# Using Specific Model Statements to Elicit Information and Cues to Deceit in Information-Gathering Interviews

Cody Normitta Porter[1], Aldert Vrij[1], Sharon Leal[1], Zarah Vernham[1], Giacomo Salvanelli[1], Niall M[c]Intyre[2]

[1]University of Portsmouth, Department of Psychology, United Kingdom

[2]Ravenswood House, Medium Secure Unit, United Kingdom

Correspondence concerning this manuscript should be addressed to Cody Normitta Porter, Department of Psychology, University of Portsmouth, King Henry I Street, PO1 2DY, Portsmouth, United Kingdom. Email: cody.porter@port.ac.uk.

## Abstract

Model Statements are designed to modify an interviewee's expectation of the amount of details required during an interview. This study examined tailored Model Statements, emphasising either spatial (Spatial-MS), or temporal (Temporal-MS) details, compared to a control condition (no-MS). 126 participants (63 liars, 63 truth-tellers), were randomly allocated to one of three interviewing conditions. Truth-tellers honestly reported a 'spy' mission, whereas liars performed a covert mission and lied about their activities. The Spatial-MS elicited more spatial details than the control, particularly for truth-tellers. The Temporal-MS elicited more temporal details than the control, for truth-tellers and liars combined. Results indicate that the composition of different Model Statements increase the amount of details provided and, regarding spatial details, affect truth-teller's and liar's statements differently. Thus, Model Statements can be constructed to elicit information and magnify cues to deceit.



Model Statement; lie-detection; investigative interviewing; information gathering

## General Audience Summary

A Model Statement (MS) is an audio recorded example of a detailed statement, on an unrelated topic to that of the interview, designed to raise interviewees' expectations of how much information they should convey during an interview. In this experiment, we tested whether the type of detail emphasised in a Model Statement makes interviewees include more of such details within their own accounts. This study included two Model Statement conditions emphasising either spatial details (Spatial-MS) or temporal details (Temporal-MS), which were compared to a control condition without a Model Statement (no-MS). A total of 126 participants (63 liars, 63 truth tellers) were randomly allocated to one of these three Model Statement conditions. Truth tellers honestly reported a 'spy' mission, whereas liars performed a covert mission and lied about their activities. More spatial details were elicited in the Spatial-MS condition than in the control condition, particularly in truth tellers; and more temporal details were elicited in the Temporal-MS condition than in the control condition, particularly in truth tellers. In addition, more truth tellers and liars could be classified correctly based on spatial details in the Spatial-MS condition (81.0%) than in the control condition (61.9%); and more truth tellers and liars could be classified correctly based on temporal details in the Temporal-MS condition (69.0%) than in the control condition (51.9%). Thus, Model Statements can be constructed to elicit specific types of information, hereby magnifying cues to deceit.

# Using Specific Model Statements to Elicit Information and Cues to Deceit in Information-Gathering Interviews

Cues to deceit are typically faint and unreliable (DePaulo et al., 2003; Hartwig & Bond, 2011). As a result of this, researchers have started to design theoretically driven interview protocols aimed at actively eliciting cues to deception (Vrij & Granhag, 2012, 2014). One such manipulation is encouraging interviewees to provide more details (Vrij, Fisher, & Blank, 2015; Vrij, Fisher, Blank, Leal, & Mann, 2015), for example by using a Model Statement (MS). Previous Model Statement research has successfully elicited more information from interviewees (Bogaard, Meijer & Vrij, 2014; Ewens et al., 2016; Leal, Vrij, Warmelink, Vernham, & Fisher, 2015). The aim of the current experiment was to examine the utility of 'tailored' Model Statements (i.e. Model Statements emphasising a specific detail category) as a means of eliciting information about the emphasised category. We also examined whether such Model Statements help differentiate liars from truth tellers.

## Strategic Interviewing

Methods that encourage interviewees to provide more information are based on the theoretical assumption that truthful interviewees do not spontaneously provide all the information they know. Therefore, they require encouragement through the use of specific prompts (Vrij, Hope, & Fisher, 2014). One means of eliciting more detailed statements from truthful interviewees is by administering a Model Statement. A Model Statement is an audio recorded example of a detailed statement, on an unrelated topic to that of the interview, designed to modify the interviewee's expectations of what is required from his/her statement (Leal et al., 2015). Unlike cognitive mnemonics that focus exclusively upon aiding retrieval by exploiting the nature of the memory trace (Fisher & Geiselman, 1992), a Model Statement is built upon a social component to encourage individuals to disclose more information.

Social comparison theory provides a theoretical explanation for the application of a Model Statement to interview settings (Festinger, 1954, see also Cialdini's [1984] social proof). According to social comparison theory, in the absence of objective information, people will compare themselves to others. An assumption of everyday communication is that individuals provide the required quantity of information to their conversation partners (e.g. the Maxim of Quantity; Grice, 1975). Forensic interviews are not everyday exchanges of information and therefore interviewees may not know the appropriate level of details to disclose. Thus, in a forensic interview setting interviewees will use the Model Statement as a point of reference, and if the Model Statement is detailed, they will become more detailed themselves. Hence, research has shown that providing interviewees with a Model Statement containing numerous details causes interviewees to adjust their recall and to incorporate many more details into their own statements (Bogaard et al., 2014; Ewens et al., 2016; Leal et al., 2015).

