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Exposing Suspects to Their Sketches in Repeated Interviews to Elicit Information and Veracity Cues

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ABSTRACT

Background/Aim: has shown that sketching while narrating facilitates the elicitation of information and verbal veracity cues in single interviews. We examined if these effects are retained when suspects are shown their sketch after one week in a repeated interview. **Method:** Participants ($N = 173$) completed a mock mission and then told the truth or lied about it in an immediate interview (interview 1). Participants either verbally reported the mission (Free recall condition) or sketched it while describing what they were sketching (sketch condition). After one week, all participants were asked for a free recall without sketching (interview 2). Half of the participants in the Sketch condition had access to their sketch while they verbally reported the event whereas the remaining half did not access the sketch. **Results:** Truth tellers provided more information than lie tellers in both interviews, and sketching elicited more information than a free recall but only in Interview 1. Participants who had access to their sketch in interview 2 repeated more information than those who did not have access, but accessing the sketch did not have an effect on veracity cues. **Conclusions:** Thus, sketching enhanced the elicitation of information in Interview 1 and access to the sketch in interview 2 seemed helpful for recalling previously reported information.

Exponiendo en entrevistas repetidas a los sospechosos a sus esquemas para obtener información e indicios de veracidad

RESUMEN

Antecedentes/objetivo: La investigación ha revelado que el uso de esquemas mientras se lleva a cabo una narración facilita la obtención de información y de indicios verbales de veracidad en una entrevista. Analizamos si estos efectos se mantienen cuando se somete a los sospechosos a su esquema de los hechos en entrevistas repetidas (una semana después). **Método:** Los participantes ($N = 173$) completaron una misión simulada y luego contaban la verdad o mentaban sobre la misma en una entrevista realizada de modo inmediato (entrevista 1). Los participantes o bien referían verbalmente la misión (condición de recuerdo libre) o la esquematizaban (condición de esquematización). Después de una semana se pidió a todos los participantes un recuerdo libre sin esquematizar (entrevista 2). La mitad de los participantes de la condición de esquematización podían acceder a su esquema mientras referían verbalmente el suceso y la otra mitad no tenía acceso al esquema. **Resultados:** Los que contaban la verdad daban más información que los que mentaban en ambas entrevistas y el esquema facilitaba más información que el recuerdo libre aunque tan solo en la entrevista 1. Aquellos participantes que tenían acceso a su esquema en la entrevista 2 repetían más información que quienes no tenían acceso, aunque el acceso no tenía efecto alguno en indicios de veracidad. **Conclusiones:** En conclusión, los esquemas incrementaron la obtención de información en la entrevista 1 y el acceso al esquema en la entrevista 2 resultó útil para recordar la información relatada previamente.

Deception research has shown that many verbal veracity cues are unreliable and weak (DePaulo et al., 2003). However, employing specific interview techniques that increase differences between truth tellers and lie tellers should enhance the diagnosticity of verbal cues (Hartwig & Bond, 2011; Mac Giolla & Luke, 2021). One such technique is sketching while narrating. Investigators are

increasingly using sketches when interviewing suspects to elicit information (Dando, Wilcock, & Milne, 2009) and verbal veracity cues (Deeb et al., 2018). Indeed, research has shown that sketches are effective for eliciting accurate information and veracity cues (Dando, 2013; Mac Giolla et al., 2017), understanding suspects' verbal reports (Eastwood et al., 2018; Marlow & Hilbourne, 2011),

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formulating interview questions (Eastwood et al., 2019), and reducing memory contamination (Fisher & Geiselman, 1992; Katz & Hershkowitz, 2010). Most research examines the effects of sketching in single interviews, and the effects of sketches in repeated interviews are not well understood. While some deception experiments have examined sketches in repeated interviews (Deeb, Vrij, Leal, & Burkhardt, 2021; Izotovas et al., 2018, 2020), none have exposed interviewees in a subsequent interview to a sketch they have made in a previous interview. We examined this in the present experiment.

Sketching while Narrating as a Technique for Eliciting Information and Veracity Cues

Sketching while narrating involves suspects reporting an experienced event through simultaneously sketching and verbally describing the event (Dando, Wilcock, Milne, & Henry, 2009; Vrij et al., 2020). This interview technique facilitates recall in truth tellers beyond a verbal free recall (Leins et al., 2014; Mattison et al., 2015) for several reasons. First, sketching mentally reinstates the context of the suspect's experience, and context reinstatement enhances recall (encoding specificity principle; Thomson & Tulving, 1970; Tulving & Thomson, 1973). Second, according to the code-compatible output principle (Fisher & Geiselman, 1992), memory can be enhanced by choosing an output format that is similar to how the experience was originally encoded. For visually experienced events, sketches comprise outputs that are more compatible with memory for the event than just a verbal free recall. Retrieval via sketching should thus facilitate the recall of visual and spatial information (Deeb et al., 2022a; Izotovas et al., 2018). Third, sketching is a time-consuming activity which slows down the recall process and offers truth tellers good opportunity to search their memory (Vrij, Granhag, et al., 2022). More time for retrieval should enhance recall. Fourth, sketching automatically leads to the provision of spatial information as the suspect must situate each person or object somewhere in the location they sketch. In a verbal free recall response, truth tellers do not always spontaneously report where persons and objects were exactly located (Vrij et al., 2012).

Sketching while narrating does not have the same effects on lie tellers who may be "unable" to report many details given that these details should be plausible (Deeb, Vrij, Leal, & Burkhardt, 2021; Köhnken, 2004), or may be "unwilling" to report many details, because they fear that such details may give leads to investigators that they are lying (Leal et al., 2023; Nahari et al., 2014). To avoid giving leads, lie tellers employ the strategy of keeping their accounts simple (Vrij, Granhag, et al., 2022). This strategy results in lie tellers providing fewer details than truth tellers (Deeb, Vrij, Leal, & Mann, 2021). Indeed, previous research showed differences between truth tellers and lie tellers when sketching while narrating.

In one experiment (Vrij et al., 2020) that was conducted in the United Kingdom, half of the truth tellers and lie tellers gave a verbal free recall about a mock mission they completed whereas the other half sketched and narrated. Truth tellers provided more total, location, and action details than lie tellers, but only in the sketching while narrating condition. Sketching while narrating was superior to the free recall in terms of eliciting information and veracity cues. Another experiment (Vrij, Leal, Fisher, et al., 2018) that was conducted with Hispanics (in the United States), Russians, and South Koreans yielded similar effects. Participants verbally responded to questions about an actual (truth tellers) or an alleged (lie tellers) trip they made. At the end of the interview, half of the participants sketched and narrated while the other half provided a free recall. Compared to the Free Recall condition, Sketching while narrating distinguished truth tellers and lie tellers on complications and resulted in more total and new details and more complications. Thus, sketching while narrating was

effective as a lie detection tool and also as an information gathering tool.

The majority of research on sketching while narrating was conducted in the context of single interviews. However, in real life interviews suspects are often interviewed repeatedly (Dickinson et al., 2019). While some deception researchers examined sketching without narration in repeated interviews (e.g., Izotovas et al., 2018, 2020), we are aware of only one experiment that systematically manipulated sketching while narrating in repeated interviews (Deeb, Vrij, Leal, & Burkhardt, 2021). In that experiment, participants in the United Kingdom were asked to report a truthful or a false memorable event in three interviews, each one week apart. Participants sketched and narrated either in the first interview, second interview, first and second interviews, or not at all (verbal free recall). In the third interview, all participants provided a verbal free recall. Significant veracity differences emerged in all three interviews. Sketches enhanced the elicitation of information across interviews by both truth tellers and lie tellers compared to the verbal free recall condition, but did not enhance the differences between truth tellers and lie tellers. Perhaps veracity differences would have emerged if participants in the sketching conditions were shown in a later interview the sketch they previously made.

To our knowledge, there is no research on the effects of suspects accessing their self-generated sketches in investigative interviews. However, the research on accessing self-generated notes can inform our understanding of the potential effects of accessing sketches. The memory (Agarwal et al., 2008; Rickards & Friedman, 1978) and forensic (Hanway, 2020; Thorley, 2016; Thorley et al., 2016) literature on note taking have generally shown that taking notes at the encoding stage (e.g., while reading a text or watching a trial) and accessing those notes later at the retrieval stage enhances recall. Accessing previously self-generated information at retrieval serves as an external storage function that strengthens one's memory of the event and thus helps with recalling more information than when such information is not accessed (Rickards & Friedman, 1978). In theory, this principle could also apply to obtaining access to previously made sketches.

Access to a previously generated sketch is likely to aid lie tellers less than truth tellers. Accessing the sketch should help truth tellers recall previously reported information (repetitions) and also new information. In contrast, lie tellers may be unwilling to change their initial account (i.e., by providing new information) when accessing the sketch as that would make the impression that they are inconsistent. Lie tellers strive to appear consistent because consistency is commonly associated with honesty (Granhag & Strömwall, 1999). The drive to be consistent could also make lie tellers apply a keeping-their-account simple strategy (Strömwall & Willén, 2011). The more they say, the more difficult it is to repeat all they said in subsequent interviews, and repeating themselves is a requirement of consistency (Deeb et al., 2017). Hence, veracity differences should emerge when truth tellers and lie tellers have access to their previously generated sketch.

