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**RUNNING HEAD: Verifiability in insurance settings**

**Applying the Verifiability Approach to insurance claims settings: Exploring  
the effect of the information protocol**

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### Abstract

**Purpose.** Lie detection in insurance claim settings is difficult as liars can easily incorporate deceptive statements within descriptions of otherwise truthful events. We examined whether the Verifiability Approach could be used effectively in insurance settings. According to the Verifiability Approach, liars avoid disclosing details that they think can be easily checked, whereas truth tellers are forthcoming with verifiable details.

**Method.** The study experimentally manipulated notifying claimants about the interviewer's intention to check their statements for verifiable details (the 'Information Protocol'). It was hypothesised that such an instruction would (i) encourage truth tellers to provide more verifiable details than liars and to report identifiable witnesses who had witnessed the event within their statements, and (ii) would enhance the diagnostic accuracy of the Verifiability Approach.

Participants reported 40 genuine and 40 fabricated insurance claim statements, in which half the liars and truth tellers were notified about the interviewer's intention to check their statements for verifiable details.

**Results.** Both hypotheses were supported. In terms of accuracy, notifying claimants about the interviewers intention to check their statements for verifiable details increased accuracy rates from around chance level to around 80%.

**Conclusion.** The VA, including the information protocol, can be used in insurance settings.

Applying the Verifiability Approach to insurance claims settings:  
Exploring the effect of the information protocol

Accurately discriminating between deceptive and genuine statements is difficult but advantageous in a variety of domains, including within insurance claims contexts. The scientific examination of deception detection in insurance claims is in its infancy and much of the forensic lie detection literature has focused upon police-suspect interview contexts (Vrij & Granhag, 2012, 2014; Vrij, Granhag & Porter, 2010). This is unfortunate given that the loss to the UK economy, due to insurance-claims fraud, is estimated at £2.1 billion per annum (Association of British Insurers [ABI], 2012) and that, when questioned, 20% of insurance holders claimed they would consider making an exaggerated or completely false insurance claim in the future (ABI, 2009). The purpose of the current study is to examine a new approach to lie detection, the Verifiability Approach ([VA], Nahari & Vrij, 2014; Nahari, Vrij & Fisher, 2014a, b), in an insurance claims setting. Specifically, we tested the assumption that the information protocol (i.e., informing claimants that the verifiability of their statements would be checked and used as the basis of credibility assessments; see Nahari et al., 2014b) moderates the utility of the VA in insurance claims settings.

### **The verifiability approach**

The VA (Nahari & Vrij, 2014; Nahari et al., 2014a, b) is predicated on two core assumptions regarding the interviewees' mental strategies. First, liars believe that 'richness of detail' is often used to render credibility assessments. This is supported by empirical findings; detailed accounts are more likely to be

believed (Bell & Loftus, 1988). Thus, to convey an honest impression, liars are motivated to provide a richly detailed report (liars reported such a strategy in Nahari, Vrij and Fisher, 2012). Second, unlike truth tellers who can freely report verifiable details, liars prefer to avoid including too many details out of fear that investigators will check such information and discover their deceit (Masip & Herrero, 2013; Nahari et al., 2012). This puts liars in an information management dilemma. On the one hand, they are motivated to provide lots of details to maximise the chance of being believed. On the other hand, they are motivated to withhold details to minimise the chance of being caught. A potential solution for the liar is to strategically withhold verifiable details and be forthcoming with details that cannot be verified. By calibrating their respective verbal strategies in this manner, it is predicted that liars and truth tellers will differ with respect to their information management strategies (Granhag & Hartwig, 2008; Hartwig, Granhag, Strömwall & Doering, 2010); that is, truth tellers will be more forthcoming with verifiable details than liars. Research from police-suspect interviewing contexts has provided support for this assumption; liars disclose fewer potentially verifiable details in their statements than truth tellers (Nahari & Vrij, 2014; Nahari *et al.*, 2014a, b).

