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THE NONVERBAL APPROACH TO THE DETECTION OF DECEPTION: JUDGEMENTAL ACCURACY

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Nonverbal research on credibility assessment indicates that observers' accuracy in distinguishing between truthful and deceptive communications on the basis of the sender's behavioural displays hardly exceeds the chance level. This contrasts with accuracy rates attained when using psychophysiological (e.g., the polygraph) or verbal (e.g., CBCA) techniques, which are quite high. However, in this paper it is argued that conclusions about the low accuracy of credibility judgements based on senders' behaviour are erroneous. Three reasons are given for this assertion. First, while the participants used in experiments examining the validity of psychophysiological and verbal lie-detection procedures normally receive some training, nonverbal research into the detection of deceit has normally used lay observers as participants; in those studies in which participants were trained their judgemental accuracy increased. Second, there are large differences between accuracy at detecting truthful (high accuracy) and deceptive (poor accuracy) statements; normally this has not been taken into account by nonverbal researchers. And third, there is a myriad of variables that influence accuracy, so that the conclusion that it is poor must be qualified.

La investigación empírica realizada desde la aproximación no-verbal o de los correlatos conductuales para la evaluación de la credibilidad muestra que los índices de precisión de los observadores que deben discriminar entre declaraciones verdaderas y falsas se sitúa apenas por encima del nivel de azar. Esto contrasta con los índices alcanzados mediante el empleo de técnicas procedentes de las orientaciones psicofisiológica (por ej., el polígrafo) y verbal (como el CBCA), muy superiores. En el presente trabajo se argumenta no obstante que la conclusión de que la precisión alcanzada desde la orientación no-verbal es muy limitada resulta engañosa, y ello debido a tres razones: Primero, mientras los sujetos de la investigación realizada sobre las técnicas psicofisiológicas y verbales normalmente reciben entrenamiento, en general la investigación no-verbal de la detección del engaño se ha hecho con sujetos ingenuos; cuando se ha entrenado a estos su precisión se ha incrementado. Segundo: hay grandes diferencias entre la precisión al detectar declaraciones verdaderas (muy elevada) y falsas (muy pobre), lo cual tradicionalmente no ha sido tomado en consideración por la investigación no-verbal. Tercero: existe una miríada de variables que afecta la precisión en ese tipo de estudios, por lo que la conclusión de que ésta es pobre debe ser matizada.

The importance of deception and its detection in legal contexts is beyond any doubt. This is acknowledged by both legal authors (e.g., Bernal, 1992; Magaldi, 1987), who understand that false testimonies may corrupt the proper functioning of the justice system (Bernal, 1992; Córdoba, Mourullo, & del Toro, 1978; Torío, 1981), and psychologists and communication scholars carrying out research on the detection of deception (e.g., Kalbfleisch, 1992; Miller, Bauchner, Hocking, Fontes, Kaminski, & Brandt, 1981; Miller & Burgoon, 1982; Pryor & Bucharan, 1984). It is not surprising, therefore, that practitioners working in judicial contexts (such as forensic psychologists, forensic psychiatrists, lawyers or judges) often demand procedures for accurate discrimination between truthful and deceptive testimonies. The facts on which judicial decisions will be based are gathered from testimony. Therefore, any alteration of testimony merits consideration. In addition, defendants, witnesses and victims involved in litigation may have good reason to lie (e.g., avoiding a sentence, protecting a loved one). Thus, in order to grasp the truth, legal professionals and those who assist them should be capable of discriminating between truthful and deceptive statements.

Currently, psychological science uses three main techniques or approaches for assessing credibility, i.e., discriminating between truthful and deceptive statements (see, e.g., Alonso-Quecuty, 1994; Masip & Garrido, 1999; Yuille, 1989): *psychophysiological techniques*,