Verbal Veracity Cues

Deception researchers have looked at different veracity cues that may distinguish truth tellers and lie tellers (Amado et al., 2016; Vrij, 2008; Vrij, Palena, et al., 2021). These cues can be nonverbal deciphered from body language (e.g., gaze aversion, nervousness) or verbal derived from speech content (e.g., details in an account, believability of an account). It has been shown that verbal veracity cues are more reliable than nonverbal veracity cues (Bond & DePaulo, 2006; Vrij, 2019), so we only focus on verbal veracity cues in this experiment.

Not all verbal veracity cues are diagnostic (DePaulo et al., 2003), so researchers should (a) make sure to use only diagnostic verbal cues, (b)

employ an interview technique (e.g., sketching while narrating) that enhances the diagnostic value of these cues by increasing differences between truth tellers and lie tellers, or (c) search for new diagnostic cues (Hartwig & Bond, 2011; Nahari et al., 2019). Further, looking at multiple diagnostic veracity cues rather than single diagnostic cues can yield more informed decisions (Vrij, Hartwig, et al., 2019). We thus examined multiple cues that have shown promising results in past research: PLATO (person, location, action, temporal, object) details, complications, and verifiable sources.

PLATO details are of interest in intelligence-gathering settings because specific types of information are at times needed to link events or to comprehend what happened during the target event (Alison et al., 2013; Soufan, 2011). Complications and verifiable sources can also result in more intelligence. They are more easily assessed than PLATO details in real life interviews. That is, complications and verifiable sources can be spotted in real time in the actual interview, whereas for PLATO details an interview needs to be transcribed and subsequently coded (Vrij, Fisher, et al., 2022).

PLATO details seem to be naturally provided by truth tellers who have experienced an event (Dando et al., 2011; Eastwood et al., 2019; Hope, Gabbert, et al., 2014; Leins et al., 2014). PLATO details have also been shown to distinguish truth tellers from lie tellers in sketch-based interviews (Deeb et al., 2022a, 2022b). These findings are driven by truth tellers being more able and willing than lie tellers to provide richer accounts.

A complication is a cluster of details that makes the recounted story more complex (e.g., “The lift door didn’t open”). For example, someone can report a straightforward story by describing that they went to the store and bought an item. However, if that person includes information such as not being able to find the item they intended to buy at that store or that there was a queue at the till then the person is reporting complications in their account (each underlined cluster of details is considered one complication). Complications often emerge as strong veracity cues. Truth tellers report more complications than lie tellers (Vrij, Palena, et al., 2021), including in sketching while narrating interviews (Deeb, Vrij, Leal, & Mann, 2021; Vrij et al., 2020). For lie tellers who try to keep their accounts simple (Hartwig et al., 2007), reporting complications contradicts this strategy. Also, lie tellers think that including complications sounds suspicious so they are less willing than truth tellers to include complications in their accounts (Maier et al., 2018).

Truth tellers report more verifiable information than lie tellers, and this effect has been corroborated in two meta-analyses (Palena et al., 2021; Verschuere et al., 2021). Verifiable information in the form of verifiable sources involves sources of information that can be checked by investigators (Leal et al., 2019). A verifiable source may be a credit card transaction, a named person, a receipt, etc. For example, “My brother messaged me” includes two verifiable sources as the message and the identity of the sender can be verified. Truth tellers include verifiable sources in their account because they are not concerned about giving leads to investigators (Nahari et al., 2014; Verschuere et al., 2021). However, for lie tellers, reporting verifiable sources goes against their strategy of not giving leads to investigators, so they tend to avoid providing this information (Vrij & Vrij, 2020). These effects generalise to sketching while narrating interviews whereby truth tellers provide more verifiable sources than lie tellers (Deeb et al., 2022a, 2022).

One experiment (Deeb et al., 2022a) directly compared accounts provided via a (i) self-generated sketch (sketching while narrating on a blank piece of paper), (ii) map (marking on a printed map while narrating), or (iii) verbal free recall. Truth tellers provided more PLATO details, complications, and verifiable sources than lie tellers, and the largest differences occurred in the self-generated sketching while narrating condition. Other experiments that compared sketching while narrating with a free recall have generally corroborated the effects of sketching while narrating

on these verbal cues (Deeb et al., 2022b, 2022; Vrij et al., 2020). It remains to be seen whether these positive sketching effects persist in repeated interviews, a question we addressed in the present experiment.

The Present Experiment

The main purpose of the present experiment was to examine repeated and new verbal cues when mock suspects sketch in a first interview and then access their sketch in a second interview after one week. In the first interview, half of the participants provided a verbal free recall only and the other half sketched while narrating. Participants who sketched while narrating were exposed to a model sketch. The model sketch is an example of a detailed sketch that is unrelated to the event under investigation and that serves as an example of how much information and of what type of information suspects should report (Deeb et al., 2022; Vrij, Leal, Fisher, et al., 2019). We introduced the model sketch in this condition because previous research has shown that it has positive effects on the elicitation of information and veracity cues, with truth tellers reporting more details than lie tellers after being exposed to the model sketch (Deeb et al., 2022). Hence, the model sketch seems to serve as a guide for truth tellers on the information they should provide, but it does not help lie tellers, perhaps because lie tellers would want to keep their accounts simple (Hartwig et al., 2007).

In the second interview of the present experiment, all participants provided a verbal free recall. Further, half of those who sketched and narrated in the first interview had access to their sketch. We expected having access to the sketch in the second interview to serve as a retrieval cue for truth tellers (Rickards & Friedman, 1978). Thus, exposure to the sketch should aid truth tellers in recalling more information from the first interview (repeated details) and in reporting information not mentioned in the first interview (new details). This would not be the case for lie tellers. Regarding repeating information, the change in modalities across interviews (from sketching while narrating in the first interview to a verbal free recall in the second interview) makes repeating information more difficult for lie tellers and therefore should reduce the chances of them repeating previously reported information (Leins et al., 2012). Regarding new information, lie tellers would want to stick to their strategy of appearing consistent (Granhag & Strömwall, 1999) and are thus unlikely to add new details to their accounts, even when they are given a previously made sketch.

Deviations from Pre-Registration

The present experiment was pre-registered on https://osf.io/edg6f?view_only=1f6dfa20696a4b16a0b2276115df7ce7. However, we decided to test an additional verbal cue, “scriptedness”, and we thus had to revise the corresponding hypotheses. We also revised the power analysis to mirror this addition and also to take the interaction effect into consideration as per the recommendations by Blake and Gangestad (2020).

Scriptedness as Verbal Cue to Deceit

The majority of verbal cues investigated in the deception literature are cues that are more likely to be provided by truth tellers than by lie tellers. Examples of such “cues to truthfulness” are detailedness (Amado et al., 2016; DePaulo et al., 2003; Vrij, 2008), plausibility (Leal et al., 2015; Vrij, Deeb, et al., 2021), PLATO details, complications, and verifiable sources. Recently, researchers started to call for examining “cues to deceit” which are cues that are more likely to be reported by lie tellers than by truth tellers (Vrij, 2016; Nahari et

al., 2019). Some cues to deceit have been investigated already (e.g., ambiguity, common knowledge details, self-handicapping strategies; DePaulo et al., 2003; Vrij, Palena, et al., 2021), but searching for more cues is encouraged (Vrij, Fisher, et al., 2022). It is easier for an investigator to detect deceit in an interview setting when looking for the presence of cues to deceit (e.g., ambiguity) than for the absence of truthfulness (e.g., detailedness; Vrij, Fisher, et al., 2022), because the brain is geared towards detecting the presence rather than the absence of signals (Treisman & Souther, 1985). Hence, cues to deceit may be more useful in practice and less cognitively demanding on the interviewer than cues to truthfulness. Furthermore, an investigator who looks at a combination of cues to truthfulness and cues to deceit should make more informed decisions on the suspect's veracity than an investigator who only assesses truthfulness cues (Vrij, Fisher, et al., 2022).

We thus examined "scriptedness" as a cue to deceit (in addition to the pre-registered cues to truthfulness: PLATO details, complications, and verifiable sources). A script refers to the characteristic components of an experience (Sporer, 2016). It can be based on information that is generally known to the public ("I went to Paris to see the Mona Lisa. I was impressed by the beauty of the painting") or on knowledge about how events typically occur ("I woke up, took a shower, had breakfast, and went to work"). In a scripted statement, the individual components (the size of the Mona Lisa; running out of toothpaste) are lacking. The rationale behind using scriptedness as a cue to deceit is that lie tellers often report the characteristic components, whereas truth tellers do tend to include individual components when describing an event (Sporer, 2016). Scriptedness is related to 'common knowledge details' (Vrij, Palena et al., 2021). The difference is that common knowledge details refer to individual clusters of details in a statement whereas scriptedness refers to the statement as a whole.

We decided to explore this cue for several reasons: (a) we know from discussions with investigators that scriptedness is used as a heuristic in interviews to detect deception; (b) unlike other cues to deceit that require counting the number of times they occur in an account (e.g., common knowledge details, self-handicapping strategies), scriptedness can be measured on a scale which is beneficial in applied settings as investigators would be able to assess scriptedness in real time during interviews; and (c) scriptedness was examined in only a single experiment that tested true and false opinions rather than past events (Mann et al., 2023). Scriptedness did not emerge as a diagnostic cue in Mann et al. (2023), which could have been due to the scenario used (discussing opinions). Thus, we aimed to examine this variable again in a reporting events scenario.

