p^2 = 0.15$ . The Veracity X Interview Protocol interaction effect was not significant,  $F(10, 346) = 1.01, p = .432, \eta_p^2 = 0.03$ .

At a univariate level significant Veracity main effects emerged for percentage truth telling,  $F(1,177) = 181.47, p < .001, d = 1.97 [1.59, 2.29]$ , and having to write a statement,  $F(1,177) = 8.04, p = .005, d = 0.40 [0.10, 0.69]$ . Truth tellers reported to have been telling the truth more ( $M = 98.32, SD = 5.95, 95\% CI [94.96, 101.56]$ ) than lie tellers ( $M = 65.68, SD = 23.08, 95\% CI [62.40, 69.24]$ ). Lie tellers ( $M = 3.37, SD = 1.70, 95\% CI [3.03, 3.72]$ ) thought it to be more likely than truth tellers ( $M = 2.72, SD = 1.58, 95\% CI [2.35, 3.02]$ ) that they had to write a statement.

For Interview Protocol only the main effect for cognitive load was significant,  $F(2, 177) = 24.50, p < .001, \eta_p^2 = 0.22$ . Post hoc Tukey tests showed that the control interview protocol ( $M = 3.03,$

$SD = 1.68$ , 95% CI [2.61, 3.38]) was seen as less mentally taxing than the CCA ( $M = 4.90$ ,  $SD = 1.50$ ), 95% CI [4.50, 5.28], ( $p < .001$ ) and RI ( $M = 4.30$ ,  $SD = 1.42$ ), 95% CI [3.90, 4.69], ( $p < .001$ ) protocols. The CCA and RI protocols did not differ from each other ( $p = .087$ ).

The mean scores for the total sample (rated on 7-point Likert scales) showed that participants had good rapport with the interviewer ( $M = 5.59$ ,  $SD = 0.87$ ).

### 3.3 | Truth tellers' recall of information lie tellers were asked to omit

We examined the details truth tellers reported about the task lie tellers were instructed to omit (secret list of corrupt officers) in two ways: A frequency score and a percentage score. For the frequency score, we first summed up all details the truth tellers reported about the secret list in Phase 1 and the subsequent phases combined (external details + internal details + contextual details + verifiable sources + complications). To calculate the percentage score, we calculated the total number of details reported about the other elements of the mission (other than the secret list details) and calculated the percentage as follows: [details about secret list/(details about secret list + other details)].

An ANOVA with Interview Protocol as the only factor and the number of secret list details as dependent variable showed that the Interview Protocol main effect was not significant,  $F(2, 94) = 2.91$ ,  $p = .059$ ,  $\eta_p^2 = 0.06$ . The average mean of reported secret list details was small ( $M = 3.80$ ,  $SD = 3.29$ ) showing that truth tellers did not report much information about the secret list.

The average percentage of secret details mean ( $M = 0.06$ ,  $SD = 0.05$ ) shows that truth tellers spent relatively few details on describing the secret list details compared to the other elements of the mission. A second ANOVA with Interview Protocol as the only factor and the percentage of secret list details as dependent variable showed a significant Interview Protocol effect,  $F(2, 94) = 6.51$ ,  $p = .002$ ,  $\eta_p^2 = 0.12$ . Tukey post hoc tests showed that the percentage was significantly higher in the control interview ( $M = 0.08$ ,  $SD = 0.05$ , 95% CI [0.07, 0.10]) than in the CCA interview ( $M = 0.05$ ,  $SD = 0.05$ , 95% CI [0.04, 0.07]) ( $p = .027$ ) and the RI interview ( $M = 0.05$ ,  $SD = 0.03$ , 95% CI [0.03, 0.06]) ( $p = .003$ ). The CCA and RI interviews did not differ significantly from each other ( $p = .690$ ).

In other words, the results show that the omission manipulation was subtle. Because lie tellers were instructed not to report the secret list information, we excluded the secret list details truth tellers reported from the verbal details variables we used for the hypotheses-testing variables. As a result, we compared truth tellers' and lie tellers' recalls of the same elements of the mission (all elements except the secret list of corrupt officers).

### 3.4 | Hypotheses-testing

To test our hypotheses, we carried out frequentist analyses and Bayesian analyses. Bayesian analyses test the likelihood of the data

under both the null hypothesis ( $H_0$ ) and the alternative hypothesis ( $H_1$ ; Jarosz & Wiley, 2014). Bayes Factors ( $BF_{10}$ ) between 1 and 3 indicate weak evidence for the alternative hypothesis ( $H_1$ ), between 3 and 20 indicate positive evidence, between 20 and 150 indicate strong evidence, and above 150 indicate very strong evidence (Jarosz & Wiley, 2014). A Bayes Factor close to 1 means no evidence can be derived from the data for either the null or the alternative hypothesis. The inverse of  $BF_{10}$  is  $BF_{01}$  ( $1/BF_{10}$ ) which is the likelihood of supporting evidence for the null hypothesis ( $H_0$ ) compared to the alternative hypothesis ( $H_1$ ). We report only  $BF_{10}$  statistics in Tables 1, 2, and 3 because  $BF_{01}$  can be inferred by inverting  $BF_{10}$ .