### **Applying the verifiability approach to the insurance claims context**

Generalising from one domain of lie detection (i.e., police-suspect settings) to another (i.e., insurance claims settings) is potentially hazardous. Insurance settings differ in one fundamental aspect from police settings. Due to the obvious asymmetry of information between the insurer and the claimant, the insurance investigators do not know when the reported incident (e.g., loss, theft or damage) occurred (Nahari, Leal, Vrij, Warmelink & Vernham, 2014). This is

unlike police-suspect interviewing when the investigators often know when the crime occurred (e.g., the timing of a robbery or assault). Thus, in police settings the emphasis is upon suspects to demonstrate that they were at a location other than the crime scene when the transgression took place. Liars making use of an embedding strategy in a police-suspect context (e.g., claiming to be at a birthday party at the time the robbery occurred) risk contradicting outright known facts. Conversely, the asymmetry in insurance settings allows a liar to choose a truthful event from memory and to embed a lie about the insurance incident into this event. Basing deception upon truthful previous experiences is a preferred strategy amongst liars and is referred to as *embedded lies* (Leins, Fisher & Ross, 2012; Vrij, 2008).

Research has shown that telling embedded lies reduces the utility of well-established verbal veracity tools that assess overall vividness of details, such as Reality Monitoring (Nahari, Vrij & Fisher 2012). This is not surprising as a central assumption of Reality Monitoring – that a fabricated report originates from internal processes (Johnson & Raye, 1981; Vrij, 2008) – is violated in cases where an embedded lie is told (i.e., when real memories are drawn upon; Leins et al., 2012). In insurance settings, the claimant can fraudulently claim that she/he lost his/her phone at a birthday party that she/he had actually attended (Leal, Vrij, Warmelink, Vernham & Fisher, 2015). In this case, a vividly detailed and verifiable account of the birthday party does not say anything about the truthfulness of the insurance claim. Thus, the ability to embed ones deception allows a claimant to temporally displace verifiable details and may reduce the ability of the VA to discriminate between truths and lies (Nahari, Leal et al., 2014).

In the first application of the VA to the insurance claims domain it was found that verifiable details did not discriminate between liars and truth tellers (Nahari, Leal et al., 2014). The authors reasoned that liars used embedding strategies, which allowed them to report sufficient checkable detail to appear credible due to the context in which the lie is told (see Nahari & Vrij, 2015). Recently, Vrij, Nahari, and Isitt (2015) replicated Nahari, Leal et al.'s (2014) insurance based experiment, but employed the 'information protocol' (Nahari, Vrij & Fisher, 2014) from police-suspect research. Specifically, Vrij et al. (2015) instructed all claimants before their interview that the verifiability of their statements details would be checked and used as the basis of credibility assessments. Interestingly, Vrij et al. (2015) found that truth tellers included more verifiable details in their reports than liars.

To explain the discrepancy between their findings and the null findings reported by Nahari, Leal et al. (2014), Vrij et al. (2015) suggested that the information protocol manipulation moderates the effectiveness of the lie-detection tool by eliciting more additional verifiable details from truth tellers than liars. Without informing claimants about the interviewers intention to analyse the statements for checkable detail, truth tellers may disclose little verifiable information (e.g., Nahari, Leal et al., 2014). If so, liars and truth tellers differ little in terms of the verifiability of their statements. However, if truth tellers are informed that reporting checkable detail is important via the information protocol, they are encouraged to report such verifiable information. Critically, even if liars are similarly informed, it remains problematic for them to be forthcoming with large quantities of such detail because checkable detail can potentially threaten their credibility (Nahari et al., 2014a, 2014b). This is

especially true regarding the core events surrounding actual loss where potential witnesses can clearly jeopardise the liar's credibility (Nahari, Leal et al., 2014). As a result, informing claimants of the intention of the interviewer to analyse verifiable details should result in different verbal behaviours from liars and truth tellers. Although this explains the discrepancy of previous results concerning the VA in insurance claims contexts, Vrij et al. (2015) did not manipulate the information protocol. Therefore its effect on the number verifiable details amongst liars and truth tellers was not empirically tested in the insurance context. The current study examines this experimental manipulation.

Based upon previous findings, we expect an interaction between the information protocol and veracity regarding the reporting of verifiable detail. Specifically, we predict that when the information protocol is withheld from participants, liars and truth tellers will not differ in the number of verifiable details they report (as observed in Nahari, Leal et al., 2014). However, when interviewees are provided with the information protocol, truth tellers will report more verifiable details than liars (as observed in Vrij et al., 2015) (Hypothesis 1). As such, it is predicted that when the information protocol is provided, the VA will be able to discriminate between more true and false statements than when it is withheld (Hypothesis 2).

Finally, according to the VA, truth tellers can be expected to include witnesses who can be identified in their claims to a greater extent than liars (Nahari, Leal et al., 2014). Because the information protocol primes suspects to include any available checkable details (including witnesses who can be identified), we predict that informed truth tellers will mention witnesses who can be identified more than informed liars, whereas uninformed liars and

uninformed truth tellers will report similar numbers of un-witnessed incidents (Hypothesis 3).

## Method

### Participants

A total of 86 participants from the University's undergraduate, postgraduate and staff communities were recruited for the study, six of which were discarded prior to analysis<sup>i</sup>, leaving a total of 80 participants (58 females and 22 males) aged between 18 and 40 years ( $M=21.36$ ,  $SD=4.13$  years).

### Procedure

Participants were recruited via adverts on the University's online participant pool. Individuals arrived at the laboratory at pre-arranged times and were informed that the study was about detecting deception within insurance claim settings. Each participant was given an information sheet about the study and where asked to give informed consent.

In order to allocate participants to the truthful or deceptive condition, each participant was asked the following; 'Has any item of yours, worth between £100 and £1000, been lost or stolen in the last three years?' Participants who answered 'yes' were allocated to the truth teller condition, while participants who answered 'no' were allocated to the lie condition. Data collection continued until 40 participants who had genuinely experienced a loss (i.e., truth tellers) had been recruited. This resulted in 46 participants who reported they had not experienced a genuine loss. All 46 of these participants were assigned to the liar condition and were interviewed, but all the data pertaining to the final six participants was discarded and not analysed. No difference in age  $t(78)=.24$ ,  $p = .809$ , or gender,  $\chi^2(1, n = 80) = 2.25$ ,  $phi = 0.168$ ,  $p = 0.133$ , emerged between



truth tellers and liars. Participants were then randomly allocated into either the informed (provided the information protocol) or uninformed (protocol withheld) conditions.

*Uninformed Truth Tellers* ( $N= 20$ ) were asked to imagine that they were submitting a claim about their lost/stolen item to an insurance company. They were asked to type a statement about the real incident of loss/theft in as much detail as possible. Participants were informed that they needed to convince the insurance investigator that they were being honest.

*Informed Truth Tellers* ( $N= 20$ ) were additionally warned that the investigator would read their statement carefully and would check if the details provided could be verified “We know from research that liars prefer to avoid providing details that can be verified whereas truth tellers prefer to provide details that can be verified. Therefore the interviewer will check carefully to what extent the details you provide can be verified”. Specifically, it was explained that verifiable details were activities that were (i) documented and therefore checkable (e.g., phone calls, cash withdrawal from ATM machines etc.), or when the interviewee said that the activities were (ii) carried out with (an)other identifiable person(s) who can be traced (e.g., in contrast to a stranger), (iii) witnessed by at least one other identifiable and traceable person or (iv) recorded by CCTV cameras (Nahari et al., 2014a, 2014b). Details that do not meet at least one of these criteria are classified as unverifiable (Nahari, Leal et al., 2014). Interviewees were also informed that the interviewer may check the occurrence of some or all of the details provided in the statements.

*Uninformed Liars* ( $N= 20$ ) were asked to imagine that they were submitting a claim about their lost/stolen item to an insurance company. They

were asked to type a statement about a fabricated incident of loss/theft in as much detail as possible. Participants were informed that they needed to convince the insurance investigator that they were being honest.

*Informed Liars* ( $N=20$ ) were provided the same additional information as informed truth tellers.

The participants wrote statements which were subsequently classified into three types of events: (i) losses in a public place, (33 truth-tellers and 31 liars), (ii) losses due to being broken into (six truth-tellers and seven liars), and (iii) losses due to assault (one truth-teller and two liars). Fisher's Exact Test revealed no statistical differences between truth-tellers and liars in the type of event they discussed,  $\chi^2(2, n = 80) = 1.344, phi = 0.126, p = .527$ .

After typing their statements the participants completed a post-interview questionnaire. This assessed participant's (i) honesty during the interview (as a manipulation check); (ii) belief that verifiable detail would be used to base credibility assessments (a manipulation check); (iii) motivation during the interview to be convincing; (iv) perceived level of success in convincing the interviewer of their honesty; (v) perceived difficulty in providing verifiable details; and (vi) prevalence of bluffing (i.e., providing false verifiable details) as a strategy amongst participants.