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based on the measurement and recording of vegetative activity (e.g., Lykken, 1998); *procedures for analyzing the verbal content of the statement*, notable among which are Criteria-Based Content Analysis (CBCA) (see Garrido & Masip, 2001, for a detailed description) and extrapolation to the deception detection area of the reality monitoring technique (RM) (see, e.g., Alonso-Quecuty, 1990, 1995; Masip, Sporer, Garrido, & Herrero, in press; Vrij, 2000); and the *nonverbal approach* –or *behavioural-indicator approach*– which emphasizes the importance of observing the person's behaviour, particularly the nonverbal signals displayed, in order to infer whether that person is lying or telling the truth (e.g., DePaulo, Zuckerman, & Rosenthal, 1980b; Köhnken, 1989; Masip & Garrido, 2000; Miller & Stiff, 1993; Vrij, 1998; Zuckerman, DePaulo, & Rosenthal, 1981). The commonest research procedure within the last type of approach (though not the only one; see Miller & Stiff, 1993, chapter 3) consists of asking a number of senders to make truthful or deceptive statements. These statements are video-recorded and analyzed in order to examine the behavioural indicators of deceitfulness and truthfulness; they may also be shown to one or several groups of observers or receivers, who are requested to assess their credibility and other aspects. The choice of procedure will naturally depend on the aims of the research.

DePaulo and Rosenthal (1979) conceptualized research within the nonverbal approach as centred on three main areas of inquiry. The first of these is *accuracy*, that is, the extent to which the sender is capable of lying successfully and the receiver is capable of accurately detecting the deceit. The second area involves the study of how the availability of different *communication channels* (body, face, voice, statement content, and so on) influences accuracy in credibility judgements. The third area of inquiry is focused on identification of the *individual behavioural cues* that are indicative of deceit. Here it is important to distinguish between actual indicators of deception, perceived indicators of deception, and people's beliefs about the indicators of deception (Burgoon, Buller, & Woodall, 1994; DePaulo & Rosenthal, 1979; Zuckerman, Koestner, & Driver, 1981). *Actual indicators of deception* are those behavioural cues that senders display more frequently when lying than when telling the truth; *perceived indicators of deception* are those cues that make observers think that senders displaying them are lying; and *beliefs or stereotypes about the indicators of deceit* are those behavioural cues that people claim to be indicative of deception.

We have already described two of the three major research areas listed by DePaulo and Rosenthal (1979) in a previous paper (Masip & Garrido, 2000). More specifically, the second area, referred to there as the "channel approach", was described in some detail, as was the third in its actual-deception-cue variety, labelled as the "individual-indicator approach." Therefore, in the present paper we summarize the general findings of research on accuracy. Some critical considerations will also be made.

ACCURACY IN DETECTING DECEPTION BY OBSERVING ITS BEHAVIOURAL CORRELATES

Accuracy rates

Human ability to detect deception simply by observing the sender's behaviour is far from perfect. Meta-analyses and theoretical reviews coincide in showing that accuracy in discriminating between truthful and deceptive accounts is normally greater than chance, but only slightly so. In an early review, DePaulo et al. (1980b) stated that: "On the basis of the available evidence, it is clear that although humans are far from infallible in their efforts to diagnose lies, they are substantially better at the task than would result merely by chance" (p. 130). Another deception researcher, Robert Kraut, promptly replied to this assertion:

"As DePaulo et al. have shown, most studies find that naive judges can detect deception at greater than chance levels. Yet looked at another way, the accuracy of human lie detectors is low. Among published studies that report accuracy in percentage terms, accuracy scores rarely exceed 65 percent, where 50 percent is the chance level…" (Kraut, 1980, p. 209).

The two quotations actually say the same thing, although one of them (that of DePaulo et al.) highlights the fact that the figures are greater than chance, while the other (Kraut's) stresses that the chance level is not exceeded by very much. In sum, the first is a largely optimistic interpretation and the second a largely pessimistic view of the same findings.

Similar accuracy rates are reported in other papers, as shown in a recent review by Vrij (2000). This author

considered observer accuracy in a series of 39 studies examining the nonverbal detection of deception. The results of these studies are shown in Figure 1. Chance accuracy would be 50% correct judgements. It can be seen that the accuracy range in which most studies are found (12 according to Vrij's review) is the 54 - 56% range. In none of the experiments reviewed by Vrij was accuracy either lower than 30% or higher than 64%. And just four studies –three of which were conducted by the same researchers– found observers' judgemental accuracy to be lower than 48%: Brandt, Miller and Hocking (1980a) and Vrij and Graham (1997) reported a mean accuracy rate of 42%; Brandt, Miller and Hocking (1980b) a mean accuracy rate of 38%; and Brandt, Miller and Hocking (1982) a mean accuracy rate of 31%.