#### 3.4.1 | Hypothesis 1 testing: Phase 1

A 2 (Veracity) X 3 (Interview Protocol) MANOVA was carried out on the Phase 1 data with the verbal cues external details, internal details, contextual details, verifiable sources and complications as dependent variables. At a multivariate level the Veracity effect,  $F(5, 173) = 8.36$ ,  $p < .001$ ,  $\eta_p^2 = 0.20$ , was significant, whereas the Interview Protocol effect,  $F(10, 346) = 0.79$ ,  $p = .640$ ,  $\eta_p^2 = 0.02$ , and Veracity x Interview Protocol interaction effect were not significant,  $F(10, 346) = 0.54$ ,  $p = .865$ ,  $\eta_p^2 = 0.01$ .

The univariate effects for Veracity are presented in Table 1. Apart from internal details, all Veracity effects were significant and received very strong evidence. As predicted in Hypothesis 1, truth tellers reported more external details, more contextual details, more verifiable sources and more complications in Phase 1 than lie tellers. The effect sizes ranged from medium ( $d = 0.65$ , external details) to large ( $d = 0.81$ , complications). At the univariate level none of the Interview Protocol main effects (all  $F_s < 0.92$ , all  $p_s > .403$ ) or Veracity X Interview Protocol interaction effects (all  $F_s < 0.89$ , all  $p_s > .412$ ) were significant. This is not surprising because the Interview Protocol manipulation took place after Phase 1.

#### 3.4.2 | Hypothesis 2 testing: Subsequent recalls (recalls after phase 1)

A 2 (Veracity) X 3 (Interview Protocol) MANOVA was carried out on the subsequent recalls data (recalls after Phase 1). The dependent variables were external details, internal details, contextual details, verifiable sources and complications not mentioned in Phase 1. At a multivariate level the Veracity,  $F(5, 173) = 2.74$ ,  $p = .021$ ,  $\eta_p^2 = 0.07$ , the Interview Protocol,  $F(10, 346) = 34.13$ ,  $p < .001$ ,  $\eta_p^2 = 0.50$ , and Veracity x Interview Protocol interaction effects,  $F(10, 346) = 2.34$ ,  $p = .011$ ,  $\eta_p^2 = 0.06$ , were all significant.

The univariate effects for Veracity are presented in Table 1. Only one significant effect emerged: Truth tellers reported more new complications than lie tellers in the recalls after Phase 1. However, the Bayesian analysis showed there was not enough evidence to support these findings.

**TABLE 1** Reported verbal cues and strategies as a function of veracity

	Truth			Lie			NHST			BF <sub>10</sub>
	M	(SD)	95% CI	M	(SD)	95% CI	F	p	d (95% CI)	
<i>Verbal cues Phase 1</i>										
External details	15.87	(11.67)	13.76,18.11	8.90	(9.43)	6.62,11.13	19.78	<.001	0.65 (0.35, 0.94)	1057.60
Internal details	0.17	(0.58)	0.07,0.27	0.07	(0.37)	-0.04,0.17	1.83	.178	0.20 (-0.09, 0.49)	0.39
Contextual details	11.53	(8.67)	10.09,13.05	5.97	(5.25)	4.41,7.48	27.08	<.001	0.77 (0.46, 1.06)	24568.34
Verifiable sources	1.95	(0.99)	1.78,2.13	1.32	(0.69)	1.14,1.50	25.02	<.001	0.73 (0.42, 1.02)	8410.62
Complications	3.20	(3.16)	2.68,3.74	1.10	(1.74)	0.55,1.65	29.91	<.001	0.81 (0.50, 1.10)	93784.97
<i>Verbal cues subsequent phases</i>										
New external details	18.34	(20.56)	15.37,21.90	17.16	(20.01)	13.47,20.23	0.56	.454	0.06 (-0.23, 0.35)	0.17
New internal details	0.89	(1.76)	0.73,1.27	0.69	(1.43)	0.40,0.96	2.61	.108	0.12 (-0.17, 0.42)	0.22
New contextual details	7.60	(6.92)	6.77,8.78	8.45	(7.34)	7.26,9.34	.52	.470	0.12 (-0.17, 0.41)	0.22
New verifiable sources	1.97	(2.65)	1.59,2.38	2.17	(3.03)	1.71,2.54	.24	.625	0.07 (-0.22, 0.36)	0.18
New complications	4.23	(4.53)	3.61,5.11	2.98	(3.68)	2.15,3.70	6.85	.010	0.30 (0.01, 0.60)	1.11
<i>Reported strategies (questionnaire)</i>										
Tell it all	4.64	(1.17)	4.37,4.88	4.50	(1.34)	4.22,4.75	00.57	.450	0.11 (-0.18, 0.40)	0.21
Keep it simple	4.15	(1.19)	3.91,4.37	4.82	(1.08)	4.59,5.06	16.76	<.001	0.59 (0.28, 0.88)	181.64
Demeanour	5.37	(1.01)	5.18,5.55	5.79	(0.82)	5.61,5.98	10.53	.001	0.45 (0.15, 0.74)	11.33

Note: NHST = Null-hypothesis significance testing.