Our hypotheses on scriptedness were based on previous findings in the deception literature on common knowledge details (Vrij, Palena, et al., 2021). We thus expected lie tellers to provide more scripted accounts than truth tellers. Also, as sketching is more unanticipated by interviewees than a free recall (Vrij et al., 2009) and as sketching requires the provision of specific information (Vrij et al., 2020), we expect interviewees who sketch while narrating to provide a less scripted account than those who provide a free recall. In terms of accessing sketches in the second interview, interviewees—particularly truth tellers—who have access to their sketch should be less scripted than those who do not have access because they can use the sketch as a memory prompt rather than relying on commonly known information.

Power Analysis

We revised the power analysis that was pre-registered to include the additional dependent variable "scriptedness". Our effect size of interest was a medium to large effect size ($f^2 = .25$), which is the effect found in previous deception research involving visuospatial tasks

(Vrij et al., 2012; Vrij et al., 2020). After running the pre-registered power analysis, we consulted Blake and Gangestad (2020), who posit that for hypotheses involving an interaction effect, the effect size should be halved. Thus, we decided to halve the size of the effect of interest so it becomes .125.

A power analysis was conducted using G*Power software. For a MANOVA (special effects and interaction), and to obtain an effect size of .125, 99% statistical power, and an alpha level of .05, at least 121 participants should be recruited. This was the minimum benchmark that we aimed for as the larger the sample size, the lower the probability of a Type II error and the higher our confidence in the research findings (see Lakens, 2022; Lakens & Evers, 2014; VanVoorhis & Morgan, 2007).

Hypotheses

First Interview

Truth tellers will report more PLATO (people, location, action, time, object) details, complications, and verifiable sources than lie tellers and their accounts will be less scripted than those of lie tellers (Hypothesis 1, Veracity main effect).

Participants who are asked to sketch and narrate (Sketch condition) will report more PLATO details, complications, and verifiable sources and their accounts will be less scripted than those who provide a free recall (Hypothesis 2, Modality main effect).

Truth tellers will report more PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers, particularly in the Sketch condition (Hypothesis 3, Veracity × Modality interaction effect).

Second Interview

Truth tellers will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers (Hypothesis 4, Veracity main effect).

Participants who sketched and narrated in the first interview (Sketch condition) will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than participants who only gave a free recall in the first interview (Hypothesis 5, Modality main effect).

Truth tellers will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers, particularly in the Sketch condition (Hypothesis 6, Veracity × Modality interaction effect).

Participants who are given access to their first interview sketch (Access condition) will report more repeated and new PLATO details, complications, and verifiable sources, and their accounts will be less scripted than participants in the No Access condition (Hypothesis 7, Access main effect).

Truth tellers will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers, particularly in the Access condition (Hypothesis 8, Veracity × Access interaction effect).

Method

Participants

We recruited a total of 178 university students and staff members from the University of Portsmouth. However, three of them did not follow instructions and two of them did not show up for the second session; thus, the final sample consisted of 173 participants. Among them, 106 were females, 64 were males, two were non-binary, and one preferred not to disclose their gender. Age ranged between 18

and 66 years ($M_{age} = 23.73$ years, $SD_{age} = 8.45$). Participants received 66 credits or £30 for taking part in the experiment. Gender (all Pillai's trace $< .31$, all $F < 1.39$, $p > .106$), age (all $r < .123$, all $p > .107$), and reward (all Pillai's trace $< .12$, all $F < 1.34$, $p > .188$) did not have a significant effect on the dependent variables in interviews 1 or 2. The experiment complied with the ethical standards set by the Declaration of Helsinki, and ethics approval was granted from the institutional ethics committee.

Design

The experiment followed a between-subjects design with Veracity (truth teller, lie teller), Modality in the first interview (sketch, free recall), and Access to the sketch in the second interview (access, no access) as factors. The dependent variables were PLATO (person, location, action, time, object) details, complications, verifiable sources, and scriptedness. The sample included 88 truth tellers, of which 59 were in the Sketch condition and 29 in the Free recall condition. There were 85 lie tellers of which 56 were in the Sketch condition and 29 in the Free recall condition. Among truth tellers who sketched, 29 were in the Access condition and 30 in the No Access condition. Among lie tellers who sketched, 28 were in the Access condition and 28 in the No Access condition.

Materials

Manipulation Check Questionnaire

The first seven items of the Manipulation Check Questionnaire measured the extent to which participants (a) were motivated to be believed, (b) thought the interviewer believed them in both interviews, (c) thought their name will be entered in the prize draw, (d) thought they will have to write an account, (e) thought the first and second interviews were difficult, (f) recalled the mission, and (g) recalled what they reported in the first interview. All seven items were rated on a 7-point scale (1 = *not at all* to 7 = *extremely so*). The questionnaire also assessed the extent to which participants were truthful on a percentage scale (0% = *not truthful at all* to 100% = *very truthful*).

Participants who sketched in the first interview were asked to rate on 7-point scales (1 = *not at all* to 7 = *very much*) if access to the sketch in the second interview (would) have helped them with (a) recalling more information and (b) providing a more convincing account.

Deception Strategies Questionnaire

The Deception Strategies Questionnaire (DSQ; [Leal et al., 2023](#)) is a 21-item questionnaire which examines the three strategies that truth tellers and lie tellers most frequently report using: "be forthcoming", "keep it simple", and "pay attention to demeanour". The DSQ includes six items on the "be forthcoming" strategy (e.g., to recall the event in as much details as possible, to explain what I was feeling), eight items on the "keep it simple" strategy (e.g., to be informative but not more than I thought was required, to keep to the point), and seven items on the "pay attention to demeanour" strategy (e.g., to sound decisive and avoid hesitations, to sound confident). All items are rated on a 7-point scale (1 = *disagree* to 7 = *agree*).

Convincing Strategies Questions

Participants were asked two open questions on their convincing strategies: "What is/are the strategy/strategies you used to prepare

for the interview?" and "Had you been asked to lie/tell the truth during the interview, what would you have done differently?". The latter question is a hypothetical question that enquires about the convincing strategies they would have used had they been in the other veracity condition (lie teller/truth teller) than the one to which they were allocated.

Procedure

Participants engaged in a mock intelligence mission in which they collected an envelope—that purportedly included a list of names and contact information of a supremacist group—from someone near the Department of Psychology, and then delivered the envelope to someone else at a nearby location. Participants were provided with a tracking device so that the experimenter could track them and ensure they were following instructions.

After completing the mission and returning to the department, participants were randomly allocated to the Veracity and Modality conditions and were interviewed about the mission. Truth tellers were asked to tell the truth whereas lie tellers had to lie about the content of the envelope, the persons whom they have met, and the locations where they met them. All participants were encouraged to appear convincing during the interview. They were told that if the interviewer believed them, their names would be entered in a draw to win one of three prizes (£75, £100 or £150), but if they were not believed, they would have to write a statement about the mission. In reality, all participants were entered in the prize draw and none was asked to write a statement. Participants were given as much time as needed to prepare for the interview.

During the interview, all participants were instructed as follows:

I would like to know your activities during the mission. Before I ask for your account, please take a few moments to picture in your mind the activities you have done during the mission. Think about where you were and what you saw, heard, felt and smelled each time. Take a moment to think about all your senses during those activities and then please let me know when you have done that.

Afterwards, participants in the Free Recall condition were asked: "Please tell me in as much detail as possible everything you did and saw during the mission. You may take as long as you need to respond." Participants in the Sketch condition received the following instructions:

Please tell me in as much detail as possible everything you did and saw during the mission. Whilst doing that, please sketch a drawing of what you did and saw on this sheet of paper. Thus, you need to sketch and at the same time describe what you are sketching. Before doing so, please look at this Model Sketch. It will give you an idea of how much detail I would like you to include in your response. So, try to include as many details as possible in your sketch and description. You may use additional pieces of paper if you like, and you may take as long as you need to respond.

Participants in the Sketch condition were exposed to the Model Sketch throughout the interview. The same Model Sketch used by [Deeb et al. \(2022\)](#) was shown to participants; it involved a drawing of an event unrelated to the mission (houses, fields, and animals surrounding a main road with people around). After completing the interview, all participants were thanked and scheduled an appointment to be interviewed again after one week.

In the second interview session, all participants were reminded of their Veracity condition and were informed that they would be entered in the prize draw again if they were convincing but would have to write a statement about the mission if not. Participants were then interviewed by the same interviewer as in the first interview. All participants were asked for a free recall of what they did and saw en route during the mission. Half of the participants who sketched and narrated in the first interview had access to their sketch (via

random allocation) while they provided the free recall and they were instructed as follows:

I need to get a full picture of the activities you completed during the mission and to ensure you did not miss any details in the first interview. Thus, please tell me again in as much detail as possible everything about the activities. Here is the sketch you made last week in case you need to look at it again while describing the activities. You may take as long as you need to respond.

At the end of the second session, participants completed a post-interview questionnaire in which they reported their demographics and responded to the manipulation check questionnaire, the DSQ, and the Convincing Strategies questions. Lastly, participants read a debrief sheet and were thanked and remunerated.

The precise instructions that were delivered to participants about the mission and the Model Sketch that was used in the interview (along with the data) can be found in the Open Science Framework repository: https://osf.io/n4vg9/?view_only=30509ef6df8f44b4a990ee2dfc21987b.

