Deception and Decay: Verbal Lie Detection as a Function of Delay and Encoding Quality

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We examined the effect of encoding quality and retention interval on the verbal accounts of truth tellers and liars. Truthful and deceptive participants ($n = 149$) reported a social interaction immediately or after a three-week delay. To manipulate encoding quality, the content of the exchange was important for, and intentionally attended to by, all liars and half of truth tellers (intentional encoding) but unimportant for half of truth tellers (incidental encoding). In the immediate condition, truth tellers in the intentional condition reported more details than liars and truth tellers in the incidental condition. All truth tellers reported fewer details after a delay (cf. immediately) whereas liars reported equivalent detail at both retrieval intervals. No differences by veracity group emerged in detail reported after delay. The oft-reported finding that truth tellers provide more detail than liars holds true when the event is intentionally encoded by truth tellers who are interviewed without delay.

General Audience Summary

We examined the effect of encoding quality (how much attention was allocated to the to-be-remembered event) and retention interval (how much time elapses between encoding an event and the interview) on the verbal accounts of truth tellers and liars. Truthful and deceptive participants ($n = 149$) reported a social interaction (a verbal exchanged between two individuals) immediately or after a three-week delay. To manipulate encoding quality, the content of the exchange was important for, and intentionally attended to by, all liars and half of truth tellers (intentional encoding) but unimportant for half of truth tellers (incidental encoding). In the immediate condition, truth tellers in the intentional condition reported more details than liars and truth tellers in the incidental condition. All truth tellers reported fewer details after a delay versus in the immediately condition, whereas liars reported equivalent detail at both retrieval intervals. No differences by veracity group emerged in detail reported after delay. Thus, oft-reported finding 'truth tellers provide more detail than liars' holds true when the event is intentionally encoded by truth tellers who are interviewed without delay.

In standard deception experiments, truth tellers and liars are interviewed immediately after experiencing an event, with the event typically being meaningful (or made meaningful) in some way to both truth tellers and liars (Vrij, 2008). This context may not reflect all real life situations involving deception. For instance, sometimes suspects and witnesses are interviewed after extended delays. Also, the incident of interest to investigators may simply not have been important for, and therefore may not have attracted the attention of truth tellers. The aim of the current study was to address these issues by examining the popular verbal veracity cue *richness of detail* (Nahari & Pazuelo, 2015; Nahari & Vrij, 2015). This feature of an account can be a

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diagnostic cue to deceit when truth tellers and liars are interviewed immediately after an event that was made meaningful to them (Amado, Arce, Fariña, & Vilarino, 2016; Masip, Sporer, Garrido, & Herrero, 2005; Vrij, 2008). In such scenarios, truth tellers typically provide more detail than liars (Vrij, 2005, 2008; Vrij, Fisher, & Blank, 2015). Specifically, we examine how verbal behaviour of honest and deceptive interviewees varies as a function of two memorial factors relevant to many interview settings: encoding quality and delay.

Most psychologically based credibility assessment techniques assume that liars and truth tellers enter interviews with differing mental states (e.g., Granhag & Hartwig, 2008; Vrij & Granhag, 2012). Whereas liars cannot take their credibility for granted and must manipulate the information they disclose (e.g., Colwell, Fede, & Hiscock-Anisman, 2013; McCornack, 1992), truth tellers can be forthcoming with information (Hartwig, Granhag, & Strömwall, 2007; Hartwig, Granhag, Stromwall, & Doering, 2010). Truth tellers' verbal behaviour is a function of the *phenomenology of innocence* (Jordan & Hartwig, 2013); that is, truth tellers believe their innocence is self-evident (Gilovich, Savitsky, & Medvec, 1998) and thus adopt a "tell it as it is" verbal strategy (Hartwig et al., 2007, 2010). In contrast, liars typically fail to convey the amount of detail that truth tellers report, perhaps lacking the skills or imagination to do so (Vrij, 2008). Liars may also be reluctant to provide details that provide leads for investigators to check (Harvey, Vrij, Leal, Lafferty, & Nahari, 2017; Nahari, Vrij, & Fisher, 2014). Unsurprisingly, truth tellers typically provide more detail than liars (Amado et al., 2016; Oberlader et al., 2016).

