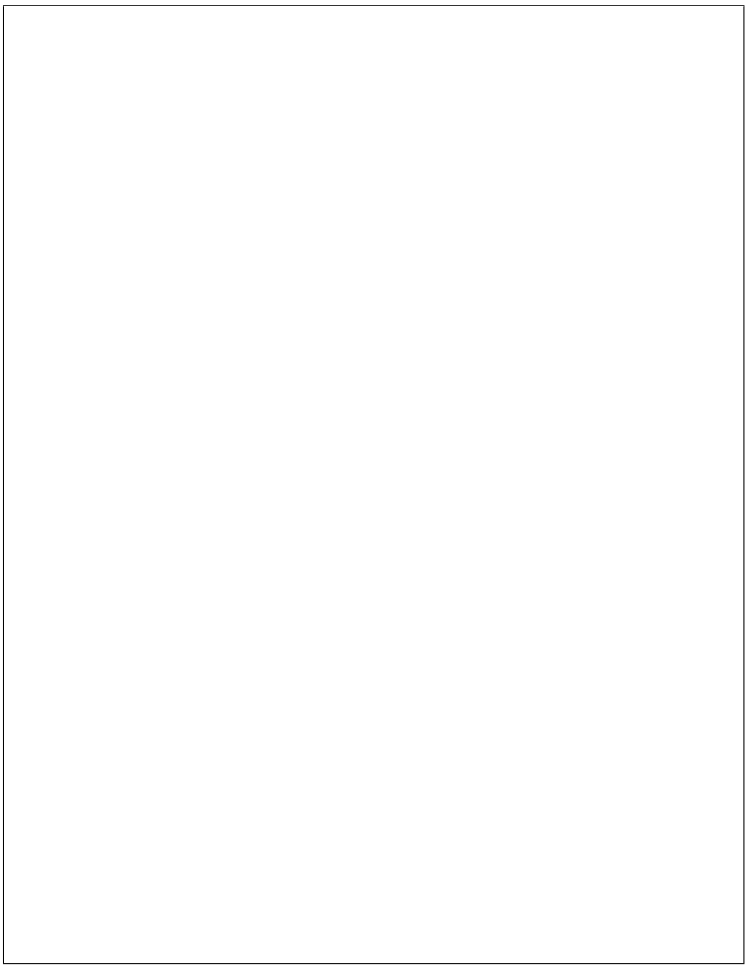

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New and improved accuracy findings in deception detection research

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Until recently, accuracy in deception detection experiments was 54 ± 10% with an accuracy ceiling of 67%. Slightly-better-than-chance accuracy findings, however, are no longer inevitable. The old accuracy ceiling has given way as recent findings documenting substantially improved levels of accuracy have accumulated and replicated. The thesis of this essay is that a theoretical shift from cue theories to a focus on contextualized communication content and persuasion accounts for the new and improved accuracy findings in deception detection research.

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Introduction

Once upon a time not so long ago it was a reliable and well established empirical fact that humans were invariably poor lie detectors. Accuracy rates were statistically better than chance, but unimpressive on the face. The weighed correct truth–lie discrimination reported in meta-analysis (53.46%) [1] was only about a third of a percentage point higher than the rate at which humans can predict random future events (53.1%) [2]. Further, these poor accuracy findings had been amazingly persistent. In the 40 year, nearly 300-result literature examined in meta-analysis, nearly 90% of all findings fell between 40% and 60% accuracy. Only 3 findings (1% of total) were better than 67% accuracy. The highest single accuracy reported was 73%. A funnel plot showed that all of the extreme findings came from small-scale studies, so it was easy to dismiss the higher accuracy findings as anomalous [1].

From the current author's perspective, the meta-analysis conclusions about poor accuracy were believable not only because they appeared in a well-executed large-scale meta-analysis with coherent results, but also because the meta-analysis findings fit perfectly with the results coming out of my own lab. Invariably my research articles on detection accuracy published prior to 2010 described a literature in line with the findings of meta-analysis. Slightly above chance accuracy was a very well established fact. One might wish it otherwise, but beliefs to the contrary were, for a long time, simply counterfactual.

A few years ago, however, things began to change. The once solid accuracy ceiling began to crumble. My lab started to see accuracy rates in the mid-60s [3]. Those findings replicated [4••]. Then we obtained and replicated findings in the 70s [4••,5]. And, it is not just our lab. Others, too, were reporting levels of accuracy that departed substantially from old and reliable slightly-better-than-chance conclusions [6,7•]. One of my most recent series of experiments reported and replicated accuracy over 90% [8••].

The deception detection literature appears to be experiencing a reverse decline effect. The decline effect refers to the all too frequent situation in the social and life sciences where once strong and reliable findings decline in effect size over time [9]. The study of nonverbal deception cues shows such a decline effect [10•]. Accuracy findings, however, are just the opposite.

The thesis of this review is that wave of new and improved accuracy findings is not a fluke or an anomaly. What has happened, I believe, is that there has been a recent change in theoretical perspectives. This change in thinking has led to changes in research design and research focus. The changes in research design and focus, in turn, account for the improved findings. This review explains why accuracy results were so poor for so long and why studies are now finding higher levels of accuracy.

