

**Proportion of complications in interpreters-absent and  
interpreter-present interviews**

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**Conflict of interest**

The authors have declared no conflict of interests

**Ethical approval**

All procedures were in accordance with the ethical standards of the University ethics committee and with the 1964 Helsinki declaration and its later amendments

**Informed consent**

Informed consent was obtained from all individual participants included in the studies

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### Abstract

Recently, researchers started searching for combinations of verbal cues to deceit and verbal cues to truth (Nahari et al., 2019). The proportion of complications (complications divided by complications + common knowledge details + self-handicapping strategies) is an example of such a combination as it includes one verbal cue of truth (complications) and two verbal cues of deceit (common knowledge details, self-handicapping strategies). In this article, we examined whether complications, common knowledge details, self-handicapping strategies as well as the proportion of complications differentiated truth tellers from liars in interpreter-absent and interpreter-present interviews. Both interpreter-absent and interpreter-present interviews take place frequently and it is important to know whether a lie detection tool works in both interview settings. For this purpose, we obtained three data sets (Vrij et al., 2017, 2018a, 2019) and aggregated the data. All four variables differentiated truth tellers from liars to a similar extent in interpreter-absent and interpreter-present interviews.

Key words: Deception; proportion of complications; interpreters

### **Proportion of complications in interpreters-absent and interpreter-present interviews**

The introduction of Criteria-Based Content Analysis (CBCA) represented a major breakthrough in verbal lie detection (Vrij, 2018). CBCA originated in Germany and Sweden in the 1950's (Undeutsch, 1982, 1989) and was introduced in English in 1988 (Köhnken & Steller, 1988). CBCA comprises 19 criteria thought to be more frequently present in truthful than deceptive statements. A meta-analysis, including 39 studies, supported this hypothesis for 17 out of 19 criteria, with the strongest effect for Criterion 3, total details (Cohen's  $d = .55$ ) (Amado, Arce, Fariña, & Vilarino, 2016). Compared to previous verbal cues to deception research, CBCA has at least two advantages. First, it is a standardised list examining a fixed set of criteria, rather than examining individual criteria in a random manner. Second, all criteria focused on units of information, rather than the use of specific words, such as negative words (e.g. denials), generalising terms (e.g. 'always') or self-references (e.g. 'I'). The advantage of the second point is that it brings lie detection more in alignment with investigative interviewing, because the aim of an investigative interview is to obtain as much accurate information as possible (Fisher, 2010; Vrij, Hope, & Fisher, 2014).

CBCA has at least one disadvantage. All criteria indicate truth (truth tellers report them more than liars) and lie criteria (liars report them more than truth tellers) are absent. This has serious limitations for using CBCA in real life. The problem is that a cut-off score to decide whether or not someone is telling the truth or lying cannot be established. That is, it is impossible to determine the threshold of how many criteria need to be present to conclude that someone is

telling the truth. In CBCA an attempt is made to overcome this issue by using a so-called Validity Checklist, but that checklist is not without problems (Vrij, 2005, 2008).

Reality Monitoring (RM, Johnson, 1988, 2006), a second verbal veracity tool frequently examined, attempted to overcome this problem because it includes one lie criterion: Cognitive operations. However, a meta-analysis of eight RM studies showed that cognitive operations does not appear to distinguish truth tellers from liars (Masip, Sporer, Garrido, & Herrero, 2005). If lie criteria did exist, it would give practitioners more confidence to make decisions in individual cases (Vrij, 2016). That is, a low frequency of truth criteria combined with a high frequency of lie criteria would give practitioners more confidence to decide that someone is lying than just the low frequency of truth criteria would. Vice versa, a high frequency of truth criteria combined with a low frequency of lie criteria would give practitioners more confidence to decide that someone is telling the truth than just the high frequency of truth criteria would.

Unsurprisingly, verbal deception researchers pleaded for the search for lie criteria to include in tools that includes both cues to truth and cues to deceit (Nahari et al., 2019). Fortunately, in recent years some have emerged. One tool that includes cues to truth and deceit is the Verifiability Approach (VA, Nahari 2018). The core of the VA is that truth tellers report more than liars details they think can be checked by investigators to verify their whereabouts (e.g., “I saw my neighbour Karl in the shop”), whereas liars are inclined to report more than truth tellers details they think cannot be checked by investigators (“There were some other people in the shop”). An overview of 13 VA studies has supported this assumption and has shown that truth tellers reported more verifiable details than liars and that liars reported more unverifiable details than truth tellers (Vrij & Nahari, 2019).