It is plausible that using a Model Statement will affect liars and truth tellers information management strategies differently (e.g. Granhag & Hartwig, 2008; Hartwig & Granhag, 2010). For liars, disclosing detailed information can be problematic. Liars may lack the imagination to invent details that sounds plausible (Köhnken, 2004; Mann et al., 2013; Leal et al., 2015; Vrij, 2008), and may be reluctant to disclose additional information out of fear that such details may provide leads for investigators to check (Nahari, Vrij, & Fisher, 2014). As a result, liars may be motivated to withhold detailed information from investigators (Colwell et al., 2014; McCornack, 1992). Unlike liars, truth tellers can be forthcoming with information (Hartwig, Granhag, & Strömwall, 2007; Hartwig, Granhag, Strömwall & Doering, 2010) and therefore adopt a 'tell it all' verbal strategy, by freely disclosing detailed information (Hartwig, Granhag & Strömwall 2007; Strömwall et al., 2006; Vrij, Mann, Leal, & Granhag, 2010). Consistent with these different strategies used by truth tellers and liars,

meta-analyses have shown that truth tellers typically provide more details than liars (Amado et al., 2016; DePaulo et al., 2003; Oberlader, Naefgen, Koppehele-Gossel, Quinten, Banse, & Schmidt, 2016).

**Implicit Coaching**

A Model Statement can, in theory, be constructed to incorporate specific types of details. For truth tellers, such details need to be accessible from genuine memory if the Model Statement is to be effective as an information elicitation technique. This will then, at the same time, also distinguish them from liars who are unlikely to have a genuine memory of the events they report, or who may choose to avoid or withhold information.

Reality Monitoring is a verbal content analysis technique (Vrij, 2005, 2008, 2015). It assumes that verbal reports of experienced memories differ in quality from imagined (e.g. fabricated) events (Johnson & Raye, 1981). Memories of real experiences are obtained through perceptual processes and therefore contain perceptual information (e.g. smells, tastes, sounds, visions) and contextual information (e.g. spatial and temporal details; Johnson, Foley, Suengas, & Raye, 1988; Johnson, Hashtroudi, & Lindsay, 1993). Lie detection research has found that verbal differences emerge in Reality Monitoring criteria between truthful and fabricated statements (Alonso-Quecuty, 1992; Alonso-Quecuty, 1996; Manzanero & Diges, 1995). For example, truthful statements contain more spatial and temporal information than deceptive statements (Masip et al., 2005, Sporer, 1997; Vrij, 2000; 2008).

In the current experiment, we examined whether focusing on a specific type of detail within a Model Statement encourages interviewees to provide such information in their subsequent statements. We focused on spatial and temporal details and examined whether a Model Statement containing either large amounts of spatial (or temporal) details encouraged interviewees to include more spatial (or temporal) details in their accounts. Importantly, in this study interviewees were not explicitly instructed to include more spatial or temporal

information in their statements. This was essential because providing explicit information to interviewees about the verbal criteria has been found to reduce the validity and reliability of some veracity tools (e.g. Criteria-based Content Analysis and Reality Monitoring; Caso, Vrij, Mann, & DeLeo, 2006; Gnisci, Caso, & Vrij, 2010; Vrij, Kneller, & Mann, 2000).

Model Statements encourage interviewees to report more information generally (explicit function of the Model Statement), but do not inform interviewees which types of detail to include. Despite this, drawing upon the verbal mimicking (e.g. Chartrand, Maddux, & Lakin, 2005; Chartrand & van Baaren, 2009) and priming (e.g. Blaxton, 1989; Hutchison, 2003; Tulving & Schacter, 1990) literatures, Model Statements may also unconsciously elicit from interviewees the types of detail present in the Model Statement (implicit function of the Model Statement). People often automatically and unconsciously mimic the verbal characteristics of their interaction partners, often described as 'behavioural matching' (Bernieri, & Rosenthal, 1991; Chartrand, & Bargh, 1999) or the 'chameleon effect' (Chartrand, & Bargh, 1999). Such mimicry includes specific words, rate of speech, accent, clauses, emotional valence and sentence grammar (e.g. Duffy & Chartrand, 2015; Hale & Hamilton, 2016; also see Chartrand et al., 2009).

Conceptual priming involves the activation of concepts that are related to the target concept and increases the accessibility of such related information (Blaxton, 1989). Such priming is ostensibly unconscious and takes place outside of an individual's awareness (Blaxton, 1989; Hutchison, 2003; Tulving, & Schacter, 1990). Listening to Model Statement containing lots of spatial information (e.g. 'above', 'adjacent to', 'to the left of') may encourage interviewees to further report spatial information into their own statement (e.g. 'below', 'opposite to', 'to the right of'). Similarly, listening to a Model Statement containing lots of temporal information (e.g. 'firstly, 'after that', '5 minutes later') may encourage

interviewees to further report temporal information within their statement (e.g. 'finally', 'then', 'at '3 o'clock').

We expect this mimicking effect to occur particularly in truth tellers. Since liars are typically unprepared for spatial and temporal details (Lancaster, Vrij, Hope & Waller, 2013; Vrij et al., 2009), they are unlikely to match the number of spatial and temporal details that truth tellers can disclose.

Based on these theoretical assumptions, we predict that participants in the Spatial-MS condition will provide more spatial details than participants in the control condition (MS main effect, Hypothesis 1A), particularly for truth tellers (Veracity X MS interaction effect, Hypothesis 1B). Based on these predictions, we expect classification rates of truth tellers and liars based on spatial details to be higher in the Spatial-MS condition than in the control condition (Hypothesis 1C).

Similarly, the Temporal-MS condition should elicit more temporal details than the control condition (MS main effect, Hypothesis 2A), again this should be particularly noticeable with truth tellers (Veracity X MS interaction effect, Hypothesis 2B). Based on these predictions, we expect classification rates of truth tellers and liars based on temporal details to be higher in the Temporal-MS condition than in the control condition (Hypothesis 2C).

## Method

### Design

A 2 (Veracity: Truth vs. Lie) x 3 (Type of Model Statement: Spatial-MS vs. Temporal-MS vs. No-MS) between-subjects design was used. The dependent variables were spatial, temporal, and perceptual/action details.

### Participants

A total of 126 participants (82 females) aged between 18 and 64 years ($M$ = 21.32 years, $SD$ = 6.54) from the University's undergraduate, postgraduate and staff communities

participated in this study. No difference in age, $t(124) = 0.735$, $p = .464$, or gender, $\chi^2=(1, n= 126) < .001$, $p = .574$, emerged between truth tellers and liars.