Cue Theories

The idea of *Cue Theories* [11] provides an umbrella term that captures and integrates the basic ideas running through much of the past theory and research on deception detection. The core logic of cue theories presumes that truths and lies are psychologically different. Examples of these differences include emotional states (fear of detection, guilt about lying, duping delight), autonomic nervous system arousal, cognitive load or effort, strategic

efforts to appear honest, planning for deception, and willingness to be forthcoming. The psychological states produced by deception are behaviorally signaled by observable cues. Thus, the psychological states mediate and explain the relationship between truths–lies and cues. It follows then that deception can be detected indirectly and probabilistically through observation of the cues arising from the mediating psychological states associated with deception. This is possible either through passive observation or cues requires additional prompting. Examples of cue theories include Ekman's work [12,13], 4-factor theory [14], interpersonal deception theory [15] and the Vrij's approach to prompting cues by inducing cognitive load [16].

Work based on cue theory produces only slightly better than chance accuracy. This is because cues are weak and inconsistent [17,18], and very considerably across individuals and situations [19,20]. The ephemeral nature of cues leads to support of cues at the level of the individual study [21••], but cue findings do not replicate across studies [10•,17] or translate in much better accuracy [18], even with training [22•].

The theoretical logic and empirical adequacy of cue theories have been strongly criticized over the years [17,23–25], but the criticisms did not stick perhaps because a lack of alternative theoretical views and empirical findings documenting a more efficacious path forward. Alternative theories, however, now exist [26••,27••] and improved accuracy findings have now been reported and replicated [4••,5,6,7•,8••,28••].

Interpreting evidence

This essay focuses on bottom-line percent-correct accuracy; that is, whether or not a human judge is correct in distinguishing truth from lie. One underappreciated fact is that the standard errors in deception detection experiments are often really small [29]. As a result, differences of only a few percentage points can be statistically significant with substantial effect sizes not because the difference is large, but because the error term is tiny. As a consequence, standard significance tests can be misleading. Another consideration is that sometimes the accuracy in a treatment group is reported as an improvement not because the obtained accuracy was impressive, but because the control group exhibited atypically poor performance [30]. Often too, accuracy is presented in metrics that make interpretation ambiguous either because honesty is scaled or because only signal detection statistics are reported. Raw accuracy and sensitivity in signal detection are corrected in the literature at $r > .98$, so with regards to bottom line accuracy, signal detection analysis adds little additional information [1]. To provide a basis for evaluation, some normative rules of thumb for interpreting accuracy for human judges relative to literature [1] are offered in Table 1.

Table 1

Proposed normative standards for interpreting accuracy in deception detection experiments.

Raw accuracy	Interpretation; prevalence of result in meta-analysis [1]
41% and below	Unusually low; bottom 3% of the literature
42–49%	Atypically low; bottom quintile
50–58%	Typical finding; more than half of all findings within this range
59–67%	Above average; top quintile
68–73%	Exceptionally high; top 1% of all findings included in meta-analysis
74% and above	Impressive if replicated: unprecedented until recently

From cues to content and persuasion

The path forward was shown more than a decade ago in a very simple survey study [31]. Rather than experimentally manipulating honesty and observing accuracy, subjects were asked to recall a time they had successfully detected deception and asked how they did it. The vast majority answers fell within two categories; comparing what was said to some type of evidence or having the liar honestly confess their lie. Cues, in contrast, were seldom listed as the basis for detected lies.

If we examine the recent studies documenting much improved accuracy listed in Table 2, it can be seen that all involve one of the two general approaches just mentioned. The first involves listening for, or soliciting, communication content that can be assessed for consistency with factual knowledge or at least plausibility. Second, potential liars can be persuaded to confess their lies and tell the truth. Obviously, these paths are not mutually exclusive. A liar can be confronted with evidence as strategy for truth solicitation because there is often little point of maintaining a falsehood when the truth is known.

Content-based lie detection

The first experimental evidence to shatter the accuracy ceiling in deception detection came from research on the strategic use of evidence (SUE) approach [6]. SUE involves an interviewer in possession of some evidence initially withholding the evidence from the interviewee and asking questions germane to the evidence. Only after evidence-inconsistent statements are made are interviewees gradually confronted with the evidence and asked to explain factual inconsistencies. Statement-evidence discrepancies provide an initial indication of deceit, and the skillful and gradual use of evidence can trap a liar in the lie facilitating accurate lie detection. Experimental tests of SUE have produced accuracy as high as 85.4% [6]. While SUE is certainly effective, it has two practical limitations. First, it requires that a would-be lie detector

Table 2

Examples of new and improved human deception detection accuracy findings.