The univariate Interview Protocol effects are presented in Table 2. Significant effects emerged for all five variables. Tukey post hoc tests showed that compared to the control condition, the CCA condition resulted in more new external details ( $p < .001$ ), more new contextual details ( $p < .001$ ), more new verifiable sources ( $p < .001$ ) and more new complications ( $p < .001$ ). Compared to the RI condition, the CCA condition resulted in more new external details ( $p < .001$ ), more new contextual details ( $p < .001$ ) and more new verifiable sources ( $p < .001$ ), whereas the effect for new complications was not significant ( $p = .364$ ). The RI condition resulted in more new internal details than the control ( $p < .001$ ) and CCA ( $p < .001$ ) conditions, whereas the control and CCA conditions did not differ from each other ( $p = .600$ ). The RI condition also resulted in more new external details ( $p < .001$ ), more new contextual details ( $p < .001$ ), more new verifiable sources ( $p = .038$ ) and more new complications ( $p < .001$ ) than the control condition.

At a univariate level only the Veracity X Interview Protocol effect for new internal details was significant,  $F(2, 177) = 5.59$ ,  $p = .004$ ,  $\eta_p^2 = 0.06$ ,  $BF_{10} = 9.32$  (all other  $F_s < 1.78$ , all  $p_s > .171$ ). Table 3 shows that in the RI condition truth tellers reported more new internal details than lie tellers. However, the Bayesian analysis showed there was not enough evidence to support this finding.

The Veracity effect for internal details was not significant in the control and CCA conditions; neither were any of the remaining Veracity effects significant in any of the three interview conditions. This means that Hypothesis 2 was not supported.

### 3.4.3 | Hypothesis 3 testing: Inferential blocks results (RI condition only)

An ANOVA was carried out with Veracity as the only factor and the number of 'No' answers to the nine multiple-choice questions in the RI protocol as dependent variable. The analysis revealed a significant effect,  $F(1, 56) = 13.45$ ,  $p < .001$ ,  $d = 0.97$  (95% CI [0.41, 1.49]),  $BF_{10} = 51.60$ . As predicted in Hypothesis 3, lie tellers ( $M = 6.55$ ,  $SD = 0.81$ , 95% CI [6.22, 6.88]) responded more frequently with 'No' than truth tellers ( $M = 5.68$ ,  $SD = 0.99$ , 95% CI [5.34, 6.02]).

## 3.5 | Exploratory analyses

### 3.5.1 | Deception strategies questionnaire (post-Interview questionnaire)

A 2 (Veracity) X 3 (Interview Protocol) MANOVA was carried out with the three strategies measured in the Deception Strategies Questionnaire (tell it all, keep simple and demeanour) as dependent variables. At a multivariate level the Veracity,  $F(3, 175) = 7.57$ ,  $p < 0.001$ ,  $\eta_p^2 = 0.12$ , and Interview Protocol main effects,  $F(6, 350) = 3.35$ ,  $p = .003$ ,  $\eta_p^2 = 0.05$ , were both significant, whereas the Veracity x Interview Protocol interaction effect was not,  $F(6, 350) = 0.73$ ,  $p = .626$ ,  $\eta_p^2 = 0.01$ . None of the univariate interaction effects were significant either, all  $F_s < 1.77$ , all  $p_s > .174$ .

The univariate Veracity results are presented in Table 1. Very strong positive evidence emerged that lie tellers reported that they