**Procedure**

Participants were recruited via the University's online participant pool and posters. When they arrived at the research room, they were presented with an information sheet outlining the study and a consent form. Participants were then randomly allocated to a veracity condition. Truth tellers ($n = 63$) were given a photograph of a female 'target' that they were instructed to spy upon in a nearby café. To avoid suspicion, they were instructed to purchase a drink and to obtain a receipt. Participants were instructed to wait 15 minutes at the café for the target to arrive. If they failed to find the target (she never arrived), they were to return to the experimenter and to report their mission in a subsequent interview. They were instructed to report what they remembered from their mission. They were told that if they failed to be convincing during the interview, they would be asked to hand write their statement (this would never actually occur).

Liars ($n = 63$) were instructed to go on a covert mission to obtain a concealed USB stick containing confidential information. It was stressed the data on the USB was sensitive and that they must not be seen with the USB. Upon returning, it was explained to them that they would be interviewed, and must convince the interviewer that they had nothing to do with the USB theft. Participants were told that if they failed to do so they would be asked to hand write their statement (again, this would never occur). To this end, they were provided with an alibi – the activities carried out by the truth tellers – and instructed to use it in the interview. For this purpose, they were given bullet points from the truth teller task indicating i) target description, ii) location details, (iii) the approximate time spent at the location, (iv) to assume that the target never arrived, and v) details of any items purchased (to avoid

suspicion). Liars were allowed to freely disclose additional details that could encourage the interviewer to believe them.

Participants were then provided with as much preparation time as they required. A significant difference emerged between accepting time to prepare, $\chi^2 = (1, n = 126) = 83.327$, $p = <0.001$, Cramer's $V = .813$ (which corresponds to a large effect size, Cohen, 1988), with the majority of truth tellers ($n = 54/63$) *declining* preparation time and the vast majority of liars ($n=60/63$) *accepting* preparation time. Furthermore, for those who decided to prepare themselves, no significant difference emerged between truth tellers ($M = 439.33$ seconds, $SD = 148.55$, 95% CI [341.38, 527.62]) and liars ($M = 386.28$ seconds, $SD = 152.50$, 95% CI [348.86, 423.76]) for the duration of preparation, $t(67) = .976$, $p = .408$, $d = 0.35$, 95% CI [.37, 1.03].

After accepting or rejecting preparation time, participants were provided with a pre-interview questionnaire that requested demographic information such as age, gender and occupation. Upon completion of the questionnaire, all participants were taken to another room for the interview and informed that the interviews would be audio recorded. Participants were randomly allocated to one of three conditions where they were provided with (i) no Model Statement ($n = 42$); a Model Statement emphasising spatial details ($n = 42$); or a (iii) Model Statement emphasising temporal details ($n = 42$). In all conditions the participant were asked just one question: "Please could you tell me, in as much detail as you possibly can, everything that happened between the time you left the experimenter next door and the time you returned back to her. Don't worry about repeating yourself and just focus on telling me everything. I will not ask you any further questions so please tell me everything you remember". The only difference between the Model Statement conditions and the Control condition is that the Model Statement conditions included the following sentence

before the interview question: “As you could hear, the person in the Model Statement included a lot of details about a lot of different things”.

**Model Statement Conditions**

The Model Statements were of equal length and all addressed the same topic (a visit to a fomula-2 track race). Both Model Statements were narrated by a 28 year old male from the Psychology department, and contained a recall about a race day event. The Model Statements were derived from Leal and colleagues (2015). Each Model Statement differed from the original script to some extent to allow for specific details (spatial or temporal) to be emphasised. For clarity, extracts of the Model Statements are included below with spatial details in bold and temporal details underlined. First, the Spatial-MS emphasised the amount of spatial details contained within the statement.

*That was actually when the marshals' began to request clearing **of** the grid, so that the drivers could go **out** for their warm up lap which started off **to** the **left**, **next to** the exit bit. As we began walking **down** the **centre towards** the exit, you have to head **towards** the pole position car so, **right** back at the **start** of the grid, and then as we started to walk **up** there the pit girls filter **in** from the **left** and **right** side…*

Second, the Temporal-MS condition emphasised the amount of temporal details contained within the statement.

*This was actually just before half 12 when the marshals' began to request clearing **of** the grid so that the drivers could go out for their 15 minutes warm up lap and then the race could begin after that. So we began walking **towards** the exit, which is a few minutes' walk away, and then we waited for the others to catch up, at the same time the pit girls filter **in** quickly from each side…*

After the interview, a post-interview questionnaire was provided, which gathered information on motivation (‘To what extent did you feel motivated to appear convincing

during your interview'; 7-point Likert scale '1- not at all' to '7- completely'); confidence ('How confident do you feel that you were believed by the interviewer'; 7-point Likert scale '1- not at all' to '7- completely'); truthfulness ('To what extent did you tell the truth during your statement'; percentage scale ranging from 0% to 100%), and likelihood of handwriting their statement ('What did you think was the likelihood of having to handwrite your statement'; 7-point Likert scale '1- not at all' to '7- completely').

Participants in the Model Statement conditions were informed that the Model Statement they heard contained different types of details and were also given examples of such details. They were then asked to rate the extent to which the information they heard in the Model Statement contained (1) *Spatial* details (e.g. 'the keys were **on** the table'), and (2) *Temporal* details (e.g. '**then** the **next** stage **started**'). Responses were indicated on a 7-point Likert scale ('1- none at all' to '7- a great deal').

Those in the Model Statement conditions also had to answer a series of four multiple choice questions about the content of the Model Statement to check whether they had listened to the Model Statement. For example; 'Please circle two of the following, which you heard during the Model Statement recording: (a) Kath the marketing director took a photo, (b) two cars collide, it was loud, (c) Tom owned the vehicle, the person recalling the event gave him a thumbs up, (d) Jason owned the vehicle, the person recalling the event gave him a thumbs up, (e) there was an ice-cream truck where cold drinks could be purchased. (Answers [a] and [c] are correct.)