### **Coding the witnessing status of the incident**

Following Nahari, Leal et al. (2014), each statement was coded dichotomously, with respect to if an identifiable other person had witnessed the event or not (witnessed versus un-witnessed). A statement was judged un-witnessed if the loss occurred when the claimant was (i) alone or (ii) if the

claimant failed to inform an identifiable other of the loss during, or subsequent to, the event. Statements were judged witnessed if (i) identified others were present and witnessed the event, or (ii) if the claimant informed an identifiable other of the loss during or after the event (e.g., called the police). One coder scored all the statements whilst a second coder scored a random 20% of the statements for witnessing status. Both coders were blind to the veracity of the statements. An inter-rater reliability analysis using the Kappa statistic was performed to determine consistency among raters. Agreement between the coders was good, Kappa = 0.75 ( $p = 0.002$ , 95% [CI 0.412, 1.000]).

### **Coding the verifiability of statements**

All statements were rated by one coder (blind to the experimental conditions) who scored the occurrence of perceptual detail (information about what was seen, heard, felt and smelt during the described activities), spatial detail (information about locations or the arrangement of persons and/or objects) and temporal details (information about when the event happened and explicit descriptions of the sequence of various events) that potentially could or could not be verified. The coders did not distinguish between these three categories of detail because no hypotheses about these three subcategories were formulated. Verifiable details were activities that were (i) documented and therefore checkable (e.g., phone calls, cash withdrawal from ATM machines etc.), or when the interviewee said that the activities were (ii) carried out with (an) other identifiable person(s) who can be traced, (iii) witnessed by at least one other identifiable and traceable person or (iv) recorded by CCTV cameras (Nahari et al., 2014a, 2014b). Details that do not meet at least one of these criteria are classified as unverifiable (Nahari, Leal et al., 2014). Importantly, the

definitions for verifiable and unverifiable details that were used for coding were identical to those given to the informed participants. A second coder also marked a second, random sample (20%) of the statements for details that could or could not be verified.

Inter-rater reliabilities between the two coders for the occurrence frequency of detail that could or could not be verified were measured via intra-class correlation coefficients (ICC). The ICC for the coders was excellent for both verifiable detail (ICC= .97) and unverifiable detail (ICC= .90). The ICC for the coders for total detail (the sum of verifiable and unverifiable detail) was also excellent (ICC = .93).

Additionally, we calculated the percentage verifiable detail (total verifiable detail/total detail) per statement. The percentage of verifiable detail per statement could range from 0 to 1 with a score of .50 indicating the same number of verifiable and unverifiable details in a statement. A score above .50 indicates the participant reported more verifiable than unverifiable details whereas a score below .50 indicates the participant reported less verifiable detail than unverifiable detail in their statement.

## Results

### Manipulation checks

#### Veracity manipulation check.

Truthful claimants overwhelmingly reported being more honest (they reported that 99.25% of their statement was truthful,  $SD = 2.66\%$ , 95% CI [98.29%, 100.00%]) than deceptive claimants (they reported that 25.75% of their statements was truthful,  $SD = 32.80\%$ , 95% CI [16.34%, 35.59%]),  $t(78) =$

14.12, Cohen's  $d = 3.15$ ,  $p = 0.001$ . This supports the validity of the veracity manipulation.

#### **Information manipulation check.**

Informed participants (63.00% on a 0-100% scale ( $SD = 29.71\%$ , 95% CI [53.95%, 72.36%]) where 0% indicated 'not at all likely' and 100% 'extremely likely') thought the interviewer would utilise the verifiability of their statements to base their credibility assessments to a greater extent than uninformed claimants (42.75%,  $SD = 32.26\%$ , 95% CI [31.91%, 52.36%]),  $t(78) = 2.92$ , Cohen's  $d = 0.56$ ,  $p = 0.005$ . This supports the validity of the information manipulation.

#### **Motivation, difficulty in reporting verifiable details, bluffing as a strategy and number of words**

##### **Motivation.**

Truth tellers (84.00% on a 0 - 100% scale ( $SD = 21.81\%$ , 95% CI [76.67%, 90.24%]) where 0% indicated 'not at all motivated' and 100% 'extremely motivated') and liars (80.00% on a 100% scale,  $SD = 13.77$ , 95% CI [75.71, 84.19]) reported being highly motivated during the experiment and to an equal extent,  $t(78) = .98$ ,  $p = 0.138$ .

