Psychophysiological and Clinical Implications of the Coincidence of High Hypnotic Ability and High Neuroticism During Threat Perception in Somatization Disorders

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The electrodermal response to cognitive threat of unhypnotized female patients with somatic symptoms and high on both hypnotic ability and neuroticism (H-H) was found to be significantly higher (p<.01) than that of a matched group of female patients moderate on hypnotic ability and low on neuroticism (M-L). On verbal report the H-H and the M-L groups did not differ, but they were significantly different on a measure of self-deception (L scale) or repression. The above findings are consistent with predictions from the High Risk Model of Threat Perception (HRMTP), which states that people in the H-H group are both chronically and acutely more reactive to threat than the people in the M-L group. This finding may have important theoretical, clinical, and financial implications for the diagnosis, therapy, and prevention of somatization disorders seen in primary medical care.

High hypnotic ability can be defined as a mode of information processing in which sequential, critical-analytic mentation can be cognitively suspended and peripheral attention restricted to the point that profound changes appear to occur involuntarily in perception, memory, and mood; these changes may have behavioral and biological consequences (Wickramasekera, 1979, 1986, 1988). There is evidence that hypnotic ability is stable (Piccione, Hilgard, & Zimbardo, 1989) and is partly genetically based (Hilgard, 1965; Morgan, 1973; Morgan, Hilgard, & Davert, 1970). For people high in hypnotic ability we hypothesize that during threat perception changes in perception, memory, and mood appear to occur automatically or involuntarily (Wickramasekera, 1979, 1988, 1993) both inside and outside of hypnosis (Bowers, 1982; Dixon, Brunet, 1985).

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& Laurence, 1990; Dixon & Laurence, 1992; Sheehan, Donovan, & MacLeod, 1988). It is hypothesized that highs may automatically enter the hypnotic mode of information processing during the perception and memory of threat or stress (Wickramasekera, 1976, 1979, 1988, 1993a). It is believed that the perception of automatic or uncontrollable and unpredictable events can amplify fear and pain (Mineka & Kihlstrom, 1978; Thompson, 1981). People high in hypnotic ability are also hypothesized to be hypersensitive and prone to surplus pattern recognition or to finding meaning in events that seem randomly distributed to others (Wickramasekera, 1979, 1988, 1993a,b). It is known that some highs can cognitively amplify in fantasy (Lynn & Rhue, 1988; Wilson & Barber, 1982) or actively inhibit or erase threatening stimuli (Wickramasekera, 1979, 1986, 1988, 1993a,b) from consciousness, as in hypnotic analgesia (Hilgard & Hilgard, 1975; Hilgard, 1977). We found that normal college students high in hypnotic ability but outside of hypnosis reported significantly more subjective distress (subjective units of distress on SUDS scale) on a threatening or difficult mental arithmetic test than do students low on hypnotic ability (Pomerantz & Wickramasekera, 1988). No formal induction of hypnosis was involved in the above stress-induction study. I have hypothesized that high hypnotic ability is a risk factor for stress-related disorders because of this hypersensitivity—this tendency to surplus pattern recognition and this vulnerability to apparently involuntary changes in perception, memory, and mood in threatening situations (Wickramasekera, 1979, 1988, 1992, 1993a).

Neuroticism (Costa & McCrae, 1986) or negative affectivity (Watson & Clark, 1984) is the high probability of experiencing negative or distressing emotions across situations and time. There is evidence that neuroticism or negative affectivity is highly stable (Costa & McCrae, 1986) and is also partly genetically based (Floderus-Myhre, Pederson, & Rasmuson, 1980; Tellegen, Bouchard, Wilcox, Segal, Lykken, & Rich, 1988). People high on neuroticism have a preattentive and attentive bias towards threat in information processing (MacLeod, Mathews, & Tata, 1986; Mathews & MacLeod, 1986; Mathews, May, Mogg, & Eysenck, 1990) and have enhanced, implicit, or unconscious memory (Mathews, Mogg, May, & Eysenck, 1989) for threatening events. I have hypothesized that high neuroticism is a risk factor for threat-related organic disorders because this negative bias in perception and memory can chronically alter the hypothalamic-pituitary-adrenal axis (Wickramasekera, 1979, 1986, 1988, 1993a,b). However, affective verbal report measures of symptoms (e.g., DSM-III-R clinical interview or MMPI) are confounded (highly correlated) with neuroticism (Dohrenwend, Dohrenwend, Doobson, & Shrou, 1984; Schroeder & Costa, 1984), and verbal report measures of neuroticism alone are not related to organic disease or pathophysiology (Costa & McCrae, 1985).

Hypnotic ability is known to be orthogonal to neuroticism (Barber, 1969; Hilgard, 1965; Remler, 1990; Wickramasekera, 1979, 1988, 1990, 1993a). The High Risk Model of Threat Perception (HRMTP) predicts that the coincidence of high hypnotic ability and high neuroticism (H-H) will amplify chronic threat, if not buffered by high social support and high coping skills (Wick-
ramasekera, 1979, 1986, 1988, 1993a). This model leads to three hypotheses:
1. People who are high on both hypnotic ability and neuroticism (H-H) are prone to surplus negative pattern recognition or to find aversive meaning in events that seem only randomly distributed to people who are moderate on hypnotic ability and low on neuroticism (M-L). For H-Hs the glass is more likely to be half empty than to be half full.
2. People who are H-H may automatically cognitively amplify threat or may inhibit the perception of threat from consciousness but not from physiology. If threat is chronically amplified in consciousness, it will elevate negative affect, inducing changes in both mind (e.g., anxiety, depression) and body (sympathetic reactivity), contributing to both psychopathology and pathophysiology (Wickramasekera, 1979, 1988, 1993a,b).
3. If threat is chronically attenuated or blocked from consciousness as in hypnotic analgesia (Hilgard & Hilgard, 1975), it will nevertheless be registered in the body (sympathetic reactivity) contributing to pathophysiology (Wickramasekera, 1988, 1993a). Hence, the chronic use of the attenuating mechanism can put threat or pain “out of mind” but not necessarily “out of body” (Wickramasekera, 1979, 1988, 1990, 1993a,b, in press), contributing to pathophysiology.

A second mechanism (Wickramasekera, 1990, 1993a) through which threat perception may be blocked or attenuated from consciousness is a “repressive coping style” marked by low neuroticism but a high Marlowe-Crowne scale score (Weinberger, 1990). Repressors are defined as people who actively keep themselves and other people convinced that they seldom experience any subjective distress or anxiety. However, a large literature on behavioral and physiological measures (electrodermal response, heart rate, immune responses, etc.) indicate that repressors unconsciously or implicitly experience levels of anxiety equal to or greater than people high on explicit or conscious neuroticism (Jammer, Schwartz, & Leigh, 1988; Jensen, 1987; Weinberger, 1990). The Eysenck Personality Inventory (Eysenck & Eysenck, 1968) is used to index neuroticism on the HRMTP: Repression is indicated by a low score on neuroticism with a high score on the Eysenck lie scale, which, like the Marlowe-Crowne (Crowne & Marlowe, 1960), is a measure of self-deception. Hypnotic ability is orthogonal to Eysenck lie scores and Marlowe-Crowne scores (Palsson, 1992; Remler, 1990; Wickramasekera, 1979, 1988, 1990). In repressors, high levels of electrodermal (EDR) activity have been found to be related to low neuroticism scores with high self-deception scores (Weinberger, 1990). Hence the “repressive coping style” can also contribute to pathophysiology.

Electrodermal response (EDR) is a measure of sympathetic nervous system reactivity (Andreassi, 1989; Boucsein, 1992) to threat. It is a nonspecific peripheral measure of the perception of threat, associated with the “fight-or-flight” response. It has been shown that this perception of “threat” can have profound neuroendocrine and immune consequences through both sympathetic activation and stress hormone receptors on immune cells (Dantzer, 1991; Mason, 1968; Naliboff et al., 1991). Stelmael’s (1981) review of the literature found no consistent relationship between EDR and neuroticism, perhaps because he did not control for repression. Unlike, for ex-
ample, heart rate, EDR is exclusively innervated by the sympathetic nervous system (Boucsein, 1992; Venables & Christie, 1973), which is implicated in "stress" related disorders (Evelry & Sobel, 1987). The reactivity model (Blascovich & Katkin, 1993), using mental arithmetic threat, has shown reliable and valid clinically significant relationships to hypertension in largescale studies, including meta-analytic reviews (Frederickson & Matthews, 1990; Manuck, Kasprowicz, & Muldoon, 1990; Kelsey, 1991). There is no evidence that mental arithmetic ability is significantly related to EDR reactivity, but higher baseline levels of EDR have been associated with superior verbal learning, superior vigilance in signal detection (Andressi, 1989), higher hypnotic ability in chronic pain patients (Wickramasekera et al., 1993b), and more severe clinical anxiety (Lader & Wing, 1966; Roth et al., 1986). It is hypothesized that conditioning mechanisms of explicit (conscious) and implicit (unconscious) memory are implicated in chronic stress-related disorders (Wickramasekera, 1976, 1979, 1986, 1988, 1993a,b). EDR may be a sensitive objective measure of explicit and implicit learned threat perception.

Hypothesis

It is hypothesized that people who are moderate\(^1\) on hypnotic ability and low on neuroticism (M-L) are at lower risk for stress-related disorders because of reduced automaticity and sensitivity to the implicit or explicit perception of threat (EDR) and are therefore less reactive (EDR) to threat than people who are high on hypnotic ability and high on neuroticism H-H (Wickramasekera, 1979, 1986, 1988, 1993a,b). In this study I tested the specific hypothesis that patients who are H-H will have a significantly higher EDR reactivity under phasic cognitive threat (mental arithmetic problem solving) than patients who are M-L. This is a very specific, quantitative, theoretically driven prediction about the consequences for EDR of the coincidence of H-H versus M-L in a clinical sample.

Methods

Subjects

The subjects in this study were 20 white females drawn from a consecutive series of 119 female patients who were candidates for psychophysiological psychotherapy (Wickramasekera, 1988, 1990, 1993a). The H-H group consisted of the first 10 consecutive patients identified who were high on both hypnotic ability and neuroticism. The M-L group was drawn from the first 10 consecutive patients identified who were moderate on hypnotic ability and low on neuroticism. Hypnotic ability was measured by the Harvard Group Scale of Hypnotic Susceptibility: Form A (HGSHS:A) (Shor & Orne, 1962), and this baseline measurement was confirmed by Kirsch and his colleagues' (Kirsch, Council, & Wickless, 1990) subjective involvement scale. The litmus test of valid hypnotic experience is the person's degree of subjective involvement in hypnosis (Kirsch et al., 1990). The confirmation of the Harvard behavioral score with the Kirsch
subjective scale has been found to improve the classification of hypnotic ability (Kirsch et al., 1990). Only people classified as scoring between 12-10 on the Harvard and 60-49 on the Kirsch were classified as high on hypnotic ability. Moderate hypnotic ability was defined as 8-4 on the Harvard and 40-29 on the Kirsch. Neuroticism was measured with the Eysenck Personality Inventory (Eysenck & Eysenck, 1968). High neuroticism was defined as a neuroticism score at or above the 75th percentile. Low neuroticism was defined as a score at or below the 35th percentile.

All of these patients were carefully diagnosed and received a DSM-III-R diagnosis of “psychological factors affecting a physical condition” or “somatization disorder.” We, like others (Katon, Lin, VonKorff, Russo, Lipscomb, & Bush, 1991; Kellner, 1991), have had problems with these diagnoses. I have not found that these DSM-III-R diagnoses significantly inform either the prediction or control of these symptoms and are essentially based on the problematic process of diagnosis by exclusion (Wickramasekera, 1986, 1988, 1993a). These patients presented with many chronic (2-30 years) somatic symptoms like muscular and vascular headaches, temporo-mandibular disorders, uncontrolled primary hypertension, syncope, and chronic pain (unresponsive to drugs, surgery, or physical therapy), plus secondary psychological symptoms like anxiety and depression. The mean age of the H-H group (N=10) was 35 years (SD=12) and their mean Harvard hypnotic ability score was 11.1 (SD=1.46). The mean age of the M-L group (N=10) was 36 years (SD=13) and their mean Harvard hypnotic ability score was 6.86 (SD=1.46). The mean neuroticism of the H-H group was 86.4 (SD=19.6) and the M-L group was 32.6 (SD=17.2).