Finally, participants were asked if they prepared a strategy for the interview and if so to elaborate on this. After completing the questionnaire, participants were debriefed, thanked and compensated for their time.

**Coding**

All statements were rated by one coder (blind to the experimental conditions) who scored the occurrence of: i) spatial details, ii) temporal details, iii) perceptual details, and iv) action details. Spatial and temporal details have been introduced above; perceptual details relate to information about what was seen, heard, felt, tasted, and smelt during the described activities (e.g. 'I saw the *woman* who then started to *scream*'); and action details relate to information that explicitly describes an action or the process of actions performed by the interviewee (e.g. 'I *walked* towards the café').

A second coder (also blind to the experimental conditions) coded a random selection of 34 statements (20%). Inter-rater reliabilities between the two coders for the occurrence of details were measured via intra-class correlation coefficients (ICC). The ICC's were satisfactory for spatial details [ICC] = .864, temporal details [ICC] = .853, perceptual details [ICC] = .898, and action details [ICC] = .903. Action details (details about other's or one's own activities) are not included in Reality Monitoring's coding scheme (Memon, Fraser, Colwell, Odinot & Mastroberardino, 2010; Vrij, 2008; Vrij, 2015), but depict sensory information. We therefore merged perceptual and action details into one category: Perceptual details.

One coder read all the strategies reported by the participants and designed a coding scheme system based on these answers. A total of 20 separate answer categories emerged. A second coder, after being informed about the coding scheme, was given a sample of 36 participant responses to code and place into the appropriate category. The inter-rater reliability between the two coders was good, Kappa = 0.81, 95% CI [0.66, 0.94] ($p < .001$).

## Results

### Analysis Plan

We report the effect size for each ANOVA using Cohen's *f*, $f = \sqrt{[\eta p^2/(1- \eta p^2)]}$, for Model Statement conditions, and we used Cohen's *d* for all other contrasts, as recommended by Lakens (2013) and Cohen (1988).

**Supplementary Analysis**

For additional analysis of veracity manipulation check, tests of motivation, Model Statement manipulation check, and information manipulation check, see the supplementary analysis section. We provide a verbal description of these results in this section. Truth tellers reported that they predominantly spoke the truth (96.35% truthful), whereas liars reported that they predominantly lied (6.83% truthful). The participants were highly motivated to appear convincing during the interview ($M$ = 5.98 on a 7-point Likert scale), with no differences emerging between truth tellers and liars. Truth tellers thought more than liars that they would be believed by the interviewer and liars thought more than truth tellers that they would be asked to produce a handwritten statement.

Participants paid sufficient attention to the Model Statement and answered most multiple choice questions about them correctly. No difference emerged between truth tellers and liars or between Model Statement conditions. Truth tellers said more than liars (in terms of number of words) and participants in the Spatial-MS condition said more than those in the control condition.

**Perceived Model Statement Content**

**Spatial details.** A 2 (Veracity: Truth vs. Lie) X 2 (Type of Model Statement:; Spatial-MS vs. Temporal-MS) ANOVA comparing the occurrence of spatial details subjectively noticed in the two experimental Model Statement conditions revealed no effect of Veracity, Type of Model Statement, or Veracity x Type of Model Statement (all $F$'s < 0.21, all $p$'s > .548). This indicates that participants were unaware of the differences in spatial details included in the different Model Statements.

**Temporal details.** A 2 (Veracity) X 2 (Type of Model Statement) ANOVA comparing the occurrence of temporal details subjectively noticed in the two experimental Model Statement conditions revealed no effect of Veracity, Type of Model Statement, or

Veracity x Type of Model Statement (all $F$'s < 2.11, all $p$'s > .150). This indicates that participants were unaware of the differences in temporal details included in the different Model Statements.

**Additional sample.** To investigate the possibility that participant's awareness of the emphasised Model Statement content was attenuated by the delay between receiving the instruction (at the interview outset) and providing ratings (in the post-interview questionnaire), we tested an *additional* sample of participants who rated the occurrence of details immediately after hearing the Model Statement.

A total of 40 participants, who had not previously taken part in a Model Statement study, listened to either a Spatial-MS or Temporal-MS and rated the occurrence of details they heard. Two one-way ANOVAs with Model Statement (Spatial-MS vs. Temporal-MS) as a factor revealed no difference between the rating of spatial details, $F(1, 39) = 1.86$, $p = .181$, $f = 0.22$, or temporal details, $F(1, 39) = 1.04$, $p = .314$, $f = 0.16$, between the two Model Statement conditions. This again indicates that participants were unaware of the differences in spatial and temporal details included in the different Model Statements.

**Hypothesis Testing**

Insert Table 1 about here

**Frequency of spatial details.** For *Ms*, *SD*s and CIs in the six experimental cells, see Table 1. A 2 (Veracity: Truth vs. Lie) X 3 (Model Statement: Spatial-MS vs. Temporal-MS vs. No-MS) ANOVA with spatial details as the dependent variable revealed a significant main effect for Veracity, $F(1, 120) = 27.38$, $p < .001$, $d = 0.84$, 95% CI [0.46, 1.19]. Truth tellers ($M = 26.62$, $SD = 21.12$, 95% CI [22.78, 30.45]) reported more spatial details within their statement than liars ($M = 12.29$, $SD = 11.70$, 95% CI [8.45, 16.12]).

A main effect for Model Statement also emerged, $F(1, 120) = 11.01$, $p < .001$, $f = 0.70$. Tukey Post Hoc tests (see Table 1) revealed that participants in the Spatial-MS

condition provided more spatial details than participants in the Temporal-MS condition, $p$ = .023 and the No-MS condition, $p < .001$. The latter comparison supports Hypothesis 1A. No difference emerged between the Temporal-MS and control condition, $p = .115$.