**TABLE 2** Reported verbal cues and strategies as a function of interview protocol

	Control		CCA		RI		NHST			BF <sub>10</sub>
	M (SD)	95% CI	M (SD)	95% CI	M (SD)	95% CI	F	p	$\eta_p^2$	
<i>Verbal cues Phase 1</i>										
External details	12.03 <sup>a</sup> (10.09)	8.92, 14.28	11.79 <sup>a</sup> (8.31)	8.99, 14.36	13.83 <sup>a</sup> (14.55)	11.16, 26.71	0.91	.404	.01	0.09
Internal details	0.11 <sup>a</sup> (0.44)	-0.02, 0.23	0.18 <sup>a</sup> (0.67)	0.05, 0.30	0.07 <sup>a</sup> (0.26)	-0.06, 0.20	0.74	.480	.01	0.11
Contextual details	8.24 <sup>a</sup> (7.15)	6.10, 9.74	9.08 <sup>a</sup> (7.34)	7.16, 10.81	9.28 <sup>a</sup> (8.77)	7.48, 11.25	0.64	.528	.01	0.07
Verifiable sources	1.67 <sup>a</sup> (0.88)	1.42, 1.85	1.55 <sup>a</sup> (0.84)	1.33, 1.76	1.72 <sup>a</sup> (1.02)	1.52, 1.96	0.80	.453	.01	0.09
Complications	2.29 <sup>a</sup> (2.95)	1.51, 2.81	2.13 <sup>a</sup> (2.62)	1.45, 2.76	2.16 <sup>a</sup> (2.79)	1.53, 2.87	0.02	.980	.00	0.06
<i>Verbal cues subsequent phases</i>										
New external details	4.16 <sup>a</sup> (6.62)	0.04, 8.08	34.18 <sup>b</sup> (24.20)	30.11, 38.16	15.02 <sup>c</sup> (11.38)	10.87, 19.20	55.66	<.001	.39	$5.320 \times 10^{16}$
New internal details	0.10 <sup>a</sup> (0.35)	-0.23, 0.43	0.32 <sup>a</sup> (0.67)	-0.004, 0.66	2.07 <sup>b</sup> (2.28)	1.75, 2.43	40.56	<.001	.31	$3.235 \times 10^{11}$
New contextual details	2.02 <sup>a</sup> (2.99)	0.74, 3.22	14.40 <sup>c</sup> (6.73)	13.20, 15.68	7.69 <sup>b</sup> (4.41)	6.41, 8.97	98.90	<.001	.53	$1.523 \times 10^{26}$
New verifiable sources	0.19 <sup>a</sup> (0.47)	-0.31, 0.67	4.90 <sup>c</sup> (3.09)	4.42, 5.40	1.07 <sup>b</sup> (1.21)	0.56, 1.57	102.36	<.001	.54	$1.909 \times 10^{27}$
New complications	1.06 <sup>a</sup> (2.09)	0.09, 1.94	5.42 <sup>b</sup> (4.94)	4.46, 6.32	4.50 <sup>b</sup> (3.65)	3.57, 5.48	24.31	<.001	.22	$1.219 \times 10^7$
<i>Reported strategies (questionnaire)</i>										
Tell it all	4.45 <sup>a</sup> (1.50)	4.11, 4.74	4.60 <sup>a</sup> (1.16)	4.29, 4.91	4.66 <sup>a</sup> (1.05)	4.33, 4.98	0.57	.564	.006	0.08
Keep it simple	4.76 <sup>b</sup> (1.06)	4.52, 5.08	4.26 <sup>a</sup> (1.23)	3.99, 4.56	4.38 <sup>ab</sup> (1.22)	4.08, 4.66	3.86	.023	.09	0.86
Demeanour	5.85 <sup>b</sup> (0.75)	5.65, 6.10	5.26 <sup>a</sup> (0.98)	5.04, 5.49	5.60 <sup>a</sup> (1.01)	5.36, 5.82	7.19	<.001	.06	15.40

Note: Only mean scores with a different superscript differ significantly ( $p < .05$ ) from each other. NHST = Null-hypothesis significance testing.

kept their stories simpler than truth tellers. Positive evidence emerged that lie tellers paid more attention to their demeanour than truth tellers. The effect for *tell it all* was not supported.

The univariate Interview Protocol results are presented in Table 2. Significant differences emerged for the keep it simple and demeanour strategies. Tukey post hoc tests showed that compared to participants in the CCA condition, participants in the control condition more strongly endorsed the keep it simple ( $p = .035$ ) and paying attention to demeanour ( $p < .001$ ) strategies. All other post hoc tests were not significant (all  $ps > .104$ ). The Bayesian analyses revealed positive evidence for the Interview Protocol main effect for demeanour only.

### 3.5.2 | Correlations between number of verbal details and strategies reported

Pearson correlations were carried out between the five verbal details variables (external details, internal details, contextual details, verifiable

sources and complications) and the three investigated strategies (tell it all, keep it simple and demeanour). The results showed that the more participants endorsed the keep it simple strategy, the fewer details they reported, see Table 4. Similarly, the more they reported to have concentrated on their demeanour, the fewer details they reported. Only weak relationships were found between tell it all and reporting verbal details.

## 4 | DISCUSSION

In the present experiment truth tellers and lie tellers carried out the same mission. Truth tellers reported all elements truthfully; lie tellers reported all elements truthfully apart from one small element (about a secret list of corrupt officers) that they deliberately omitted in their recalls. In the analyses, we left out the information truth tellers reported about the secret list. The result is that we compared the truthful information truth tellers and lie tellers reported about the