Another recent development is examining the proportion of complications which consists of one cue to truthfulness (complications) and two cues to deceit (common knowledge details and self-handicapping strategies). Research has shown the proportion of complications to be higher in truth tellers than in liars (Vrij, Leal, Jupe, & Harvey, 2018b). For veracity assessment tools to be used in real life it is important to examine them in different settings. One important distinction is interpreter-absent and interpreter-present interview settings. In this increasingly globalised world it frequently occurs that interviewer and interviewee do not share the same language, and one way to resolve the language barrier is to use an interpreter (Ewens et al., 2016). We obtained three data sets in which the proportion of complication was examined in interpreter-absent and interpreter-present interviews (Vrij et al., 2017, 2018a, 2019). The findings were somewhat erratic when the three individual studies were analysed but this does not rule out that a consistent pattern emerges when the three data sets are aggregated. We assumed that the presence of an interviewer could affect the occurrence of complications in particular (Interpreter main effect), but expected this to occur to the same extent in both truth tellers and liars (absence of a Veracity x Interpreter interaction effect). However, we could not be certain about this without further testing. Below we briefly introduce the three variables and how they could be related to the presence of an interpreter and Veracity.

A complication is an occurrence that makes a situation more difficult to report than necessary (e.g., “On my way back I got lost and could not find the entry to the tube station”). Complications are typically non-essential information. That is, even when someone leaves out reporting complications, s/he can still give a detailed account of what s/he has experienced. Because complications are not essential, they may be left out in interpreter-present interviews. Interviewees may be inclined to leave them out because they may choose to be more concise

when talking to an interpreter (REFERENCE WITHDRAWN FOR ANONYMOUS REVIEW); whilst interpreters may decide not to report them when focusing on translating the main content of the interviewee's report. Vrij et al. (2018a, 2019) found that interpreter-present interviews resulted in fewer complications than interpreter-absent interviews, whereas a null effect occurred in Vrij et al. (2017).

Common knowledge details refer to strongly invoked stereotypical information about events (e.g., "We went to the top of the Eiffel Tower from where we had a wonderful view of Paris"). The relationship between common knowledge details and interpreter is not straightforward to predict and we can only speculate. Examinees' tendency to be concise when talking to an interpreter could result in more common knowledge details reported in interpreter-present than in interpreter-absent interviews, because scripted accounts could provide a good understanding of somebody's experiences without providing much detail. Alternatively, the presence of an interpreter could result in fewer common knowledge details because the presence of an interpreter slows down the interview and gives the interviewee more time to fill in some details so that the story becomes less scripted. In Vrij et al. (2017, 2018a) it was found that interpreter-present interviews resulted in fewer common knowledge details than interpreter-absent interviews, whereas a null effect occurred in Vrij et al. (2019). Self-handicapping strategies refer to justifications as to why someone is not able to provide information ("I can't tell you about the beginning of the BBQ, because I arrived late"). The relationship between self-handicapping strategies and the presence of an interpreter is not straightforward to predict either. The inclination to be concise may also result in reporting more self-handicapping strategies. Alternatively, the presence of an interpreter could result in fewer self-handicapping strategies because the slower interview procedure gives interviewees time to think how to avoid reporting

self-handicapping strategies. In Vrij et al. (2017) it was found that interpreter-present interviews resulted in fewer self-handicapping strategies than interpreter-absent interviews, whereas null effects occurred in Vrij et al. (2018c<sup>1</sup>, 2019). In sum, we predicted that interpreter-present interviews, compared to interpreter-absent interviews, would result in fewer complications (Hypothesis 1), whereas we explored the relationship between the presence of an interpreter and common knowledge details and self-handicapping strategies.

Regarding the relationship between Veracity and complications, common knowledge details and self-handicapping strategies, truth tellers are thought to report more complications than liars, due to liar's tendency to keep their stories simple (Hartwig, Granhag, & Strömwall, 2007). Liars are thought to report more common knowledge details than truth tellers, because liars lack personal experiences to add to their descriptions of events. Truth tellers have personal experiences of an event and are likely to report them when describing these events (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). Adding personal experiences when describing an event makes those descriptions less scripted. Liars are thought to report more self-handicapping strategies than truth tellers. Liars are inclined to keep stories simple, but are also concerned that just admitting lack of knowledge and/or memory appears suspicious (Ruby & Brigham, 1998). A potential solution is to provide a justification for the inability to provide information. Whether the presence of an Interpreter affects the Veracity effects regarding complications, common knowledge details and self-handicapping strategies –for this article a more important question than the occurrence of Veracity main effects- will be explored. These three dependent variables can be compiled into one index, the proportion of complications (i.e. the proportion of cues to truthfulness):  $\text{Complications} / (\text{complications} + \text{common knowledge details} + \text{self-handicapping strategies})$ . This proportion score should be higher in truth tellers than in liars (as was found in

all three studies on which the data set was based); we explored how the presence of an interpreter affects the proportion of complications score on the aggregated data set.