Coding

The interviews were transcribed verbatim and verbal coding was done on the two interviews. PLATO details were coded as person, location, action, temporal, or object details in line with previous PLATO coding schemes (e.g., Deeb et al., 2022a, 2022). Person details involved the mention and physical descriptions of persons (e.g., “There was a young lady in black following me” includes three person details). Location details referred to directions and to static places (e.g., streets and buildings) and their descriptions (e.g., “I walked towards Gunwharf along a residential street” includes five location details). Action details were action verbs such as walked, collected, turned, broke, etc. Temporal details denoted time such as then, afterwards, before, throughout, etc. Object details referred to non-static objects such as monitor, cars, phone, and their descriptions (e.g., “There was a black bag, and in that black bag was a red bottle” includes four object details).

We also coded the frequency of complications and verifiable sources in each interview. The statement “The automatic doors at the Dennis Schiama building didn’t work” is an example of a complication. The statement “On the way, I made a phone call” includes a verifiable source as the phone call can be verified.

PLATO details, complications, and verifiable sources that were repeated in a single interview were coded only once. In the second interview, repeated details (details already mentioned during the first interview) and new details (details not mentioned during the first interview) were marked.

Scriptedness was defined as “Are the activities described in a way as activities typically happen?” and was rated on a 7-point scale (1 = *not at all scripted* to 7 = *very scripted*). Transcripts from the first and second interviews were each given one separate score. Thus, each participant would receive two scriptedness scores (one for the first interview and another for the second interview). The below transcript received a score of 7 on scriptedness because the participant described activities that typically happen and are not unique to a specific experience.

I was in class in this building; going back tomorrow. The building had partitioned floors and I left through the main door. From this building, I walked down that street. I went to a nearby coffee shop which took about five minutes to get through. I don't really like taking coffee but I was tired and needed some caffeine. They've got different options like lattes, cappuccino, and hot chocolate. I was feeling adventurous so I tried the latte. It was okay. After that, I just went for a walk around the city...

The below transcript received a score of 1 on scriptedness because it included unique information that is specific to the participant and

to the reported event.

I came to the psychology department where they gave me a phone number. They asked me to call a number that I saved on my phone. Once I had called the number, I was given specific instructions to do a drop. They said that I was meant to meet them in the student union and that I needed to deliver a bottle to them. So once I left, I went down this road so this is the Park Building and then I was at Guildhall Walk with the stairs. I went down the road where the pharmacy is by Astoria. I was carrying the bottle with me, it was a blue bottle....

To assess inter-rater reliability, one author coded all the transcripts and another author coded some of the transcripts. The transcripts coded by the second coder were always randomly chosen from the dataset. The first and fourth authors—both have previous experience in coding and were blind to the participants’ Veracity and Modality conditions—coded the transcripts independently from each other for PLATO details, verifiable sources, and scriptedness. The first author coded all the transcripts, and the fourth author coded 48 transcripts (27% of all interviews). As for complications, the second author—also an expert in coding complications and blind to the participants’ Veracity and Modality conditions—coded all the transcripts, and the first author coded 53 transcripts (30%). Inter-rater reliability was measured with the intra-class correlation (ICC) coefficient (single measures scores). The consensus is that inter-rater reliability is poor for ICC values less than .40, fair for values between .40 and .59, good for values between .60 and .74, and excellent for values between .75 and 1 (Hallgren, 2012). Inter-rater reliability was excellent for person details (ICC = .88), location details (ICC = .94), action details (ICC = .75), temporal details (ICC = .82), object details (ICC = .89), complications (ICC = .92), verifiable sources (ICC = .90), and scriptedness (ICC = .85).

Open responses on participants’ strategies to appear convincing and on what they would have done differently had they been in the other veracity condition were coded by the first author. Inductive coding was employed such that categories were generated based on participants’ responses. That is, similar responses were grouped together in a single category. When the same response could fit in more than one category, it was allocated to each of those categories. A second coder (a research assistant) grouped the responses based on the corresponding categories generated by the first author after receiving definitions and examples of each category. For the question “What is/are the strategy/strategies you used to prepare for the interview?”, inter-rater agreement was excellent, Cohen’s $\kappa = .87$. For the question “Had you been asked to lie/tell the truth during the interview, what would you have done differently?”, inter-rater agreement was also excellent, Cohen’s $\kappa = .86$.

Results

Post-Interview Questionnaire

Manipulation Check Questionnaire

For analysing the rated items in the manipulation check questionnaire, Modality and Access variables were combined into a single variable with three categories: Free recall, Sketch + Access, and Sketch + No access. A 2 (Veracity: truth teller, lie teller) \times 3 (Modality: Free recall, Sketch + Access, Sketch + No access) multivariate analysis of variance (MANOVA) with the variables in Table 1 as dependent variables revealed a significant multivariate effect of Veracity, Pillai’s trace = .80, $F(9, 159) = 72.19$, $p < .001$, $\eta^2 = .80$. The Modality main effect and the Veracity \times Modality interaction effect were not significant (all $F_s < 1.57$, all $p_s > .066$). The Veracity main effects are shown in Table 1. Truth tellers were significantly more likely than lie tellers to be truthful and to think that the interviewer believed them in both interviews and that their name would be entered in the prize draw. Lie tellers

Table 1. Descriptive and Inferential Statistics for the Ratings in the Post-Interview Questionnaire

Questionnaire item	Truth tellers		Lie tellers		F	p	η ²
	M (SD)	95% CI	M (SD)	95% CI			
Truthfulness							
Motivation to be believed	6.15 (1.03)	5.93, 6.37	5.82 (1.32)	5.54, 6.11	03.17	.077	.02
Believed by interviewer	5.83 (0.95)	5.63, 6.03	4.96 (1.47)	4.65, 5.28	21.09	< .001	.11
Likelihood of being entered in prize draw	5.51 (1.16)	5.27, 5.76	4.80 (1.51)	4.47, 5.13	12.41	< .001	.07
Likelihood of writing a statement	2.56 (1.41)	2.26, 2.85	3.00 (1.46)	2.68, 3.32	04.05	.046	.02
Difficulty of the first interview	3.27 (1.91)	2.87, 3.68	3.39 (1.72)	3.02, 3.76	00.19	.661	.00
Difficulty of the second interview	3.07 (1.61)	2.73, 3.41	3.64 (1.60)	3.29, 3.98	05.70	.018	.03
Recalling the mission	5.56 (1.19)	5.30, 5.81	5.54 (1.34)	5.25, 5.83	00.01	.921	.00
Recalling what was reported in the first interview	5.39 (1.21)	5.13, 5.64	5.18 (1.58)	4.84, 5.52	01.15	.285	.01

were significantly more likely than truth tellers to think that they would have to write a statement and that the second interview was difficult. Truth tellers and lie tellers were equally and highly motivated to appear convincing. Truth tellers and lie tellers also did not differ on the extent to which they thought the first interview was difficult nor on the extent to which they were able to recall the mission and the information they reported in the first interview.

To test if participants who sketched and narrated in the first interview believed that access to the sketch in the second interview (would have) helped in recalling more information and in providing a more convincing account, two one-way MANOVAs were conducted with Veracity as factor and recalling more information and providing a more convincing account as dependent variables. Among participants who sketched and had access to their sketch, the multivariate effect was nonsignificant, Pillai's trace = .02, $F(2, 45) = 0.39, p = .677, \eta^2 = .02$. Similarly among participants who sketched but did not have access to their sketch, the multivariate effect was nonsignificant, Pillai's trace = .01, $F(2, 55) = 0.27, p = .762, \eta^2 = .01$. All means were above 3.82 which suggested that truth tellers and lie tellers thought that access to the sketch (could) have helped them.

Deception Strategies Questionnaire

Cronbach's alpha was calculated to measure the internal consistency of the Deception Strategies Questionnaire subscales. Reliability was good for all three subscales: .772 for the "be forthcoming" subscale, .779 for the "keep it simple" subscale, and .767 for the "pay attention to demeanour" subscale. The means were 4.31 ($SD = 1.34$) for the "be forthcoming" subscale, 4.55 ($SD = 1.14$) for the "keep it simple" subscale, and 5.37 ($SD = 1.06$) for the "pay attention to demeanour" subscale.

A 2 (Veracity: truth teller, lie teller) × 3 (Modality: Free recall, Sketch + Access, Sketch + No access) MANOVA with the means of the three subscales as dependent variables revealed a significant multivariate effect of Veracity, Pillai's trace = .20, $F(3, 165) = 13.41, p < .001, \eta^2 = .20$. The Modality main effect and the Veracity × Modality interaction effect were not significant (all $F_s < 1.22$, all $p_s > .298$). At the univariate level, truth tellers ($M = 4.51, SD = 1.28, 95\% CI [4.24, 4.78]$) scored higher on the "be forthcoming" subscale than lie tellers ($M = 4.10, SD = 1.37, 95\% CI [3.81, 4.40]$), $F(1, 167) = 4.14, p = .043, \eta^2 = .02$. For the "keep it simple" subscale, lie tellers ($M = 5.02, SD = 0.93, 95\% CI [4.82, 5.22]$) scored higher than truth tellers ($M = 4.10, SD = 1.15, 95\% CI [3.86, 4.34]$), $F(1, 167) = 32.85, p < .001, \eta^2 = .16$. The univariate effect was not significant for the "pay attention to demeanour" subscale, $F(1, 167) = 3.27, p = .072, \eta^2 = .02$.

