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ALIED: Humans as adaptive lie detectors

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Abstract

People make for poor lie detectors. They have accuracy rates comparable to a coin toss, and come with a set of systematic biases that sway the judgment. This pessimistic view stands in contrast to research showing that people make informed decisions that adapt to the context they operate in. The current article proposes a new theoretical direction for lie detection research. I argue that lie detectors make informed, adaptive judgments in a low-diagnostic world. This Adaptive Lie Detector (ALIED) account is outlined by drawing on supporting evidence from across various psychological literatures. The account is contrasted with longstanding and more recent accounts of the judgment process, which propose that people fall back on default ways of thinking. Limitations of the account are considered, and future research directions are outlined.

Keywords: Deception detection; Truth bias; Adaptive lie detector; Uncertainty; Adaptive decision making; Truth-default theory

Word Count: 129

People have little idea of when they are being lied to, with accuracy rates only marginally above chance (Bond & DePaulo, 2006; Kraut, 1980). They seem to have the wrong beliefs about what cues give away liars (The Global Deception Research Team, 2006), and even with training there is only a modest increase in accuracy (Frank & Feeley, 2003; Hauch, Sporer, Michael & Meissner, 2014). What is more, there is a robust bias to take what others say at face value and believe it is the truth, dubbed the ‘truth bias’ (Bond & DePaulo, 2006; McCornack & Parks, 1986), which some have taken as evidence that people are gullible (Buller & Burgoon, 1996; O’Sullivan, 2003) and not in control of this bias (Gilbert, 1991). This pessimistic view has been dominant in the field for some time (e.g., Bond & DePaulo, 2006; Kraut, 1980; Mandelbaum, 2014; Vrij, Granhag & Porter, 2010). The current article takes a new position. I draw on recent advances and present a more optimistic view of the lie detector: as one who makes informed judgments in a low diagnostic world. In particular, I take a more Brunswikian point of view and argue that people adapt their judgment strategies based on the nature of the information available (see Brunswik, 1952). This is referred to as the Adaptive Lie Detector account (ALIED).

Overview of the Account

The ALIED account is inspired by advances in the decision-making literature, in particular the adaptive decision making perspective (Gigerenzer & Selten, 2001; Gigerenzer, Todd & The ABC Group, 1999; Platzer & Bröder, 2012; Simon, 1990). In an information-limited world and with a finite cognitive capacity, people can arrive at satisfactorily accurate judgments. By adapting to the context, one can put those limited resources to best use. Simplified strategies such as recognition and heuristics allow for ‘satisficing’ inferences to be made (Gigerenzer & Selten, 2001; Simon, 1956, 1990). Notably, people do not default to leaning on their contextual knowledge,

but vicariously adapt what information they use in order to make an informed judgment (Brunswik, 1952). These simplified context-general rules help form decisions under uncertainty (Gigerenzer & Gaissmaier, 2011; Simon, 1990).

ALIED proposes that people attempt to form a judgment about a specific statement by using information that pertains directly to that specific statement. For instance, a confession that the statement is false is an individuating piece of information that can help us decide whether this particular statement is true or false. Similarly, verbal cues such as the amount of detail in the statement (e.g., Hartwig & Bond, 2011) are also specific to the current statement. This is referred to as ‘*individuating information*’ because it gives us information about this specific statement, rather than about statements in general.

The first key claim of ALIED is that raters trade off individuating information with more context-general information, so that as the individuating information becomes less diagnostic there is a greater influence of context. ‘*Context-general*’ here is used to refer to information that is generalized across statements. For instance, it turns out that most people tell the truth most of the time in their day-to-day interactions (DePaulo, Kashy, Kirkendol, Wyer & Epstein, 1996; Grice, 1975; Halevy, Shalvi & Verschuere, 2013; Serota, Levine & Boster, 2010). This is useful context-general information because it tells us on average how often we will encounter lies, in this (daily-life) setting. But it does not tell us whether the current statement is a lie or truth. Other forms of generalized information that will also be subsumed under the heading of context-general are person-based information (e.g., “Wayne rarely lies”), prior experience with similar situations (e.g., “salespeople often lie to me”) and beliefs (e.g., “people are fundamentally honest”), because all these

generalize across statements. As can be seen by these examples, the sole use of such context information will lead to systematic biases.

ALIED proposes that the truth bias (or lie bias, where appropriate) is a result of making use of context-general information. This is a second key claim of the account. Because it is argued that people rely more on context-general information when individuating cues are absent or low in diagnosticity, truth and lie biases are thought to reflect an informed, sensible guess to fill in for the absence of more diagnostic individuating cues. Put another way, if the context suggests most speakers will lie and the rater has no or little individuating information to work from, a smart strategy is to be biased towards guessing speakers will lie.