**TABLE 3** Verbal cues as a function of veracity for the separate interview conditions in the subsequent phases

	Truth			Lie			NHST			BF <sub>10</sub>
	M	(SD)	95% CI	M	(SD)	95% CI	F	p	d	
<i>Standard interview protocol</i>										
New external details	4.94	(7.22)	2.71, 7.18	3.18	(5.77)	0.68, 5.68	1.11	.297	0.27 (−0.24, 0.76)	0.41
New internal details	0.06	(0.24)	−0.06, 0.17	0.14	(0.45)	0.01, 0.27	0.95	.333	0.23 (−0.27, 0.33)	0.39
New contextual details	2.31	(3.36)	1.30, 3.33	1.64	(2.45)	0.51, 2.77	0.78	.380	0.22 (−0.28, 0.72)	0.36
New verifiable sources	0.26	(0.56)	0.10, 0.42	0.11	(0.31)	−0.07, 0.28	1.60	.211	0.32 (−0.18, 0.82)	0.51
New complications	1.49	(2.41)	0.79, 2.18	0.54	(1.50)	−0.24, 1.31	3.32	.073	0.46 (−0.05, 0.96)	1.03
<i>CCA interview protocol</i>										
New external details	35.53	(24.00)	26.92, 44.15	32.73	(24.74)	23.84, 41.63	0.20	.653	0.11 (−0.39, 0.61)	0.28
New internal details	0.22	(0.49)	−0.02, 0.46	0.43	(0.82)	0.19, 0.68	1.59	.212	0.31 (−0.19, 0.81)	0.51
New contextual details	13.22	(7.20)	10.86, 15.58	15.67	(6.06)	13.23, 18.10	2.08	.154	0.37 (−0.14, 0.86)	0.62
New verifiable sources	4.66	(2.78)	3.56, 5.75	5.17	(3.41)	4.03, 6.30	0.42	.520	0.16 (−0.34, 0.66)	0.31
New complications	6.38	(5.36)	4.65, 8.10	4.40	(4.31)	2.62, 6.18	2.54	.117	0.41 (−0.10, 0.90)	0.75
<i>RI interview protocol</i>										
New external details	15.43	(12.36)	11.08, 19.77	14.63	(10.59)	10.44, 18.83	0.07	.793	0.07 (−0.45, 0.58)	0.27
New internal details	2.71	(2.35)	1.88, 3.55	1.47	(2.06)	0.66, 2.27	4.62	.036	0.56 (0.03, 1.08)	1.77
New contextual details	7.79	(4.42)	6.10, 9.47	7.60	(4.47)	5.98, 9.23	0.03	.874	0.04 (−0.47, 0.56)	0.27
New verifiable sources	1.04	(1.37)	0.57, 1.50	1.10	(1.06)	0.65, 1.55	0.04	.842	0.05 (−0.47, 0.56)	0.27
New complications	5.21	(3.88)	3.85, 6.58	3.83	(3.35)	2.51, 5.16	2.11	.152	0.38 (−0.15, 0.89)	0.64

Note: NHST = Null-hypothesis significance testing.

Verbal details	Tell it all	Keep it simple	Demeanour
<i>Verbal cues Phase 1</i>			
External details	0.09	−0.40**	−0.18*
Internal details	0.11	−0.04	−0.02
Contextual details	0.16*	−0.36**	−0.19*
Verifiable sources	0.18*	−0.21**	−0.13
Complications	0.10	−0.27**	−0.19*
<i>Verbal cues subsequent phases</i>			
New external details	0.05	−0.33**	−0.28**
New internal details	0.09	−0.15*	−0.05
New contextual details	0.10	−0.26**	−0.23**
New verifiable sources	0.04	−0.17*	−0.25**
New complications	0.16*	−0.32**	−0.26**

Note: Only mean scores with a different superscript differ significantly from each other. NHST = Null-hypothesis significance testing.

\* $p < .05$ ; \*\* $p < .01$ .

same parts of the mission. The truthful information truth tellers and lie tellers provided in Phase 1 revealed evidence that lie tellers deliberately omitted some information about other elements of the mission: Lie tellers reported fewer external details, contextual details, verifiable sources and complications than truth tellers. The results for complications replicated the findings of the previous two omission lies experiments (Leal et al., 2020; Leal et al., 2022) which shows growing evidence that complications is a veracity indicator in

omission lies. This is the first experiment examining verifiable sources in omission lies and shows that this variable too has potential as a veracity indicator when attempting to detect omission lies. Unlike in Leal et al. (2020) and Leal et al. (2022), lie tellers reported fewer details than truth tellers. Despite the absence of a details Veracity effect in Leal et al. (2020) and Leal et al. (2022), we predicted this effect to occur because it could be derived from the deception literature.

**TABLE 4** Correlations between the number of reported details and strategies claimed to have been used

We do not know why lie tellers provided fewer details than truth tellers in the present experiment but not in Leal et al. (2020) and Leal et al. (2022). One possible explanation, worth examining, is that this has to do with how subtle the omission is. If lie tellers deliberately leave out relatively large parts of an experience, they may feel the need to compensate for this by reporting many details about the parts of the experience they are willing to talk about. This means that they do not use a 'keep it simple' strategy. Whereas if the omission is subtle, lie tellers may not feel the need to compensate and may be inclined to use their typically preferred 'keep it simple' strategy. This speculative argument would lead to the counter-intuitive conclusion that small omissions are easier to detect than large omissions when analysing speech content. This is worth testing in future research.

We theorised that the Veracity effects would be caused by lie tellers employing a 'keep it simple' strategy. We found evidence for this: Negative correlations were found between keeping it simple and reporting details. However, a second strategy—paying attention to demeanour—could also have attributed to the Veracity effects: Lie tellers endorsed such a strategy more than truth tellers and negative correlations were found between paying attention to demeanour and reporting details. Although we did not expect this effect to happen, we can explain it with hindsight. People find it difficult to pay attention to their speech content and demeanour at the same time (Patterson, 1995, 2006). This implies that the more they concentrate on their demeanour, the more they will neglect their speech and the fewer details they will report.

No Veracity differences were obtained in the subsequent phases of the interview. The most straightforward explanation would be that since both truth tellers and lie tellers provided entirely truthful information in the subsequent phases, differences between them were unlikely to occur. However, this explanation is unsatisfactory because also in Phase 1 the information truth tellers and lie tellers provided was truthful. We cannot explain the absence of Veracity effects in the subsequent phases.

