

Original Paper

Verbal Veracity Indicators and the Efficacy of Countermeasures in Three Non-WEIRD Populations

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Abstract

Practitioners ask whether verbal veracity cues are (i) diagnostic across populations and (ii) resistant to countermeasures. We examined this by merging the three datasets reported by Vrij, Leal et al. (2020, 2022).

Participants from Lebanon (n = 187), Mexico (n = 205) and South-Korea (n = 239) discussed a city-trip they had made (truth tellers, n = 328) or made up a story (lie tellers, n = 303) about such a trip. Some participants (n = 325) were informed about the relation between deception and complications, common knowledge details and self-handicapping strategies (informed participants), whereas others were not (uninformed participants). The dependent variables were total details, complications, common knowledge details, self-handicapping strategies and plausibility.

All five variables discriminated truth tellers from lie tellers, but particularly complications and plausibility. These cues were diagnostic veracity indicators across different populations and remained diagnostic when we compared informed lie tellers with uninformed truth tellers.

Keywords

deception, countermeasures, non-WEIRD population, complications, plausibility

1. Introduction

In our discussions with practitioners about verbal veracity cues, two questions frequently arise: Are these cues diagnostic across populations? And are they resistant to countermeasures (i.e., can lie tellers who are informed about these cues produce statements that sound like truth tellers' statements)? These questions refer to a gap in the verbal deception literature: Verbal veracity cues are typically examined

with participants belonging to WEIRD cultures, but these participants do not represent the world population; lie tellers prepare themselves for interviews, which may include searching the internet for verbal veracity cues practitioners pay attention to. Vrij and colleagues carried out three countermeasures experiments with non-WEIRD participants from Lebanon, Mexico and South Korea in which they examined five verbal cues (complications, common knowledge details, self-handicapping strategies, total details and plausibility) (Vrij, Leal et al., 2020; Vrij, Leal et al., 2022). However, they did not report the differences between the three countries, as happened in this article after merging the three data sets.

1.1 Complications, Common Knowledge Details, Self-Handicapping Strategies, Total Details and Plausibility

A complication is an occurrence that affects the story-teller and makes the statement more complex (Vrij, Mann et al., 2021) (“During our visit to London, we also visited friends who live not far from London”). In a recent meta-analysis (Vrij, Palena et al., 2021), complications emerged as a diagnostic veracity cue ($d = .58$), with truth tellers reporting more complications than lie tellers. There are at least two explanations for this finding. First, lie tellers prefer to keep their stories simple (Hartwig et al., 2007) and including complications in their statements goes against this strategy. Second, lie tellers wish to avoid providing information that they believe appears suspicious (Ruby & Brigham, 1998) and lie tellers believe that adding complications sounds suspicious (Maier et al., 2018). The complication cue shows overlap with the unexpected complications criterion that is part of Criteria-Based Content Analysis (CBCA). A meta-analysis of CBCA research showed that truth tellers report more unexpected complications than lie tellers ($d = .25$; Amado et al., 2016). The difference between this CBCA criterion and the complications variable examined by Vrij and colleagues is that in Vrij et al.’s definition complications are not necessarily unexpected. For example, the statement “During our visit to London, we also visited friends who live not far from London” counts as a complication in Vrij et al.’s coding system but not in CBCA.

Common knowledge details refer to strongly invoked stereotypical information about events (Vrij, Leal, Jupe et al., 2018) (“There was a food market where we bought fresh vegetables and fruit”). Lie tellers report more common details than truth tellers ($d = .40$) according to a meta-analysis (Vrij, Palena et al., 2021). Lie tellers who lack personal experiences of the event they report base their statement on what they think typically happens or what they know about the event after searching the internet (Sporer, 2016). In contrast, after experiencing an event, truth tellers often report idiosyncratic details about their experience (DePaulo et al., 1996).

Self-handicapping strategies refer to justifications as to why someone chooses not to provide information (Vrij, Leal, Jupe et al., 2018) (“I can’t tell you what happened at the beginning because I arrived late”). Lie tellers report more self-handicapping strategies than truth tellers ($d = .37$) according to a meta-analysis (Vrij, Palena et al., 2021). Although keeping a story simple by not providing

information appeals to lie tellers, the disadvantage is that it may appear suspicious. In an attempt to reduce this suspiciousness, lie tellers explain why it is not possible to report much information.

Total details refer to the total amount of unique pieces of information provided. It is the most frequently researched verbal cue in deception research (Vrij, 2008) and research has shown that truth tellers typically report more details than lie tellers ($d = .55$, Amado et al., 2016), see also Gancedo et al. (2021) and Verschuere et al. (2021). Lie tellers may be unable to report many details because they lack the imagination to come up with as many details as truth tellers do, given that the details they report also need to sound plausible if the lie tellers want to appear honest (Hamlin et al., 2022; Köhnken, 2004). Lie tellers may also be unwilling to report many details out of fear that these details may provide leads to interviewers (Nahari et al., 2014a) or out of fear that they will be unable to report these details again when asked to repeat their experiences for a second time (Vrij, 2008).

Plausibility addresses the question how likely it is that the activities happened in the way described (Vrij, Deeb et al., 2020). It has been examined as part of the Reality Monitoring tool, where the variable is called 'realism.' A meta-analysis has shown that truth tellers' stories typically sound more realistic than lie tellers' stories ($d = .42$; Gancedo et al., 2021). When observers judge how likely it is that activities happened in the way as reported, they often take contextual information into account (Blair et al., 2010; Markowitz & Hancock, 2022). Statements that contradict independent evidence are deemed implausible. Lie tellers may contradict independent evidence, particularly when they are not aware that investigators possess such evidence (Hartwig et al., 2014). Statements that are considered unconventional or unreasonable are also deemed implausible. Lie tellers may produce such statements if they are unaware what is conventional or reasonable in a given situation (Vrij, Deeb et al., 2020). For example, a lie teller who claimed that people in London drove on the right is probably not aware that in the United Kingdom (UK) people drive on the left.

1.2 A Comparison between Populations

Verbal deception research is typically carried out using participants from Western, Educated, Industrialised, Rich and Democratic (WEIRD) nations (Deeb et al., 2020). Practitioners often ask whether the findings obtained in such research generalise to non-WEIRD populations. This is a relevant question. Cultural differences in speech are widespread with the first-person pronoun drop amongst many Asian populations being just one example (Kashima & Kashima, 1998; Kashima et al., 2014). Relevant for deception research is that some verbal veracity cues are also population-dependent (Cacuci et al., 2021). For example, Taylor and colleagues found that the use of spatial information was a cue to deceit in North African and Pakistani populations but a cue to truthfulness in Arab and White British populations (Taylor et al., 2014, 2017).

Focusing on verbal cues that are population-dependent further complicates practitioners' work (Vrij, Fisher, et al., 2022). Lie detection, which already is a difficult task, is then further complicated because practitioners must also take the interviewee's background into account. Verbal cues that are stable and

appear to be cues to truthfulness or cues to deceit consistently across different populations are therefore preferable. We expect this to be the case for the five verbal cues examined in this article: Complications, common knowledge details, self-handicapping strategies, verifiable sources and plausibility. We believe the reasons why these cues discriminate between truth tellers and lie tellers to apply across populations. Previous research with non-WEIRD populations supports this view. We are not aware of plausibility research conducted with non-WEIRD-populations, but research has examined the other four cues with participants from Russia and South-Korea, Arabs living in Israel, Chinese living in the UK and Hispanics living in the USA (Leal et al., 2018; 2019; Vrij, Leal, et al., 2021; Vrij & Vrij, 2020). Although the effect of veracity was not always significant, the direction of differences between truth tellers and lie tellers was always as found in WEIRD populations: Truth tellers reported more details, more complications, fewer common knowledge details, and fewer self-handicapping strategies than lie tellers.

In the present set of analyses, we analysed Veracity differences in participants from Lebanon, Mexico and South Korea. Despite predicting the same pattern of results for each population, we justify examining it for two reasons. First, it addresses the plea amongst psychology and law researchers to carry out cross-cultural research (Hope et al., 2022; Nahari et al., 2019). Second, this type of research is valuable to practitioners. They will be more confident to use the verbal veracity cues we recommend using if these cues have shown to be diagnostic in the populations they work with.

1.3 Countermeasures Employed by Lie Tellers

Suspects prepare themselves for interviews (Hartwig et al., 2007) and such preparations may include searching the internet for possible verbal veracity cues. Previous research examining the effect of informing interviewees about verbal veracity cues on their performance in subsequent interviews showed mixed results. When interviewees were informed about the Verifiability Approach (VA; Nahari, 2019; Nahari & Vrij, 2019; Vrij & Nahari, 2019), lie tellers were unsuccessful in employing countermeasures and the veracity differences became actually more pronounced. That is, truth tellers were more capable than lie tellers to include verifiable information in their statements (Nahari et al., 2014b; Palena et al., 2020). Lie tellers had some success when informed about the working of the Strategic Use of Evidence (SUE) technique (Granhag & Hartwig, 2015; Hartwig et al., 2014). Informed lie tellers still reported fewer critical details than uninformed truth tellers but the difference was smaller than in the comparison between uninformed lie tellers and uninformed truth tellers (Luke et al., 2016). Lie tellers could successfully implement countermeasures when informed about Criteria-Based Content Analysis (CBCA; Amado et al., 2015; Köhnken, & Steller, 1988; Volbert & Steller, 2014) or about Reality Monitoring (RM; Gancedo et al., 2021; Masip et al., 2005; Sporer, 2004). That is, lie tellers who were informed about some CBCA and RM criteria sounded similar to truth tellers (Caso et al., 2006; Vrij et al., 2000, 2004).

In VA and SUE interviews, statements are compared with evidence. These are therefore evidence-based tools. In CBCA and RM, the quality of details in a statement is assessed without taking evidence into account. These are therefore statement quality-based tools. Apparently, it is more difficult for lie tellers to make their statements more congruent with independent evidence than to adjust their statements so that they include more high-quality details. In the countermeasures experiments carried out by Vrij and colleagues (Vrij, Leal et al., 2020; Vrij, Leal et al., 2022), interviewees were informed about complications, common knowledge details and self-handicapping strategies. Since these three variables are related to the quality of the statement rather than evidence, lie tellers should be able to successfully implement countermeasures when they are informed about them. Yet, lie tellers could still be distinguished from truth tellers in those experiments, probably because the information variable was systematically varied: Not only half of the lie tellers but also half of the truth tellers were informed about these variables. Since in real life, truth tellers are less likely to prepare themselves for interviews than lie tellers (Hartwig et al., 2007), perhaps a better way to examine the efficacy of countermeasures is to compare lie tellers (either informed or not informed) with uninformed truth tellers. Such a test has not been reported by Vrij and colleagues but will be reported in the current set of analyses.

1.4 Hypotheses

Truth tellers will report more details, more complications, fewer common knowledge details and fewer self-handicapping strategies than lie tellers. Their statements will also sound more plausible (Hypothesis 1).

The pattern described in Hypothesis 1 will emerge in each of the three populations (Hypothesis 2).

Hypothesis 1 will be supported, particularly when comparing truth tellers with uninformed lie tellers (Hypothesis 3).

The pattern of results described in Hypothesis 3 will occur in all three populations (Hypothesis 4).

2. Method

2.1 Participants

A total of 631 participants took part in the three experiments, 201 in Experiment 1, 209 in Experiment 2 and 221 in Experiment 3. More participants ($n = 363$, 59%) were female than male ($n = 252$, 41%), whereas 16 participants did not reveal their gender. The average age in the sample was $M = 22.34$ ($SD = 4.07$), but 12 participants did not reveal their age. A total of 187 participants (29.6%) were from Lebanese origin whereas the others were from Mexican ($n = 205$, 32.5%) and South-Korean origin ($n = 239$, 37.9%).

A total of 328 participants (52%) were randomly allocated to the truth telling condition whereas 303 participants (48%) were randomly allocated to the lie telling condition. A total of 317 participants (50.2%) were randomly allocated to the Types of Detail Pre-Informed present condition whereas 314 participants (49.8%) were randomly allocated to the Types of Detail Pre-Informed absent condition.

The 2 (Veracity) X 2 (Types of Detail Pre-Informed) X 3 (Population) experimental design had 12 cells. The cell sizes ranged from 44 to 65.

2.2 Design

We carried out several MANCOVAs in the hypotheses-testing part of the article. The analyses always had details, complications, common knowledge details, self-handicapping strategies, and plausibility as dependent variables and modality, experiment, being informed about the model statement, interpreter, preparation thoroughness, preparation time, motivation and rapport as covariates.

To test Hypothesis 1, we carried out a MANCOVA utilising a 2 (Veracity) X 2 (Type of Detail Pre-Informed) X 3 (Population) between-subjects factorial design. In the next set of analyses, to test Hypothesis 2, we carried out three MANCOVAs utilising a 2 (Veracity) X 2 (Type of Detail Pre-Informed) between-subjects factorial designs for each of the three countries separately. To test Hypothesis 3, we carried out a MANCOVA utilising a 3 (Veracity: Uninformed Truth Tellers vs Uninformed Lie Tellers vs Informed Lie Tellers) X 3 (Population) between-subjects factorial design. To test Hypothesis 4, we carried out three MANCOVAs with Veracity (Uninformed Truth Tellers vs Uninformed Lie Tellers vs Informed Lie Tellers) as the only factor for each of the three populations separately.

2.3 Procedure

2.3.1 Recruitment, Pre-Condition Selection Form, Preparation, and Pre-Interview Questionnaire

The three experiments used similar Procedures, which are reported in detail in Vrij, Leal, et al. (2020, 2022). Large parts of the text below are taken from these articles word for word. All study materials (recruitment material, selection form, (de)briefing forms, questionnaires, countermeasures material) were translated and provided in the participants' native language. Translations were made by native speakers familiar with the relevant deception literature.

Experiment 1 was carried out before the COVID-19 outbreak, whereas Experiment 2 was carried out partly before and partly during the COVID outbreak. Experiment 3 was carried out entirely during COVID time. Experiment 1 was carried out entirely face-to-face, whereas Experiment 2 was carried out face-to-face in Lebanon and South-Korea before COVID and but online (via Zoom) in Mexico during COVID, 12 months after data collection in Lebanon and South Korea was completed. Experiment 3 was carried out entirely during COVID via Zoom. We included 'modality' (face-to-face or via Zoom) as a covariate in the main analyses.

There were small differences between the three experiments. We therefore also included 'experiment' as a covariate in the analyses. In the text below, we report the common procedure and mention where the differences occurred.

Participants were recruited mainly via adverts posted on the university intranets. The advert mentioned that in the experiment, participants would be asked to tell the truth or lie about a trip that they may (or

may not) have made within the last year (before COVID) or in the last 24 months (during COVID). Since many people may not have travelled during the COVID outbreak, we changed “within the last year” to “during the last two years” during COVID time.

All study materials were presented in a hard copy format before COVID and online (via Qualtrics) during COVID. Participants first read a participant information sheet and signed an informed consent form. They then filled out a selection form that listed six cities the researchers thought the participants may have visited during the past 12 months (before COVID) or past 24 months (during COVID). In each of the three countries, different cities were listed. These six cities were included on the selection form to obtain some standardisation of the cities discussed in the experiment. The participants were also asked to write down the names of two other cities they had visited during the past 12 months (before COVID) or 24 months (during COVID). If truth tellers had not visited any of the six cities mentioned on the selection form in the past 12 or 24 months, they could discuss one of these two additional cities in the interview.

For each city the participants reported (a) whether and (b) when they had been there during the last 12 or 24 months, (c) for how long they stayed there, and (d) whether they have lived there. For truth tellers, the experimenter selected one of the six cities where the participant had stayed during the last 12 or 24 months for at least two nights but had never lived. If a truth teller had stayed in only one of those six cities, that particular city was chosen. If a truth teller had stayed in more than one of these six cities, the experimenter chose a city that had not been discussed by (too) many truth tellers before to increase the number of cities discussed. If a truth teller had not been to any of the six cities, the experimenter selected an additional city that the truth teller had listed on the selection form.

Truth tellers were told that they would be interviewed about the selected city (city X) and to be truthful when answering the questions. For lie tellers, the experimenter selected one of the six cities on the selection form where the lie teller had never been in their life before or selected a city not on the list that was discussed by a truth teller during an interview (after checking that the lie teller had never been to this city before). The truth tellers' and lie tellers' cities were therefore matched. Lie tellers were told that they would be interviewed about city X pretending to have stayed there for at least two nights during a trip made during the last 12 or 24 months. The 323 truth tellers reported trips to more than 75 cities. The cities lie tellers discussed were taken from this sample of cities.

Participants were given a computer with internet access and twenty minutes to prepare themselves for their interview. They were informed that they were allowed to make notes while doing their research and (in Experiment 2) that they could bring these notes into the interview. They were further told that it was important to be convincing because they would be asked to write a statement about what they told the interviewer in the interview if they did not appear convincing.