It is important to note that no mention has been made of accuracy. Using sensible, informed judgments in the current context does not necessarily entail that those judgments will therefore be accurate (Jussim, 2012). As we will see, accuracy will depend on the diagnosticity of the individuating cues and whether the world really is biased in the same way that the rater believes (i.e., the correlation between the rater's beliefs about the rate of honesty and the actual rate of honesty). It is also important to note that the context-general information is only *correlated* with honesty; it does not directly pertain to whether the current statement is the truth. ALIED addresses how people form their judgment, and does not directly address how they might make *accurate* judgments.

Before moving into the main body of the argument, a rationale is given for the proposal of a new account. From there, I will consider why the truth bias can be considered an adaptive strategy. First, discussion is given to the use of individuating and context-general cues, and how it can be functional to be truth biased. Specifically, it is useful to be truth biased when the individuating cues to deception have low

diagnosticity (or are lacking entirely), but in the given context people usually tell the truth. The following section contrasts the claims of ALIED, which argues people do not default to being biased, with other accounts that suggest people have a cognitive default to believe others. From there, predictions and limitations of the account are addressed, and practical applications of the theory are offered.

Rationale for a New Account

Behavioral (verbal, paraverbal and nonverbal) cues to deception have low diagnosticity and appear only probabilistically (DePaulo et al., 2003): There is no Pinocchio's nose that clearly indicates a person is lying or telling the truth (Vrij, 2008). Coupled with lie detection rates comparable to a coin toss (Bond & DePaulo, 2006), it is clear that there is uncertainty¹ in making the judgment. How do raters tackle this uncertainty to make a lie-truth judgment? This seems like an obvious question, but it has surprisingly received little attention. ALIED fills this gap by arguing that people can make use of informed strategies.

In contrast to both the history of the field and more contemporary theories (e.g., Asp & Tranel, 2012; Gilbert, 1991; Levine, 2014a), ALIED claims the truth bias is not an ever-present default of the system. ALIED can explain why people sometimes show a bias towards judging others as *lying*, and that they can do so just as quickly and effortlessly as judging others to be telling the truth (Hanks, Mazurek, Kiani, Hopp & Shadlen, 2011; Richter, Schroeder & Wöhrmann, 2009; Street & Richardson, 2014). This should not be possible if the cognitive system defaults to believing others are telling the truth (Gilbert, Krull & Malone, 1990). According to ALIED, the presence and direction of the bias is all a matter of context: Relying on context-

¹ Uncertainty refers to the objective lack of clear, predictable information in the environment, rather than the subjective experience of confidence.

general information (“most people will lie/tell the truth”) can be a useful aid to making an informed judgment in the absence of more precise information. To my knowledge there is no theory that claims the truth bias is an active, flexible and adaptive response to deal with uncertainty, rather than being a passive default response. The ALIED account is in accord with the decision-making literature, which has largely rid itself of the strictly rational and normative theories that show people to be error-prone in favor of theories that highlight the adaptive and flexible nature of decisions (see Kahneman & Tversky, 1982; Mellers, Schwartz & Cooke, 1998; Weber & Johnson, 2009). The lie detection literature unfortunately has little cross-fertilization with judgment and decision-making work. Indeed, one of the strengths of the proposed account is that it is consistent with work from across a wide range of psychological disciplines.

Additionally, the account I outline here suggests the direction that the field should move towards. Because individuating behavioral cues have low diagnosticity (DePaulo et al., 2003), they place a very low ceiling on potential lie detection accuracy. There have been at least two suggestions for new research directions to address this. Some suggest that the field should try to find ways to evoke more diagnostic behavioral cues to deception (Hartwig & Bond, 2011; Vrij & Granhag, 2012). By increasing the diagnosticity of cues, accuracy should increase. Others meanwhile have taken to a ‘content in context’ approach: Rather than focusing on what cues the liar portrays, which are unreliable, raters should interpret what they hear in terms of the current context (Blair, Levine & Shaw, 2010). For instance, Blair et al. (2010) showed how people can better detect lies about a crime if they were given contextual information about the crime itself, such as where the crime occurred and what was stolen. Those authors also noted that the lies told by Asch’s (1956)

confederates in the line judgment study could have been easily detected if participants were given information about the aims of the experiment. The emphasis here is on understanding the contents of a statement in a given context. Interestingly, those authors found that the content in context approach only works if participants are encouraged to attend to the context information, suggesting that they may need explicit motivation to ignore individuating information.

It is no secret that the behavioral cue approach to lie detection has fallen out of favor in the lie detection community. But if we are to understand how people make their judgment, accurate or not, we must accept that people do incorporate behavioral cues into their judgments (see Hartwig & Bond, 2011, for a set of meta-analytic studies showing the degree to which people use behavioral cues), even if that results in poor accuracy. We must also accept that people do seem to track the context in which their judgment is made (e.g., Blair et al., 2010; Masip, Alonso, Garrido & Herrero, 2009; P. J. DePaulo & DePaulo, 1989). I propose that neither direction (cue boosting or content in context) in isolation of the other will give us an understanding of how lie-truth judgments are made. Rather, the field must consider how people trade off context-related information with individuating cues in order to reach a judgment.

A final rationale, perhaps the most important, is that the most recent theoretical advance in the lie detection field offers a theory that is more descriptive than predictive. Truth-default theory (TDT: Levine, 2014a) proposes that people passively default to believing others are telling the truth. If there is a ‘trigger’, a lie judgment can be made. Although a number of triggers are offered by the theory, the list is non-exhaustive. As such, it allows (and maybe requires) that anything causing a lie judgment is defined as a trigger. Given this flexibility, it is difficult to generate testable predictions. Perhaps one falsifiable claim that might be inferred from TDT is

that, because it takes a similar default position to that proposed by Gilbert (1991) (Levine, 2014a), it may be cognitively more effortful to make lie than truth judgments: “If a trigger... is *sufficiently potent*, a threshold is crossed... and evidence is cognitively *retrieved* and/or sought to *assess* honesty-deceit” (italics added). It is not clear whether the account makes the cognitive difficulty prediction. It seems that we have arrived at a detailed descriptive theory of lie detection, but not a predictive one. ALIED offers a number of novel, numerically quantifiable predictions that are yet to be tested. This is not to undermine the importance of TDT: it is undoubtedly a useful framework that synthesizes decades of work. ALIED instead reinterprets past findings and develops novel predictions.

In summary, ALIED explains how both individuating cues and more generalized cues are used in the judgment process, rather than trying to push one approach over the other. A surprising result of this integration is that the truth bias, commonly thought of as an error, is reconceptualized as both functional and flexible.

Individuating Cues

For some time low accuracy was largely thought of as a knowledge problem (e.g., Strömwall & Granhag, 2003; Vrij & Semin, 1996; Zuckerman, Koestner & Driver, 1981). People seem to have the wrong beliefs about what clues identify a liar (The Global Deception Research Team, 2006). They report focusing on non-diagnostic information such as eye contact, which was thought to explain their inaccuracy. But a recent set of meta-analytic studies showed that despite what people self-report they actually make use of the more diagnostic content and behavioral cues that are available (Hartwig & Bond, 2011; see also Masip & Herrero, 2015). This is perhaps the first evidence that lie detectors are more adaptive (in the sense of

functional) than they were previously thought to have been. With the limited individuating cues available, raters seem to attend to the more diagnostic ones.

Accuracy rates are likely so low not because of misguided beliefs then, but because liars do not show reliable signs of deception: Behavioral cues -- verbal, nonverbal, paraverbal -- are infrequent and have low diagnostic value (DePaulo et al., 2003; Sporer & Schwandt, 2006, 2007). Until relatively recently the field has mostly explored lie-truth judgments in situations where the individuating cues are weak. This, I argue, has limited the scope of theorizing in the area. We should also consider how judgments are made when highly diagnostic individuating cues are available, even though such a situation is rare (see Levine, 2010, on the possibility of a few transparent, readily detectable liars).

It seems reasonable to assume that if the individuating cues to deception are perfectly diagnostic, people can achieve perfect accuracy. But the assumption requires the following also to be true: (a) People attend to individuating cues, (b) they can identify cues that are diagnostic and can separate them from the nondiagnostic cues, and (c) they rely more on the individuating information than on the context-general information to make their judgment. Although relatively little research has considered lie detection in highly diagnostic environments, those few studies that used highly diagnostic individuating cues found that people can achieve near perfect accuracy (Bond, Howard, Hutchison & Masip, 2013; Levine et al., 2014; see also Blair et al., 2010). For instance, Bond et al. (2013) found that when the motive behind a given statement was known (a perfectly diagnostic cue), accuracy was almost perfect.

Of course, this situation is rare. Individuating cues to deception are typically weak and have low diagnosticity (DePaulo et al., 2003). Raters usually need to deal with the uncertainty and ambiguity in the environment to reach a judgment. How do

people deal with probabilistic and low-diagnostic individuating information? In such uncertain situations, the evidence is in accord with the ALIED proposal that people rely on generalized rules informed by their knowledge of the situation (Fiedler & Walka, 1993; Stiff, Kim & Ramesh, 1992; for overviews see Gigerenzer & Gaissmaier, 2011; Gigerenzer, Hertwig & Pachur, 2011; Gilovich, Griffin & Kahneman, 2002). These rules allow people to reach ‘good enough’ judgments from limited information (Brunswik, 1952; Simon, 1990; see also Garcia-Retamero & Rieskamp, 2008, 2009; Hogarth & Karelaia, 2007). The truth bias may be the result of using just such a simplified rule, informed by past experience with the situation.

Context: When a Truth Bias Is and Is Not Functional

A truth bias is commonly observed in lie detection experiments (Bond & DePaulo, 2006). When the individuating deception cues in the environment are uninformative, it makes good sense to use the generalized rule that a speaker is telling the truth. The reason is that speakers typically tell the truth (DePaulo et al., 1996; Grice, 1975; Habermas, 1984; Halevy et al., 2013; McNally & Jackson, 2013; Serota et al., 2010). After all, communication between people is useful only if both choose to deliver a message that is not false (Grice, 1975). In this sense, a bias towards believing is functional: it will generally lead to the correct judgment (Jekel, Glöckner, Bröder & Maydych, 2014; Jussim, 2012; Meiser, Sattler & von Hecker, 2007).

But there are two caveats to this functionality of the truth bias. First, it is functional to have a context-based bias if the individuating cues to deception are weak or lacking. When they are strong and highly informative, it is more functional to make use of those cues to inform the judgment (see Bond et al., 2013; Levine et al., 2014). The second caveat to the functionality of the truth bias is that, assuming the individuating cues are weak, the truth bias is only functional if most people tell the

truth *in the current context*. The context proviso is important: If the current context makes it more likely that people will lie, then a lie bias is far more functional because, in the long run, it is more likely to give higher accuracy rates than a truth-biased response.

The bias must reflect the current context if it is to be adaptive, in the sense of both functional and flexible. When the situation makes it difficult for speakers to tell the truth, raters are more prepared to infer others are lying (Bond et al., 2013; Levine, Kim & Blair, 2010; Sperber, 2013; Sperber et al., 2010). And those who expect most speakers will lie to them, such as police officers (Moston, Stephenson & Williamson, 1992), show a lie bias (Meissner & Kassin, 2002). More generally, if context-general information suggests that others will lie, raters are biased towards judging statements as lies (G. D. Bond, Malloy, Arias, Nunn & Thompson, 2005; P. J. DePaulo & DePaulo, 1989; M. G. Millar & Millar, 1997; see also Kim & Levine, 2011). This can be seen even from the earliest moments of consideration, suggesting the lie bias can be fast and effortless (Hanks et al., 2011; Richter et al., 2009; Street & Richardson, 2014; van Ravenzwaaij, Mulder, Tuerlinckx & Wagenmakers, 2012). It is important that a bias towards disbelieving can be observed early in the process, and that it is just as fast and efficient as truth-biased judgments (Richter et al., 2009; Street & Richardson, 2014), because it shows the bias is not a fixed cognitive default (see Nadarevic & Erdfelder, 2013). If the cognitive system defaulted to believing statements are truthful, we would not expect to see such rapid and effortless biases towards lying in different contexts. The possibility that the bias is a fixed cognitive default is considered further in the Truth Bias as a Cognitive Default section. Biased

responding seems to be adaptive and flexible, and reflects an understanding of the current context.²

Integrating Individuating Cues with Context

As well as being flexible to context, it is important for the ALIED account to show that people rely less on context when the cues in the immediate environment have high diagnosticity. This is because people would no longer need to make an ‘educated guess’ to cope with the environmental uncertainty. Similarly, they should rely more on context when the individuating cues have low diagnosticity.

People do rely on oversimplified rules to interpret the ambiguous, uncertain behavior of others to fill in on missing pieces of information (Higgins, Rholes & Jones, 1977; Kahn, Dang & Mack, 2014; Kelley, 1950; Widmeyer & Loy, 1988). But when there is more individuating information available, there is less reliance on generalized stereotypic knowledge (Kunda Davies, Adams & Spencer, 2002; Lick & Johnson, 2014; see also Woolley & Ghossainy, 2013; Yzerbyt, Schadron, Leyens & Rocher, 1994). Similarly, base rates provide a useful overview of the current situation. When more individuating information is available, raters make relatively little use of the base rates. But as the individuating information becomes less diagnostic participants switch to using more generalized base-rate information

² As already alluded to, the current context is not the only way to make informed judgments when unsure. If the context information has faded from memory, people can rely on other information such as meta-cognitive feelings of familiarity (Skurnik, Koon, Park & Schwarz, 2005; Unkelbach, Bayer, Alves, Koch & Stahl, 2010; see also Schwarz, 2015). For simplicity, this article refers to context-based information, but other available sources of generalized information could take its place.

(Ginossar & Trope, 1980; Koehler, 1996; Kruglanski, Pierro, Mannetti, Erb & Chun, 2007). Neuropsychological research finds that closed neuronal circuits create a self-feedback loop so that the uncertainty in incomplete representations can be filled in by using previously stored context-generalized information (Marr, 1971). Thus it seems context-relevant knowledge is being used to compensate for the absence of more immediately available diagnostic evidence (Bar-Hillel, 1980, 1990; Kruglanski et al., 2007; see also Barbey & Sloman, 2007; Kim, Gunlogson, Tanenhaus & Runner, 2015). Street and Richardson (2015a) argued for just such a view of lie detection. In their study, raters who were forced to make a lie-truth judgment showed a truth bias. But raters who could explicitly indicate they were unsure showed a reduced truth bias, suggesting the bias reflects a guess to deal with uncertainty.

The same strategies can be observed in young children who are still developing executive control (De Luca & Leventer, 2008). Although they will often show a bias to believe others (e.g., Diamond, 2002), this is not an all-encompassing, ever-present naivety to believe everything (see Clément, Koenig & Harris, 2004; Ma & Ganea, 2010; Robinson, Mitchell & Nye, 1995). They use simple generalized rules to decide what to believe. For example, characters committing a good or bad act are judged as truth-tellers and liars, respectively (Wandrey, Quas & Lyon, 2012; see also Clément et al., 2004). But if more diagnostic individuating information is available, children as young as 4 years make use of it instead of showing a blanket bias to believe or disbelieve (Brosseau-Liard & Birch, 2011; Brosseau-Liard, Cassels & Birch, 2014; Robinson et al., 1995; see also Mitchell, Robinson, Nye & Isaacs, 1997; see also Reyes-Jaquez & Echols, 2015).

Truth Bias as A Cognitive Default

Might there still be room for an account claiming that people *default* to believing others and that disbelieving requires additional time or effort to override the default? Both long-standing (Gilbert, 1991; Mandelbaum, 2014; Morison & Gardner, 1978) and recent (Levine, 2014a) accounts have proposed the truth bias reflects a default belief. The ‘Spinozan’ account (Gilbert, 1991; Mandelbaum, 2014) takes a strong default position. It claims that people have no choice but to believe what others say is true, at first. Only afterwards can the initial belief be re-evaluated. No amount of effort can prevent the initial truth belief (Gilbert et al., 1990). The Spinozan account offers no flexibility in its truth bias: Even forewarning does not allow people to overcome their default truth belief (Gilbert et al., 1990).

Such a strong position is hard to defend, and has been criticized both empirically and conceptually (e.g., G.D. Bond et al., 2005; Hasson, Simmons & Todorov, 2005; Nadarevic & Erdfelder, 2013; Richter et al., 2009; Skurnik et al., 2005; Sperber et al., 2010; Street & Richardson, 2014, 2015a; although see Mandelbaum, 2014, for an argument in support of the Spinozan position). For instance, there is evidence that negating a statement (e.g., “the eagle *is not* in the sky”) compared to affirming a statement (e.g., “the eagle *is* in the sky”) can be faster, unintentional, and effortless (Deutsch, Kordst-Freudinger, Gawronski & Strack, 2009; Dodd & Bradshaw, 1980; Schul, Mayo & Burnstein, 2004; see Skowronski & Carlston, 1987, for similar findings in impression formation research). Nadarevic and Erdfelder (2013) suggest the evidence supporting the Spinozan account is limited to situations where people have no background knowledge, and where the statements are uninformative (i.e., in situations where there is a large scope for uncertainty). Put another way, people are Spinozan truth-biased when individuating cues to meaning

are lacking: People are guessing information is true only when they are unsure (Street & Richardson, 2015a).

Although this guessing bias is consistent with ALIED, it is also consistent with another default account that makes more conservative claims. Truth-default theory (TDT: Levine, 2014a) proposes a presumption of truth on part of the listener because people either fail to consider the possibility of a lie or they cannot find *enough* evidence to warrant switching from the default truth belief (Levine, 2014a, van Swol, 2014). However, truth-biased responders do not require additional cognitive effort or more processing time to consider the possibility of deception (Richter et al., 2009; Street & Richardson, 2014), and when people are made to feel distrustful, they rapidly activate knowledge that is incongruent with the content of the speaker's message (Schul et al., 2004). These findings suggest there need not be greater cognitive resources available to disbelieve others' statements (Hasson et al., 2005).

In fact, in contrast to default theories, in certain contexts it may take *more* effort to believe what others say is true. People are more likely to make lie judgments when made suspicious than when they are not suspicious (e.g., Levine & McCornack, 1991; McCornack & Levine, 1990; Stiff et al., 1992; Toris & DePaulo, 1985), even when cognitive resources are limited by means of a cognitive load (M. G. Millar & Millar, 1997). And when made suspicious, people make a similar proportion of lie judgments when under cognitive load than when there is no load (M. G. Millar & Millar, 1997³; see also Reinhard & Sporer, 2008, for similar findings without a suspicion

³ In their sample, respondents made 7.4% more lie judgments under high load than low load, but this difference was not statistically significant. A standardized effect size was not reported.

manipulation). So it is not always more cognitively taxing to disbelieve, as a default account would claim.

What determines if it is cognitively more taxing to believe or disbelieve? The common underlying factor is whether the information is incongruent with the listener's experience and expectations (Gervais & Henrich, 2010; Lane & Harris, 2014; Subbotsky, 2010; Woolley & Ghossainy, 2013; see also Anderson, Huettenlocher, Matlock & Spivey, 2009, for evidence in the psycholinguistic literature). That is, if the context suggests statements are truthful, then truth judgments are less cognitively taxing to make. This is only true *provided* there is an absence of more tangible and readily testable individuating evidence (Gervais & Henrich, 2010; Woolley, Boerger & Markman, 2004; Woolley & Ghossainy, 2013). Or in terms of ALIED, people do not have a cognitive default to believe, as TDT would argue. Instead, context information guides the belief judgment process only in the absence of more individuating cues.

Predictions of the ALIED account

One of the advantages of ALIED is that it offers a number of predictions that can be tested. When highly diagnostic cues are available, people will make use of them to form their lie-truth judgments. There is some albeit limited evidence in the lie detection literature to support this (Bond et al., 2013; Hartwig & Bond, 2011; Levine et al., 2014). But as I will show in the Limitations section this prediction is not entirely unchallenged, which leaves open an opportunity for falsifying the account.

Importantly, people must on some level know that there are diagnostic individuating cues available. As recent meta-analyses have shown us, we cannot trust people's self-report to assess what diagnostic cues are available (Hartwig & Bond, 2011). If raters fail to notice or process diagnostic individuating cues (which may be

assessed by means of a lens model analysis, for example), then raters should rely on context-general information to make an informed guess. Not detecting a diagnostic individuating cue is equivalent to that cue not being present, and so should lead to context-informed judgments.

Assuming the absence of individuating cues, judgments consistent with context-general information should be cognitively easier, which may exhibit itself in reaction times or other measures of judgment difficulty. In the presence of highly diagnostic individuating cues, context-general information should have less of an influence on the decision process, and so there should be less cognitive difficulty in making judgments that contrast with context-general information.

Notice that no distinction has been made between the truth bias and the lie bias. Under the ALIED account, these biases are functionally equivalent and result from the same underlying process: an attempt to make an informed guess in the absence of more diagnostic individuating cues. If the lie bias can be shown to be functionally distinct from the truth bias, and as arising from different underlying processes, this would be problematic for the ALIED account.

The account assumes that as individuating information becomes less diagnostic or absent, the use of context-general information increases. As such, it would be difficult for ALIED to explain a positive relationship between the use context-general and individuating information, i.e. where context-based general information is relied upon more heavily as an individuating cue becomes more diagnostic. How is the integration of context-general and individuating cues carried out? A simple linear model should be able to capture this behavior: As the diagnosticity of the individuating cues decrease, the use of context-general information should increase.

Such a numerical prediction should be relatively easy to test, but as yet I am unaware of any published data that has assessed this.

The adaptive strategy I have argued for should often lead to relatively accurate judgments compared to random guessing. But it can lead to wildly inaccurate judgments too, if the raters' beliefs about the current context (e.g., most people tell the truth) diverge from the actual state of the environment (e.g., in an experimental setting usually there is an equal proportion of liars and truth-tellers). The same is true of individuating cues. Thus a mismatch between (a) subjective perceptions of context-general and individuating cues and (b) the objective diagnosticity of context-general and individuating cues will lead to lower accuracy rates compared to when there is a match. This again offers a testable prediction of the account.

The Park-Levine (P-L) probability model (Park & Levine, 2001) shows that accuracy increases as the base rate of honesty increases. TDT (Levine, 2014a) would propose that accuracy increases because the environment becomes more representative of people's default cognitive tendency to believe others are telling the truth. But ALIED argues that, because people's prior experiences suggest most people tell the truth (DePaulo et al., 1996), and because individuating cues are usually weak (DePaulo et al., 2003), accuracy increases because the environment becomes more representative of a context-based heuristic. If the context suggested most people would lie, ALIED would predict that responding would be reverse to the P-L probability model such that accuracy would increase as more and more people lied, again assuming the individuating cues are weak. Put another way, ALIED would predict that a more general version of the P-L model could be constructed such that a dummy variable is multiplied to their formula to account for context: The variable should be -1 when people are expected to lie (thus accuracy should be greatest when

the base rate of lies is greatest) and +1 when people are expected to tell the truth (thus accuracy should be greatest when the base rate of honesty is greatest).⁴

Because TDT claims the truth bias is a default, accuracy should decrease when most people are lying, not increase. Put simply, the ALIED position encapsulates default theories by claiming that the support for default theories is the result of a fixed truth-suggestive context. When the context shifts, so too will the response bias.

In summary, (i) highly diagnostic individuating-cues should guide the judgment. (ii) The less diagnostic an individuating cue is, the more impact context-general information will have on the final judgment. (iii) Individuating and context-general cues will be used to different degrees in a judgment. This trade-off should be easily simulated with a linear model. (iv) Although the strategies people use are adaptive and functional, they can lead to highly inaccurate judgments: In situations where beliefs about (subjective perceptions of) the diagnosticity of individuating cues and/or about the context-general information diverges markedly from the true (objective) state of the world. (v) It may even be possible to generalize the P-L model to account for the effect of context-generalized information. Some further predictions may be garnered from the Practical Application section below.

Limitations of an Adaptive Lie Detector Account

Although ALIED offers a number of testable predictions and synthesizes work across psychological disciplines, it has its limitations. People do not always rely on the best evidence available to them. Consider a recent finding by Bond et al. (2013). Even when a perfectly diagnostic cue is available in the form of incentives the

⁴ Although one must be careful to note that ALIED would predict this model would perform more poorly in accounting for accuracy as the diagnosticity of individuating cues increase.

speaker has for lying, raters still incorporate less diagnostic behavioral information into their judgment, which causes lower accuracy. Although this seems to undermine the account, there are two important caveats. First, accuracy was still relatively high when behavioral information was available (just under 80%), similar to previously reported accuracy rates using behavioral information alone (i.e., without incentive information). So although accuracy clearly declined, to use individuating behavioral information was not misguided because it nonetheless resulted in an impressive accuracy rate.

Second, and more importantly, incentive information and behavioral cues are both individuating cues – they each speak directly to the veracity of the given statement. The account does not make any claims as to *how* people select or integrate multiple diagnostic individuating cues; rather, the account places focus on how people can make adaptive judgments when individuating cues are absent or lacking diagnosticity. This places a limit on the explanatory power of the account. Speculatively, it may be that the speakers' behaviors, being more salient than abstracted incentive information, are given more credence and so more weighting in the judgment (see Nisbett & Ross, 1980; Miller & Stiff, 1993; Platzer & Bröder, 2012).

It is important to note that salience can be functional and lead to informed judgments. Schwarz's (2015) 'Big Five' criteria shows that the easier it is to process some information, the more likely that information is to be supported by other evidence, more compatible with what one believes, and more internally coherent with other available information. Thus salient, easily processed information can often act as a useful proxy to guide truth judgments (Ask, Greifeneder & Reinhard, 2012; Dechêne, Stahl, Hansen & Wänke, 2010; Fiedler, 2000; Reber & Schwarz, 1999;

Street & Richardson, 2015b). Indeed, Street and Richardson (2015b) argue saliency may be the key to explaining why accuracy improves when using the indirect lie detection method. This account of Bond et al.'s (2013) findings is of course mere speculation, but it is consistent with previous findings and shows how even salience can be relied upon to make an informed choice (Schwarz, 2015). Future work is required to test this speculation, and it may be fruitful to integrate those findings into the ALIED account.

A more problematic limitation is that ALIED does not propose how people select or integrate various types of context-general cues. They can vary from social rules (O'Sullivan, 2003), personal relationships (McCornack & Levine, 1990), base rates (Park & Levine, 2001; Street & Richardson, 2014) and even emotion and affect (Shackman et al., 2011). Clearly then, we need a theory that can explain if and when different types of context-general cues are used, and if they are all integrated into the judgment or if people select only a small set of the available cues. Given that manipulations of generalized suspicion and other manipulations sometimes only reduce the truth bias rather than result in a lie bias (e.g., Levine, Park & McCornack, 1999), it may be that people integrate their context-general beliefs about, say, the base rate of honesty with other context-general cues (e.g., suspicion) in the current environment (see Street & Richardson, 2014, for consideration of this possibility).

Finally, the consistently low accuracy rates (Bond & DePaulo, 2006) show people do not always make the most accurate judgments. This does not seem very adaptive or functional. But ALIED does not claim people always make the *most accurate* judgment: otherwise researchers would only need to look at the environment to be able to perfectly predict behavior (Simon, 1992). Instead, ALIED argues the truth bias, only one component of the lie detection process, is the result of an attempt

to make accurate judgments by relying on informed but generalized strategies. It is an adaptive strategy to rely on more generalized context-general information when more individuating cues have low diagnosticity. This generalized knowledge will be adaptive in the long run, but in individual instances it may lead to incorrect judgments.

Practical Application

As is widely known in the community, lie detection accuracy is only marginally above chance (Bond & DePaulo, 2006; Kraut, 1980). This fact, coupled with the obvious applications to, say, the police force and military investigations, sparked a rush to application. This has largely been lacking in theory (Köhnken, 1990, cited by Reinhard & Sporer, 2010; Miller & Stiff, 1993; Vrij & Granhag, 2012). To reliably improve lie detection in applied settings, we must understand (i) the processes underlying how and why people deceive, (ii) how raters try to make the lie-truth judgment, and (iii) where that judgment process goes wrong.

One of the most important contributions of the ALIED account, then, is to provide a process-oriented foundation from which to begin addressing how best to detect deception, and to encourage the field to explore lie detection from a process-oriented perspective. By integrating across cognitive, social, developmental, and judgment and decision-making research, amongst others, the theoretical account offered here stands in sharp contrast to the long-held view that lie detectors are error-prone (e.g., Buller & Burgoon, 1996; Gilbert, 1991; The Global Deception Research Team, 2006).

This has drastic implications for how the field should progress. For instance, the word ‘bias’ unfortunately implies an erroneous imbalance that must be corrected (see Street & Masip, 2015). But before trying to remove biases from lie-truth judgments,

we must first ask whether we ought to remove judgmental biases at all. ALIED claims that the bias comes about as an attempt to make an informed guess in the absence of more individuating cues by relying more heavily on context-general information. Hypothetically, if there were no diagnostic individuating cues available (e.g., before the speaker has even begun to deliver a statement), should we flip a coin to decide if a statement is a lie or truth? Or should we instead make use of our prior knowledge of the world and other context-general information to make an informed choice? The latter seems more likely to lead to more accurate judgments in the long run.

But despite this benefit, I still believe we must rid ourselves of the truth bias. To attain reliable accuracy rates, practitioners and lay people who are required to make veracity assessments must come to rely on diagnostic individuating cues and be aware of when those cues are absent. In their absence, people must be encouraged to acknowledge the uncertainty in the environment and then abstain from judgment, remaining agnostic. This is particularly important if we are to prevent people guessing (or assuming) that someone will lie or tell the truth before they have even begun speaking. A very simple way to do this is to give people the explicit option of saying ‘unsure’, rather than forcing them into making a lie or truth judgment. When this option is available, the bias has been shown to reduce or disappear (Street & Kingstone, 2015; Street & Richardson, 2015a). It does not necessarily follow that less biased judgments will be more accurate judgments (Jussim, 2012). But some work in the memory domain finds that allowing people to indicate they are uncertain, rather than making a forced choice, improves their recall accuracy (Koriat & Goldsmith, 1996).

This has implications beyond the domains of detecting deception. Most organizations are concerned with effective and unbiased decision-making. Reducing

judgmental biases may mean paying attention to when there are few or no diagnostic individuating cues available and refraining from making a guess. This may be easier said than done, and metacognition is likely to play an important role here (see Ask et al., 2012; Schwarz, 2015; Schwarz & Clore, 2007).

In line with current thinking, if we are to improve lie detection accuracy we must increase the diagnosticity of individuating cues. This might mean amplifying behavioral cues (Vrij & Granhag, 2012), using effective questioning methods to probe the statement (Levine, 2014b), or giving further information about the motives and incentives behind the statement (Bond et al., 2013; Blair et al., 2010). By gaining a further understanding of how and why people lie, and by exploring how behavior unfolds, we should in turn be able to focus our scientific telescope on the relevant behaviors to discover what individuating clues there may be to deception (Burgoon, Scheutzler & Wilson, 2015; Duran, Dale, Kello, Street & Richardson, 2013; Van Der Zee, Poppe, Taylor & Anderson, 2015).

The role of context-general information has a greater effect when individuating cues have low diagnosticity. We have long known that there is no reliable indicator to deception, and that individuating cues typically have low diagnosticity (DePaulo et al., 2003). So in many circumstances, context-general information is liable to play a relatively large role. Potentially subtle cues in the environment, then, may serve to guide the direction of the judgment. For instance, might interviewing a suspect or witness in the back of a police car lead to more guilt-presumptive questioning and expectations of deception, compared to interviewing the same person in a more relaxed environment such as the suspect's/witness' own home?

This is a particularly pressing issue in England and Wales presently. They have a magistrate system where lay members of the community act as volunteer judges on

more minor offences such as theft. This system has remained relatively unchanged since its inception over 700 years ago, but right now it is currently undergoing the largest reform in its history (Donoghue, 2014). A think tank recommendation is to create ‘mobile courts’, where magistrates will dispense justice from “community building, unused shops, leisure centres and office space – with mobile courts that change their location over time” (Chambers, McLeod & Davis, 2014). How might the dispensing of justice be influenced by the subtler context-general cues in these different environments? ALIED suggests the setting may guide credibility judgments in the absence of more diagnostic cues to honesty or deception.

Because judges and jurors in many countries are explicitly expected to incorporate credibility into their interpretation of the evidence, they may feel they have no choice but to make a lie-truth judgment. The ALIED account proposes jurors and judges should be instructed that, if they must incorporate credibility, to be aware of the basis of their judgment – whether it is the result of individuating cues or context-general cues. The latter is liable to lead to biases that, although useful in the long run, may lead to incorrect judgments about a given statement and so should be treated with caution.

These issues are not confined to the courtroom. Psychological domestic violence can involve deceiving friends, family, and social services, with little to no physical evidence to substantiate allegations of abuse. Hospital staff must be careful not to give out sensitive information about a celebrity if a press reporter calls posing as a family member. And online forum users must protect themselves from potential identity fraud when giving their details out to supposed online friends. In all these cases, people should pay attention to the lack of highly diagnostic individuating cues – often this means a lack of cues indicating honesty, rather than deception – and to be

aware of the potential context-general cues that they may be relying on when deciding to trust or distrust others, and when deciding to believe their allegations or claimed identity.

Conclusion

The ALIED account proposes that people attempt to make informed judgments when the individuating cues leave people unsure by relying on relevant context-general knowledge. This will ultimately exhibit itself as a truth or lie bias. ALIED argues there is no cognitive defaulting towards believing others, and that it is not always cognitively more difficult to make a lie rather than a truth judgment. Instead, it is argued these biases appear in the research because more diagnostic individuating cues are absent (see Bond et al., 2013; Levine et al., 2014 for accurate judgments in high diagnostic environments) and raters are attempting to make an informed guess – informed by their understanding of the current context. Lie-truth judgments may be inaccurate and biased, but they are nonetheless functional, adaptive strategies to deal with the ever-changing state of the world.

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