##### **Difficulty in Reporting Verifiable Details.**

Deceptive claimants overall reported finding it more difficult to provide verifiable detail (48.75% on a 0-100% scale, ( $SD = 28.57\%$ , 95% CI [39.75%, 57.80%]) where 0% indicated 'not at all difficult' and 100% 'extremely difficult') than truthful claimants (33.50% on a 0 - 100% scale,  $SD = 30.26\%$ , 95% CI [23.66%, 42.27%]),  $t(78) = 2.43$ , Cohen's  $d = .55$ ,  $p = 0.017$ .

##### **Bluffing with verifiable details as a strategy.**

More deceptive claimants (26 of 40 liars, 65%) reported bluffing (i.e., providing false verifiable details) during their interview than honest claimants (3 of 40 truth tellers, 7.5%),  $\chi^2(1, n = 80) = 28.64$ ,  $phi = 0.59$ ,  $p = 0.001$ .

### **Number of words.**

On average the claimants wrote 174.54 words ( $SD = 75.98$ , 95% CI [158.04, 190.49]). A 2 (Veracity) X 2 (Information) analysis of variance (ANOVA) showed a main effect for Veracity,  $F(1, 76) = 4.56$ ,  $MSE = 5057.56$ ,  $partial\ eta^2 = .05$ ,  $p = 0.047$ , with truthful claimants ( $M = 191.53$ ,  $SD = 89.51$ , 95% CI [163.96, 217.64]) providing longer statements than deceptive claimants ( $M = 157.55$ ,  $SD = 55.59$ , 95% CI [139.32, 174.87]). Additionally, a main effect for Information was found,  $F(1, 76) = 8.50$ ,  $MSE = 5057.56$ ,  $partial\ eta^2 = .10$ ,  $p = 0.006$ , with informed claimants ( $M = 197.73$ ,  $SD = 78.65$ , 95% CI [173.91, 221.15]) providing longer statements than uninformed claimants ( $M = 151.35$ ,  $SD = 66.37$ , 95% CI [132.43, 172.47]). The Veracity X Information manipulation was not significant,  $F(1, 76) = 1.11$ ,  $MSE = 5057.56$ ,  $partial\ eta^2 = .01$ ,  $p = 0.362$ .

### **Hypothesis testing**

We examined the claimant's reports for both absolute number of verifiable details and the relative percentage of each statement's detail that was verifiable (i.e. verifiable detail/ total detail).

### **Number of verifiable details.**

A 2 (Veracity) X 2 (Information) analysis of variance (ANOVA) with the number of verifiable details as the dependent variable revealed a significant main effect for Veracity,  $F(1, 76) = 11.94$ ,  $MSE = 50.21$ ,  $partial\ eta^2 = .14$ ,  $p = 0.001$ , showing that truth tellers ( $M = 14.15$ ,  $SD = 9.37$ , 95% CI [11.33, 17.22]) reported more verifiable details than liars ( $M = 8.68$ ,  $SD = 5.61$ , 95% CI [7.07,

10.56]). There was also a statistically significant main effect for Information,  $F(1, 76) = 12.606$ ,  $MSE = 50.21$ ,  $partial\ eta^2 = .14$ ,  $p = 0.001$ , showing that informed claimants ( $M = 14.23$ ,  $SD = 9.10$ , 95% CI [11.70, 17.30]) reported more verifiable details than uninformed claimants ( $M = 8.60$ ,  $SD = 6.13$ , 95% CI [6.82, 10.50]).

The Veracity X Information interaction effect was statistically significant,  $F(1, 76) = 5.67$ ,  $MSE = 50.21$ ,  $partial\ eta^2 = .07$ ,  $p = 0.020$ . Informed truth tellers ( $M = 18.85$ ,  $SD = 9.37$ , 95% CI [14.93, 22.81]) reported significantly more verifiable details than informed liars ( $M = 9.60$ ,  $SD = 6.09$ , 95% CI [6.94, 12.42]),  $t(38) = 3.70$ , Cohen's  $d = 1.17$ ,  $p = 0.010$ . In contrast, there was no significant difference between uninformed truth tellers ( $M = 9.45$ ,  $SD = 7.07$ , 95% [6.50, 12.62]) and uninformed liars ( $M = 7.75$ ,  $SD = 5.07$ , 95% CI [5.67, 10.07]),  $t(38) = .87$ ,  $p = 0.388$ . These findings support Hypothesis 1.

