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The focal account: Indirect lie detection need not access unconscious, implicit knowledge

Supplementary Material

The account as outlined in the main article makes a number of simplifying assumptions. This supplement considers the result of relaxing some of those assumptions. Additionally, we consider situations where the integration of multiple cues may be useful, rather than detrimental, and briefly explore alternative accounts of the reported effects.

Simplifying Assumptions

Symmetrical diagnosticity. In the worked example given in the main body of text, we assumed that cues were symmetrical in diagnosticity: the presence of a cue, e.g., thinking hard (TH), might correctly indicate honesty 75% of the time, and so symmetrically its absence correctly indicates dishonesty 75% of the time. But there may be an asymmetry. For instance, while the presence of the TH cue is taken as evidence in favour of honesty, the absence of the TH cue might simply be taken as an absence of evidence, in the same way as large p-values do not allow us to assess whether the evidence is in favour of the null (in this case, deception) or whether the evidence is not sufficiently powerful to make any conclusions. That is, the absence of a cue is no longer considered to be 75% indicative of deception – rather, it is simply considered non-diagnostic.

In this instance, there are two possibilities. First, people may switch to using another cue. Given the limited cognitive capacities in a complex world, people are often selective in what they bring into their judgment so as to reach a satisfactorily accurate decision (Brunswik, 1952; Simon, 1990; Gigerenzer, Todd, & The ABC

Group, 1999). There is always some form of focussing or selective attention in play, guiding what in the environment is and is not to be processed. To put it crudely, the movement of the clouds won't help you spot a liar. So one possibility is that people will simply shift their attention to more diagnostic indicators in place of the non-diagnostic cue. Lie detectors do pay attention to and make use of the more diagnostic cues that are available in favour of the non-diagnostic ones (Hartwig & Bond, 2011).

A second possibility is that they will incorporate non-diagnostic information into their judgment because it is a cue under the focus of attention. In this case, accuracy should decrease, in the same way as using both the 60% and 75% diagnostic cues in our worked example results in a lower accuracy compared to using the 75% diagnostic cue alone. Simply put, whether the cue influences the judgment will depend on whether the cue is brought to the focus of attention, either through internal selection mechanisms or through external prompting, such as we did in Experiment 2.

A difficulty arises when there are *no* diagnostic indicators available. In the simplified example in the main text, this would mean that both the tense (TE) and TH cues do not offer diagnostic information, and those are the only cues available. The Adaptive Lie Detector (ALIED: Street, 2015) proposes that people will rely on more generalised information that are more indirectly related to whether the statement is true or false (e.g., how often people in general tell the truth). That is beyond the explanatory scope of the focal account, but ALIED argues that raters would use their beliefs about how often people tell the truth to make an informed guess. Regardless of whether the absence of a cue is taken as a lack of evidence or as positive evidence in favour of deception, if the TH cue is not believed to be less diagnostic than it actually is and if it is the most diagnostic cue available, accuracy should be lower than what could have been achieved if the cue had been taken into consideration.

Cue co-dependence. Are cues typically likely to occur together and be absent together? There is no data we are aware of that explores the correlation between behavioral cues to deception. However, it is evident that people are skilled liars (Buller & Burgoon, 1996; Duran, Dale, Kello, Street & Richardson, 2013; Van Der Zee, Poppe, Taylor & Anderson, 2015) and give very few cues to their deceptions (DePaulo et al., 2003; Sporer & Schwandt, 2006, 2007), if any at all (see Levine, 2014). It is also well known that cues to deception are highly probabilistic and largely unreliable (DePaulo et al., 2003). We should also consider whether the behaviors of truth-tellers are correlated. People are better at detecting truths than lies (Bond & DePaulo, 2006; Levine, Park & McCornack, 1999), perhaps resulting from the tendency to believe ‘the truth will out’ (Gilovich, Savitsky & Medvec, 1998; Hartwig, Granhag & Strömwall, 2007; Kassin, 2005) – as such, these people may not structure and control their behavior in the ways that liars do (Duran et al., 2013). Thus we might expect the behaviors of truth-tellers to be more correlated than those of liars. In the case of lie detection, then, we might expect relatively little correlation between cues, which would make lie detection more difficult than truth detection, consistent with research (Bond & DePaulo, 2006; Levine et al., 1999).

In the main body of text, Figure 1 depicts the situation when two cues are independent: the probabilities are multiplied. But if two cues were perfectly positively dependent, this would mean that the presence of one cue would guarantee the presence of the other cue. If they were perfectly negatively dependent, the presence of one would guarantee the absence of the other. In either case, one cue would be entirely redundant, and so accuracy should be dependent on the diagnosticity of the one cue.

The account can only explain situations where the cues are not perfectly correlated. If they were, there would be no room for the two cues to contradict one another. In Experiment 1a, we report a correlation of $r = .46$ between the TH and TE cues – there is a dependency, but there is room for conflict also. One might argue that the perfect scenario would be that on those occasions where the more diagnostic cue suggested the wrong judgment, the other cue would be perfectly diagnostic. This way, either one or the other cue would be able to tell us on any given occasion whether the person is lying or telling the truth. Although this is true, the problem for the person making the decision is that they are unlikely to know whether it is the TH or TE cue that is diagnostic *on this particular occasion*. Which cue should they choose to use, or which one should they weight more heavily when they combine them into a single judgment, if either? Raters would have to know which of the two cues is diagnostic on this particular statement,¹ because combining the cues would reduce their joint diagnosticity. The focal account claims simply that combining multiple probabilistic cues raises the dilemma of having to deal with conflicting information, and this is what reduces explicit lie detection accuracy.

Guessing under uncertainty. We made the simplifying assumption that when the cues are in conflict, raters make an unbiased guess. But there may be reasons why people are biased to use one cue more than another. For instance, salient cues can have a powerful influence on the decision process, as we noted in the motivation for

¹ There may be some other cue the speaker produces that indicates whether the TH or TE cue is more diagnostic on this occasion, a sort of meta-cue. For simplicity we make the assumption that there either is no such cue or at the very least the rater does not notice this cue. The presence and use of such a cue would be problematic for the focal account.

Experiment 2 (e.g., Nisbett et al., 1981; Platzer & Bröder, 2012). The more salient cue may take precedence in the case of a cue conflict. For instance, the presence of a cue is likely to be more salient than the absence of a cue. And visual cues are more salient than verbal cues (Stiff et al., 1989). The focal account would predict that the more salient information should have the larger impact on the judgment. Experiment 2 manipulates this and shows that saliency of a cue does lead to that cue having heavier weighting in the judgment. It is an open question whether such saliency effects come into play when two cues conflict and a judgment must be reached. ALIED theory (Street, 2015) and the 'Big Five' of truth judgments (Schwarz, 2015) would predict such generalised pieces of information could be used to help overcome this uncertainty due to cue conflict.

Saliency is only one way in which the rater may attempt to overcome the issue of cue conflict. Raters may more heavily rate one cue than another under cue conflict, depending on their long-run diagnosticity, for instance. Or they may simply pick one cue and ignore all others in a non-compensatory fashion. If the cue selected is 75% diagnostic, then accuracy should also be 75%, regardless of what other cues are present. Although there is some evidence that people pick one piece of information to base their judgments on (Gigerenzer, Hoffrage & Kleinbölting, 1991), the evidence is compromised by the fact that they only do so when they are not free to choose their own decision strategies (Bröder, 2000; Newell & Shanks, 2003; Newell et al., 2003). So an assumption we make is that people do in fact attend to a variety of cues and integrate them to form their judgment. This is known as a compensatory strategy because the various cues are weighted and combined to form a single judgment (e.g. Bröder & Eichler, 2006; Newell & Fernandez, 2006; Newell & Shanks, 2004; Pohl, 2006; Richter & Späth, 2006), as opposed to a non-compensatory strategy that uses

only one cue and ignores the others. The compensatory-strategy assumption is not entirely unchallenged, however (see Street, Bischof, Vadillo & Kingstone, 2015, for an inability of either strategy to better predict lie-truth judgments; also see Pohl, 2011, for a review of the debate). We are unable to distinguish these two possibilities with the current data. To our knowledge, only one study has attempted to distinguish these two accounts in the lie detection literature (Street, Bischof, Vadillo & Kingstone, 2015). They found neither strategy predicted lie-truth judgments particularly well, and neither strategy stood out as clearly better than the other in accounting for the data. So the jury is still out.

Cue strength. On a related note, we made the simplifying assumption that the presence of two cues is taken as strong enough evidence to trigger a lie or truth judgment. When they conflict there ought to be indecision. But when they complement a lie or truth judgment is favored. If the cues are weakly diagnostic, combining two complementary weak cues may not be enough evidence to trigger a lie or a truth judgment, and so may still result in indecision (or result in a truth decision, if people default to believing others are telling the truth: Levine, 2014). In such a case, it might be predicted that although there is indecision, there is still more evidence in favor of one judgment over another and so if forced to guess raters may rely on that partial evidence to make a judgment (Street, 2015; Street & Richardson, 2015). Potentially, then, the effect of cue contradiction reducing accuracy could be alleviated by allowing raters to abstain from judgment. This is not a core prediction of the focal account, but it is consistent with the logic.