A comparison of the three interview protocols (CCA, RI and control) showed that CCA interviews resulted in the most information. To gather information is an important aim in an interview (Brandon, 2011; Loftus, 2011; Vrij et al., 2014) and is thus mostly fulfilled by using an CCA interview protocol. The second important aim of an interview is to detect deceit (Brandon, 2011; Loftus, 2011; Vrij et al., 2014) and that aim was mostly fulfilled by using the RI protocol, particularly through the inferential block results. To our knowledge, the inferential block results are not considered when distinguishing truth tellers from lie tellers in RI protocols but may be worth examining based on our findings. CCA and RI have both discriminated truth tellers from lie tellers in outright lies or embedded lies scenarios (Vrij, 2018; Vrij & Fisher, 2016). Comparing the two interview protocols in such scenarios is worth pursuing in future research.

We measured strategies with a newly developed Deception Strategy Questionnaire (DSQ). Using a questionnaire to measure strategies is not common in deception research where mostly open-ended questions are used (Strömwall et al., 2004). We encourage other researchers also to use questionnaires, possibly the DSQ. A limitation

of the DSQ is that it only measures three strategies. In the future more strategies could be added to the questionnaire; the four maxims of Grice that participants in a conversation are expected to abide by (quantity, quality, relevance and manner) would be an obvious choice (Grice, 1975, 1989). Grice principles are widely examined, even in a cross-cultural context (Tabata & Vrij, 2022), albeit more by communication researchers than by psychologists.

How easy or difficult will it be to detect omission lies in real life settings? This will depend largely on the evidence investigators possess. If someone omits information about which evidence exists (i.e., someone says he was at work all day, but CCTV footage showed him meeting someone for a coffee in a café) a possible omission lie has been detected. Comparing a statement with evidence, is investigators' preferred method to detect lies (Park et al., 2002). Not having evidence available makes investigators more reliant on other cues, for example, what the person does or says. Nonverbal cues to deceit are generally unreliable. The present experiment showed that what the person says includes verbal cues to omission lies. Follow up research could examine the extent to which observers are able to detect such verbal cues.

One methodological issue is worth reporting. Lie tellers were instructed that the interviewer cannot be trusted, whereas truth tellers received no information about the interviewer. There was thus a confound between veracity and instructions about trusting the interviewer. Lie tellers were given this instruction so that they had a reason to lie to the interviewer. Giving reasons why to lie are commonplace in deception research (Vrij, 2008). We cannot rule out that such instructions trigger specific, yet undefined, responses in interviewees. We prefer this option above the other two available options: (a) giving lie tellers no reason to lie or (b) giving truth tellers the same information as lie tellers (e.g., the interviewer cannot be trusted) but still instruct truth tellers to tell the truth. We believe that our chosen option is the most ecologically valid option of the three.

## AUTHOR CONTRIBUTIONS

Sharon Leal and Aldert Vrij designed the study, analysed the data and wrote the initial draft. Haneen Deeb helped with the statistical analyses and commented on the initial draft. Ronald P. Fisher commented on the initial draft.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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## ENDNOTES

- <sup>1</sup> This hypothesis contradicts Leal et al.'s (2020) and Leal et al.'s (2022) findings for details. We predicted it nevertheless because it is the logical prediction to make based on the verbal deception literature.
- <sup>2</sup> The model statement is a detailed account of a man visiting a Formula 2 motor race and used for the first time by Leal et al. (2015).

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## APPENDIX A: THE MISSION

### ALL PARTICIPANTS

I would like you to imagine that you are an undercover officer for AC12, which is an institution to uncover corrupt police officers. I am about to send you on a mission to identify a fellow undercover officer in this organisation. It is important that you ensure that you correctly identify the officer and that you are not followed during this process.

You will later be debriefed in an interview about your mission.

I do not know the exact details of the mission but now please go to the 2nd floor of this University Building where you should find an envelope with a star on in a tray outside office 2.12. This will contain (a) the exact instructions for your mission and (b) money to buy the identifying items in Sainsbury's Local (please bring receipt on your return). Do you have any questions?

Instructions in the envelope:

*Please ensure that you are not followed when completing this mission*

1. Leave this building and walk to the Sainsbury's Local store in Guildhall square.
2. Once in the store buy a gluten free chocolate bar (use the money in this envelope and return with any change and receipt)
3. Walk, holding the chocolate bar visibly in front of you to Café Coco at Cambridge Road (these can identify you to the undercover officer).
4. When you enter Café Coco, look for a person with a lemon on the table—this should be the officer but in order to be certain please ask the person if they have a cigarette lighter you can borrow. If it is the correct person, s/he will reply 'I am sorry but I gave up smoking 2 years 7 months ago'. On receipt of the correct response say: 'I believe you are the undercover officer?'
5. After you have successfully identified and spoken with the officer please return to the University Building where you started. Once again, ensure you are not followed. Also please destroy these instructions.

All participants then had the following conversation with the undercover officer. The information was presented verbally by the undercover officer as well as in writing.

### CONVERSATION IN THE CAFE

Please sit down. First of all, congratulations for successfully completing this mission and identifying me; I hope you were not followed. As you are aware you are acting as a new recruit for AC-12 and this is the first part of your training.