Figure 1
Accuracy of the credibility judgments based on observation of senders' behavioural cues in the 39 studies reviewed by Vrij (2000)

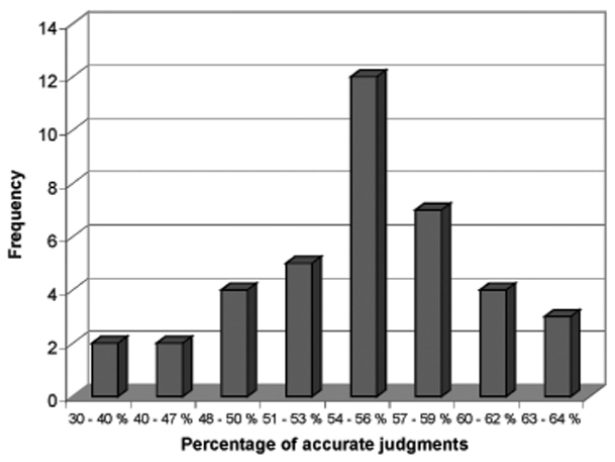


Table 1
Reasons given by Vrij (2000) to account for observers' poor lie- and truth-detection ability

- There are occasions on which people do not want to uncover the truth.
- There is no such thing as a kind of behaviour that, in itself, indicates that the sender is indeed lying.
- The behavioural differences between liars and truthtellers are very small.
- Conversational rules prevent the potential detectors from scrutinizing the potential liar adequately.
- Observers' judgments are often affected by a number of errors and biases (the availability heuristic, the infrequency heuristic, the relational truth-bias heuristic, the representativeness heuristic).
- Not even the display of indicators of nervousness or content complexity necessarily implies that the person is lying.
- When judging credibility, observers often fail to take into account individual differences in behaviour.

Reasons for such limited accuracy

Diverse explanations have been proposed for these poor accuracy rates. Kraut (1980) referred to phylogenetic factors. For the liar, the adaptive value of deceiving convincingly is clear, as is the adaptive value of the ability to detect deception for the potential victim of deceit. However, the same living organism often acts as the liar on some occasions and as the recipient of the lie on others. As a result, according to Kraut (1980), "evolution should lead to an equilibrium in which people are skilled simulators and social actors and are also talented at piercing others' deceptions, with, of course, individual variations at both skills" (p. 213). Bond, Kahler and Paolicelli (1985), Bond, Omar, Mahmoud and Bonser (1990), and Bond and Robinson (1988) provided a similar argument, though from a more extreme sociobiological standpoint than that of Kraut.

The explanation that Burgoon et al. (1994) proposed for the limited accuracy rates is of a different nature:

"The poor detection skills may also be a function of the inferential process by which receivers attribute deception… Since nonverbal cues are not directly indicative of deceptive intent… a receiver must make an inferential leap from these perceptions to deceptive intent" (p. 276).

In fact, in line with these observations of Burgoon et al. (1994), research has shown that the behavioural cues observers pay attention to in order to infer deception do not coincide with the actual indicators of deceit (e.g., Ekman, 1989a; Vrij & Winkel, 1993).

Finally, Vrij (2000) put forward the reasons listed in Table 1 to account for people's poor ability in making credibility judgements.

Is accuracy really so poor?