## Method

### Participants

A total of 608 University students (135 males, 466 females and seven unknown) took part in the three studies. Their age ranged from 18-42 years with an average age of  $M = 21.82$  years ( $SD = 3.41$ ). The experiment took place in three different universities in Russia, South Korea and Texas, USA, and the participants were of Russian ( $n = 239$ ), Korean ( $n = 240$ ), and Hispanic ( $n = 129$ ) origin.

### Procedure

The three studies on which the current data set was based all used the same procedure. We will provide here a synopsis of the procedure and refer to the original articles for the full details (Vrij et al., 2017, 2018a, 2019). Participants were interviewed about an alleged trip to a city they made during the last twelve months. Truth tellers ( $n = 303$ ) really had made the trip they discussed, whereas liars ( $n = 305$ ) did not. In fact, they had never visited the city they talked about before. Both truth tellers and liars were given time to prepare themselves for the interview for which a computer with internet access was available.

The interview protocols used in the three studies differed somewhat, which is why we included Study as a covariate in the analysis. Despite these differences, all interview protocols invited interviewees to discuss their trip in as much detail as possible. In the three studies the participants were interviewed either in their own native language by an interviewer who shares their native language ( $n = 301$ ) or in their own native language by an English-speaking interviewer through an interpreter ( $n = 307$ ). In total, three interpreters were used in each study,



one in each country. The Korean and Russian interpreters were the same in all three studies. The Korean interpreter was a professional interpreter and the Russian interpreter spoke fluent English. The same Hispanic interpreter was used in Vrij et al. (2017, 2018a) but the Hispanic interpreter in Vrij et al. (2019) was a different person. The two Hispanic interpreters in the three studies were both English – Hispanic bilingual. The interpreters were instructed to use a long consecutive interpreter style (Viezzi, 2012). In this interpreter style, the interviewee provides chunks of information at a time with the interpreter writing down what the interviewee says. During a natural pause in the interviewee’s speech, the interpreter interprets the chunk of information consulting his/her notes.

In the interpreter condition, one British interviewer was used, and in the non-interpreter condition one Russian, one Korean and one Hispanic interviewer were used. The British and Russian interviewers were the same in all three studies; the same Korean interviewer was used in Vrij et al. (2017, 2018) but a different interviewer was used in Vrij et al. (2019). Three different Hispanic interviewers were used in the three studies. Prior to the experiment the British interviewer -a very experienced interviewer who has interviewed in many experiments before- instructed the other interviewers how to conduct the interview. They were instructed to be friendly and not to interrupt the interviewee. Practise sessions took place until the British interviewer was satisfied with the interview style of each interviewer. That is, she was satisfied with the demeanour of the interviewers (appeared friendly) and the opportunities they gave to the interviewees to talk (no interruptions). Each study was carried out at three locations: Russia, South Korea and Texas, USA. We included the country where the experiment was conducted (Russia, South Korea and Texas, USA) as a covariate in the analysis.

In the three studies, different manipulations took place to encourage interviewees to provide more details: The model statement in Vrij et al. (2017) and the use of sketches in Vrij et al. (2018a, 2019). The effects of these manipulations have been discussed in the articles by Vrij and colleagues and will not be discussed here. We introduced in the current analyses the presence of a manipulation (yes or no) as a covariate.