We examined the association between the three subscales and unique PLATO details, complications, and verifiable sources, and average scriptedness in Interviews 1 and 2 by running three one-tailed Pearson's correlational analyses. To compute the unique scores, we summed the score of each detail type in Interview 1 with new details reported in Interview 2. For example, for person details, the

formula was: person details reported in Interview 1 + new person details reported in Interview 2. For scriptedness, we averaged the scores in Interviews 1 and 2.

As Table 2 shows, the "be forthcoming" subscale was significantly positively correlated with unique PLATO details, unique complications, and unique verifiable sources. The "keep it simple" subscale was significantly negatively correlated with unique PLATO details, unique complications, and unique verifiable sources but significantly positively correlated with average scriptedness. No significant correlations emerged for the "pay attention to demeanour" subscale. These findings suggest that the "be forthcoming" subscale was associated with reporting more details whereas the "keep it simple" subscale was associated with the provision of fewer and scripted details. The "pay attention to demeanour" subscale correlations suggested that demeanour is irrelevant to how much information is provided.

Table 2. One-Tailed Pearson's Correlational Analyses between the Deception Strategies Questionnaire Subscales and Unique PLATO Details, Unique Complications, Unique Verifiable Sources, and Average Scriptedness in Interviews 1 and 2

Detail type	Be forthcoming		Keep it simple		Pay attention to demeanour	
	r	p	r	p	r	p
Person details	.21	.003	-.26	< .001	-.06	.212
Location details	.24	< .001	-.33	< .001	-.04	.291
Action details	.26	< .001	-.31	< .001	-.02	.406
Temporal details	.33	< .001	-.33	< .001	-.06	.214
Object details	.26	< .001	-.31	< .001	-.06	.219
Complications	.26	< .001	-.24	< .001	-.07	.199
Verifiable sources	.15	.024	-.27	< .001	.00	.483
Scriptedness	.02	.382	.16	.019	.11	.067

Convincing Strategies Questions

Participants answered open questions on what convincing strategies they used during the interview and what would they have done differently had they been in the other Veracity condition (lie teller/truth teller). Table 3 shows that truth tellers were more likely than lie tellers to report that during the interview, they provided a detailed ("Told the truth with as much detail as possible"), honest ("Tried to recall all the events that happened"), and (non) chronological account ("Say everything in clear chronological order") and acknowledged failures during the mission or the interview ("Recalled details but also went back to correct myself").

On the other hand, lie tellers were more likely than truth tellers to report using an embedded lie ("Used a familiar route and augmented my instructions to create a formula for a believable similar event"), maintaining consistency ("Tried as much as possible to remember what I had said in the first interview"), and providing a simple account ("Keep it simple and straight to the point").

Table 3. Frequency of Self-Reported Strategies by Truth Tellers and Lie Tellers in the Post-Interview Questionnaire

Strategy	Convincing Strategy		Different Strategy ¹	
	Truth Tellers	Lie Tellers	Truth Tellers	Lie Tellers
Provide a detailed account	49	13	4	32
Provide an honest account	39	0	0	26
Use an embedded lie	0	29	27	0
Maintain consistency	6	30	10	6
Control non-verbal behaviour (less)	16	17	3	1
Show a confident/calm demeanour	14	12	4	6
Prepare or recall the events in my mind/Make notes or mental map	12	13	7	0
Provide a simple account	3	10	10	1
Provide a (non)chronological account	9	2	4	3
Prefer being/looking spontaneous	7	5	0	1
Provide/Avoid irrelevant details	2	7	8	2
Add thoughts, feelings, and senses	4	7	3	5
Use the sketch to help with recall/Provide a more detailed sketch	4	5	4	4
(Do not) Provide verifiable details	5	3	2	3
Act friendly	2	5	0	0
Fabricate details	0	6	11	0
Omit details	0	6	9	1
Employ self-handicapping strategies	0	6	0	0
Add details	0	4	12	19
Acknowledge failures	4	0	0	2
Believe the lie	0	2	0	0

Note. ¹Truth tellers were asked “Had you been asked to lie during the interview, what would you have done differently?”; lie tellers were asked “Had you been asked to tell the truth during the interview, what would you have done differently?”.

Table 4. Univariate Main Effects of Veracity in Interviews 1 and 2

Detail Type	Truth Tellers		Lie Tellers		<i>F</i>	<i>p</i>	<i>d</i>	BF ₁₀
	<i>M</i> (<i>SD</i>)	95% CI	<i>M</i> (<i>SD</i>)	95% CI				
Interview 1								
Person details	13.61 (10.91)	11.30, 15.93	06.35 (05.76)	05.11, 07.59	27.82	<.001	0.83 [0.52, 1.14]	69525.585
Location details	74.68 (47.79)	64.56, 84.81	41.45 (32.89)	34.35, 48.54	22.87	<.001	0.81 [0.50, 1.12]	38380.466
Action details	24.05 (10.65)	21.79, 26.30	15.04 (07.07)	13.51, 16.56	44.36	<.001	1.00 [0.68, 1.31]	1.254 × 10 ⁷
Temporal details	26.36 (15.61)	23.06, 29.67	12.98 (09.69)	10.89, 15.07	39.45	<.001	1.03 [0.71, 1.35]	3.799 × 10 ⁷
Object details	11.97 (08.85)	10.09, 13.84	06.91 (05.69)	05.68, 08.13	18.41	<.001	0.68 [0.37, 0.99]	1158.026
Complications	06.08 (07.09)	04.58, 07.58	02.41 (03.08)	01.75, 03.08	19.37	<.001	0.67 [0.36, 0.98]	883.470
Verifiable sources	02.11 (01.78)	01.74, 02.49	00.56 (01.05)	00.34, 00.79	53.41	<.001	1.06 [0.74, 1.38]	1.040 × 10 ⁸
Scriptedness	01.56 (01.48)	01.24, 01.87	03.36 (02.45)	02.84, 03.89	29.85	<.001	0.89 [0.57, 1.20]	526966.030
Interview 2: Repeated								
Person details	07.84 (06.48)	06.47, 09.21	03.45 (03.21)	02.76, 04.14	30.55	<.001	0.86 [0.55, 1.17]	153277.187
Location details	42.52 (28.12)	36.56, 48.48	22.13 (18.80)	18.07, 26.19	23.99	<.001	0.85 [0.54, 1.17]	131777.001
Action details	17.93 (08.19)	16.20, 19.67	10.40 (05.46)	09.22, 11.58	47.59	<.001	1.08 [0.76, 1.40]	2.276 × 10 ⁸
Temporal details	16.55 (10.08)	14.41, 18.68	07.67 (06.58)	06.25, 09.09	40.76	<.001	1.04 [0.72, 1.36]	5.742 × 10 ⁷
Object details	07.66 (06.06)	06.37, 08.94	03.88 (03.25)	03.18, 04.58	25.03	<.001	0.78 [0.47, 1.09]	14303.734
Complications	02.33 (02.94)	01.71, 02.95	01.09 (01.65)	00.74, 01.45	12.00	<.001	0.52 [0.22, 0.83]	30.228
Verifiable sources	01.66 (01.60)	01.32, 02.00	00.38 (00.94)	00.17, 00.58	43.75	<.001	0.98 [0.66, 1.29]	6.118 × 10 ⁶
Interview 2: New								
Person details	02.90 (02.86)	02.29, 03.50	01.53 (02.11)	01.07, 01.98	08.75	.004	0.55 [0.24, 0.85]	53.034
Location details	17.00 (11.49)	14.57, 19.43	10.42 (09.72)	08.33, 12.52	11.05	.001	0.62 [0.31, 0.93]	268.783
Action details	04.86 (03.27)	04.17, 05.56	02.58 (02.47)	02.04, 03.11	22.05	<.001	0.79 [0.48, 1.10]	21841.966
Temporal details	04.83 (04.84)	03.80, 05.85	01.89 (02.28)	01.40, 02.39	22.32	<.001	0.78 [0.47, 1.09]	14119.201
Object details	03.53 (03.24)	02.85, 04.22	01.64 (02.29)	01.14, 02.13	13.69	<.001	0.67 [0.37, 0.98]	1078.685
Complications	01.52 (02.06)	01.09, 01.96	00.47 (00.80)	00.30, 00.64	17.29	<.001	0.67 [0.36, 0.98]	928.442
Verifiable sources	00.65 (00.86)	00.47, 00.83	00.19 (00.57)	00.07, 00.31	11.44	<.001	0.63 [0.32, 0.94]	359.928
Interview 2 scriptedness	01.27 (00.99)	01.06, 01.48	02.95 (02.41)	02.43, 03.47	33.51	<.001	0.91 [0.60, 1.23]	1.064 × 10 ⁶

For the question on what they would had done differently had they been asked to lie, many truth tellers mentioned using an embedded lie, fabricating details, providing a simple account, and maintaining consistency. Lie tellers, on the other hand, were more likely to report that had they been asked to tell the truth, they would have provided a more detailed and honest

account and added details (refer to Table 3). Put differently, truth tellers conveyed that they would use a “keep it simple” strategy whereas lie tellers conveyed that they would use a “be forthcoming” strategy. Hence, the overall results from the open questions on strategies matched those of the Deception Strategies Questionnaire.