If we compare the above figures attained using the nonverbal approach to the detection of deceit, which are only slightly greater than the 50% chance expectation, with the accuracy rates typically obtained using verbal and psychophysiological methods, it becomes clear that they are markedly low. For example, the verbal procedure known as *Criteria-Based Content Analysis* (CBCA) has on occasions yielded accuracy rates higher than 80% (Köhnken, Schimossek, Aschermann & Höfer, 1995; Tye, Amato, Honts, Devitt & Peters, 1999, experiment 2; Vrij, Edward, Roberts & Bull, 2000; Yuille, 1988), and even of 100% in the well-known study by Esplin, Boychuk and Raskin (1988; see also Raskin & Esplin, 1991a,b; Wells &

Loftus, 1991). Although there are some relevant studies in which accuracy did not surpass the chance level (e.g., Brodie, 1993; Joffe & Yuille, 1992), it seems that this was because the participants did not actually use the CBCA content criteria in judging the credibility of the statements. As regards the *reality monitoring technique* (RM) applied to the detection of deception, research shows that both its overall accuracy and its separate accuracy in detecting truthful and deceptive statements are significantly greater than chance, and similar to that of the CBCA (Masip et al., in press). As far as the *polygraph* is concerned, reviews and meta-analyses show that with the Control Question Test (CQT), accuracy most often clusters between 80% and 90% when testing the guilty suspects (those who are lying) (see the reviews by Ben-Shakhar & Furedy, 1990; Carroll, 1988; Kircher, Horowitz, & Raskin, 1988; Lykken, 1988, 1998; Masip, 2002; Raskin, 1988, 1989; Vrij, 2000), and between 53% (Carroll, 1988; Lykken, 1988) and 93% (Raskin, 1989) when testing the innocent suspects (those who are telling the truth) (see also Ben-Shakhar & Furedy, 1990; Kircher et al., 1988; Lykken, 1998; Masip, 2002; Raskin, 1988; Vrij, 2000). With the Guilty Knowledge Test (GKT), polygraph accuracy is often over 80% when testing the guilty suspects and over 90% when testing the innocent ones (see Ben-Shakhar & Furedy, 1990; Lykken, 1988, 1998; Masip, 2002; McLaren, 2001; Raskin, 1989; Vrij, 2000).

These discrepancies between the poor validity obtained in research using the behavioural-indicator approach and the remarkable accuracy rates found when using verbal or psychophysiological procedures have led some authors working from the nonverbal approach to remark that there seems to be little reason to continue conducting accuracy research in this way:

"If overall accuracy rates are consistently low, perhaps it is time to declare deception detection a "dead area" or at least to alter radically our approaches to studying it… instead of investigating detection accuracy, researchers should begin to identify explanations for detection errors" (Miller & Stiff, 1993, p. 71).

We are, indeed, inclined to agree with Miller and Stiff's (1993) appreciations. Much has already been written about overall accuracy in making credibility judgements based on the observation of the sender's behaviour, and those variables that might have an influence on accuracy should certainly be explored. In this regard, DePaulo et al. (1980b) seem to be on the right lines:

"We want to know not only whether humans can detect lies but also who is skilled and who is less skilled at such detection. Furthermore, we are interested not only in the accuracy of the end product of human lie detection, but also in the process –how people actually detect lies, how they think they detect lies, and whether the actual and perceived processes of lie detection correspond to one another" (p. 130).

However, the conclusion that the accuracy obtained using nonverbal indicators is necessarily extremely poor, particularly when compared with the accuracy normally obtained using psychophysiological and verbal techniques, is erroneous. Three reasons can be adduced for the poor accuracy found up to now: lack of training of participants in the studies carried out using the nonverbal approach; the existence of large differences between accuracy in the detection of truthful and deceptive statements; and the powerful influence of a range of variables upon accuracy. The remainder of the present work focuses on the discussion of these three points.

Untrained Observers. First of all, accuracy rates attained using verbal and psychophysiological techniques should not be compared with those attained in studies conducted from the behavioural-indicator or nonverbal approach. While polygraphers or forensic psychologists using verbal techniques such as CBCA or RM have been trained, thus learning the psychophysiological responses or verbal criteria associated with the deceptive act (or with stress, or with internally-generated memories, or with narrations of facts that have been experienced, etc.), in most cases those who participate in studies on nonverbal detection of deception are people without any special knowledge about the behavioural cues to deceit, and they are not instructed before performing their experimental task. When such participants are trained to infer deception from behavioural cues, accuracy increases.

Several procedures have been used in training sessions (Vrij, 2000):

a) *Attentional procedure*. This procedure consists of asking observers to pay attention to certain cues that are indicators of deception and to ignore others (e.g., DePaulo, Lassiter, & Stone, 1982).
b) *Informational procedure*. This consists of providing participants with information about the actual relationship between certain indicators and deception. Participants can subsequently use this information to make their credibility judgements (e.g., Vrij, 1994).

c) *Providing feedback*. This procedure consists of giving the observers feedback about their performance, so that they can learn from their correct and incorrect judgements as they carry out the credibility-assessment task (e.g., Zuckerman, Koestner, & Colella, 1985).

As Vrij (2000) observes, *regardless of the procedure being used, in general observers in the training condition are able to increase their accuracy* . However, an interesting exception to this finding are police officers. Far from permitting officers to increase their accuracy in making credibility judgements, training actually results in a decrease in accuracy (Köhnken, 1987; Vrij, 1994, 2000; Vrij & Graham, 1997).

In this context, it is relevant to mention a recent study by Vrij et al. (2000), in which the authors focused on whether deception can be detected using nonverbal indicators, CBCA criteria and RM criteria. Senders were 73 students who were video-recorded while lying or telling the truth in a situation in which lying required making a cognitive effort –that is, the lies could not be planned beforehand. Thus, behavioural signals of cognitive effort were expected to appear; in fact, the videotapes were analyzed to code the following behaviours: gaze aversion, illustrators, adaptors, hand and finger movements, leg and foot movements, filled pauses or speech hesitations ("aaaahhh", "mmhhh", etc.), other speech errors, latency period (amount of time between the end of the question and the beginning of the answer) and speech rate.

Observers were required to watch the videotapes and judge whether senders were lying or telling the truth. However, these observers were not naïve participants; instead, as is normally the case in CBCA and RM studies (and also in this experiment with those observers who used these other methods), two coders were trained to examine the videotapes and record the occurrence of all the nonverbal behaviours indicative of cognitive load listed above.

Table 2
Accuracy in detecting truths and lies attained by trained participants in Vrij et al.'s (2000) experiment

	Detection Accuracy		
	Truthful Statements	Deceptive Statements	Overall
Nonverbal Behaviour (NVB)	70.6	84.6	78.1
CBCA	64.7	79.5	72.6
RM	70.6	64.1	67.1
NVB + CBCA + RM	76.5	84.6	80.8

As would be expected in a cognitively complex situation, it was found that when giving their deceptive statements senders made fewer hand and finger movements than when giving their truthful statements; they also presented fewer illustrators, more filled pauses in their speech and longer latency periods. No significant differences emerged in the other nonverbal measures. When these data were entered in the computer and a discriminant analysis was run with the nonverbal variables, 70.6% of the truthful statements and 84.6% of the deceptive statements were correctly classified, and overall correct classification rate was 78.1%. These figures, rather than being poorer than those obtained with other procedures, such as CBCA and RM, were actually better (see Table 2). However, when 10 of the interviews used in this experiment were randomly chosen and shown to 50 untrained participants who had to judge whether they were truthful or deceptive –thus using the procedure normally employed in nonverbal deception detection studies– accuracy was 56% for the truthful statements and 50% for the deceptive statements (Vrij & Baxter, 1999, as cited in Vrij et al., 2000). These latter figures are similar to those found with the procedure normally used in this type of research (see Figures 1 and 2).

In summary, *if participants are trained they may become capable of discriminating between truthful and deceptive statements by observing senders' nonverbal behaviour. They might even attain accuracy rates similar to or higher than those attained using verbal procedures*.[1]

Differences between accuracy in identifying truthful and deceptive statements. A second argument in support of the argument that accuracy in making nonverbal-behaviour-based judgements of credibility is not necessarily poor rests on the distinction between accuracy in judging truthful statements and accuracy in judging deceptive statements. In many reports, only the overall accuracy rate is reported, and no distinction is made between the correct classification of truths and of lies – a practice that has been criticized elsewhere (e.g., Levine, Park, & McCornack,1999; Stiff & Miller, 1993).