An interaction effect for Veracity X Type of Model Statement was found, $F(1, 120) = 5.40$, $p = .003$, $f = 0.21$. We examined the data for truth tellers and liars separately. For truth tellers, a significant Type of Model Statement effect occurred, $F(2, 60) = 10.64$, $p < .001$, $f = 0.60$. Tukey Post Hoc tests (see Table 1) revealed that truth tellers reported more spatial details in the Spatial-MS condition than in the Temporal-MS condition, $p = .006$ or control condition, $p < .001$. No significant effects emerged between the Temporal-MS and control condition, $p = .416$. For liars, the Type of Model Statement effect was not significant, $F(2, 60) = 1.95$, $p = .151$, $f = 0.25$. In Hypothesis 1B, we were particularly interested in the difference between the Spatial-MS and control condition; therefore, we conducted Tukey Post Hoc tests despite the absence of a significant main effect. The Spatial-MS versus the control condition comparison was not significant, $p = .229$, and neither were any of the other contrasts, all $p$'s > .194. Thus, more spatial details were elicited in the Spatial-MS condition than in the control condition, particularly in truth tellers. This supports Hypothesis 1B.

**Frequency of temporal details.** A 2 (Veracity) X 3 (Type of Model Statement) ANOVA with the frequency of temporal details as the dependent variable revealed a significant main effect for Veracity, $F(1, 120) = 24.71$, $p < .001$, $d = 0.84$, 95% CI [0.43. 1.16]). Truth tellers ($M = 14.21$, $SD = 8.64$, 95% CI [12.41, 16.00]) reported more temporal details within their statement than liars ($M = 7.83$, $SD = 6.33$, 95% CI [6.03, 9.62]).

A significant main effect for Type of Model Statement also emerged, $F(1, 120) = 7.85$, $p = .001$, $f = 0.26$. Tukey Post Hoc tests (see Table 1) revealed that participants in the Spatial-MS condition reported more temporal details than those in the control condition, $p = .001$. Participants in the Temporal-MS condition also reported more temporal details than

those in the control condition, $p = .011$, supporting Hypothesis 2A. The Spatial-MS and Temporal-MS conditions resulted in similar levels of temporal details, $p = .683$.

There was no significant interaction effect for Veracity X Type of Model Statement, $F(1, 120) = 0.68$, $p = .507$, $f = 0.08$. However, as we predicted a directional effect with specific group differences based on theory and research, a more informative test of Hypothesis 2B is to statistically test for significant differences between the conditions for truth tellers and liars separately and to compare the two effect sizes to understand the magnitude of differences (e.g. Nahari & Ben-Shakhar, 2011; Shaw et al., 2015; Vrij et al., 2017; for a review on the importance of effect sizes compared with significant effects, see du Prel, Hommel, Röhrig, and Blettner [2009], and Fritz, Morris, and Richler [2012]). For truth tellers, a significant Type of Model Statement effect occurred, $F(2, 60) = 5.04$, $p = .005$, $f = 0.41$. Tukey Post Hoc tests (see Table 1) revealed that truth tellers in the Spatial-MS condition reported more temporal details than those in the control, $p = .008$. Truth tellers in the Temporal-MS condition reported more temporal details than those in the control condition, one-sided $p = .043$. No significant effects emerged between the Spatial-MS and Temporal-MS conditions, $p = .624$. For liars, the Type of Model Statement effect was not significant, $F(2, 60) = 2.91$, $p = .062$, $f = 0.31$. In Hypothesis 2B, we were particularly interested in the difference between the Temporal-MS and control condition, and therefore we conducted Tukey Post Hoc tests despite the absence of a significant main effect. The Temporal MS versus control condition contrast was not significant, $p = .119$ (neither were the other contrasts, both $p$'s $> .086$). Thus, more temporal details were elicited in the Temporal-MS condition than in the control condition, particularly in truth tellers. This supports Hypothesis 2B.

**Additional analyses**

**Frequency of Perceptual details (including action details).** A 2 (Veracity) x 3 (Type of Model Statement) ANOVA with the frequency of perceptual details (including action details) as the dependent variable revealed a significant main effect for Veracity, $F(1, 120) = 24.32$, $p < .001$, $d = 0.79$, 95% CI [0.38, 1.10]). Truth tellers ($M = 60.97$, $SD = 40.93$, 95% CI [53.32, 68.62]) reported more perceptual details than liars ($M = 34.02$, $SD = 26.00$, 95% CI [26.36, 41.67]).

A significant main effect for Type of Model Statement also emerged, $F(2, 120) = 13.89$, $p < .001$, $f = 0.48$. Tukey Post Hoc tests (see Table 1) revealed that participants in the Spatial-MS condition reported more perceptual details than those in the Temporal-MS condition, $p = .016$ and the control condition, $p < .001$. Participants in the Temporal-MS condition reported significantly more perceptual details than those in the control condition, $p = .040$.

A significant Veracity X Type of Model Statement interaction effect was found, $F(2, 120) = 3.56$, $p = .032$, $f = 0.24$. We examined the data for truth tellers and liars separately. For truth tellers, a significant Type of Model Statement effect occurred, $F(2, 60) = 11.42$, $p < .001$, $f = 0.62$. Tukey Post Hoc tests (see Table 1) revealed that truth tellers in the Spatial-MS condition reported more perceptual details than those in the Temporal-MS condition, $p = .009$ , and the control condition, $p < .001$. No significant effects emerged between the Temporal-MS and control conditions, $p = .229$. For liars, the Type of Model Statement effect was significant, $F(2, 60) = 3.35$, $p = .042$, $f = 0.33$. Liars in the Spatial-MS condition reported more perceptual details than those in the control condition, $p = .043$. No other effects were found, all *p's* > .142.

**Classification rates**

We examined the extent to which the dependent variables (spatial, temporal, and perceptual details) could discriminate between truth tellers and liars in the (i) Spatial-MS, (ii)

Temporal-MS, and (iii) No-MS [control] conditions by running discriminant analyses. We cross-validated the data by reporting the 'leave-one-out' classification data. In all cases, Veracity was the classifying variable. All statistical information is provided in Table 2. Table 1 provides the *d*-effects for the Veracity effects in each of the three conditions.