Hypotheses Testing

To test our hypotheses, we carried out frequentist analyses to test for significance and also Bayesian analyses of variance to test the likelihood of the data under both the null hypothesis (H_0) and the alternative hypothesis (H_1). We carried out MANOVAs for the frequentist analyses and reported Pillai's trace as this test statistic is more robust than other test statistics when there are unequal cell sizes. For the Bayesian analyses, we report Bayes factors (BF_{10}), BF_{10} scores (Olson, 1979) above 3 suggest support for H_1 over H_0 , and BF_{10} scores close to 1 indicate that no evidence can be derived from the data for either hypothesis (Jarosz & Wiley, 2014). We also report Cohen's d effect size to test the magnitude of effects (Cohen, 1988). An effect size of 0.2 is considered small, of 0.5 is moderate, and of 0.8 is large. The frequentist analyses were conducted via SPSS 28.0 and the Bayesian analyses via JASP 0.16.10.

As we predicted separate hypotheses for Interviews 1 and 2, we did not include all the factors in a single analysis. Instead, for Interview 1, we analysed the data using the Veracity and Modality factors and for Interview 2, we included all Veracity, Modality, and Access factors (as the Access factor was manipulated in Interview 2 only). However, as we predicted different interaction effects in Interview 2 that involved different factors (that is, Hypothesis 6 was posited for Veracity and Modality and Hypothesis 8 was posited for Veracity and Access as factors), we do not include all three factors in a single analysis when testing Hypotheses 6 and 8 but in separate analyses in line with our hypotheses.

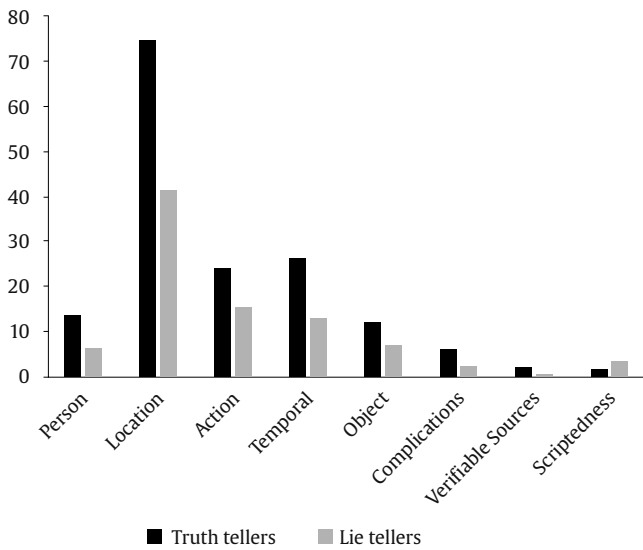


Figure 1. Means of the Dependent Variables in Interview 1 as a Function of Veracity.

Interview 1

A 2 (Veracity: truth teller, lie teller) \times 2 (Modality: free recall, sketch) MANOVA with PLATO details, complications, verifiable sources, and scriptedness in Interview 1 as dependent variables revealed significant multivariate main effects of Veracity, Pillai's trace = .38, $F(8, 162) = 12.17, p < .001, \eta^2 = .38$, and Modality, Pillai's trace = .12, $F(8, 162) = 2.64, p = .010, \eta^2 = .12$. The Veracity \times Modality effect was not significant, Pillai's trace = .08, $F(8, 162) = 1.83, p = .075, \eta^2 = .08$.

At the univariate level, the Veracity main effect (see Table 4 and Figure 1) demonstrated that truth tellers reported significantly more PLATO details, complications, and verifiable sources and their accounts were perceived as less scripted than those of lie tellers. The Bayesian analyses were strongly in favour of these results and the average of the effect size ($0.67 \leq d \leq 1.06$) was large ($d = 0.87$), which supported Hypothesis 1 that predicted a Veracity main effect in Interview 1.

For the Modality main effect (see Table 5 and Figure 2), participants who sketched reported significantly more location, temporal, and object details than those in the Free recall condition. However, the Bayesian analysis showed weak evidence for object details. Thus, Hypothesis 2 that predicted a Modality main effect in Interview 1 was supported for location and temporal details only. Further, the Bayesian analyses showed weak evidence for the interaction effect (all $BFs < 3$). Thus, Hypothesis 3 that predicted a Veracity \times Modality effect in Interview 1 was not supported.

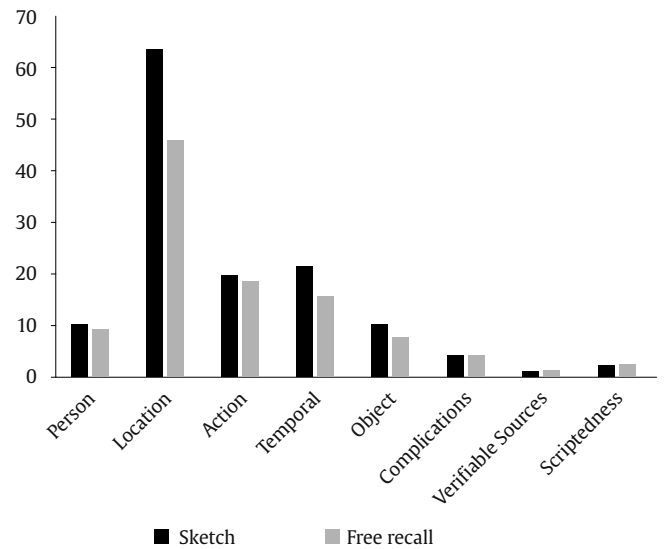


Figure 2. Means of the Dependent Variables in Interview 1 as a Function of Modality.

Table 5. Univariate Main Effects of Modality in Interview 1

Detail type	Free Recall		Sketch		F	p	d	BF_{10}
	$M(SD)$	95% CI	$M(SD)$	95% CI				
Interview 1								
Person details	09.40 (08.07)	07.28, 11.52	10.37 (10.12)	08.50, 12.24	0.39	.532	0.11 [-0.21, 0.42]	0.209
Location details	46.38 (34.84)	37.22, 55.54	64.39 (47.36)	55.64, 73.14	7.24	.008	0.43 [0.11, 0.75]	3.479
Action details	18.86 (10.77)	16.03, 21.69	20.00 (09.78)	18.19, 21.81	0.51	.477	0.11 [-0.21, 0.43]	0.217
Temporal details	15.88 (11.01)	12.98, 18.77	21.76 (15.83)	18.83, 24.68	7.61	.006	0.43 [0.11, 0.75]	3.226
Object details	07.81 (05.70)	06.31, 09.31	10.32 (08.66)	08.72, 11.92	4.20	.042	0.34 [0.02, 0.66]	1.081
Complications	04.33 (06.59)	02.60, 06.06	04.25 (05.37)	03.26, 05.24	0.02	.896	0.01 [-0.30, 0.33]	0.174
Verifiable sources	01.41 (01.79)	00.94, 01.88	01.32 (01.59)	01.03, 01.62	0.21	.646	0.05 [-0.26, 0.37]	0.183
Scriptedness	02.45 (02.24)	01.86, 03.04	02.44 (02.20)	02.04, 02.85	0.00	.953	0.00 [-0.31, 0.32]	0.173

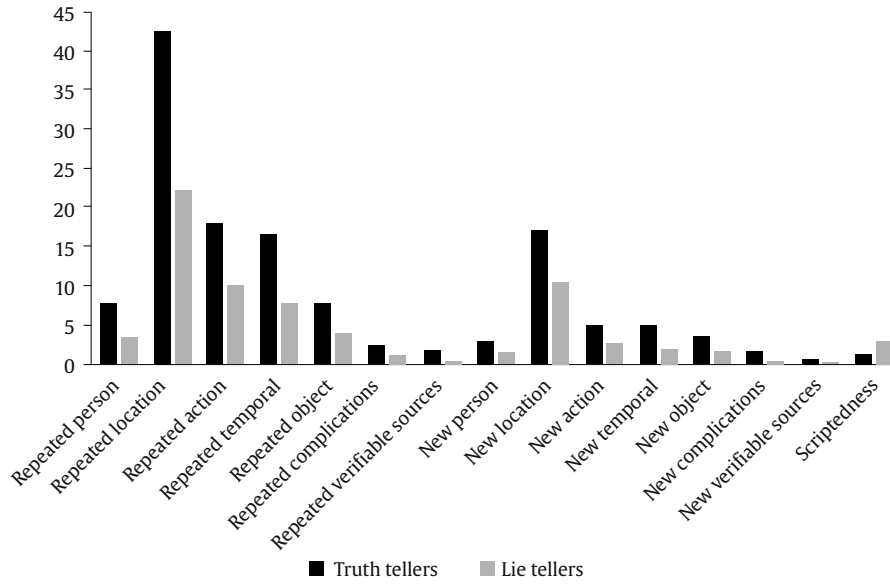


Figure 3. Means of the Dependent Variables in Interview 2 as a Function of Veracity.