I would like to tell you a little more about what the job entails. Basically, AC-12 is a secret organisation that operates within Scotland Yard. However, we have the capability and resources to operate throughout any station in the UK. Specifically, we will work anywhere that is necessary to apprehend corrupt officers.

You may be required to spend months on end investigating and building up evidence against corrupt officers. This job takes patience

and determination to do the right thing. You will also be involved in proactively trying to prevent corruption by identifying organised criminal gangs (OCGs) and any approaches they make to officers. As such this is not a job without risk and utmost care must be taken at all times.

You will need to abide by the letter of the law and as such you will be sent on courses to learn all the necessary legalities. This is important as the last thing you want is to spend months building up a case against a corrupt officer only to have it thrown out on a technicality.

You may be required to work undercover at times, in which case you would be deployed to a different area of the country where you are not known and would be provided with a cover story.

This is a very brief overview of the job of working for AC-12 but does this make sense? When person answers 'No' the undercover agent will explain the parts the person did not understand; if the person says 'Yes', the undercover agent will say: 'Good, I actually have another mission that I need you to complete, please listen very carefully'.

The undercover agent will then surreptitiously slide a napkin across the table. It will have a paper list of five made up names in the napkin. The undercover agent then will say: 'This is a list of five high ranking officers that we suspect are corrupt, none of these officers is aware that I have this list or that I am asking you to take care of it. We believe that because you are new, they will not suspect that I have divulged any classified information to you. We need to safely get this list to our contact in London without it being intercepted. In order to do this, I need you to hold on to the list. You will later be contacted by a Dr. Holmes from the University. Dr. Holmes is in fact an undercover officer from Scotland Yard. She is working at the University because we believe there is an OCG network inside the University. Dr. Holmes will send you an email that will seem like a normal university email, however it will have a study meeting time in that email- you must meet her in her office and deliver the list of names at that given time. Dr. Holmes will then travel to London next week and meet her contact on the London Eye—the list will then have been safely delivered and you need to do no more. Please ask any questions you may have now? Do you understand your part and Dr. Holmes' part in this mission? The undercover agent will answer any questions the participant may have'.

Once the person says yes tell them to please go back to KHB as initially instructed.

On returning to the experimenter participants then received instructions which differed for truth tellers and lie tellers.

## APPENDIX B: INSTRUCTIONS TO TRUTH TELLERS AND LIE TELLERS

### TRUTH TELLERS

You will now be interviewed by a security official regarding the mission you have just been on. Please truthfully recall everything that you experienced. It is important to appear convincing. If the interviewer

believes you are being cooperative and telling the truth then you will be entered into a draw to win up to £150 in prize money. If the interviewer does not believe you then you will be asked to write a statement about what happened during the mission ...so please try to appear convincing! (In reality, no one will have to write a statement and all those who complete the interview will be entered into the draw.) 'You can take time to prepare for this interview, please take as much time as you need and then just let me know when you feel ready, OK?'

## LIE TELLERS

You will now be interviewed by a security official regarding the mission you have just been on. Unfortunately, we believe that the person who will interview you cannot be trusted as they have known links to at least two of the corrupt officials named on the list. It is therefore VITAL that you do not mention that (1) you received anything from the undercover officer you met and (2) that the officer told you any details about Dr. Holmes collecting this list and delivering it to a location in London. Specifically, do not say that you were given anything or that you were told anything about Dr. Holmes— please omit these details. Please say that you went on an exercise to meet and identify an agent and were given an AC-12 job overview by that officer— the interviewer will know that you did this. Just DO NOT say about being given anything or being informed about Dr. Holmes.

You will now be interviewed by this security official regarding the mission you just went on. Remember you have to omit the information about the list and the involvement of Dr. Holmes. It is important to appear convincing. If the interviewer believes you are being cooperative and telling the truth then you will be entered into a draw to win up to £150 in prize money. If the interviewer does not believe you then you will be asked to write a statement about what happened during the mission...so please try to appear convincing! (In reality, no one will have to write a statement and all those who complete the interview will be entered into the draw.) 'You can take time to prepare for this interview, please take as much time as you need and then just let me know when you feel ready. OK?'

## APPENDIX C: THE INTERVIEW PROTOCOL

### THE CCA INTERVIEW PROTOCOL

I understand that you have been on a mission today. In this interview I will ask you questions about that mission. Depending on your answers, we may decide to interview you a second time.

Q1. Please tell me in as much detail as possible everything you did from the moment you left this building to the moment you came back.

Thank you for that, I would now like you to tell me again, but this time, before doing so I would like to play you an audio clip which serves as an example of how many details I would like you to include in your response. The example I will play is a so called 'Model Statement' as it gives you an idea of a detailed response to a question. After listening to the example, I will ask you again about what happened during your mission, and would like you to be that detailed in your response ok?

Play Model Statement<sup>2</sup> and then say:

Q2. Bearing in mind the amount of detail you heard in that clip, please tell me once more everything that happened from the moment you left the building till the moment you returned?

Q3. Thank you for that, what I would like to do now is ask you to recall your event in reverse order. I ask this because we know from memory research that recalling an event in reverse order aids memory recall. Therefore, I would like you to go back in your memory and recall the event once more but this time talk me back through from the moment you returned to the experimenter right back through to the moment you left the building to meet the undercover officer. Please take as much time as you need to prepare yourself for this and to recall the event in reverse order.