After participants indicated to be ready for their interview, they were randomly allocated to the Types of Detail Pre-Informed condition. Participants allocated to the Types of Detail Pre-Informed Present

condition read about complications, common knowledge details and self-handicapping strategies. They read the parts of Vrij, Leal, Jupe et al. (2018) that gave definitions and examples of these three variables. In Experiments 2 and 3 the text finished with the following sentence that summarised how these three variables were related to deception: “In summary, in a convincing story, complications are often included, whereas common knowledge details and self-handicapping strategies are largely absent”. See Appendix 1 for the full information sheet. Participants allocated to the Types of Detail Pre-Informed Absent condition did not receive any information about types of detail.

In Experiments 1 and 2 another factor was introduced. Half of the participants were asked to read information about the Model Statement interview tool. A model statement is an example (typically presented in audio-format) of a detailed recall of an event unrelated to the topic of investigation. It raises expectations amongst interviewees how much information they are expected to report and typically results in interviewees reporting more information than an instruction ‘to be detailed’ (Vrij, Leal, & Fisher, 2018). Since the model statement information sheet was dropped in Experiment 3, we did not analyse the effect of this factor but included it as a covariate.

The participants were then asked to complete a pre-interview questionnaire measuring age, gender, motivation, thoroughness of preparation and preparation time. For motivation, participants were asked how motivated they were to perform well during the interview: (1) *not at all motivated* to (5) *very motivated*. Thoroughness of preparation was measured via three items: (1) *shallow* to (7) *thorough*; (1) *insufficient* to (7) *sufficient*; and (1) *poor* to (7) *good*. The answers to the three questions were averaged (Cronbach’s alpha was .90 in Experiment 1, .83 in Experiment 2 and .86 in Experiment 3). For preparation time, participants were asked whether they thought they were given enough time to prepare themselves: “Do you think the amount of time you were given to prepare was: (1) *insufficient* to (7) *sufficient*”.

2.3.2 The Interview

All interviews were conducted by native interviewers in the native languages in Experiment 1 and by English speaking interviewers who spoke with the interviewees through an interpreter in Experiment 2. That is, the interviewers (non-native to Lebanon, Mexico and South Korea) spoke English and the participants spoke in their native language. Interpreters (native to Lebanon, Mexico and South-Korea) translated the questions and responses from English to the native language and vice versa. The presence of the interpreter was manipulated in Experiment 3. The interpreters were either professional or bi-lingual and used a long consecutive interpretation style (Viezzi, 2012), similar to what was used in many previous interpreter experiments (e.g. Ewens, Vrij, Leal, Mann, Jo, & Fisher, 2016; Ewens, Vrij, Leal, Mann, Jo, Shabolta et al., 2016; Ewens et al., 2017; Vrij et al., 2017; Vrij, Leal, Fisher et al., 2019). Interpreters were asked to speak in the first person and to recall the interviewee’s response as completely as possible after the interviewee had finished answering each question. The interpreters took notes when the interviewee spoke. We included ‘interpreter’ as a covariate in the factorial design.

Before the interview started, the experimenter informed the interviewer which city the participant would discuss. The interviewer offered the interviewees a glass of water. Offering something helps rapport building (reciprocation principle, Cialdini, 2007) and rapport benefits information-gathering (Brandon et al., 2018; Brimbal et al., 2019). The interview protocols differed between the three experiments, but in each experiment, participants were invited to describe their alleged trip in detail. See Appendix 2 for the full interview protocols.

The interviews were audio recorded. The Arabic, Spanish and Korean text was transcribed and then translated into English. In Experiments 2 and 3 the interpreter's spoken English text was transcribed.

2.3.3 Post-Interview Questionnaire

After the interview, participants completed a post-interview questionnaire. The participants indicated the extent to which they told the truth during the interview on an 11-point Likert scale ranging from 0% to 100%. The Interaction Questionnaire (Vallano & Schreiber Compo, 2011) was used to measure rapport with the interviewer. It consists of nine items rated on 7-point scales ranging from [1] not at all to [7] extremely. Examples are *smooth*, *bored*, *engrossed*, and *involved* (Cronbach's alpha = .65 in Experiment 1, .81 in Experiment 2 and .86 in Experiment 3).

Participants were then given multiple-choice questions to measure their knowledge about the relationship between complications, common knowledge details, self-handicapping strategies and deception. For complications the question was "Truth tellers typically report more complications than lie tellers: (i) true, (ii) false and (iii) I don't know". Similar questions were used for common knowledge details and self-handicapping strategies. No definitions of complications, common knowledge details and self-handicapping strategies were given. For these three questions a total accuracy score was computed, which could range from 0 (all three relationships incorrectly identified) to 3 (all three relationships correctly identified).

2.3.4 Coding

The raters were blind to the Veracity and Countermeasure conditions and the hypotheses. The first author, who has almost 25 years of experience in coding detail, taught them the coding scheme. Coding occurred on the English transcripts. A rater first read the transcripts and coded each detail in the entire interview. A detail is a unit of perceptual information about the trip the interviewee allegedly had made. For example, the following sentence has six details: "In the afternoon we took the ferry back to the mainland; we bought a takeaway curry which we ate in the hotel". Each detail in the interview was coded only once and repetitions were ignored. A second rater coded a random sample of 40 transcripts in Experiment 1 (20%), 35 transcripts in Experiment 2 (17%) and 57 transcripts (26%) in Experiment 3. Inter-rater agreement between the two raters, using the two-way random effects model measuring consistency, ranged from good to very good (Single Measures ICC = .72 in Experiment 1, .92 in Experiment 2 and .95 in Experiment 3).

Another rater coded complications, common knowledge details, self-handicapping strategies and plausibility. Repetitions were again not coded. A complication is an occurrence that affects the story-teller and makes a situation more complex (Vrij, Palena et al., 2021). Examples are (a) “Dubai’s roads change every year so no matter how well I remember the roads, I have to use GPS”; (b) “We bought different flights: I left in the afternoon and she left in the morning”; and (c) “When the bus went through a tunnel, the movie was paused from time to time, which was very annoying”.

Common knowledge details refer to strongly invoked stereotypical knowledge about events (Vrij, Palena et al., 2021). Examples are: (d) “I also went to Al Ain Dubai, which has the largest zoo in the Middle East”; (e) “We were staying close to the centre, so we went sightseeing in the centre” and (f) “We played games for a long time”. Self-handicapping strategies refer to justifications as to why someone is not able to provide information (Vrij, Palena, et al., 2021). Examples are: (g) “I don’t remember many details because I stayed there just for two days”; (h) “I don’t remember the location of the hotel. I went with my family, so I didn’t pay attention to it” and (i) “I can’t even think of the name of the café, because I didn’t book the accommodation myself”.

A second rater coded a random sample of 40 transcripts (20%) in Experiment 1, 35 transcripts (17%) in Experiment 2 and 73 transcripts (33%) in Experiment 3. Inter-rater agreement between the two raters, using the two-way random effects model measuring consistency, was very good for complications (Single Measures, Intraclass correlation coefficient, ICC = .92 in Experiment 1, .93 in Experiment 2 and .91 in Experiment 3) and good for common knowledge details (Single Measures ICC = .81 in Experiment 1, .73 in Experiment 2 and .69 in Experiment 3) and good or acceptable for self-handicapping strategies (Single Measures ICC = .70 in Experiment 1, .65 in Experiment 2 and .74 in Experiment 3).

Complications can range in the degree of complexity and in Experiment 1 a distinction was made between complications low in complexity versus other complications (medium/high). Since this distinction was not made in Experiments 2 and 3, the two types of complications in Experiment 1 were merged for the current analyses.

Plausibility was defined as *How likely is it that the activities happened in the way described* (Leal et al., 2019, p. 278). It was coded on a 7-point Likert scale ranging from (1) *not plausible* to (7) *very plausible* after each of the questions, taking into account the plausibility of the previous answers (thus, in fact, measuring plausibility of the story as it develops). We report here the average plausibility score. The story by a participant who said that during a walk with her parents they got lost and that her parents started arguing and blaming each other for why they got lost was considered very plausible because of the detailed description of how the argument developed. In contrast, a story by a participant who went to London and said he visited Windsor Castle, Tate Gallery and Madam Tussauds in one day was considered implausible because he would have lacked the time to do this all in one day. A second rater coded a random sample of 40 transcripts (20%) in Experiment 1, 35 transcripts (17%) in Experiment 2

and 73 transcripts (33%) in Experiment 3. Inter-rater agreement between the two raters, using the two-way random effects model measuring consistency, was good or acceptable, ICC = .75 in Experiment 1, .66 in Experiment 2 and .66 in Experiment 3.