Interview 2

A 2 (Veracity: truth teller, lie teller) × 2 (Modality in Interview 1: free recall, sketch) MANOVA with repeated and new PLATO details, complications, and verifiable sources and scriptedness in Interview 2 as dependent variables revealed a significant multivariate main effect of Veracity, Pillai’s trace = .45, $F(15, 155) = 8.45, p < .001, \eta^2 = .45$. The Modality main effect, Pillai’s trace = .07, $F(15, 155) = 0.77, p = .711, \eta^2 = .07$, and the Veracity × Modality effect, Pillai’s trace = .09, $F(15, 155) = 1.03, p = .423, \eta^2 = .09$, were not significant.

As Table 4 and Figure 3 show, truth tellers reported significantly more repeated and new PLATO details, complications, and verifiable sources and their accounts were less scripted than lie tellers. These findings were supported by the Bayesian analyses. The effects were medium to large ($0.52 \leq d \leq 1.08$) and averaged 0.78. Thus, Hypothesis 4 that predicted a Veracity main effect in Interview 2 was supported.

Evidence from the Bayesian analyses corroborated the frequentist analyses and did not support a Modality main effect or a Veracity × Modality effect (all BFs < 3). Thus, Hypothesis 5, that predicted a Modality main effect in Interview 2, and Hypothesis 6, that predicted a Veracity × Modality effect in Interview 2 were not supported.

To test Hypotheses 7 and 8, a 2 (Veracity: truth teller, lie teller) × 2 (Access: access, no access) MANOVA was conducted only on participants who sketched in Interview 1. The dependent variables were the repeated and new PLATO details, complications, and verifiable sources and scriptedness in Interview 2. A significant multivariate main effect emerged for Veracity, Pillai’s trace = .52, $F(15, 97) = 6.97, p < .001, \eta^2 = .52$. The Access main effect, Pillai’s trace = .21, $F(15, 97) = 1.68, p = .067, \eta^2 = .21$, and the Veracity × Access effect, Pillai’s trace = .13, $F(15, 97) = 0.96, p = .500, \eta^2 = .13$, were not significant. The Veracity main effects matched those discussed above with truth tellers providing significantly

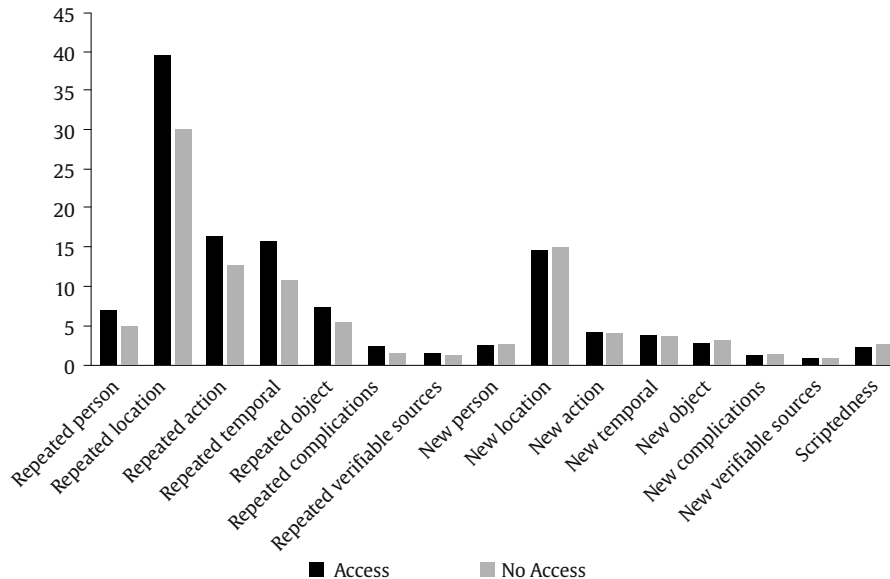


Figure 4. Means of the Dependent Variables in Interview 2 as a Function of Sketch Access.

Table 6. Summary of Hypotheses and the Corresponding Findings

Hypotheses	Direction of Predictions	Findings
Interview 1		
Hypothesis 1, Veracity main effect	Truth tellers will report more PLATO details, complications, and verifiable sources than lie tellers and their accounts will be less scripted than those of lie tellers	Supported
Hypothesis 2, Modality main effect	Participants in the Sketch condition will report more PLATO details, complications, and verifiable sources and their accounts will be less scripted than those in the Free recall condition	Supported for location and temporal details only
Hypothesis 3, Veracity × Modality interaction effect	Truth tellers will report more PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers, particularly in the Sketch condition	Not supported
Interview 2		
Hypothesis 4, Veracity main effect	Truth tellers will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers	Supported
Hypothesis 5, Modality main effect	Participants in the Sketch condition will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than participants in the Free recall condition	Not supported
Hypothesis 6, Veracity × Modality interaction effect	Truth tellers will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers, particularly in the Sketch condition	Not supported
Hypothesis 7, Access main effect	Participants in the Access condition will report more repeated and new PLATO details, complications, and verifiable sources, and their accounts will be less scripted than participants in the No Access condition	Supported for repeated action and repeated temporal details only
Hypothesis 8, Veracity × Access interaction effect	Truth tellers will report more repeated and new PLATO details, complications, and verifiable sources and their accounts will be less scripted than lie tellers, particularly in the Access condition	Not supported

more repeated and new PLATO details, complications, and verifiable sources and less scripted accounts than lie tellers.

The Bayesian analyses did not support the Veracity × Access effect (all $BFs < 3$) but revealed positive evidence for the Access main effect. Participants who were given their Interview 1 sketch in the second interview (Access condition) repeated more action details, $M = 16.23$, $SD = 8.15$, 95% CI [14.07, 18.39]; $BF_{10} = 3.253$; $d = 0.47$, 95% CI [0.10, 0.84], and temporal details, $M = 15.58$, $SD = 11.41$, 95% CI [12.55, 18.61]; $BF_{10} = 4.053$; $d = 0.49$, 95% CI [0.11, 0.86]) than participants in the No Access condition (for repeated action details, $M = 12.55$, $SD = 7.53$, 95% CI [10.57, 14.53]; for repeated temporal details, $M = 10.60$, $SD = 8.88$, 95% CI [8.27, 12.94]). See Figure 4. The frequentist analysis showed that these effects were indeed significant at the univariate level for repeated action details, $F(1, 111) = 8.20$, $p = .005$, $\eta^2 = .07$, and for repeated temporal details, $F(1, 111) = 8.60$, $p = .004$, $\eta^2 = .07$. Thus, Hypothesis 7 that predicted an Access main effect in Interview 2 was supported for repeated action and temporal details only. Hypothesis 8 that predicted a Veracity × Access effect in Interview 2 was not supported.

In sum, veracity main effects emerged in Interviews 1 and 2 as hypothesised. A Modality main effect emerged only for location and temporal details in Interview 1. The Access main effect was supported only for repeated action and temporal details in Interview 2. The predicted interaction effects were not supported in Interviews 1 or 2. All the hypotheses and the corresponding findings are summarised in Table 6.

Discussion

The present experiment examined the effects of sketches and access to sketches in repeated interviews. We found that sketches were more effective in the first interview in which they were requested and access to these sketches in the second interview was more beneficial for recalling information, albeit previously reported information only.

Veracity Effects

The predicted differences between truth tellers and lie tellers emerged in the first and second interviews for all dependent variables.

These results align with previous research findings that truth tellers report more PLATO details, complications, and verifiable sources than lie tellers (Deeb, Vrij, Leal, & Mann, 2021; Vrij et al., 2020). As the strategies from the post-interview questionnaire show (Table 3), truth tellers were more willing to be forthcoming whereas lie tellers were less willing to do that and were more likely to keep their accounts simple. Indeed, the findings from the Deception Strategies Questionnaire indicate that the “be forthcoming” strategy was more often used by truth tellers than by lie tellers and that this strategy was positively correlated with providing more information (Table 2). In contrast, the “keep it simple” strategy was more often used by lie tellers than by truth tellers and this strategy was negatively correlated with providing information. Thus, lie tellers avoided providing information that may reveal their lie (Verschuere et al., 2021; Vrij, Granhag, et al., 2022).

The same “be forthcoming” and “keep it simple” strategies emerged when truth tellers and lie tellers were asked about the strategies they would use had they been in the other veracity condition. Given that these intended strategies matched the self-reported strategies that were used (Table 3 and Deception Strategies Questionnaire) and replicated previous findings on suspects' actual strategies (Hartwig et al., 2010; Vrij et al., 2010), this further underlines the presence of such strategies in suspect interviews. Most of the research on strategies have been carried out in Western cultures. Researchers can examine potential differences or similarities in strategies employed by truth telling and lie telling suspects from different cultures or backgrounds (Tabata & Vrij, 2023).

The significant correlations between the reported strategies and the verbal cues are theoretically important. Verbal cues occur for a reason. We found evidence that they are the result of strategies that truth tellers and lie tellers employ in interviews. Future research may examine how targeting suspect strategies can enhance the elicitation of these veracity cues (Vrij & Granhag, 2012). Ultimately, interviewers may ask questions that aggravate these strategies to elicit larger and noticeable differences between truth tellers and lie tellers (Hartwig & Bond, 2011). One example is the Model Sketch that was introduced in the present experiment to encourage truth tellers to talk more with minimal effects on lie tellers.