### **Coding**

The coders, all from the UK, were blind to the Veracity condition in the three studies. A complication is an occurrence that makes a situation more difficult to report than necessary. For example, the sentence “The hotel beach was full of little stones which made it painful to walk on” contains one complication (stones makes walking painful). Common knowledge details refer to strongly invoked stereotypical knowledge about events. The sentence “We also visited a car museum with different Soviet cars” counts as one script. Self-handicapping strategies refer to explicit or implicit justifications as to why someone is not able to provide information “I’m not very good at remembering names, so I will just tell you like common details” (Vrij et al., 2018b). Two coders coded all transcripts independently from each other and discussed their disagreements. Reliability between the coders was measured via Intraclass correlation coefficients (ICC). Reliability in all three studies was good for complications (ICC’s ranged from .74 to .92) and satisfactory for common knowledge details (ICC’s ranged from .64 to .70) and self-handicapping strategies (ICC’s ranged from .68 to .85), see Vrij et al. (2017, 2018a, 2019). For all dependent variables, repetitions were never coded. We calculated the total number complications, common knowledge details and self-handicapping strategies reported in the entire interview. These total numbers have not been not reported in any of the individual articles but are reported in Vrij and Leal (2019) where the factors Veracity and Country (Russia, South Korea

and Texas) on the aggregated data were examined. As a result, we do not discuss in the current article the Veracity main effects, and will only discuss the Interpreter main effect and the Veracity x Interpreter interaction effects. The proportion of complications was calculated as follows: complications/ (complications + common knowledge details + self-handicapping strategies).

## Results

A MANCOVA was carried out with Interpreter and Veracity as between-subjects factors, the four variables listed in Table 1 as dependent variables, and Study, Country and Presence of manipulation as covariates. We also report the Cohen  $d$ 's and Bayes Factors,  $BF_{10}$ . A  $BF_{10}$  smaller than 1 indicates evidence for the absence of an effect (support of the null hypothesis);  $BF$ s between 1 and 3 suggest weak evidence,  $BF$ s between 3 and 10 suggest strong evidence and  $BF$ s  $> 10$  very strong evidence for the alternative hypothesis (Jeffreys, 1961). We used the default Cauchy's prior of .707 for the Bayesian  $t$ -tests (Lakens, 2016).

The multivariate Interpreter effect was significant,  $F(4, 598) = 6.61, p < .001, \eta_p^2 = .04$ . Table 1 shows strong evidence that interpreter-present interviews result in fewer complications, fewer common knowledge details and fewer self-handicapping strategies than the interpreter-absent interviews. This supports Hypothesis 1. There is no evidence to suggest that the proportion of complications differ between interpreter-absent and interpreter-present interviews.

The multivariate Veracity effect,  $F(4, 598) = 39.82, p < .001, \eta_p^2 = .21$  and the multivariate Interpreter x Veracity interaction effect,  $F(4, 598) = 3.90, p = .003, \eta_p^2 = .03$  were both significant. Since the interaction is more informative, we only discuss those effects. At a univariate level, the effect for complications was significant,  $F(1, 601) = 4.05, p = .045, \eta_p^2$

= .01, but the other effects were not, all  $F$ 's < 1.92, all  $p$ 's > .166. The Veracity effects for the interpreter-absent and interpreter-present conditions separately are presented in Table 1.

In the interpreter-absent interviews, very strong evidence emerged that truth tellers include more complications, fewer common knowledge details and fewer self-handicapping strategies in their reports than liars. The proportion of complications was also higher for truth tellers than for liars. Despite the significant Veracity x Interpreter effect for complications, a very similar pattern of results emerged in the interpreter-present interviews.

### **Discussion**

The presence of an interpreter resulted in fewer complications, fewer common knowledge details and fewer self-handicapping strategies. These findings are not consistent. Interviewee's inclination to be more concise while being interviewed via an interpreter could explain why fewer complications occurred in interpreter-present interviews than in interpreter-absent interviews, but the same reasoning should also result in more common knowledge details and more self-handicapping strategies in interpreter-present interviews, whereas, actually, the opposite effect occurred. In the Introduction we suggested that this is possibly due to the fact that the presence of an interpreter slows down the interview process which gives interviewees more time to think what to say, but we acknowledge that this is pure speculation. An alternative speculative explanation, at least for the decrease in common knowledge details, is that the inclination to be concise results in less units of information, including fewer common knowledge details. Alternatively, again to explain the decrease in common knowledge details, perhaps the interpreter sometimes added details so that common knowledge details were no longer present. The British interviewer noticed that sometimes interpreters explained things to her, particularly when a word was not understood or not known in the British culture.

Importantly, the presence of an interpreter did not affect the Veracity effects regarding complications, common knowledge details, self-handicapping strategies and the proportion of complications. That is, similar differences between truth tellers and liars regarding these four variables occurred in interpreter-present and interpreter-absent interviews. This is good news for practitioners who want to pay attention to these variables for lie detection purposes. Lie detection is already complicated enough, and it only will become more complicated if using particular tools depend on the settings in which they are used.