3. Results

3.1 Preparation Thoroughness, Preparation Time, Motivation, Rapport and Percentage of Truth Telling
A 2 (Veracity: truth vs lie) X 2 (Types of Detail Pre-Informed: present vs absent) X 3 (Population: Lebanon, Mexico and South Korea) MANOVA was carried out with preparation thoroughness, preparation time, motivation, rapport and percentage of truth telling as dependent variables. At a multivariate level, the Veracity main effect, $F(5, 615) = 92.93, p < .001, \eta_p^2 = .43$ and Population main effect, $F(5, 615) = 13.17, p < .001, \eta_p^2 = .10$ were significant, and so was the Veracity X Population interaction effect, $F(5, 615) = 11.43, p < .001, \eta_p^2 = .09$. All other multivariate effects were not significant, all $F_s < 1.51$, all $p_s > .131$.

Truth tellers found their preparation more thorough and were more satisfied with their preparation time than lie tellers, see Table 1. Truth tellers were also more motivated than lie tellers and found their rapport with the interviewer better than lie tellers. Truth tellers also reported to have been more truthful in the interview than lie tellers.

Population differences emerged for thoroughness of preparation, motivation and rapport, see Table 2. The Mexican participants judged their preparation as more thorough than the Lebanese and South-Korean participants, who did not differ from each other. The Lebanese participants were less motivated than the Mexicans and South-Koreans, who did not differ from each other. The Mexican participants reported higher rapport with the interviewer than the Lebanese participants, who reported higher rapport than the South-Korean participants. The significant interaction effect was caused by the Mexican participants. The percentage reported truth telling was smaller between Mexican truth tellers ($M = 64.65, SD = 42.40, 95\% CI [58.25, 69.38]$) and lie tellers ($M = 46.00, SD = 44.27, 95\% CI [39.68, 52.28]$). $d = 0.43, 95\% CI [0.15, 0.70]$ than between Lebanese truth tellers ($M = 93.41, SD = 13.93, 95\% CI [86.92, 99.30]$) and lie tellers ($M = 27.90, SD = 31.96, 95\% CI [21.69, 33.95]$), $d = 2.65, 95\% CI [2.22, 3.00]$ or South-Korean truth tellers ($M = 93.74, SD = 12.81, 95\% CI [88.30, 99.19]$) and lie tellers ($M = 21.82, SD = 22.84, 95\% CI [16.43, 27.28]$), $d = 3.88, 95\% CI [3.39, 4.25]$.

The grand mean scores for preparation thoroughness ($M = 5.03, SD = 1.28$), preparation time ($M = 5.72, SD = 1.51$) and rapport ($M = 5.54, SD = 0.96$) (all measured on 7-point Likert scales) revealed that participants reported that their preparation thoroughness and preparation time were good and that they experienced good rapport with the interviewer. The grand mean for motivation ($M = 4.05, SD = 0.78$) (measured on a 5-point Likert scale) revealed that participants were motivated to perform well during the interview. Preparation thoroughness, preparation time, motivation and rapport could all affect participants' verbal output and we therefore introduced these variables as covariates in the

hypothesis-testing analyses.

3.2 Understanding the Provided Material

A 2 (Veracity) X 2 (Types of Detail Pre-Informed) X 3 (Population) MANOVA was carried out with accuracy in reporting the relationship between complications, common knowledge details and self-handicapping strategies and deception as dependent variable. The Types of Detail Pre-Informed, $F(1, 618) = 65.18, p < .001, d = 0.62, 95\% \text{ CI } (0.45, 0.77)$ and Population, $F(2, 618) = 84.22, p < .001, \eta_p^2 = .21$, main effects were significant, whereas all other effects were not significant, all $F_s < 2.13$, all $p_s > .119$.

Participants who did read information about the relationships between complications, common knowledge details, self-handicapping strategies and deception were more accurate in reporting these relationships ($M = 1.75, SD = 1.01, 95\% \text{ CI } [1.58, 1.77]$) than participants who did not read that information ($M = 1.15, SD = 0.93, 95\% \text{ CI } [1.02, 1.21]$).

Post-hoc tests showed that South Korean participants ($M = 2.00, SD = .89, 95\% \text{ CI } [1.89, 2.10]$) were more accurate than Mexican participants ($M = 1.26, SD = .99, 95\% \text{ CI } [1.11, 1.35]$) who were more accurate than Lebanese participants ($M = 0.96, SD = .87, 95\% \text{ CI } [0.84, 1.09]$).

Broken down into the three individual variables, results revealed that amongst the participants who were informed about the relationship between complications, common knowledge details, self-handicapping strategies and deception, 68.5% reported the correct relationship between complications and deception, whereas 49.8% and 56.2% reported the correct relationship between deception and common knowledge details and self-handicapping strategies.

3.3 Time Since the Trip was Made

Truth tellers made their trip on average $M = 7.19$ months ($SD = 5.23$) before the interview (as indicated on the pre-condition selection form). We correlated this variable with the transcript coding variables. It was negatively correlated with the number of details reported, ($r = -.13, p = .024$). All other correlations were not significant (all r 's $< .10$, all $p_s > .080$).

3.4 Hypotheses-Testing

3.4.1 Overall Analysis

A MANCOVA was carried out utilising a 2 (Veracity) X 2 (Type of Detail Pre-Informed) X 3 (Population) between-subjects factorial design. Details, complications, common knowledge details, self-handicapping strategies, and plausibility were the dependent variables and the covariates were modality, experiment, being informed about the model statement, interpreter, preparation thoroughness, preparation time, motivation and rapport.

At a multivariate level, the analysis revealed significant main effects for Veracity, $F(5, 607) = 17.33, p < .001, \eta_p^2 = .13$, and Population, $F(10, 1214) = 26.19, p < .001, \eta_p^2 = .18$, and a significant Veracity X Population interaction effect, $F(10, 1214) = 2.43, p = .007, \eta_p^2 = .02$. All other multivariate effects were not significant, all $F_s < 1.70$, all $p_s > .132$.

Regarding Veracity, only the results for self-handicapping strategies were not significant. Truth tellers provided more details, more complications and fewer common knowledge details than lie tellers, see Table 1. Truth tellers' stories also sounded more plausible than lie tellers' stories. The effect sizes (d) were small for details ($d = .28$) and common knowledge details ($d = .22$), medium for complications ($d = .42$) and large for plausibility ($d = .78$). Apart from self-handicapping strategies, these findings support Hypothesis 1.

Also for Population, all univariate effects apart from the self-handicapping strategies effect were significant, see Table 2. Tukey post-hoc tests revealed that South Korean participants reported more details and more complications than Mexican participants, who reported more details and more complications than Lebanese participants. The differences between South-Korean and Lebanese participants were large for both details ($d = 1.43$, 95% CI [1.19,1.62]) and complications ($d = 1.25$, 95% CI [1.02,1.44]). South-Korean participants reported fewer common knowledge details than Lebanese and Mexican participants, who did not differ from each other. The stories of the Lebanese participants sounded less plausible than the stories of Mexican and South-Korean participants, whose stories did not differ from each other.

At a univariate level, none of the Veracity X Population interaction effects were significant, all F s < 2.39, all p s > .092.

Table 1. Statistical Results for Questionnaire Variables and Transcripts Coding as a Function of Veracity

	Truth (n = 328)		Lie (n = 303)		F	p	Cohen's d	
	M (SD)	95% CI	M (SD)	95% CI			d	95% CI
Questionnaire variables								
Preparation thoroughness (1-7)	5.28 (1.23)	5.14,5.40	4.77 (1.29)	4.67,4.94	23.05	<.001	0.41	0.24,0.56
Preparation time (1-7)	6.10 (1.29)	5.90,6.22	5.30 (1.62)	5.17,5.50	39.00	<.001	0.55	0.38,0.70
Motivation (1-5)	4.14 (0.75)	4.05,4.21	3.95 (0.80)	3.86,4.04	8.55	.004	0.25	0.08,0.40
Rapport (1-7)	5.71 (0.92)	5.61,5.81	5.37 (0.97)	5.30,5.50	17.77	<.001	0.36	0.20,0.51
Percentage truth telling	83.29 (30.68)	80.24,86.87	30.81 (34.55)	28.44,35.33	450.51	<.001	1.61	1.41,1.76
Transcript coding								
Number of details	68.98 (47.44)	63.33,70.95	57.38 (41.07)	50.35,58.26	20.19	<.001	0.28	0.12,0.44
Number of complications	6.43 (7.18)	5.48,6.65	3.85 (4.70)	3.02,4.23	31.17	<.001	0.42	0.26,0.57
Number of common knowledge details	2.23 (2.23)	2.01,2.48	2.73 (2.24)	2.55,3.04	9.57	.002	0.22	0.06,0.38
Number of self-handicapping strategies	0.13 (0.62)	0.07,0.20	0.19 (0.52)	0.12,0.25	1.01	.314	0.10	-.05,0.26
Plausibility (1-7)	4.41 (0.81)	4.30,4.47	3.77 (0.83)	3.69,3.87	84.16	<.001	0.78	0.61,0.93