The relationship between focal cues. We also only considered the presence of two cues. If there were many weak cues that complemented one another we would expect high accuracy, in exactly the same way as a single strong cue in isolation

would give high accuracy (see Christiansen, Conway & Curtin, 2005, for a proof of principle in the field of psycholinguistics). Of course, if those weak cues did not complement one another we would predict indecision, just as we predicted for competing cues in Experiment 1. So far it seems the account would predict the same outcomes regardless of the amount of cues present. But there is an exception. A compensatory strategy that we assume allows a set of low-diagnostic cues that complement each other (e.g., all suggesting deception) to overpower a single high-diagnostic cue in the other direction (e.g., one cue suggesting honesty), or to balance and so cancel each other out. If on a single trial there are three cues with a low weighting of -0.25, all suggesting deception, and there is a cue with a higher weighting of +0.75 in favor of a truth judgment, then additively combining the cues would result in total indecision ($(-0.25 \times 3) + 0.75$). Although there are more numerous cues suggesting deception rather than honesty, indecision should result and accuracy should be low. A challenge for the focal account, and compensatory lie detection strategies more generally, is to show that the presence of many low-diagnostic cues can overpower a highly diagnostic cue. As discussed previously, there is already some evidence of this (Bond et al., 2013; Duffy & Feltovich, 2006).

Summary. As can be seen, the focal account as it currently stands makes a number of simplifications, and it requires further empirical work to clarify how direct lie detectors cope with uncertainty in the environment. We believe it is important for lie detection researchers to start considering how people tackle this uncertainty, because it is clear that there are no highly reliable cues to deception (DePaulo et al., 2003). It has received little attention, as in part evidenced by the lack of detail that the focal account can offer in regards to how people make judgments when the cues conflict.

When (and When Not) To Use Multiple Cues

It is possible that people incorrectly weight the cues. Cues might be taken as weak evidence when they actually have high diagnostic value. Or the cue might be highly diagnostic when it is present, but it is so rarely present that it is given a low weighting in the judgment. We assumed that raters veridically perceive the diagnosticity of the cue. This assumption places a boundary on the scope of the account. Should participants be found to incorrectly weigh the available cues, accuracy may not increase. Nonetheless, the judgment should be guided by those more heavily weighed cues.

In these circumstances, it would be beneficial to incorporate other available cues, provided that those other available cues are more diagnostic than the cue already under focus. Consider our experiments here, as well as those of the indirect lie detection paradigm more generally. The cue that is being focused upon is chosen by the experimenter because it is known to be a useful indicator of deception. This sets the bar high. But imagine that in our study the TH cue has a long-run diagnosticity of 70% and the TE cue has a long-run diagnosticity of 80%. If the cue under focus is *not* the most diagnostic of the two cues, then accuracy would be *worse* (70%) than what could have been achieved by integrating the two cues ($56\% + 19\% = 75\%$). So the diagnosticity of the cue selected for focusing must be the most diagnostic of all the cues under consideration if we are to see an improvement in accuracy. Similarly, focusing on a cue that is more indicative of honesty should lead to more truth judgments compared to focusing on a cue that is more indicative of deception, for the same reason. Experiment 2 demonstrated precisely this. In short, adding another cue into focus is useful when that new cue is more diagnostic than the currently focused cue.

Competing Accounts

This article sought to address one alternative to the implicit knowledge claim. There are other accounts that could also explain the indirect lie detection findings. First, the accusatory reluctance account (O'Sullivan, 2003; see also DePaulo & Rosenthal, 1979) claims people are biased towards rating others as truth-tellers because there are socializational rules and practices that discourage calling people liars. It may be that explicit lie detectors do not achieve the accuracy rates that are possible from the diagnostic cues presented because they are reluctant to explicitly call people liars. Our findings cannot rule out this possibility. However, it is first worth noting that our manipulations clearly influenced judgments, and that the evidence is consistent with our focal account. Unfortunately, there is little research that tests the accusatory reluctance account (see O'Sullivan, 2003).

Of course, the focal and accusatory reluctance accounts are not mutually exclusive and both may contribute to the decreased accuracy. In that sense, it is not truly an alternative account. But one true alternative is that explicit raters perform poorly because they do not attend to *any* of the diagnostic cues available. That is, the cause of lower accuracy when making direct lie-truth judgments is not cue conflict, but cue ignorance. Our data cannot distinguish between these two possibilities.

Do explicit lie detectors typically attend to diagnostic cues? It has long been thought that they do not, with research showing they have many misguided beliefs about the cues to deception (The Global Deception Research Team, 2006). However, in a set of Brunswikian lens-model meta-analyses, Hartwig and Bond (2011) have shown that despite what people self-report, the cues that contribute to their judgments tend to be of higher diagnosticity and those cues that do not contribute to their judgment. That is, people seem to be making use of the more diagnostic cues in

reaching their judgment. Based on this evidence we would argue that people typically make use of diagnostic information when it is available.