Study	Approach	Reported accuracy (%)
Hartwig *et al*. (2006)	Strategic use of evidence	85
Blair *et al*. (2010) Exp. 3	Content in context	77
Blair *et al*. (2010) Exp. 4	Content in context	80
Blair *et al*. (2010) Exp. 5	Content in context	69
Blair *et al*. (2010) Exp. 6	Content in context	73
Blair *et al*. (2010) Exp. 7	Content in context	72
Blair *et al*. (2010) Exp. 8	Content in context	81
Blair *et al*. (2010) Exp. 9	Content in context	75
Levine and McCornack (2001) Exp. 2	Situational familiarity	69
Reinhard *et al*. (2011), Exp. 4	Situational familiarity	71
Reinhard *et al*. (2013)	Situational familiarity	72
Levine *et al*. (2010) Exp. 1	Projecting motive	95
Levine *et al*. (2010) Exp. 2	Projecting motive	87
Levine *et al*. (2010) Exp. 3	Projecting motive	86
Bond *et al*. (2013) Exp. 1	Projecting motive	99
Bond *et al*. (2013) Exp. 2	Projecting motive	97
Bond *et al*. (2013) Exp. 3	Projecting motive	97
Levine *et al*. (2010)	Diagnostic questioning	68
Levine *et al*. (2014) Exp. 1	Diagnostic questioning	71
Levine *et al*. (2014) Exp. 2	Diagnostic questioning	77
Levine *et al*. (2014) Exp. 3	Diagnostic questioning	75
Levine *et al*. (2014) Exp. 6	Diagnostic questioning	73
Levine *et al*. (2014) Exp. 1 students	Diagnostic questioning	79
Levine *et al*. (2014) Exp. 2 students	Diagnostic questioning	94
Levine *et al*. (2014) Exp. 1 expert	Expert questioning	100
Levine *et al*. (2014) Exp. 2 experts	Expert questioning	98

possess useful evidence and second it appears to require training to achieve full efficacy.

Content in context [5] provides an approach with broader application for situations were specific evidence is lacking and SUE is therefore unavailable. Content refers to communication content; careful listening to what is said and assessment based on the meaning of words rather than communicator demeanor or cues. Context refers broadly to the situation in which the communication occurs. The key idea is that content is useful when what is said is understood in context but misleading when taken out of context or absent context. For example, if I say 'I saw a beetle today,' what is understood is different if the statement takes place in a conversation about cars or a call to a pest control service.

In a series of experiments, accuracy was substantially improved by giving judges a little background knowledge about context. Across 8 experiments, accuracy for content in context was 75% compared to 57% in controls seeing the same communication but lacking context [5].

Situational familiarity is a similar idea under a different label. The idea is that people who are familiar with topic and context are better able to assess communication content for veracity. Several studies document improved accuracy in familiar situations [7•,32,33].

A particularly useful type of contextual–situational information pertains to incentives and motivations to lie. People seldom lie absent a reason to do so [27••,34]. Two sets of experiments report accuracies between 86% and 99% when the situation is such that motives can be projected [35,36].

A final successful approach to using communication content to detect lies involves using questioning strategies to prompt diagnostically useful answers. The keys to effective questioning are that the questioning needs to be context sensitive and needs to focus not only on lie detection but also on providing exoneration for honest interviewers. Poorly worded questions can make honest people look deceptive and produce below-chance accuracy [4••]. Questioning strategies based on soliciting cues across situations produce accuracy just slightly better than chance [37,38]. But, questioning designed with contextualized communication content in mind has produced accuracy above 70% [4••]. Experts can be especially good at this [8••].

Confession solicitation

The second path to improved lie detection is through persuasion. While sometimes a liar will spontaneously or inadvertently confess a lie [31], liars can be actively persuaded to honesty, especially by a skilled interviewer [8••,39,40]. In fact, it has recently been argued that expertise in deception is a function of the experts' ability to solicit diagnostic information (including honest confessions) rather than passively reading cues. Meta-analysis shows that when the task involves passive viewing, experts perform no better than students at lie detection [1]. Much higher accuracy, however, has been reported when experts are free to question a potential liar unscripted and when confession-seeking is allowed as a lie detection strategy [8••]. While the solicitation of false confessions is a concern [41], recent findings of solicitation of honest confessions by experts [8••,39] suggest that persuasion can be highly effective.

Summary

For decades, experiment after experiment invariably reported that humans were poor lie detectors. Accuracy always hovered just above chance. The slightly-better-than-chance accuracy findings coincided with various theoretical perspectives specifying that lie detection rested on identification of deception cues. Truth telling and lying were thought involve different psychological states. These states were manifested differently, and the resulting tell-tale behavioral manifestations signaled deceit. But, as evidence accumulated, reliable cues that replicated

failed to emerge [10•,17,18], key moderators specified by cue theories did not obtain [21••], and accuracy remained only slightly above chance [1].

Recently, however, more than two dozens findings have broken through the once impenetrable accuracy ceiling. All of these successes have shunned cues instead focusing on communication content and persuasion. Approaches such as SUE [6], content in context [5], situational familiarity [7,32,33], strategic questioning [4••], and expert questioning [8••] have all produced levels of accuracy thought impossible a few years ago. Along with these findings of improved accuracy, new theories have been developed which account for improved accuracy without recourse to deception cues [26••,27••]. Together, the new theory and empirical findings provide a long-sought break-through in human deception detection.

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- •• of outstanding interest

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