Statistical Results for Questionnaire Variables and Transcript Coding as a Function of Veracity

Table 2 Statistical Results for Questionnaire Variables and Transcripts Coding as a Function of Population

	Lebanon (n = 187)		Mexico (n = 205)		South Korea (n = 239)		F	p	η_p^2
	M(SD)	95% CI	M(SD)	95% CI	M(SD)	95% CI			
Questionnaire variables									
Preparation thoroughness (1-7)	4.87 ^a (1.36)	4.69,5.04	5.57 ^b (1.24)	5.38,5.72	4.70 ^a (1.10)	4.55,4.85	29.43	<.001	.09
Preparation time (1-7)	5.60 ^a (1.65)	5.38,5.80	5.92 ^b (1.36)	5.68,6.08	5.63 ^a (1.51)	5.45,5.82	2.31	.100	.007
Motivation (1-5)	3.81 ^a (0.86)	3.71,3.93	4.24 ^b (0.71)	4.13,4.34	4.07 ^b (0.73)	3.97,4.17	14.64	<.001	.05
Rapport (1-7)	5.49 ^b (0.79)	5.46,5.62	5.93 ^c (0.95)	5.78,6.03	5.26 ^b (0.98)	5.15,5.38	27.72	<.001	.08
Percentage truth telling	60.48 ^a (41.05)	56.11,64.82	56.44 ^a (44.08)	50.70,59.10	57.63 ^b (40.51)	53.96,61.65	1.64	.196	.005
Transcript coding									
Number of details	34.56 ^a (21.35)	31.07,41.33	58.36 ^b (37.55)	51.77,62.84	90.32 ^c (48.52)	84.02,93.29	120.12	<.001	0.28
Number of complications	1.31 ^a (1.88)	0.64,2.21	5.06 ^b (5.39)	4.07,5.76	8.35 ^c (7.33)	7.49,8.91	84.51	<.001	0.22
Number of common knowledge details	2.64 ^a (1.94)	2.65,3.28	2.79 ^b (2.36)	1.90,2.58	2.07 ^a (2.32)	2.07,2.65	5.67	.004	0.02
Number of self-handicapping strategies	0.15 ^a (0.52)	0.07,0.24	0.12 ^a (0.34)	0.03,0.22	0.19 ^b (0.75)	0.11,0.27	0.42	.657	0.001
Plausibility	3.91 ^a (0.87)	3.78,4.02	4.23 ^b (0.82)	4.08,4.34	4.14 ^b (0.91)	4.03,4.24	6.85	.001	0.02

Notes. Only mean scores with a different superscript differ significantly ($p < .05$) from each other.

Plausibility emerged as the strongest veracity indicator. Through a regression analysis we examined which other verbal output variables contributed to the plausibility ratings. A forced entry method regression analysis was carried out with details, complications, common knowledge details, and self-handicapping strategies as predictors and plausibility as the outcome variable. Complications ($\beta = .43, p < .001$) and common knowledge details ($\beta = -.34, p < .001$) contributed more to the model than self-handicapping strategies ($\beta = -.12, p < .001$) and details ($\beta = -.11, p = 0.032$).

3.4.2 Veracity Differences per Population

In the next set of analyses, we analysed the results for each of the three countries separately. We first carried out a MANCOVA utilising a 2 (Veracity) X 2 (Type of Detail Pre-Informed) between-subjects factorial design for Lebanese participants only. Details, complications, common knowledge details, self-handicapping strategies, and plausibility were the dependent variables and the covariates were modality, experiment, being informed about the model statement, interpreter, preparation thoroughness, preparation time, motivation and rapport. The analysis revealed a significant multivariate main effect for Veracity, $F(5,172) = 10.45, p < .001, \eta_p^2 = .23$, whereas the Type of Detail Pre-Informed main effect, $F(5,172) = 1.05, p = .391, \eta_p^2 = .03$, and Veracity X Type of Detail Pre-Informed interaction-effect, $F(5,172) = 0.35, p = .881, \eta_p^2 = .01$, were not significant.

All Veracity univariate effects apart from the common knowledge details and self-handicapping effects were significant, see Table 3. Truth tellers reported more details ($d = 0.44$) and more complications ($d = 0.58$) than lie tellers, and truth tellers' stories sounded more plausible than lie tellers' stories ($d = 1.01$). The plausibility effect was large and the other effects were medium.

The MANCOVA for Mexican participants revealed a significant multivariate main effect for Veracity, $F(5,190) = 4.17, p = .001, \eta_p^2 = .10$, whereas the Type of Detail Pre-Informed main effect, $F(5,190) = 1.48, p = .197, \eta_p^2 = .04$, and Veracity X Type of Detail Pre-Informed interaction-effect, $F(5,190) = 1.15, p = .338, \eta_p^2 = .03$, were not significant.

For Mexican participants only the self-handicapping effect univariate effect was not significant, see Table 3. Truth tellers reported more details ($d = .45$), more complications ($d = .55$) and fewer common knowledge details ($d = .27$) than lie tellers and truth tellers' stories sounded more plausible than lie

tellers' stories ($d = .65$). All effects were medium except the common knowledge details effect which was small.

The MANCOVA for South-Korean participants revealed a significant multivariate main effect for Veracity, $F(5,224) = 5.30$, $p < .001$, $\eta_p^2 = .11$, whereas the Type of Detail Pre-Informed main effect, $F(5,224) = 0.68$, $p = .643$, $\eta_p^2 = .02$, and Veracity X Type of Detail Pre-Informed interaction-effect, $F(5,224) = 0.93$, $p = .466$, $\eta_p^2 = .02$, were not significant.

For South Korean participants the results for details, complications and plausibility were significant at a univariate level, see Table 3. Truth tellers reported more details ($d = .22$) and more complications ($d = .50$) than lie tellers. Truth tellers' stories also sounded more plausible than lie tellers' stories ($d = .70$). The effect for details was small, the effect for complications was medium and the effect for plausibility was large.

In sum, we found a large overlap in results across populations, which supports Hypothesis 2.

Table 3. Statistical Results for Transcripts Coding as a Function of Population and Veracity

	Truth		Lie		<i>F</i>	<i>p</i>	Cohen's <i>d</i>	
	<i>M</i> (<i>SD</i>)	95% CI	<i>M</i> (<i>SD</i>)	95% CI			<i>d</i>	95% CI
Lebanese participants (<i>n</i> = 93 truth and <i>n</i> = 94 lie)								
Number of details	39.14 (25.01)	34.6,42.58	30.02 (15.84)	26.69,34.63	7.32	.007	0.44	0.14,0.72
Number of complications	1.84 (2.21)	1.48,2.24	0.79 (1.30)	0.42,1.18	14.67	<.001	0.58	0.28,0.86
Number of common knowledge details	2.41 (2.02)	2.04,2.77	2.87 (1.84)	2.51,3.24	3.09	.081	0.24	-0.05,0.52
Number of self-handicapping strategies	0.11 (0.48)	0.01,0.23	0.19 (0.55)	0.08,0.29	0.65	.420	0.15	-0.13,0.44
Plausibility (1-7)	4.31 (0.80)	4.16,4.46	3.52 (0.76)	3.3,3.67	50.85	<.001	1.01	0.69,1.30
Mexican participants (<i>n</i> = 116 truth and <i>n</i> = 89 lie)								
Number of details	65.59 (41.89)	59.61,71.98	48.92 (28.58)	40.92,55.03	13.48	<.001	0.45	0.17,0.73
Number of complications	6.30 (5.99)	5.19,7.07	3.44 (3.96)	2.49,4.63	12.07	<.001	0.55	0.26,0.82
Number of common knowledge details	2.51 (2.28)	2.06,2.85	3.15 (2.42)	2.82,3.73	6.89	.009	0.27	-0.01,0.55
Number of self-handicapping strategies	0.09 (0.28)	0.03,0.16	0.17 (0.41)	0.08,0.23	1.51	.220	0.23	-0.05,0.51
Plausibility (1-7)	4.45 (0.80)	4.27,4.56	3.94 (0.76)	3.81,4.14	15.08	<.001	0.65	0.36,0.92
South Korean participants (<i>n</i> = 119 truth and <i>n</i> = 120 lie)								
Number of details	95.60 (51.11)	88.69,104.47	85.08 (45.41)	76.19,91.91	4.39	.037	0.22	-0.04,0.47
Number of complications	10.15 (8.58)	8.74,11.33	6.57 (5.30)	5.37,7.96	11.75	<.001	0.50	0.24,0.75
Number of common knowledge details	1.83 (2.30)	1.47,2.35	2.31 (2.33)	1.80,2.68	0.99	.320	0.21	-0.05,0.46
Number of self-handicapping strategies	0.18 (0.90)	0.05,0.33	0.20 (0.56)	0.05,0.34	0.005	.943	0.03	-0.23,0.28
Plausibility (1-7)	4.44 (0.82)	4.27,4.59	3.84 (0.89)	3.69,4.01	23.18	<.001	0.70	0.43,0.95