Table 2 about here

In Table 2, particularly interesting for Hypotheses 1C and 2C, are the comparisons between the Spatial-MS and Temporal-MS conditions with the No-MS condition regarding spatial and temporal details. As Table 2 shows, in the Spatial-MS condition more truth tellers and liars were classified correctly based on spatial details (81.0%) than in the No-MS condition (61.9%), supporting Hypothesis 1C. In addition, in the Temporal-MS condition more truth tellers and liars were classified correctly based on temporal details (69.0%) than in the No-MS condition (57.1%), supporting Hypothesis 2C. These findings reflect the effect sizes, see Table 1. For spatial details, the effect size was larger in the Spatial-MS condition ($d$ = 1.41) than in the control condition ($d$ = 0.73)**.** For temporal details the effect size was larger in the Temporal-MS condition ($d$ = 0.95) than in the control condition ($d$ = 0.67). Table 2 further shows that the three lowest accuracy rates were obtained in the No-MS condition, providing further evidence that a Model Statement facilitates lie detection.

**Strategies Developed**

We analysed whether or not participants reported preparing a verbal strategy for use during the interview. A significant difference emerged between Veracity conditions for preparing an interview strategy with more liars ($n$= 37/63, 58.73%) than truth tellers (13/63, 30.6%) reporting to have implemented a strategy, $\chi^2$= (1, $n$ = 126) = 19.20, $p$ <.001, Cramer's $V$= .389.

Out of 20 strategies reported, twelve were related to the two factors we were interested in; the amount of information disclosed and the ways in which interviewees could

do this. Liars widely differed in the strategies they reported to use during the interview, but the three most popular strategies reported by liars were to 'provide spontaneous answers' (15.70%), 'rehearse a story' (10.00%), and 'report minimal details' (8.60%). Truth tellers overwhelmingly reported using the 'just tell the truth' strategy (76.20%).

## Discussion

The current study demonstrated that Model Statements emphasising a specific category of details can induce interviewees to include such information in their own statements: Participants who were exposed to the Spatial-Model Statement provided more spatial details than participants in the control (No-MS) condition, and participants who were exposed to the Temporal-Model Statement provided more temporal details than participants in the control (No-MS) condition.

Our data showed that the Model Statement facilitated the elicitation of a specific category of details emphasised within the Model Statements, without interviewees being aware that such information was included in the Model Statement. Importantly, eliciting specific information implicitly, rather than explicitly, is useful because interviewers may not wish to disclose the exact nature of the information they seek.

We further examined whether the introduction of these Model Statements facilitated lie detection. We found that it did. More substantial differences between truth tellers and liars emerged in the Spatial-MS condition than in the control condition when the classifications were based on spatial details. Similarly, more substantial differences between truth tellers and liars emerged in the Temporal-MS condition than in the control condition when the classifications were based on temporal details. Interestingly, this is the first experiment in which the use of a Model Statement not only facilitated the elicitation of information, but also enhanced the ability to discriminate between truth tellers and liars. In previous studies in which 'total details' was the dependent variable, a Model Statement only facilitated eliciting

information (Bogaard et al., 2014; Ewens et al., 2016; Leal et al., 2015). We cannot explain why a Model Statement resulted in better lie detection in this experiment and not in the previous studies, but from a theoretical perspective, it could be the result of the unconscious nature of verbal mimicking (Chartrand et al., 2005; Chartrand et al., 2009; Lakin, Jefferis, Cheng, & Chartrand, 2003) or priming (Blaxton, 1989; Hutchison, 2003; Tulving et al., 1990). A Model Statement makes both truth tellers and liars aware that they need to provide more details and both groups appear to do this to the same extent. Truth tellers and liars do not seem to be aware of the type of details that are included in the Model Statements and appear to respond to this more implicit message differently.

The effects for the Spatial-MS in particular were not limited to spatial details. Truth tellers in the Spatial-MS condition reported more temporal and perceptual/action details than truth tellers in the control condition. We did not find a similar effect for temporal details, as truth tellers in the Temporal-MS did not provide more spatial and perceptual/action details than those in the control condition. We can only speculate as to why the Spatial-MS also elicited more temporal and perceptual/action details in truth tellers. One possibility is that spatial information is closely associated in memory with perceptual and temporal information. In other words, spatial information may have functioned as an effective general retrieval cue, enhancing retrieval of other types of details. Future research should explore this possibility. Another explanation is that in the scenario we used participants lacked sufficient temporal information they could report (floor effect). As Table 1 shows, the number of temporal details reported by participants was lower than the number of spatial and perceptual details reported by them.

**Practical Application**

The current study demonstrated that the composition of Model Statements affects the verbal behaviour of interviewees. This suggests that the optimal Model Statement to utilise

depends in part on the interview's objective. In applied settings where spatial information is required, a Spatial-MS may be the optimal selection. For example, if investigators require detailed information about layouts of buildings, including entrance and exit points, then a Spatial-MS may be useful. If the aim is to find the sequence of events leading up to a key event, a Temporal-MS may be most effective. In sum, Model Statements could be part of an investigator's general 'tool kit' to be deployed according to the specific objectives of the interview in question. The notion that an investigator can influence the type of details an interviewee will report without an interviewee being aware of it is interesting, particularly if this also applies to other types of details that investigators may require, such as affective information or action details. Future research could examine this.

## Conclusion

In conclusion, this research extends the existing literature in two critical respects. First, the results indicate that the composition of a Model Statement affects the verbal behaviour of interviewees. In each case, the provision of a certain type of details in a Model Statement resulted in interviewees reporting more of these details in their statement. Second, the administered Model Statement affected truth tellers and liars differently, facilitating lie detection. Thus, the current findings support the hypothesis that a Model Statement elicits additional information and facilitates lie detection.