There is evidence that *accuracy in detecting truthful statements is greater than accuracy in detecting deceptive statements* (see, e.g., DePaulo, Stone, & Lassiter, 1985; Levine et al., 1999; Vrij, 2000; Zuckerman,

DePaulo et al., 1981). In the above-mentioned review by Vrij (2000), the partial accuracy rates –that is, the separate accuracy rates for truthful and deceptive statements– were reported in only nine of the 39 studies reviewed. By plotting a graph with these data (Figure 2), two distributions close to normality emerge. Note that the distribution for the deceptive statements is more to the left than the distribution for the truthful statements, making it clear that accuracy in detecting truthful accounts is greater than accuracy in detecting deceptive accounts.

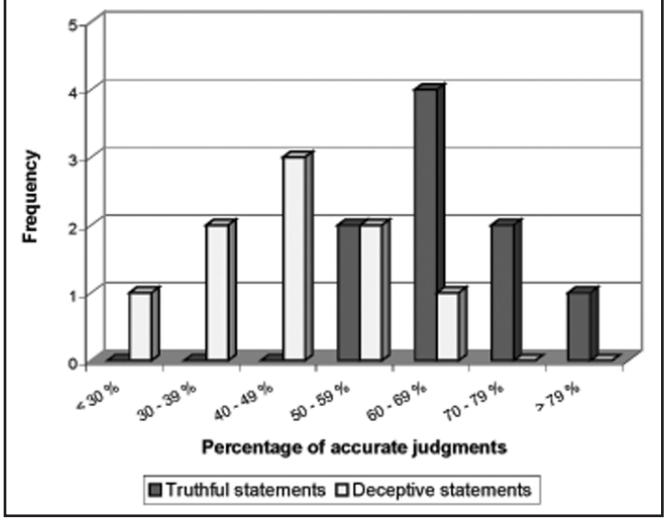
Levine at al.'s (1999) paper is of particular interest here. The authors argue as follows:

"That (a) accuracy rates are, on average, only slightly better than fifty percent, and that (b) people exhibit a rather strong and persistent truth-bias are perhaps the two most widely accepted and well documented findings in deception research. Yet, one might question if these two conclusions are entirely consistent with one another. The existence of a strong truth-bias suggests that the veracity of the message judged may be an important determinant of detection accuracy … people are more likely to correctly identify truths than lies. Thus, accuracy rates for truths should be considerably higher than accuracy rates for lies. If this is the case, conclusions regarding accuracy rates may be an artifact of how detection accuracy is calculated, and breaking accuracy rates down by truths and lies may yield dramatically different conclusions" (p. 127).

In their report, Levine and his colleagues posed the hypothesis that they would find a *veracity effect*: accuracy in judging truthful statements would be significantly greater than accuracy in judging deceptive statements. In fact, they expected accuracy in judging truths to be greater than chance, and accuracy in judging lies to be less than chance. This would be caused by a *truth bias*: people's tendency to judge statements as truthful would be greater than their tendency to judge statements as deceptive. In a series of three experiments, Levine et al. (1999) re-analyzed Levine and McCornack's (2000) and McCornack and Levine's (1990) data, finding support for their hypotheses. Furthermore, they found that, in those experiments, the effect of the independent variables (suspicion, probing, and heuristic vs. systematic processing of information) was not the same on accuracy at detecting truthful statements as on accuracy at detecting deceptive statements. The conclusion is clear: *all the previous research should be reconsidered, given that normally only the impact of the experimental manipulations on overall accuracy* ("detection accuracy", according to Miller & Stiff's [1993] terminology) *has been examined, neglecting its impact on accuracy in detecting truths and lies separately*.

Of course, if accuracy in detecting truthful statements is greater than accuracy in detecting deceptive ones, then the more the truthful statements included in the stimulus series to be judged by the observers, the greater the overall accuracy rate. A fourth study reported by Levine et al. (1999) showed that this is exactly what happens: a linear increase in overall accuracy was found as the proportion of truthful statements included among the experimental stimuli increased. In other words, the greater the proportion of truthful statements, the higher the participants' accuracy in judging credibility. What, then, does overall accuracy reflect? Does it reflect observers' ability to discriminate between truthful and deceptive statements? Or, rather, it does reflect the proportion of truthful statements in the experiment?