Modality Effects

Sketching elicited more location and temporal details than a free recall but only in the first interview. In the post-interview questionnaire, participants mentioned that they tried to make a mental map account of the activities they completed. Making a mental map requires (i) visualising the locations that were visited and (ii) making a timeline of when these locations were visited. This should have enabled participants to think of both location and temporal details. It may have been easier to envision the locations and timeline when sketching than when providing a free recall (Hope et al., 2013). Indeed, among the 50 participants who reported (potentially) using a mental map or a chronological account (see Table 3), 37 of them were in the Sketch condition. Thus, using a sketch seems to elicit at least more location and temporal details than a free recall. This has practical implications for real life interviews where events often involve more locations and longer timelines than those in the present experiment, so suspects may find it easier to recall location and temporal details when sketching while narrating than when only providing a free recall.

In Interview 2, we did not find a significant difference between participants who previously (in Interview 1) provided a sketch and those who provided a free recall. Past research has shown that sketches are effective for eliciting a rich account compared to a free recall only in the interview in which they are requested (Deeb, Vrij, Leal, & Buckhardt, 2021). Hence, sketches do not seem to have carryover effects to follow-up interviews. This implies that when the purpose of an interview is to elicit information, sketching can be a useful tool in that interview but the interviewer should not expect suspects who sketch to recall new information in subsequent interviews.

The absence of a significant difference between truth tellers and lie tellers across modalities (interaction effect) in both interviews was unexpected. The veracity effects may explain the absence of an interaction effect. The differences between truth tellers and lie tellers were large in both interviews (average $d = 0.83$). Thus, there may have been a ceiling effect that prevented sketches from further enhancing the already large veracity differences. Previous research in which veracity effects were large similarly showed that sketching while narrating could not enhance the elicitation of veracity cues (e.g., Deeb, Vrij, Leal, & Buckhardt, 2021; Deeb, Vrij, Leal, & Mann, 2021).

We can only speculate why this ceiling effect occurred in these and the present experiments. Across experiments, transcripts were assessed for the types of details (e.g., PLATO details). Types of details can sometimes be more diagnostic than total details in distinguishing truthful from false verbal accounts (Vrij, Leal, Jupe, et al., 2018; Vrij, Leal, Mann, et al., 2018). Researchers have thus recommended looking at types of details in an account to assess veracity (Nahari et al., 2019; Vrij, Fisher, et al., 2022). While some previous sketch-based experiments by Deeb and colleagues (e.g., Deeb, Vrij, Leal, & Mann, 2021) examined total details, these total details were the sum of the types of details (e.g., P+L+A+T+O details). Perhaps when the types of details are examined in an account, strong verbal differences emerge between truth tellers and lie tellers and sketching while narrating cannot further enhance lie detection.

Sketch Access Effects

We found positive evidence for accessing sketches in the second interview: among participants who sketched and narrated in the first interview, having access to their sketch in the second interview resulted in repeating more action and temporal details compared to not accessing the sketch. This suggests that accessing the sketch helps to a limited extent with recalling some of the information mentioned in a previous interview but does not trigger the reporting

of new information. These findings contradict previous research that showed that accessing self-generated information at recall such as one's notes helps with recalling the content of the notes and also new information about the to-be-recalled event that was not previously noted down (Rickards & Friedman, 1978). Perhaps the type of event that participants had to recall resulted in these contradictory findings. In the present experiment, participants had to recall a larger amount of and more complicated information than in the Rickards and Friedman's experiment. Given the difficulty of this task, access to the sketch may have only made it feasible to remember and repeat sketch content but not to recall new information about the mock mission. Future research can examine the effects of recalling different stimuli or event types on accessing self-generated sketches.

We did not find significant differences between truth tellers and lie tellers depending on whether or not they accessed the sketch. The absence of such an interaction effect shows that the beneficial effect of having access to a sketch in repeating information is true for both truth tellers and lie tellers. We expected accessing sketches to be beneficial for truth tellers more than for lie tellers. Accessing the sketch in the second interview could have possibly elicited larger veracity differences had truth tellers' memory been further strengthened in the first interview by asking for a structured sketch (e.g., a blank sheet of paper that is divided into sections) rather than for a freely generated sketch. Structuring encoded information into headings and subheading involves a generative process in which information becomes more organised and more deeply encoded which makes it more easily accessible at retrieval compared to freely generated, unstructured information (Hope, Eales, et al., 2014; Thorley et al., 2016).

Previous research on note taking has shown enhanced recall when the notes were structured rather than freely generated. In one experiment (Thorley et al., 2016), participants watched a video of a jury trial while making structured notes using the pre-structured trial-ordered notebook (TON) developed by Hope, Eales, et al. (2014), while making freestyle notes on a blank notepad, or while not making any notes (control). The TON was structured into sections relevant to jury trial proceedings (e.g., opening statement, witness 1 account, witness 2 account, prosecution, etc.). Participants were then asked to recall information with half of those who took notes given access to their notes. Making structured notes and having access to them at retrieval enhanced memory performance the most. Thus, a structured sketch similar to the TON or to the timeline technique for example (Hope et al., 2013) in which the sketch may be divided into sections (e.g., persons, locations, actions, etc.) may aid truth tellers' recall (with minimal effects on lie tellers' recall) more than a freely generated sketch. Future research can compare the effects of freely generated and structured sketches on memory recall and on the detection of veracity cues.

Scriptedness as a Cue to Deceit

We explored the variable "scriptedness" that was not previously examined in the deception literature on past events. We found that lie tellers provided more scripted accounts than truth tellers in both interviews. Lie tellers tend to provide basic information that is commonly known and avoid the provision of more complicated or unique experiences to not give their lies away (Vrij, Palena, et al., 2021). Lie tellers also rehearse their accounts (Granhag & Strömwall, 1999; Hartwig et al., 2010; Vrij et al., 2010) which may make them appear more scripted than truth tellers who prefer spontaneity and who report information from memory (see Tables 2 and 3). Given the large effect sizes found for scriptedness, this cue can be added to a set of cues to deceit that have been recently investigated (e.g., common knowledge details, self-handicapping strategies; Vrij, Leal, Mann, et al., 2018) and that indicate deceit rather than truthfulness.

Being able to make a veracity assessment based on a mixture of cues to truthfulness and deceit is beneficial compared to making such a decision on cues to truthfulness alone as sometimes happens in deception research (Vrij, Fisher, & Leal, 2022). First, the brain is set up to detect the presence rather than the absence of signals (Ganis, 2015; Shulman et al., 2001). Assessing deception through cues to truthfulness implies looking for the absence of signals because the absence of cues to truthfulness indicates deceit. Second, someone can be more confident in deciding that someone is lying if, apart from the absence of cues to truthfulness, the account appears to also include cues to deceit.

Limitations and Future Research Implications

We examined only a handful of verbal cues but many other diagnostic verbal cues have been identified in the deception literature. Future research can study these cues, particularly cues to deceit. For example, common knowledge details and self-handicapping strategies have shown promise as cues to deceit, so these cues can be added to the cues examined here. Researchers can also look for other cues that can be assessed in real time on a rating scale (similar to scriptedness) as these have more practical benefits. One such potential cue to deceit could be predictability or how expected an account is. False accounts are likely to be more expected than truthful accounts as the latter would involve more unique experiences.

We examined sketching while narrating as a lie detection tool in an investigative setting. While this technique has been examined in different settings such as eyewitness (Dando, Wilcock, Milne, et al., 2009) and intelligence (Vrij, Leal, Fisher, Mann, et al., 2018) settings, it can also be tested in occupational, insurance, and clinical settings. Also, future research can look at different types of events. We looked at a past event, but the results may differ for future events (i.e., true versus false intentions). Research has shown that sketches that denote a false intention are rated as more abstract than sketches denoting a true intention (Calderon et al., 2018). Future research can also look at different types of lies. The majority of lie tellers in the present experiment used embedded lies, but some reported using omission lies (Table 3). Research on omission lies has only recently started (Leal et al., 2020; Vrij, Fisher, & Leal, 2022). Omission lies are often encountered in forensic interviews, and investigators often ask us to carry out relevant research as lie tellers may tell the truth but hide other critical information. In other words, if lie tellers report only truthful information, how can they be distinguished from truth tellers? The findings on omission lies have so far revealed differences between truth tellers and lie tellers in verbal responses (Leal et al., 2023, 2020), but it remains to be tested if sketching while narrating also elicits similar differences when such lies are reported.

Conclusions

Our results suggest that sketching while narrating is more effective than a free recall for eliciting information in the interview in which it is requested. We also found that access to the sketch in a repeated interview is beneficial for recalling previously reported information but not for the provision of new information or veracity cues. Thus, the benefits of accessing sketches in a subsequent interview are limited when the focus of the interview is on eliciting new information and veracity cues. However, accessing sketches may be helpful when the interviewer wants to confirm previously reported information in the form of repetitions.

We also examined different cues to truthfulness and deceit all of which yielded large veracity effects. Truthfulness cues (PLATO details, complications, and verifiable sources) were positively correlated with truth tellers' strategies and negatively correlated

with lie tellers' strategies, whereas the cue to deceit "scriptedness" showed the opposite pattern. These findings suggest that the strategies employed by truth tellers and lie tellers drive differences in veracity cues. Thus, researchers could develop interview techniques that address these strategies to increase veracity differences and ultimately to make assessing veracity more effective in real life interviews.

Conflict of Interest

The authors of this article declare no conflict of interest.

Note

The data and relevant material are available in the Open Science Framework repository at <https://osf.io/n4vg9/>

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