Observers appear to be aware that truth tellers typically provide more detail than liars (Vrij, 2008). The more detailed a statement is perceived to be in terms of spatial information (details about locations or the arrangement of persons and/or objects), temporal information (details about when the event happened and the sequence of various events), and perceptual information (details about what was seen, heard, felt, and smelt during the described activities), the more likely it will be judged as credible (Bell & Loftus, 1989). In sum, this *richness in detail* heuristic has received empirical support from the deception literature and richness of detail is both an *objective* (valid) and a *subjective* (believed) cue to truthfulness.

At least two factors pertinent to memory quality can contribute to a compromised truthful interviewee, reducing their ability to provide detailed statements. First, the ability of honest interviewees may be compromised if they did not attend to the information at the time of encoding. Goal-directed behaviour requires focusing attention upon specific stimuli whist ignoring distractions (e.g., Broadbent, 1958). Applying selective attention to perceptual events is a key factor in encoding (Mulligan, 1998) with divided attention during encoding reducing memory performance (Craik, Govoni, Naveh-Benjamin, & Anderson, 1996; Mulligan, 2003; Sauer & Hope, 2016). Critically, failure to attend towards a to-be-remembered (TBR) event reduces the quality of the processing (Craik & Tulving, 1975). Specifically, compared to TBR-events that are attended to (and intentionally encoded), this incidental (unintentional) encoding results in a weaker, less detailed memory trace (e.g., Unsworth &

Spillers, 2010). As what information can be accurately retrieved and reported is a function of what information was originally encoded, differences in encoding quality should be reflected in the quality of interviewees' statements.

Critically, both forms of encoding are relevant to forensic settings. For example, in the 7th July 2005 London bombings it was reported that the perpetrators executed a practice run prior to the attack (official-documents. gov.uk/document/ hc0506/hc10/1087/1087). Investigators may thus have considered questioning individuals travelling on underground transport in London that week, although the information provided by these potential witnesses would likely have been encoded incidentally. Alternatively, informants may deliberately collect information (Soufan, 2011) and that information would be encoded intentionally.

Second, the ability of an honest interviewee to recall information may be compromised by memory decay (forgetting) over time. Lengthy delay between an interviewee obtaining information and disclosing that information during an interview is often unavoidable. Unfortunately, the quality of witness accounts may be time-critical. As the interval between witnessing (encoding) an event and being interviewed about it increases, so does the risk of memory decay: delay reduces both the completeness and accuracy of recall (Penrod, Loftus, & Winkler, 1982; Wixted & Ebbesen, 1991, 1997), because information held in memory becomes less accessible with increased time (Anderson, 1983; Ayers & Reder, 1998). The loss of information occurs rapidly at first before plateauing ('forgetting curve', Ebbinghaus, 1885).

Whereas it is acknowledged that a good memory is fundamental to successful deception (Gombos, 2006; Sporer & Schwandt, 2006; Vrij, 2014), it is less often stated that deceivers require good metacognition to lie effectively (cf. Lancaster, 2011). Vrij et al. (2009) speculated that the retention interval between encoding and retrieval could prove especially problematic for liars and that liars may misjudge the appropriate level of detail to report in order to appear credible. Thus, liars could potentially make a metacognitive error by calibrating their verbal behaviour on the basis of false beliefs about truth teller's memory performance over time.

Individuals generally do not understand the nature (and limitations) of memory (Legaut & Laurence, 2007; Loftus & Loftus, 1980; Ost, Easton, Hope, French, & Wright, 2015; Simons & Chabris, 2011) and specifically underestimate the extent of forgetting over time (Koriat, Bjork, Sheffer, & Bar, 2004). This pattern of failing to correctly understand the degree to which memory can change over time is referred to as a *stability bias* (Kornell & Bjork, 2009). If liars display a stability bias, and thus have erroneous metacognitive beliefs regarding memory, they may plausibly fail to adequately regulate their verbal output to take into account the effect of delay (e.g., Vrij et al., 2009).

Based upon these theoretical considerations, we predict that truth tellers for whom the target event is made important (and intentionally encoded) will provide a more detailed and accurate account than truth tellers for whom the target event is not important (incidentally encoded). As we did not orthogonally manipulate veracity and encoding condition (incidental liars makes little sense), this resulted in three veracity conditions: