

MY RIGHT I: DECEPTION DETECTION AND HEMISPHERIC DIFFERENCES IN SELF-AWARENESS

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Previous research has indicated a relationship between the ability to detect deceit and self-awareness. In this study, two experiments were conducted to further investigate this relationship. Thirty-two (28 females and 4 males) undergraduate students listened to 116 true and false statements with headphones in an attempt to determine which statements contained deception. The participants also completed a variety of self-awareness questionnaires including the Schizotypal Personality Questionnaire (Raine, 1991) and the Self-Consciousness Scale (Fenigstein, Scheier, & Buss, 1975). An additional 11 participants were tested with the statements played in reverse to determine the role of information processing. It was found there was a correlation between self-awareness and deception detection. These data support the hypothesis that self-awareness is related to mental state attribution (Theory of Mind).

It was suggested by Frank and Ekman (1997) that detecting deceit is a two-step process. First, the detector has to recognize that a cue is abnormal or that an emotion expressed does not match the words being spoken. Then, the detector has to interpret the cue or cues accurately. In support of this model, DePaulo and Rosenthal (1979) found that even if a person detected deceptive cues s/he was not necessarily able to identify what was being concealed.

Those who were highly accurate at detecting deception have reported using a different detection strategy, which includes using more cues and a larger variety of cues. These include both verbal and nonverbal cues (Anderson, DePaulo, Ansfield, Tickle, & Green, 1999; Ekman & O'Sullivan, 1991; Ekman,

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O'Sullivan, Friesen, & Scherer, 1991; Porter Campbell, Stapleton, & Birt, 2002). Ekman et al. (1991) showed that using a combination of Duchenne (enjoyment) smiles, masking smiles, and the pitch of one's voice all yielded high accuracy rates separately, but had the highest accuracy rate of 86.4% when used together.

Fabbro, Gran, and Bava (1993) note that the voice of a deceiver can also lead to deception cues. They suggest that emotions are recognizable through the voice due to dryness in the mouth and larynx, quickened breath, and muscle tremors in the vocal tract. This may be the cause of the increase of fundamental frequency in one's voice when stating a false statement (DePaulo et al., 2003; Ekman & O'Sullivan, 1991; Fabbro et al., 1993).

While there has been much research done on how deception is detected, little is known about the neurological correlates. There is evidence that suggests those with left hemisphere damage (LHD) are better at detecting lies than are individuals with no, or right hemisphere, damage (RHD; Ectoff, Ekman, Magee, & Frank, 2000; Stuss, Gallup, & Alexander, 2001). Winner, Brownell, Happe, Blum and Pincus (1998) investigated the ability of RHD patients to tell if a false statement was either a lie or a joke. They found that RHD patients were significantly more impaired than were the control group when distinguishing between a lie and a joke.

Further, left-handed subjects appear to outperform right-handed subjects in tasks involving deception detection (Porter et al., 2002). Specific to the current study, Fabbro et al. (1993) found that there was a significant left ear advantage when recognizing both true and false statements.

Previous research has shown a relationship between the ability to detect deceit and self-awareness. Fenigstein, Scheier, and Buss (1975) define *self-awareness* as a *state of self-directed attention that is either chronic or situational*. They developed a scale to measure a person's self-awareness. This is further divided into the *private self-consciousness factor*, which involves *one's inner thoughts and feelings*, and the *public self-consciousness factor*, which involves a *general awareness of oneself in social settings*. Johnson et al. (under review) used this measure and found a relationship between self-awareness and deception detection. They found that as one's self-awareness increased, the ability to detect deceit also increased. The goal of this research was to examine the relationship of the right hemisphere with deception detection and self-awareness, by replicating and extending the findings of Fabbro et al. (1993).

METHOD

PARTICIPANTS

A total of 32 students (28 females and 4 males) enrolled in Psychology classes from Montclair State University volunteered to participate. All students were

given extra credit by their instructors for participating. All participants were treated in accordance with the ethical guidelines of the American Psychological Association.

PROCEDURE

A total of 116 true and false statements were recorded using a microphone and computer program. A male recorded half of the statements and a female recorded the other half of the statements. Both actors were untrained. Half of the statements were self-centered and began with "One thing I like about myself is..." and the other half were other-centered and began with "One thing I like about my best friend is..." Participants were each seated in a separate room which contained a desk and a computer. They were given an informed consent form and survey to complete. Upon completion, they were given both oral and written instructions. They were informed that they would listen to four sets of statements. Two sets of 28 statements were presented to the left ear and two to the right. For each ear, the right hand was used for one set and the left hand for the other set. The order of the four combinations was randomly determined for each participant. After each statement was heard, the question "Was that statement true or false?" appeared centered on the screen. If the participant believed the statement was true, s/he was to respond by striking the green-marked key and if s/he believed the statement was false, s/he was to respond by striking the red-marked key. The participants were asked to answer as quickly and as accurately as possible. After the participant had finished all four sets of statements, s/he was informed of the nature of the study.

To determine if the results were due to information processing (see results below) an additional 11 students (9 females and 2 males) participated in a similar study. Here, the statements were digitally altered such that each statement was played in reverse. The participants were informed that the statements would be played in reverse. Portions of these data are reported elsewhere (see Malcolm & Keenan, under review).

RESULTS

A series of correlations was examined in relation to self-awareness and deception detection. It was found that there was a significant correlation between the Schizotypal Personality Questionnaire (SPQ) and accuracy when other-centered lies were being told by a female and the lies were being presented to the left ear ($r(30) = .44, p < .01$). The nature of this relationship indicated that increased self-awareness resulted in increased accuracy. Further, it was found that the right ear was correlated with self-awareness in detecting male deception. There was a positive correlation with the private Self-Consciousness Scale (SCS) and other lies

($r(30)=.39$, $p<.03$) and a negative correlation with self-centered lies ($r(30)=-.36$, $p<.05$). These data indicate that the right ear (left hemisphere) appears to have both a positive and a negative correlation with self-awareness and deception detection. It was found that an increase in public self-awareness correlated with a reduction in deception detection, but only for self-centered lies ($r(30)=-.47$, $p<.007$). There was no correlation between any other variables when examined as main effects (Lie Type x Gender x Ear).

To determine if these results were due to hemispheric differences in nonverbal detection, 11 additional participants were tested with the sentences played in reverse. It was found that there was no significant difference in terms of hand or ear in accuracy (all $ps <.05$).

DISCUSSION

It was found that there is a relationship between self-awareness and deception detection. Further, this was found to be related to the type of lie told, the gender of the person telling the lie and the brain hemisphere processing the deception. Specifically, other-centered lies told by females and processed via the right hemisphere were correlated with self-awareness. This finding is in agreement with previous research linking deception detection and self-awareness in the right hemisphere (Johnson et al., under review).

These is significant evidence that suggests a right hemisphere dominance for deception detection (Etcoff et al., 2000; Fabbro et al., 1993; Porter et al., 2002; Stuss et al., 2001) and self-awareness (for review, see Keenan, Gallup, & Falk, 2003). However, this is on the first studies that have linked the role of the right hemisphere with deception detection with self-awareness. As self-awareness increased, the participants became better at detecting other-centered lies told by females when the right hemisphere was involved. DePaulo Kashy, Kirkendol, Wyer, & Epstein (1996), in fact, indicated that other-centered lies were told predominately by females. Therefore, the right hemisphere appears to be detecting lies that are actually employed in everyday occurrences. A much less consistent effect was seen in the left hemisphere.

The relationship between deception detection, self-awareness and the left hemisphere is not clear and is quite ambiguous. The data demonstrated correlations in both directions, which indicates a somewhat ambiguous role for the left hemisphere. In comparison, the right hemisphere overall had a positive correlation with deception detection on the SPQ ($r=.27$) whereas the left hemisphere had a negative correlation ($r=-.07$). Though not significant, there was a trend for the right hemisphere to be significantly more correlated with self-awareness than the left ($p=.08$). Taken together, these data support the findings of Johnson et al. (under review).

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