Q4. Thank you once again. Another aid to memory is drawing. I would therefore like you to go back in your memory to the moment you met the undercover officer. Please think about that specific moment and recall everything what you could see, what you could hear, what you could feel and what you could smell. OK? Now please draw for me what you could see at that moment and whilst doing so, talk me through everything you experienced. I realise that not everyone is good at drawing, so I would like you to talk to me whilst you draw so that I can understand your drawing.

Q5. What I would like you to do now is to talk me through the whole event one final time, but this time I would like you to help me out by including any details that you think I could verify—an example of a detail I could verify would be CCTV footage, official records such as receipts, people who you know by name and who saw you during the mission, etc. Does that make it clear what verifiable details are?

[Once participant says yes...]

OK, please talk me through the whole event once more but this time at each stage include any details I can verify

That is all my questions, thank you. Now please return to the experimenter.

### THE RI INTERVIEW PROTOCOL

I understand that you have been on a mission today. In this interview I will ask you questions about that mission. Depending on your answers, we may decide to interview you a second time.

Q1. Please tell me in as much detail as possible everything you did from the moment you left this building to the moment you came back.

Q2. Thank you for that, I would now like you to tell me your mission again, but this time I would like you to include all associated details such as sights, sounds, smells, emotions, thoughts at the time, or anything else you remember from the time of the event.

After the response the interviewer asks the following three questions:

#### Inferential block 1

- During your mission did you encounter anyone who spoke with an accent?
- If an intelligence officer was present in the café where you met the officer, would he have noticed anything suspicious?
- Did you tell anyone else about what happened during your mission?

Q3. Thank you for that, I would now like you to tell me your mission again, but this time from someone else's perspective. 'If someone else had been present, what would they have seen?'

After the response the interviewer asks the following three questions:

#### Inferential block 2

- Did your mission occur during the day?
- Did you notice anyone acting suspiciously during your mission?
- In the mission did anyone intend to deceive anyone else?

Q4. Thank you for that, what I would like to do now is ask you to recall your event in reverse order. I ask this because we know from memory research that recalling an event in reverse order aids memory recall. Therefore, I would like you to go back in your memory and recall the event once more but this time talk me back through from the moment you returned to the experimenter right back through to the moment you left the building to collect the package. Please take

as much time as you need to prepare yourself for this and to recall the event in reverse order.

After the response the interviewer asks the following three questions:

#### Inferential block 3

- If anyone followed you during your mission would they think that you did something you were not supposed to?
- Do you think you have left any important details out of what happened during your mission?
- Did you purchase anything during your mission?

Q5. Thank you for that. Please tell me for a final time in as much detail as possible everything you did from the moment you left this building to the moment you came back.

That is all my questions, thank you. Now please return to the experimenter.

#### THE CONTROL INTERVIEW PROTOCOL

I understand that you have been on a mission today. In this interview I will ask you questions about that mission. Depending on your answers, we may decide to interview you a second time.

Q1. Please tell me in as much detail as possible everything you did from the moment you left this building to the moment you came back.

Q2. Thank you for that.

The interviewer will briefly leave the room and after returning says:

I have been instructed to ask you to tell me one more time in as much detail as possible everything that happened during your mission. Please tell me again in as much detail as possible everything you did from the moment you left this building to the moment you came back.

That is all my questions, thank you. Now please return to the experimenter.

## APPENDIX D: THE DECEPTION STRATEGIES QUESTIONNAIRE (DCQ)

To what extent did you try to employ each of the following strategies while providing your statement (answers were given on 7-point Likert scales ranging from [1] *strongly disagree* to [7] *strongly agree*).

Item	Concept
1. To be informative, but not more than I thought was required	Keep it simple
2. To first decide what parts of the mission to convey and then only to tell the information that I remembered well	Keep it simple
3. To keep to the point	Keep it simple
4. To avoid obscurity and ambiguity	Demeanour
5. To first decide what parts of the mission to convey and then to recall these parts in as much detail as possible	Tell it all
6. To keep the story simple	Keep it simple
7. To sound decisive and avoid hesitations	Demeanour
8. To give a statement that sounds plausible (that sounds as the entire mission really could have happened the way I described it)	Demeanour
9. To be consistent (stick with a story and do not change important elements within it)	Demeanour
10. To make the story sound unrehearsed and spontaneous	Demeanour
11. To keep the details to a certain minimum so that there would be less room for error if the story needed to be repeated	Keep it simple
12. To explain what I was feeling	Tell it all
13. To also report details that I remembered but thought were insignificant	Tell it all
14. To sound confident	Demeanour
15. To display a confident demeanour	Demeanour
16. To elaborate on specific details	Tell it all
17. To include details that did not sound that relevant but made the story sound more complex	Tell it all
18. To describe the event in more general terms	Keep it simple
19. To include justifications as to why I could not recall some details	Keep it simple
20. To provide a number of details that is just enough to come across as convincing	Keep it simple
21. To provide more details than necessary to come across as convincing	Tell it all