We tested the utility of the information manipulation to elicit a higher number of verifiable details as a diagnostic cue to deception. We ran two discriminant analyses to distinguish between (i) informed claimants and (ii) uninformed claimants. In each case, the objective group belonging (truthful versus deceptive) was the classifying variable and verifiable detail was the predictor. As Table 1 shows a significant discriminant function emerged for distinguishing between informed truth tellers and liars,  $\chi^2(1) = 11.53$ , Wilk's Lambda = 0.74,  $p = 0.001$  (canonical correlation was .51). The function correctly classified 65.0% of truth tellers and 90% of liars resulting in a total accuracy rate of 77.5%. The discriminant function for uninformed claimants was not significant,  $\chi^2(1) = 0.75$ ,  $p = 0.388$ . These results support Hypothesis 2.

[Insert Table 1 about here]

#### **Percentage of verifiable details.**

A 2 (Veracity) X 2 (Information) analysis of variance (ANOVA) with the percentage of verifiable details as the dependent variable revealed a significant main effect for Veracity,  $F(1,76)=5.62$ ,  $MSE=2.75$ ,  $partial\ eta^2 = .07$ ,  $p = 0.020$  showing that truth tellers ( $M=.46$ ,  $SD=.23$ , 95% CI [.38, .52]) reported a higher percentage of verifiable details in their statement than liars ( $M=.36$ ,  $SD=.17$ , 95% CI [.30, .41]). The analysis also revealed a significant main effect for Information,  $F(1,76)=7.88$ ,  $MSE= 2.75$ ,  $partial\ eta^2 = .09$ ,  $p = 0.006$ , showing that informed participants ( $M=.47$ ,  $SD=.03$ , 95% CI [.29, .43]) reported a higher percentage of verifiable details in their statements than uninformed participants ( $M=.35$ ,  $SD=.30$ , 95% CI [.26, .44]). Furthermore, the Veracity x Information interaction was significant  $F(1, 76)=7.23$ ,  $MSE=2.75$ ,  $partial\ eta^2 = .09$ ,  $p = 0.009$ . Informed truth tellers ( $M = .57$ ,  $SD = .18$ , 95% CI [.49, .64,]) reported a significantly higher percentage of verifiable detail per statement than informed liars ( $M = .36$ ,  $SD = .16$ , 95% CI [.29,.43]),  $t(38)=3.88$ , Cohen's  $d = 1.26$ ,  $p=0.001$ . However, no statistically significant difference was found for the percentage of verifiable detail reported by uninformed truth tellers ( $M = .34$ ,  $SD = .21$ , 95% [.25, .43]) and by uninformed liars ( $M = .35$ ,  $SD = .20$ , 95% CI [.26, .44]),  $t(38)=.87$ ,  $p = 0.836$ . Collectively, these findings support Hypothesis 1.

We also ran two discriminate analyses to distinguish between (i) informed claimants and (ii) uninformed claimants. In each case, the objective group belonging (truthful versus deceptive) was the classifying variable and the percentage of verifiable detail (verifiable/total detail per statement) was the predictor. As Table 1 shows a significant discriminate function emerged for distinguishing between informed truth tellers and informed liars,  $\chi^2(1) = 12.56$ , Wilk's Lambda = 0.71,  $p = 0.001$  (canonical correlation was .53). The function



correctly classified 80.0% of the informed truth tellers and 80.0% of the informed liars resulting in an overall total accuracy rate of 80.0% of the informed claimants. The discriminate function for uninformed claimants was not significant,  $\chi^2(1) = 0.43, p = 0.84$ . These results support Hypothesis 2.

Finally, we used a simple decision rule to classify truth tellers and liars (unlike discriminant analyses, it is easier for investigators to apply simple decision in real life). When the rule 'those who include more verifiable than unverifiable detail in their statements are truth tellers' was applied, 80% (16 of 20) of informed truth tellers and 90% (18 of 20) of informed liars (85% overall accuracy) were correctly classified. In contrast, when the same decision rule was applied to uninformed claimants, 40% (8 of 20) of uninformed truth tellers and 70% (14 of 20) of uninformed liars (55% overall accuracy) were correctly classified. These results support Hypothesis 2.