Research into examining complications, common knowledge details and self-handicapping strategies only just started, with only a handful studies available, all coming from the same lab (Vrij et al., 2017, 2018a, b, c, 2019). It is important to replicate their findings in other labs, because it will contribute to the robustness of the tool. Hopefully this article will stimulate research in this area. It is important that in these studies truth tellers and liars report self-generated stories rather than recalling video-footage, what often happens in deception research (Vrij, 2008). The benefit of recalling video-footage is that the ground truth is known. That is, by comparing the video footage with the verbal reports it can be checked whether the truth tellers actually told the truth and liars actually lied. The disadvantage is that such scenarios are not suitable for measuring complications, because the number of complications truth tellers potentially can report are defined by the number of complications in the video footage. In terms of self-generated stories, they probably need to cover a minimum time span, because the shorter the time period someone recalls, the less likely it is that complications did occur.

### **Acknowledgement**

This work is funded by the High-Value Detainee Interrogation Group, DJF-15-1299-V-0010271 awarded to the University of Portsmouth (UK). Any opinions, findings, conclusions, or

recommendations expressed in this article are those of the authors and do not necessarily reflect the views of the U.S. Government.

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Proportion of complications in interviews with interpreters

Table 1

*Dependent Variables as a Function of Interpreter: ANOVA Results*

	Interpreter absent (n = 301)			Interpreter present (n = 307)			<i>F</i>	<i>p</i>	$\eta_p^2$	<i>d</i>	<i>BF</i> <sub>10</sub>
	<i>M</i>	<i>SD</i>	95% CI	<i>M</i>	<i>SD</i>	95% CI					
<b>Total sample</b>											
Complications	9.40	10.35	8.45,10.32	7.32	6.86	6.41,8.27	9.25	.002	.02	0.24 (0.07,0.39)	5.62
Common knowledge details	5.50	3.46	5.14,5.88	4.68	3.36	4.31,5.04	10.05	.002	.02	0.24 (0.08,0.40)	6.34
Self-handicapping strategies	0.65	0.96	0.55,0.74	0.45	0.76	0.36,0.54	8.34	.004	.01	0.23 (0.07,0.39)	3.47
Proportion of complications	0.52	0.27	0.50,0.55	0.53	0.28	0.51,0.56	0.24	.628	.00	0.04 (-0.12,0.19)	0.10
<b>Interpreter absent</b>	Truth tellers (n = 151)			Liars (n = 150)							
	<i>M</i>	<i>SD</i>	95% CI	<i>M</i>	<i>SD</i>	95% CI					
Complications	12.85	12.96	11.30,14.44	5.91	4.72	4.33,7.47	38.03	< .001	.11	0.71 (0.47,0.93)	4.14 <sup>6</sup>
Common knowledge details	4.60	3.21	4.09,5.15	6.41	3.47	5.86,6.92	21.60	< .001	.07	0.54 (0.30,0.76)	3934.87
Self-handicapping strategies	0.36	0.61	0.21,0.51	0.93	1.14	0.78,1.08	29.03	< .001	.09	0.62 (0.38,0.85)	114723.36
Proportion of complications	0.63	0.26	0.59,0.67	0.41	0.22	0.38,0.46	59.54	< .001	.17	0.91 (0.66,1.14)	6.98 <sup>10</sup>
<b>Interpreter present</b>	Truth tellers (n = 152)			Liars (n = 155)							
Complications	9.45	8.07	8.38,10.45	5.23	4.55	4.25,6.29	31.48	< .001	.09	0.65 (0.41,0.87)	303491.37
Common knowledge details	3.96	3.03	3.43,4.44	5.39	3.52	4.92,5.92	17.01	< .001	.05	0.44 (0.20,0.65)	120.26
Self-handicapping strategies	0.26	0.57	0.14,0.37	0.65	0.87	0.53,0.76	21.43	< .001	.07	0.53 (0.29,0.75)	2774.45
Proportion of complications	0.65	0.26	0.61,0.69	0.41	0.25	0.38,0.45	68.04	< .001	.18	0.94 (0.69,1.16)	7.78 <sup>11</sup>

<sup>1</sup> Vrij et al. (2018a) and Vrij et al. (2018c) describe different parts of the same dataset. Self-handicapping strategies are only reported in

Vrij et al. (2018c).