Statistical Results for Transcript Coding for Each of the Three Populations as a Function of Veracity

3.4.3 Uninformed Truth Tellers vs Uninformed Lie Tellers and Informed Lie Tellers

A MANCOVA was carried out utilising a 3 (Veracity: Uninformed Truth Tellers vs Uninformed Lie Tellers vs Informed Lie Tellers) X 3 (Population) between-subjects factorial design. Details, complications, common knowledge details, self-handicapping strategies, and plausibility were the dependent variables and modality, experiment, being informed about the model statement, interpreter,

preparation thoroughness, preparation time, motivation and rapport were the covariates. The analysis revealed significant multivariate main effects for Veracity, $F(10, 886) = 4.68, p < .001, \eta_p^2 = .05$, and Population, $F(12,886) = 21.19, p < .001, \eta_p^2 = .19$. The Veracity X Population interaction-effect was also significant, $F(20,1470.215) = 1.59, p = .047, \eta_p^2 = .02$, although none of the univariate interaction effects were, all $F_s < 1.91$, all $p_s > .108$.

We will not discuss the Population main effect because this effect has been discussed above in the overall analysis section. For Veracity, all effects were significant at a univariate level except for common knowledge details and self-handicapping strategies. Tukey post-hoc tests revealed that none of the uninformed vs informed lie tellers comparisons were significant. Several significant effects emerged when comparing uninformed truth tellers with lie tellers, particularly when uninformed truth tellers were compared with uninformed lie tellers, supporting Hypothesis 3. Compared to *uninformed* lie tellers, the uninformed truth tellers reported more details ($d = .23$) and more complications ($d = .45$) and their stories sounded more plausible ($d = .76$). Compared to *informed* lie tellers, the uninformed truth tellers reported more complications ($d = .22$) and their stories sounded more plausible ($d = .57$).

Table 4. Statistical Results for Transcript Coding for each of the Three Populations Comparing Uninformed Truth Tellers with Uninformed and Informed Lie Tellers

	Uninformed truth tellers (n = 162)		Uninformed lie tellers (n = 150)		Informed lie tellers (n = 152)		F	p	η_p^2	TT-uninformed LT	TT-informed LT
	M(SD)	95% CI	M(SD)	95% CI	M(SD)	95% CI				d	d
Total sample											
Number of details	67.04 ^b (48.55)	60.41, 71.07	56.74 ^a (38.83)	48.90,59.71	58.59 ^{ab} (43.30)	49.59,60.40	5.34	.005	.02	0.23 (0.01,0.45)	0.18 (-0.04,0.40)
Number of complications	5.90 ^b (7.06)	4.82, 6.34	3.31 ^a (3.82)	2.43,3.97	4.49 ^a (5.40)	3.36,4.89	9.29	<.001	.04	0.45 (0.22,0.67)	0.22 (0.00,0.44)
Number of CKD	2.35 ^a (2.17)	2.03,2.70	2.91 ^a (2.42)	2.59,3.28	2.59 ^a (2.09)	2.27,2.95	2.72	.067	.01	0.24 (0.02,0.46)	0.11 (-0.11,0.33)
Number of SHS	0.10 ^a (0.41)	0.04,0.19	0.22 ^a (0.53)	0.13,0.29	0.16 ^a (0.50)	0.08,0.23	1.46	.233	.007	0.25 (0.03,0.47)	0.13 (-0.09,0.35)
Plausibility	4.33 ^b (0.85)	4.16,4.42	3.69 ^a (0.84)	3.58,3.84	3.85 ^a (0.85)	3.72,3.98	20.70	<.001	.09	0.76 (0.52,0.98)	0.57 (0.34,0.79)
Lebanese participants (uninformed truth tellers: n = 51; uninformed lie tellers: n = 47; informed lie tellers: n = 46)											
Number of details	38.86 ^b (24.00)	32.99,43.24	29.06 ^a (15.88)	24.66,35.10	31.30 ^{ab} (15.92)	25.90,36.72	2.74	.069	.04	0.48 (0.07,0.87)	0.37 (-0.04,0.76)
Number of complications	1.59 ^b (2.09)	1.13,2.07	0.62 ^a (1.24)	0.17,1.13	0.98 ^{ab} (1.36)	0.44,1.43	4.04	.020	.06	0.56 (0.15,0.95)	0.34 (-0.06,0.74)
Number of CKD	2.37 ^a (2.08)	1.87,2.87	2.96 ^a (2.18)	2.47,3.48	2.80 ^a (1.45)	2.27,3.32	1.46	.236	.02	0.28 (-0.13,0.67)	0.24 (-0.17,0.63)
Number of SHS	0.12 ^a (0.59)	-.03, .29	0.15 ^a (0.36)	-.02, .031	0.21 ^a (0.71)	0.06, 0.90	0.41	.662	.01	0.06 (-0.34,0.46)	0.18 (-0.22,0.58)
Plausibility	4.25 ^b (0.85)	4.04,4.47	3.56 ^a (0.82)	3.18,3.62	3.67 ^a (0.67)	3.41,3.86	15.80	<.001	.19	1.06 (0.63,1.47)	0.75 (0.33,1.15)
Mexican participants (uninformed truth tellers: n = 51; uninformed lie tellers: n = 44; informed lie tellers: n = 44)											
Number of details	60.24 ^a (38.37)	53.81,69.97	52.32 ^a (28.69)	43.36,60.68	45.77 ^a (28.70)	35.64,52.78	4.37	.015	.06	0.23 (-0.18,0.63)	0.42 (0.01,0.82)
Number of complications	5.49 ^b (5.87)	4.12,6.68	3.39 ^a (3.36)	2.18,4.94	3.57 ^a (4.53)	2.13,4.86	2.58	.080	.04	0.43 (0.02,0.83)	0.34 (-0.07,0.74)
Number of CKD	3.00 ^a (2.14)	2.30,3.55	3.41 ^a (2.78)	2.85,4.20	2.89 ^a (2.04)	2.19,3.52	1.17	.313	.02	0.17 (-0.24,0.57)	0.05 (-0.35,0.46)
Number of SHS	0.10 ^a (0.30)	.001, .21	0.18 ^a (0.39)	.07, .30	0.16 ^a (0.45)	-.03, .26	0.49	.612	.01	0.23 (-0.18,0.63)	0.16 (-0.24,0.57)
Plausibility	4.30 ^b (0.87)	4.02,4.48	4.09 ^b (0.72)	3.79,4.29	3.87 ^a (0.82)	3.65,4.14	2.24	.110	.03	0.37 (-0.04,0.77)	0.51 (0.09,0.91)
South-Korean participants (uninformed truth tellers: n = 60; uninformed lie tellers: n = 59; informed lie tellers: n = 62)											
Number of details	96.78 ^a (55.42)	86.20 (109.50)	82.08 ^a (42.12)	70.43,92.85	87.91 ^a (48.15)	76.48,98.15	1.84	.162	.02	0.30 (-0.07,0.66)	0.17 (-0.19,0.53)
Number of complications	9.90 ^b (8.41)	8.03,11.44	5.39 ^a (4.20)	3.92,7.30	7.76 ^{ab} (5.96)	6.18,9.35	5.68	.004	.06	0.68 (0.30,1.04)	0.29 (-0.07,0.65)
Number of CKD	1.78 ^a (2.16)	1.31,2.56	2.49 ^a (2.28)	1.80,3.00	2.23 ^a (2.47)	1.86,2.74	0.53	.588	.006	0.32 (-0.05,0.68)	0.19 (-0.17,0.55)
Number of SHS	0.10 ^a (0.30)	-.01, .025	0.31 ^b (0.70)	0.17,0.42	0.10 ^a (0.35)	-.04,0.21	3.10	.047	.04	0.39 (0.02,0.75)	0.00 (-0.36,0.36)
Plausibility	4.41 ^b (0.88)	4.16,4.62	3.73 ^a (0.85)	3.51,3.94	3.95 ^a (0.92)	3.76,4.19	8.10	<.001	.09	0.81 (0.42,1.17)	0.53 (0.15,0.88)

Notes. Only mean scores with a different superscript differ significantly ($p < .05$) from each other. CKD = common knowledge details. SHS = self-handicapping strategies

We carried out three more MANCOVAs with Veracity (Uninformed Truth Tellers vs Uninformed Lie Tellers vs Informed Lie Tellers) being the only factor for each of the three populations separately. Details, complications, common knowledge details, self-handicapping strategies, and plausibility were the dependent variables and the covariates were modality, experiment, being informed about the model statement, interpreter, preparation thoroughness, preparation time, motivation and rapport.