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**Table 1.** *Spatial, Temporal and Perceptual (with action) details reported for the type of Model Statement, as a function of Veracity.*

| | **Spatial-MS** | | | **Temporal-MS** | | | **No-MS** | | |
|---|---|---|---|---|---|---|---|---|---|
| | M | SD | CI | M | SD | CI | M | SD | CI |
| **Spatial details** | | | | | | | | | |
| Truth | **41.19**[b] | 25.09 | [34.55, 47.83] | **22.95**[a] | 14.44 | [16.31, 29.60] | **15.71**[a] | 13.49 | [9.07, 22.36] |
| Lie | 14.14 | 10.33 | [7.50, 20.79] | 14.48 | 16.19 | [7.83, 21.12] | 8.24 | 5.42 | [1.60, 14.88] |
| Mean | **27.67** [b] | 23.38 | [22.97, 32. 36] | **18.71**[a] | 15.75 | [14.02, 23.41] | **11.98** [a] | 10.83 | [7.28, 16.67] |
| | **Cohen's *d* = 1.41, 95% CI [.66, 1.99]** | | | Cohen's *d* = 0.55, 95% CI -[.10, 1.13] | | | **Cohen's *d* = 0.73, 95% CI [.06, 1.33]** | | |
| **Temporal details** | | | | | | | | | |
| Truth | **17.57**[b] | 7.86 | [14.46, 20.68] | **15.24**[a] | 7.33 | [12.13, 18.35] | **9.81**[a] | 9.10 | [6.70, 12.92] |
| Lie | 9.29 | 8.19 | [6.17, 12.40] | 9.00 | 5.74 | [5.89, 12.11] | 5.19 | 3.63 | [2.08, 8.30] |
| Mean | 1**3.43**[b] | 8.97 | [11.23, 15.63] | **12.12** [b] | 7.23 | [9.92, 14.32] | **7.50** [a] | 7.23 | [5.30, 9.70] |
| | **Cohen's *d* = 1.03, 95% CI [.33, 1.61]** | | | **Cohen's *d* = 0.95, 95% CI [.26, 1.53]** | | | **Cohen's *d* = 0.67, 95% CI [.01, 1.25]** | | |
| **Perceptual details (including action)** | | | | | | | | | |
| Truth | **89.24** [b] | 47.25 | [75.99, 102.49] | **55.90** [a] | 28.39 | [42.65, 69.16] | **37.76** [a] | 26.87 | [24.51, 51.02] |
| Lie | **41.76** [b] | 31.01 | [28.51, 55.02] | **37.57** [ab] | 28.66 | [24.32, 50.83] | **22.71** [a] | 10.07 | [9.46, 35.97] |
| Mean | **65.50** [c] | 47.17 | [56.13, 74.87] | **46.74** [b] | 29.66 | [37.37, 56.11] | **30.24** [a] | 21.44 | [20.87, 39.61] |

| | | |
|---|---|---|
| **Cohen's *d* = 1.19, 95% CI [.47, 1.77]** | **Cohen's *d* = 0.64, 95% CI [-.01, 1.22]** | **Cohen's *d* = 0.74, 95% CI [.07, 1.32]** |

**Bold total scores** refer to a significant Model Statement main effect, whereby the $^{abc}$ superscripts explain the significant ($p < .050$) differences between Model Statement cells (only cells with different superscripts differ significantly from each other). Bold *d*-scores refer to significant ($p < .050$) differences between truth tellers and liars in the specific Model Statement condition.

Table 2. *Accuracy Rates for the frequency of Spatial, Temporal, and Perceptual Details as a Function of Type of Model Statement.*

| | Accuracy rate | | | Wilks Lamba | Chi square | P value | F value |
|---|---|---|---|---|---|---|---|
| | Truths (%) | Lies (%) | Total (%) | | | | |
| *Spatial Model Statement* | | | | | | | |
| **Spatial details** | **71.4** | **90.5** | **81.0** | **.657** | **16.582** | **<.001*** ** | **20.865** |
| **Temporal details** | **66.7** | **71.4** | **69.0** | **.781** | **9.741** | **.002** ** | **11.187** |
| **Perceptual details** | **57.1** | **85.7** | **71.4** | **.741** | **11.837** | **.001** ** | **13.977** |
| *Temporal Model Statement* | | | | | | | |
| Spatial details | 52.4 | 85.7 | 69.0 | .926 | 3.044 | .081 | 3.205 |
| **Temporal details** | **57.1** | **81.0** | **69.0** | **.809** | **8.359** | **.004** ** | **9.427** |
| **Perceptual details** | **57.1** | **90.5** | **73.8** | **.902** | **4.084** | **.043*** | **4.357** |
| *No Model Statement* | | | | | | | |
| **Spatial details** | **47.6** | **76.2** | **61.9** | **.878** | **5.136** | **.023*** | **5.555** |
| **Temporal details** | **38.1** | **76.2** | **57.1** | **.895** | **4.362** | **.037*** | **4.671** |
| **Perceptual details** | **42.9** | **81.0** | **61.9** | **.876** | **5.225** | **.022*** | **5.657** |

*Note:* Accuracy rates from significant discriminant function appear in *** .050, ** .010, *** .001**

Appendix 1

**Spatial Model Statement**

"I would like you to explain to me why you were filming on the grid area at formula 2 last Saturday. Please can you describe in as much details as possible why you were there and everything that happened from the moment you stepped onto the grid to the moment you left it? Please include all details you remember no matter how insignificant they may seem"

So I walked back towards Tom's car, I then gave him the thumbs up to wish him the best of luck and actually I was only 5 minutes or well more like 10 minutes left on the grid, as of course the race begins at a certain time, stopped and had a picture with his pit girl – she's the girl at the front of his car, stood facing forward with his name board. So I had a picture taken by Kath who's our marketing director, she walked over from the centre of the grid, it only took a few seconds. That was actually when the marshals' began to request clearing of the grid, so that the drivers could go out for their warm up lap which started off to the left, next to the exit bit. As we began walking down the centre towards the exit, you have to head towards the pole position car so, right back at the start of the grid, and then as we started to walk up there the pit girls filter in from the left and right side one by one into a very neat little line in the middle. As they go past, the pit girls lead everyone else off the grid so that they go out to the right hand side [er…ah] alongside the pit wall and they filter back down into the hospitality area. So, we followed them the whole way around until I left he grid. So that's my brief time on the grid at formula 2 in as much details as I can recall.