Figure 2
Accuracy in detecting lies and truth in the nine studies reviewed by Vrij (2000) in which accuracy rates were given separately for truthful and deceptive accounts



[1] Such training would require creating a standard credibility-assessment method or instrument based on the behavioural-indicator approach. This would imply a number of problems regarding the forensic implications (and applications) of this instrument, as well as need for the training of practitioners before they assessed credibility in police and judicial contexts. For a discussion of these aspects, the reader may refer to Masip (2002), and Masip and Garrido (2000, 2001).

The authors concluded that:

a) Overall detection accuracy cannot be equated with deception detection accuracy, and the findings of the studies that have used a 50/50 proportion of truthful and deceptive messages cannot be generalized to other studies: "Simply put, most previous findings are artifactual, and lie accuracy is often significantly below chance levels" (Levine et al., 1999, p. 141).
b) The effects of certain variables (such as the observers' suspicion, whether the interviewee is probed or not, and how the information is processed) on accuracy are moderated by the truth value of the statements. Therefore, as stated above, the evidence currently available should be re-evaluated.
c) The validity of calculating overall accuracy scores is questioned: accuracy in detecting truthful statements does not correlate with accuracy in detecting deceptive statements, and there are several variables that have different effects on each kind of accuracy.

The veracity effect may be caused by a variety of factors. It may be the result of heuristic processing (Stiff, Kim, & Ramesh, 1992), or the result of the very functioning of the human mind, which in principle represents as true all the incoming information it comprehends (Gilbert, 1991; Gilbert, Krull, & Malone, 1990). Or it may be a consequence of the adaptive strategy of believing the incoming messages, since in everyday life most of those messages are truthful (Anderson, Ansfield, & DePaulo, 1999). In the two final experiments of his doctoral dissertation, Masip (2002) found evidence that the truth bias –and, consequently, also the veracity effect– decreases as the judgement is made at a later point of the sender's statement, and that the difference in the proportion of judgements of truthfulness in judging truthful and deceptive statements increases as respondents make their judgement later. Masip explained these results in terms of information processing. Heuristic judgements of credibility seem to be judgements of truthfulness (see Gilbert et al., 1990; Millar & Millar, 1997; Stiff et al., 1992). When, as is the case in most experiments conducted in this area, the videotaped statements whose credibility has to be assessed are very brief, the amount of information conveyed by the witness might be insufficient for receivers to make a reasoned judgement. It is also possible that these receivers are at the first stage of certain attribution and person-perception models, such as Gilbert's (1989; Gilbert & Malone, 1985), Trope's (1986) or Fiske and Neuberg's (1990). At that initial stage judgements are made heuristically; only at a subsequent stage can the information be processed systematically. As a result, if the statement is very brief, the judgement is made heuristically, and is therefore a judgement of truthfulness (i.e., the receiver concludes that the sender is expressing the truth). But if segments are added to this brief statement, then as the decision is made later, the proportion of judgements of truthfulness decreases progressively, particularly when judging deceptive statements, since the receivers have access to an increased amount of information conveyed by the sender, and use that information as a basis for their credibility judgements – at that point already the result of systematic processing. In this way, the initial truth bias decreases over time, whereas discrimination between truthful and deceptive statements increases progressively.

In any case, and returning to our line of reasoning, it is essential to be aware that appreciations about the extent to which the detection rates attained using the nonverbal approach are high or low must take into account the distinction between accuracy in detecting truths (comparatively high) and accuracy in detecting lies (quite low). They must also consider the length of the statements being shown to the receivers and the point of the statements at which receivers determine whether the witness is lying or telling the truth.

Variables with an impact on accuracy. A third argument contrary to the idea that accuracy rates are no more than moderate rests on the evidence showing that there is a myriad of variables that have an influence on those rates. As stated above, whether the receivers are trained or not is one such variable. The communication channel through which the information is conveyed is another one, as explained in Masip and Garrido's (2000) review. But there are many more variables influencing accuracy, and the thorough examination of all of them is far beyond the limited goals of the present paper. Even so, we list some of them below, though it is important to make clear that neither the list nor the citations are exhaustive, but merely examples to illustrate the point:

a.- *Variables of the deceptive situation:* Whether the lie is prepared beforehand or is spontaneous (Greene, O'Hair, Cody, & Yen, 1985), the kind of relationship between the sender and the receiver (Comadena, 1982; Levine & McCornack, 1992), the receiver's degree of familiarity with the sender's normal behaviour (Brandt

et al., 1980 a,b; 1982), the receiver's familiarity with the situation (Stiff, Miller, Sleight, Mongeau, Garlick, & Rogan, 1989), the observer's expectations (Bond, Omar, Pitre, Lashley, Skaggs, & Kirk, 1992), the observer's social knowledge of deception (Caballero, Sánchez, & Becerra, 2000), whether the receiver is having a conversation with the sender or is only observing (Buller, Strzyzewsky, & Hunsaker, 1991), whether the lie is factual or emotional (Becerra & Sánchez, 1989), the amount of cognitive effort required by the lie (Vrij & Heaven, 1999), the stakes of the deception situation (Frank & Ekman, 1997; Vrij & Mann, 2001), whether the sender is probed or not (Buller, Stiff, & Burgoon, 1996; Levine & McCornack, 1996a,b, 2000), how suspicious the receiver is (Toris & DePaulo, 1984), whether the experimental situation is interactive or not (Buller & Burgoon, 1996), the sender's motivation to deceive (DePaulo, Kirkendol, Tang, & O'Brien, 1988), the receiver's motivation to detect deception (DePaulo, Zuckerman, & Rosenthal, 1980a), the number of times the liar is interviewed (Granhag & Strömwall, 2000), and, as regards the experimental procedures, whether the study is a laboratory or a field experiment (Mann, Vrij, & Bull, 2000; Vrij, 2000), as well as the length of the statements and the point at which the decision about their veracity is made (Masip, 2002).

b.- *Sender's and/or receiver's variables:* The most important of these are sex (Burgoon, Buller, Grandpre, & Kalbfleisch, 1998), age (DePaulo & Jordan, 1982), personality and social skills (e.g., social anxiety, self-monitoring, public self-consciousness, dominance, extraversion, impulsivity, machiavellianism, neuroticism, intelligence, psychopathy) (Geis & Moon, 1981; Hare, Forth, & Hart, 1989; Miller, deTurck, & Kalbfleisch, 1983; Riggio & Friedman, 1983; Vrij, 1992; Vrij & Graham, 1997; Vrij & Winkel, 1992), profession (Ekman, O'Sullivan, & Frank, 1999), ethnic or cultural origin (Bond et al., 1990; Cody, Lee, & Chao, 1989), and physical appearance (Bond, Berry, & Omar, 1994; Masip, 2002; Seiter & Dunn, 2000).

Since all of the above variables might influence accuracy in judging a communicator's credibility (and, indeed, it has been found that most of them do), it cannot simply be asserted that accuracy is high or low. Rather, such assertions must be qualified. *Detection accuracy will be high or low depending on who tells what lie to whom, and on the circumstances under which that lie is being told*. As shown in Figure 1, the variability between studies in terms of the accurate classification of statements is large, ranging from 30% to almost 70% correct classifications; under certain circumstances, this maximum figure can be even higher. For instance, the federal officers in the recent study by Ekman et al. (1999) reached a 73% overall accuracy rate, and, as stated above, training procedures and the use of statistical techniques raised accuracy to 78% correct classifications in Vrij et al.'s (2000) study. Therefore, all of these factors have to be taken into consideration.

In summary, the conclusion that accuracy in discerning between truthful and deceptive statements by observing the sender's nonverbal behaviour is low must be qualified. The way research in this area has been conducted and reported has produced a distorted picture of people's ability to differentiate between truthful and deceptive accounts. Participants have typically been untrained observers, and only overall accuracy rates have normally been reported, so that differences in the accuracy at detecting truthful and deceptive statements have been neglected. However, training observers to use nonverbal cues has often increased accuracy rates, and there is also a general truth bias, particularly when the communications are brief, which results in accuracy rates in judging truthful statements being significantly greater than accuracy rates in judging deceptive statements. Finally, it is important to bear in mind that the accuracy of credibility judgements made by observing the witness's behaviour is under the strong influence of an endless series of additional personal and situational variables.

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