### **Witnessing the incident.**

A series of chi-square analyses were conducted to explore the dependence between veracity (truth teller or liar) and witnessing of the incident (witnessed or un-witnessed). Overall, liars (20 of 40, 50.0%) and truth tellers (13 of 40, 32.5%) did not report a significant difference in the number of un-witnessed incidents,  $\chi^2(1, n = 80) = 2.527, phi = 0.17, p = 0.086$ . When we distinguished between informed and uninformed participants (relevant for Hypothesis 3), a different pattern emerged. Uninformed liars (11 of 20, 55%) and uninformed truth tellers (10 of 20, 50%) did not report a significant difference in the number of un-witnessed incidents,  $\chi^2(1, n = 40) = 0.10, phi = 0.05, p = 0.752$ . In contrast, informed liars (9 of 22, 45%) reported significantly

more un-witnessed incidents than informed truth tellers (3 of 20, 15%),  $\chi^2(1, n = 40) = 4.386$ ,  $\phi = 0.32$ ,  $p = 0.038$ . This supports Hypothesis 3.

### Discussion

The current study showed that notifying claimants about the interviewer's intention to check their statements for verifiable details moderates the utility of the VA (Nahari et al., 2014a, b, c) in insurance claims settings. As such, the findings offer an explanation for the discrepancy between the results of previous research regarding the VA's utility in insurance claims settings (Nahari, Leal et al., 2014; Vrij et al., 2015). Within insurance claim based studies, where no information protocol is administered, liars and truth tellers do not appear to differ with regard to the verifiability of their statements (Nahari, et al., 2014). In the current study, when claimants were not provided with the information protocol, uninformed truth tellers and liars reported similar levels of verifiable detail. Conversely, in previous insurance claim based studies, where the information protocol is provided (Vrij et al., 2015), truth tellers report more verifiable details than liars, thus facilitating lie detection with the VA. Analogously, in the current study, when claimants were provided with the information protocol, truth tellers provided more verifiable details in their claims than informed liars. In terms of diagnosticity of the VA, uninformed claimants in the current study could not be accurately classified by the discriminant function when using either the number of verifiable details or percentage of verifiable detail as the predictor. In contrast, informed claimants could be classified at a higher level of accuracy when using the number of verifiable details (overall accuracy of 77.5%) and the percentage of verifiable detail (overall accuracy of 80%). Thus, the information protocol facilitated

increased lie detection accuracy in the current study. The current results reinforce the conclusion that the information protocol moderates the diagnostic utility of the VA within insurance claims settings. These results clearly contrast with those that utilise the VA within police-suspect interviews whereby the information protocol enhances the utility of the VA (Nahari et al., 2014b); however, is not necessary to elicit diagnostic verbal cues (Nahari et al., 2014a). Hence, the current study indicates that the effectiveness of lie detection tools generally, and the VA specifically (e.g. Nahari, Leal et al., 2014; Jupe, Vrij & Nahari, 2015), cannot be generalised without empirical testing for the specific forensic domain being considered (e.g., police-suspect, portal crossing, intelligence gathering or insurance claims contexts) (Vrij & Granhag, 2012, 2014; Vrij et al., 2010).

The present study's accuracy rates are encouraging when one considers the length of the claimant's statements. Overall in this study – and in line with previous research (Leal et al., 2015, experiment 2) – claimants provided short statements ( $M = 174.54$  words;  $SD = 75.98$ , 95% CI [158.04, 190.49]). This is generally problematic for lie detection tools that analyse verbal content because there is little opportunity for differences between liars and truth tellers to emerge (Leal et al., 2015; Vrij, Mann, Kristen, & Fisher, 2007). However, when claimants were provided with the information protocol, clear verbal content differences emerged. Collectively, these results support previous research findings; that the VA is not detrimentally affected by interviewees knowing about it's function. Rather, such information actually *enhances* its utility (Nahari, et al., 2014b).

Unsurprisingly, liars indicated finding it more difficult to report verifiable details than truth tellers. Liars, if embedding their lie within real memories, are unable to provide verifiable detail that threatens their credibility if investigated (Nahari et al., 2014a, b). However, deceptive claimants (26 of 40 liars, 65%) also reported bluffing (e.g., providing *false* verifiable details) more during their interview than honest claimants (3 of 40 truth tellers, 7.5%). We do not think this bluffing strategy used by liars is overly problematic for two reasons. First, the number of liars prepared to bluff in an experiment is almost certainly higher than in real life, as liars are less likely to believe that the truthfulness of their statements will be investigated. Second, as our findings show, even with prevalent bluffing liars still reported fewer verifiable details and lower percentages of verifiable detail per statement than truth tellers. Thus, the problem for informed liars appears to be a matter of calibration because they cannot report the quantity of checkable details that informed truth tellers can.

The results of the current study are encouraging given that lie detection within the insurance claim domain is particularly problematic. First, the insurance claims settings is difficult because it provides an opportunity for claimants to provide embedded deception (Leal et al., 2015; Leins et al., 2013), a strategy that generally reduces the diagnostic accuracy of verbal veracity assessment tools (Nahari et al., 2012). Given that liars reported that approximately 25% of their claims were being drawn from a truthful experience, it is evident that liars in the current study used such embedded tactics. Previous research has shown that, in comparison with outright lies, embedded lies are more difficult to detect by verbal lie-detection tools (Nahari et al., 2012). Again, this makes the current detection rates impressive.

The percentage of verifiable detail (verifiable detail/total detail) can be used as a within-subjects decision rule to facilitate lie detection. Within-subjects lie detection tools are preferred by practitioners as they allow for control of the considerable number of individual differences within verbal and non-verbal responses (Warmelink, Vrij, Mann, Jundi, & Granhag, 2012). When the rule 'those who include more verifiable than unverifiable detail in their statements are truth tellers' was applied, 80% (16 of 20) of informed truth tellers and 90% (18 of 20) of informed liars (85% overall accuracy) were correctly classified. These percentages are especially promising because this rule is easy to apply. When the same decision rule was applied to uninformed claimants, 40% (8 of 20) of uninformed truth tellers and 70% (14 of 20) of uninformed liars (55% overall accuracy) were correctly classified. These findings reinforce the conclusion that the information protocol moderates the utility of the VA in insurance claims contexts.

The current findings converge with two broader theoretical perspectives in the lie detection literature. First, the lack of diagnostic cues in the uninformed condition supports the finding that without active elicitation, cues to deception are typically weak and unreliable (DePaulo et al., 2003; Colwell et al., 2013; Vrij & Granhag, 2012; Levine, 2014). Second, the fact that verifiable detail displayed diagnostic utility in the informed condition supports the corollary of this first assumption, namely, that cues to veracity can be elicited and enhanced via strategic, cognitively-based interviewing (Vrij, Fisher, Mann & Leal, 2006, 2008; Vrij, Granhag, Mann & Leal 2011).

In conclusion, providing insurance claimants with information about the VA facilitated improved lie detection accuracy. Therefore the VA was shown to

be generally robust against countermeasures. Coupled with previous results that showed that the information manipulation enhanced the utility of the approach in police-suspect interviews (Nahari et al., 2014b), it can be recommended that the information protocol be integrated within the full VA.

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Table 1. *Hit Rates for verifiable detail and the percentage of verifiable detail per statement (verifiable/ total detail) as a function of information.*

	Informed claimants			Uninformed claimants		
	Truthful	Deceptive	Total	Truthful	Deceptive	Total
	(%)	(%)	(%)	(%)	(%)	(%)
Verifiable detail						
Accuracy rate	<b>65.0</b>	<b>90.0</b>	<b>77.5</b>	50.0	65.0	57.5
Verifiable/ total						
detail	<b>80.0</b>	<b>80.0</b>	<b>80.0</b>	50.0	45.0	47.5
Accuracy rate						

*Note.* Accuracy rates from significant discriminate functions appear in **bold**.

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<sup>i</sup> For practical reasons we continued data collection until 40 participants reported having had an item of theirs, worth between £100 and £1000, being lost or stolen in the last three years. The six participants excluded from analysis were the last participants recruited prior to the truthful conditions being filled. For ethical reasons, the additional participants were run and entered into the prize draw. However, due to an *a priori* decision to have 20 per cell as a stopping rule, their data was not transcribed, coded or analysed.