Appendix 2

**Temporal Model Statement**

"I would like you to explain to me why you were filming on the grid area at formula 2 last Saturday. Please can you describe in as much details as possible why you were there and everything that happened from the moment you stepped onto the grid to the moment you left it? Please include all details you remember no matter how insignificant they may seem"

I waited around for a bit and then went back towards Toms vehicle, we only had about 5 minutes or well more like 10 minutes left on the grid at this point as of course the race begins at a certain time. So I walked towards Tom's car and then gave him the thumbs up to wish him the best of luck and actually at that point had a picture with his pit girl – she's the girl at the front of his car, with his name board. So, after that I had another picture taken by Kath who's our marketing director. It only took a few seconds. This was actually just before half 12 when the marshals' began to request clearing of the grid so that the drivers could go out for their 15 minute warm up lap and then the race could begin after that. So we began walking towards the exit, which is a few minutes' walk away, and then we waited for the others to catch up, at the same time the pit girls filter in quickly from each side, in [ah] into a very neat line. As they go past, they firstly lead everyone else off the grid and then they go to the right hand side [umm] alongside the pit wall and they filter into the hospitality area. So at that point we followed them around the grid for about 10 minutes before leaving. So, that's my brief time last Saturday in as much details as I can recall, it was a fun couple of hours.

## Supplementary Material

### Manipulation checks

**Veracity manipulation check.** A 2 (Veracity) x 3 (Type of Model Statement) analysis of variance (ANOVA) revealed a significant main effect for Veracity, $F(1, 120) = 1894.56$, $p < .001$, $d = 7.83$, 95% CI [6.39, 8.34]) with truth tellers reporting their overall truthfulness as significantly higher ($M$= 96.35%, $SD$= 11.68, 95% CI [93.47, 99.23]) than liars ($M$ = 6.83%, $SD$ = 11.19, 95% CI [3.95, 9.71]). The type of Model Statement main effect and the Veracity X Type of Model Statement interaction effect were not significant, both $F's < 0.76$ both $p's > .472$.

**Motivation scores.** Overall, the participants were highly motivated to appear convincing to the interviewer *(*$M$ = 5.98, $SD$ = 1.08, 95% CI [5.80, 6.17]), on a 7-point Likert scale. A 2 (Veracity) X 3 (Type of Model Statement) ANOVA revealed no significant main effects or interaction effect, all $F's < 2.52$, all $p's > .840$.

**Likelihood of being believed.** A 2 (Veracity) X 3 (Type of Model Statement) ANOVA revealed a significant main effect for Veracity, $F(1, 120) = 48.11$, $p < .001$, $d$ = 0.95, 95% CI [0.53, 1.26]), with truth tellers ($M$ = 5.24, $SD$ = 1.23, 95% CI [5.24, 5.90]) thinking that the interviewer believed them more than liars ($M$ = 4.00, $SD$ = 1.38, 95% CI [3.63, 4.20]). The Type of Model Statement main effect and Veracity X Type of Model Statement interaction effect were not significant, both $F's <.1.54$, both $p's > .219$.

**Likelihood of handwriting the statement.** A 2 (Veracity) X 4 (Type of Model Statement) ANOVA revealed a significant main effect for Veracity, $F(1, 120) = 45.34$, $p < .001$, $d = 1.21$, 95% CI [0.76, 1.52]). Liars were more inclined to believe that they would be asked to handwrite their statements ($M$ = 4.52, $SD$ = 1.79, 95% CI [4.12, 4.93]) than truth tellers ($M$ = 2.57, $SD$ = 1.41, 95% CI [2.17, 3.00]). The Type of Model Statement main effect

and Veracity X Type of Model Statement interaction effect were not significant, both *F's* <.68, both *p's* > .507.

**Model Statement manipulation checks**

**Participant attention.** Participants were asked to answer a series of four multiple choice questions about the Model Statement content and '8' was the highest possible score (all answers correct). The grand mean was reasonably high (*M* = 5.79*, SD* = 1.41), indicating that the participants paid attention to the Model Statement, and were able to answer most multiple choice questions correctly. A 2 (Veracity) x 2 (Type of Model Statement) ANOVA revealed no significant main effects for Veracity, Type of Model Statement, or Veracity X Type of Model Statement, all *F's* < .58, all *p's* > .449. Therefore, participants reported paying equal attention to the different Model Statements.

**Information Manipulation Check**

**Number of words.** On average, participants spoke 262.53 words (*SD* = 205.75, 95% CI [230.03, 295.04]). A 2 (Veracity) x 3 (Type of Model Statement) ANOVA revealed a significant main effect for Veracity, $F(1, 120) = 13.26$, $p < .001$, $d = 0.61$, 95% CI [0.21, 0.93]), with truth tellers (*M* = 322.32, *SD* = 232.82, 95% CI [276.35, 368.29]) using more words than liars (*M* = 202.75, *SD* = 154.54, 95% CI [156.78, 248.71]).

Additionally, a main effect for Type of Model Statement was found, $F(2, 120) = 10.52$, $p < .001$, $f = 0.42$. Tukey Post Hoc test revealed that participants in the Spatial-MS condition (*M* = 354.74, *SD* = 224.33, 95% CI [298.44, 411.04]) used more words than those in the No-MS condition (*M* = 170.26, *SD* = 153.87, 95% CI [113.96, 226.56]), $p < .001$. No other comparisons were significant, all *p's* > .060. The Veracity X Type of Model Statement interaction effect was not significant, $F = 0.76$, $p = .470$. As there was no interaction effect, word count was not included as a covariate in further analyses.