The analysis for *Lebanese* participants showed a significant multivariate Veracity effect, $F(10,258) = 3.22, p < .001, \eta_p^2 = .11$. At a univariate level, the effects for complications, and plausibility were significant, see Table 4. Compared to *uninformed* lie tellers, uninformed truth tellers reported more details and more complications. Their stories also sounded more plausible. Compared to *informed* lie tellers, uninformed truth tellers' stories sounded more plausible. No differences emerged when comparing uninformed and informed lie tellers.

The analysis for *Mexican* participants showed a non-significant multivariate Veracity effect, $F(10,248) = 1.48, p = .147, \eta_p^2 = .06$. None of the univariate effects were significant either, see Table 4, all $F_s < 2.59$, all $p_s > 0.79$

The analysis for *South-Korean* participants showed a significant multivariate Veracity effect, $F(10,332) = 2.49, p = .007, \eta_p^2 = .07$. At a univariate level, the effects for complications, self-handicapping strategies, and plausibility were significant, see Table 4. Compared to *uninformed* lie tellers, uninformed truth tellers reported more complications and fewer self-handicapping strategies. Their stories also sounded more plausible. Compared to *informed* lie tellers, uninformed truth tellers' stories sounded more plausible. No differences emerged when comparing uninformed lie tellers with informed lie tellers. The absence of an effect for Mexican participants implies that Hypothesis 4 was not supported.

4. Discussion

4.1 Verbal Veracity Indicators in Non-WEIRD Populations

The first aim of this article was to examine whether five cues that are diagnostic veracity indicators in WEIRD populations (details, complications, common knowledge details, self-handicapping strategies and plausibility) also emerge as such in Lebanese, Mexican and South-Korean populations. This was the case for the three cues to truthfulness: In all three populations truth tellers reported more details and more complications than lie tellers and their stories sounded more plausible. To our knowledge, veracity differences in plausibility were never examined before in non-WEIRD populations but details and complications emerged as cues to truthfulness in previous research examining non-WEIRD populations. Truth tellers reported more details than lie tellers in Chinese participants living in the UK (Leal et al., 2018), in Arab participants living in Israel (Leal et al., 2018, 2019; Vrij, Leal et al., 2021) and in South-Korean participants (Vrij & Vrij, 2020). Truth tellers reported more complications than lie tellers in Russian and South-Korean participants and in Hispanic participants living in the USA (Vrij & Vrij, 2020). In sum, there is growing evidence that details and complications are cues to truthfulness in both WEIRD and non-WEIRD populations.

Plausibility emerged as the strongest veracity indicators in all three non-WEIRD populations. This replicates research in WEIRD-populations that also has shown that plausibility is amongst the strongest verbal veracity indicators (Vrij, Deeb et al., 2020). Two reasons have been put forward to explain this

(Vrij, Deeb et al., 2020). First, plausible can be explained by a cluster of individual cues (complications, common knowledge details, self-handicapping strategies and details in the current set of analyses) and clusters of cues are typically better veracity indicators than individual cues (DePaulo & Morris, 2004; Hartwig & Bond, 2014). Second, when assessing plausibility, the context is taken into account and context is a strong veracity indicator (Blair et al., 2010).

Plausibility is widely used as a veracity assessment tool amongst practitioners, for example, in asylum seekers interviews in Australia and the European Union (Luker, 2013; Selim et al., 2022; UNHCR, 2013), yet it is typically ignored by researchers (Vrij, Deeb, et al., 2020; Vrij, Fisher, & Leal, 2022). Given that practitioners examine plausibility to make veracity judgements and research has shown it to have good potential as a veracity indicator, we urge researchers to start examining this cue (Vrij, Deeb, et al., 2020; Vrij, Fisher, & Leal, 2022).

It is good news for practitioners that the three cues to truthfulness (details, complications and plausibility) emerged as veracity indicators across different populations. Lie detection is already a difficult task and would become even more difficult if cues to truthfulness are population-dependent. However, the results showed that practitioners cannot ignore an interviewee's background. The frequency of reporting details and complications differed amongst the three populations, with Lebanese participants reporting far fewer details ($d = 1.43$) and complications ($d = 1.25$) than South-Korean participants. In other words, practitioners should consider the number of details and complications typically reported in a population before attempting to detect deceit by assessing details and complications.

Differences in reporting details across populations have been found before (Hope et al., 2021). For example, in two deception experiments, British interviewees reported more details than Arab participants living in Israel (Leal et al., 2018; Vrij, Leal, et al., 2021) and Chinese participants living in the UK (Leal et al., 2018). In two memory experiments, British participants reported more details than Arab participants from Lebanon (Hope, 2019), and Dutch participants reported more details than Ghanaian participants (Anakwah et al., 2020). Different theoretical perspectives explain differences in communication styles between populations, including Hall's (1976) distinction between high-context and low-context communication and Hofstede's (1983) collectivistic—individualistic culture distinction—see also Liu (2016). Population differences in reporting information can also be predicted via Grice's (1975, 1989) Cooperation Principle. According to Grice, communicating successfully requires speakers to follow four conversation rules (maxims): 1) Quality (be truthful); 2) Quantity (make communication as informative as is required); 3) Relation (be relevant); and 4) Manner (be perspicuous). Grice's work was developed for the English language, but several studies have shown that these maxims are not applied universally. For 'reporting details' the Maxim of Quantity is particularly relevant: Say not less or more than is required. Research has shown that it is often disregarded by non-English speakers, including Arabic (Al-Qaderi, 2015), Chinese (He, 2012) and

Indonesian (Herawati, 2013) speakers who all say less than required according to the Maxim of Quantity.

The results for two cues to deceit were poor: Self-handicapping strategies failed to become a veracity indicator in any of the three populations whereas common knowledge details discriminated truth tellers from lie tellers only in Mexican participants. Although we cannot explain why these two cues to deceit showed poor results, research with WEIRD populations showed that complications distinguish truth tellers from lie tellers better than common knowledge details and self-handicapping strategies (Vrij, Palena et al., 2021).

It is unfortunate that common knowledge details and self-handicapping strategies were not more effective veracity indicators because verbal cues to deceit are scarce. For example, all 19 CBCA criteria are cues to truthfulness (Amado et al., 2015), and so are seven out of eight RM criteria (Gancedo et al., 2021). The single cue to deceit examined in RM (cognitive operations) does not discriminate truth tellers from lie tellers (Gancedo et al., 2021). The only verbal cue to deceit that appears to be a diagnostic veracity indicator is the inconsistency variable measured in SUE (Hartwig et al., 2014). It would facilitate discriminating between truth tellers and lie tellers if practitioners can rely on a mixture of cues to truthfulness and deceit rather than just on cues to truthfulness. That is, at present lies can only be detected in speech content in an indirect way, through the absence of cues to truthfulness, but lie detection would become easier if lies can be detected directly through the presence of cues to deceit (Vrij, Fisher et al., 2022; Vrij, Granhag et al., 2022). Identifying verbal cues to deceit is a priority in future research according to verbal deception researchers (Nahari et al., 2019).

4.2 The Efficacy of Countermeasures

The second aim of this article was to examine whether lie tellers could successfully implement countermeasures when they were informed about the verbal cues complications, common knowledge details and self-handicapping strategies. The results showed that they could do this to some extent: More veracity differences emerged between uninformed truth tellers and uninformed lie tellers than between uninformed truth tellers and lie tellers who were informed about these three variables. However, in the latter comparison differences still emerged: Uninformed truth tellers reported more complications than informed lie tellers and their stories sounded more plausible.

The countermeasures effects were similar in Lebanese and South-Korean participants suggesting that informing participants about verbal veracity cues have similar effects across populations. The results for Mexican participants were different, because the uninformed truth tellers did not differ from the informed lie tellers. However, this cannot be seen as a successful use of countermeasures because uninformed truth tellers did not differ from uninformed lie tellers either. Participants' self-reported percentage of telling the truth in the interviews may give a possible explanation. The difference in reporting truth telling between truth tellers and lie tellers was considerably smaller in the Mexican sample ($d = 0.43$) than in the Lebanese ($d = 2.65$) and South-Korean ($d = 3.88$) samples. The smaller

this difference, the less likely it is that verbal veracity indicators will emerge.

A simple explanation for the small difference in percentage truth telling between Mexican truth tellers and lie tellers is that some participants misunderstood the veracity instructions. This was not the case. All Mexican truth tellers reported to have stayed for at least two nights in the city they discussed and all Mexican lie tellers reported never having been to the city they discussed. An alternative explanation is that the differences in the cultural dimensions among the three populations may have driven the results. Whereas Mexico, Lebanon, and South Korea all score high on conservatism in which societal harmony is prioritised, Mexico scores distinctively high on indulgence (having the World's second highest index after Venezuela; Hofstede, 1983; Hofstede et al., 2010). The indulgence dimension is defined as a sense of personal control and happiness in a society where freedom of speech and leisure are important and where norms are lenient and maintaining order is not prioritised (Hofstede, 2011). Perhaps, leniency in norms results in a flexible interpretation of the Veracity instructions given in the experiment.

Practitioners often inform us that they are worried about countermeasures. For them the present set of results is encouraging news, even more so because we gave lie tellers a good opportunity to use countermeasures. That is, we provided them with an article discussing the verbal cues we used to distinguish truth tellers from lie tellers. In real life, lie tellers are not given such a good opportunity. They will have to search the internet for possible cues to truthfulness and deceit and the chance that this search will lead to information about complications, common knowledge details and self-handicapping strategies seems small. We think it to be more likely that such a search leads to nonverbal cues to deceit because people typically associate more nonverbal than verbal cues with deceit (Strömwall et al., 2004; Taylor & Hick, 2007; Vrij et al., 2006).

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Appendices

Appendix 1. The Types of detail information sheet

Research has shown that truth tellers and liars often differ in speech content when recalling a story. In this document we briefly describe the main differences.

You can take as long as you wish to read this document and to think how to apply your knowledge about it in the interview. Good luck!

Speech content and deception (from Vrij, Leal, Jupe, & Harvey, 2018)

Total amount of information

Truth tellers typically provide *more details* than liars, because (i) liars lack the imagination to fabricate details that sound plausible or (ii) they are unwilling to provide many details out of fear that those details give leads to investigators that they are lying.

Complications, common knowledge details and self-handicapping strategies

Total amount of information is a generic measure that does not take into account the different types of detail truth tellers and liars report. In brief, truth tellers provide stories that include non-essential details that make the story more complex (complications). By comparison, liars provide details that are based on common knowledge, or justify why they cannot provide certain types of information (self-handicapping strategies).

A *complication* is “an occurrence that makes a situation more difficult than necessary” (“The air conditioning was not working properly in the hotel”). Complications are more likely to occur in truthful statements than in deceptive statements. Making up complications requires imagination, but liars may not have adequate imagination to do so. In addition, research examining liars’ interview strategies showed that liars prefer to keep their stories simple, but adding complications makes the story more complex. More examples of complications are: i)...” she was meant to get a sirloin and I was meant to get a rump but she wanted hers medium rare and they did it the wrong way round and when we tried to complain they didn’t like it” ii)...“when we got on to the M23 there was a lot of traffic there, I’m not sure what was causing the hold-up but yeah took a bit longer than expected to get there”, and iii)...“I remember my en-suite the toilet wouldn’t flush properly, so we had to call maintenance for them to try to sort it out”.

Common knowledge details refer to strongly invoked stereotypical information about events (“We visited the Louvre museum where we saw the Mona Lisa”). Liars are more likely to include common knowledge details in their statements than truth tellers. Truth tellers have personal experiences of an event and are likely to report such unique experiences. When they do so the statement is no longer scripted. If liars do not have personal experiences of the event they report, they then will draw upon general knowledge to construe the event (Sporer, 2016). In case liars do have personal experiences of the event, they may not report them due to their desire to keep their stories simple. More examples of common knowledge details are: i)...“we visited the haunted house and we went to London Eye” ii)...“we just went sightseeing to Bath Abbey and then just looked around there” and iii)...“yeah it was wonderful sightseeing. We went to the Colosseum”.

Self-handicapping strategies refer to explicit or implicit justifications as to why someone is not able to provide information (“I can’t remember; it was a while ago when this happened”, “Nothing unexpected happened; I am a very organised person”; “I fell asleep in the bus”). Liars are more likely to include self-handicapping strategies in their statements than truth tellers. For liars, who are inclined to keep stories simple, not having to provide information is an attractive strategy. However, liars are also concerned about their credibility and believe that admitting lack of knowledge and/or memory appears suspicious. A potential solution is to provide a justification for the inability to provide information. Note that the justification does not have to be made explicit. The example “I fell asleep in the bus” is an implicit justification for not being able to provide information. More examples of self-handicapping strategies are: i) “I’m not sure exactly what shops we went in because it was quite a while ago”, ii) “And then we just all sort of fell asleep in the car on the way back home” and iii) “We got there around the afternoon-ish and we looked around. And we went home after that because we were really tired because it’s quite tiring looking around and stuff”. (Examples 1 and 3 are explicit justifications and example 2 is an implicit justification.)

In summary, in a convincing story, complications are often included, whereas common knowledge details and self-handicapping strategies are largely absent.

Appendix 2. The interview protocols

In *Experiment 1* the interviewer started by saying “I will interview you about your trip to _____. Depending on your answers, we may decide to interview you a second time.” This was followed by two questions: “Please tell me in as much detail as possible everything you did to plan this trip? E.g. organising transportation, accommodation, where to visit and so on” and “Please tell me in as much detail as possible everything you did when you were at _____ from the moment you arrived to the moment you left.” The two questions were always asked in this order.

After finishing the second answer the interviewer said: “Thank you, I would like to ask you the questions once more but this time, before doing so, I am going to play you a model statement to give you an example of how much detail I would like you to include in your responses.” The interviewer then played the audiotaped model statement used by Leal et al. (2015). It was a detailed account of someone attending a Formula 2 motor racing event and lasted 1.30 minutes. The account was a spontaneous, unscripted, recall of an event truly experienced by the person. This model statement was followed by the same two questions as asked before the model statement, again always in the same order (the question about planning of the trip first).

In *Experiment 2* the interviewer started by saying “I will interview you about your trip to _____. Depending on your answers, we may decide to interview you a second time.” This was followed by the following question: “Please tell me in as much detail as possible everything you did when you were at _____ from the moment you arrived to the moment you left.” After the response the interviewer continued: “Thank you, I would like to ask you the questions once more but this time, before doing so, I am going to play you a model statement to give you an example of how much detail I would like you to include in your responses.” The interviewer then played the audiotaped model statement used by Leal et al. (2015) (also used in Experiment 1). After playing the model statement the interviewer continued: “I will ask you the questions once more about your trip to _____. When responding to the questions, please bear in mind the amount of detail provided in the model statement you just heard. Please can you tell me again in that amount of detail everything you did when you were at _____ from the moment you arrived to the moment you left”.

The interviewer started in *Experiment 3* by saying “I will interview you about your trip to _____. Depending on your answers, I may decide to interview you a second time so be as complete as possible when answering the questions.” This was followed by the following five questions which were always asked in the same order: (1) “Please tell me in as much detail as possible everything you did when you were at _____ from the moment you arrived to the moment you left?”; (2) “Tell me in as much detail as possible about your accommodation where you stayed, including the location and address if

you can remember, and what amenities (e.g., shops, restaurants, gyms) were nearby?"; (3) "Tell me in as much detail as possible everything you did to plan this trip in terms of organising where to visit and so on?"; (4) "Tell me in as much detail as possible everything you did to plan this trip in terms of organising transport and accommodation?"; and (5) "Finally, thinking about what you just told me, can you think of ways in which I can check the details you have told me? For example, this could be names/telephone numbers of witnesses, receipts, emails or photographs—basically anything I can check?"

Question 5 relates to verifiable sources. Since this was only measured in Experiment 3, we did not analyse the results of this variable in the present article. For this article, the answers to Question 5 were ignored, but see Vrij, Leal et al. (2022) for an analysis of this variable.