Procedure and Instrumentation

At baseline (prior to therapy) the patients were conducted to an electrically shielded and sound-attenuated psychophysiology laboratory, and after instrumentation they were habituated to the situation with instructions to relax for 4 minutes with their eyes open and for 4 minutes with their eyes closed in preparation for a “stress profile” (Wickramasekera, 1976, 1988, 1993). The patients were next subjected to 4 minutes of cognitive threat using standardized, mental-arithmetic problem solving, while their response time and accuracy were conspicuously measured with a large stopwatch as in an IQ testing situation. At the termination of the mental-arithmetic-generated cognitive stress, they were asked for a rating of their subjective units of distress (SUD) level on a visual analogue scale that ranges from 0-100 SUDs. The technician was blind to the patients’ hypnotic ability and neuroticism test scores.

Electrodermal responding or skin conductance was measured with the J & J computer system Model No.1-330,
which monitors EDR and performs basic data reduction on the EDR signal. Skin conductance is recorded using silver/silver chloride disc electrodes, 12 mm in diameter, attached with electrolyte to the ventral surface of the distal phalanges of the second and third fingers of the subject’s cleaned left hand and held in place by velcro straps (Scherbo, Freedman, Raine, Dawson, & Venables, 1992). The EDR physiological signal is conditioned by J & J Enterprises module and acquired using the J & J J1-330 interface with a CompuAdd 333T computer operating under the J & J “USE” software system. The application is programmed so that each stored data point is an average of 4 seconds of activity, providing 60 averages for each 4-minute period. Averages of activity for each minute and each period are also derived.

Results

There was no significant difference in age between the H-H and M-L groups. The mean EDR (based on the patient’s average for all 4 minutes) under cognitive stress of the H-H group was 12.5 micromhos (SD=4.01 micromhos) and the M-L group was 3.77 micromhos (SD=1.85 micromhos). This EDR difference is significant (t=6.25, df=18, p<.01). The mean SUDs rating for the H-H group was 63.5 (SD=10.2) and the mean SUDs rating for the M-L group was 66.5 (SD=15.3). This difference was not significant. The mean lie score (self-deception) for the H-H group was 68 (SD=17.6) and the M-L group was 20.7 (SD=13.8). This difference is significant (t=6.69, df=18, p<.0001) and indicates higher self-deception in the H-H group.

The M-L mechanism pattern (low-risk group) could be found in only 8% of our total (N=119) female patient sample. The H-H mechanism pattern was slightly more common (16%) in the patient sample from which this high risk group was drawn.

Discussion

EDR activation is a nonspecific measure of threat, and it can occur in response to both aversive and pleasant stimuli. We can only conclude from this study that the absolute level of sympathetic reactivity is higher under cognitive threat in H-Hs than in M-Ls. If this result is compared with the earlier finding (Pomerantz & Wickramasekera, 1988) of greater subjective distress (SUDs) during cognitive threat (difficult mental arithmetic) in high hypnotic ability, unhypnotized, male college students (matched for neuroticism), it appears that the higher EDR level may indicate aversive affect under conditions of high cognitive threat. The hypothesis of this study was explicitly focused on the EDR level during a cognitive threat condition only and does not pertain to resting baselines and recovery from cognitive threat conditions, etc. The present study does not allow the separation of the effects of hypnotic ability and neuroticism that is required to prove an interaction effect, but the above findings are consistent with my specific quantitative prediction that EDR will be higher in patients H-H than M-L during a threat condition. While this does not prove an interaction between high hypnotic ability and high neuroticism, it is nevertheless the empirical confirmation of a specific theoretically driven hypothesis. It confirms a specific prediction from the HRMTP, without reliance on verbal re-
port measures of threat (e.g., MMPI test scores, DSM-III-R clinical interview, etc.) that are inevitably confounded by the pervasive influence of neuroticism on all such verbal report measures (Costa & McCrae, 1985; Dohrenwend et al., 1984; Schroeder & Costa, 1984). A difference in EDR under cognitive threat emerged in spite of using a small sample (N=20) restricted to the high range of threat perception because they are all patients. It is noteworthy that this EDR difference emerged in this range-restricted small sample, despite ignoring the empirically established doctrine of psychophysiological individual response specificity (Engel, 1972; Sternbach, 1966).

Note that verbal report measures of threat perception (SUDs scale) do not distinguish between these patients as EDR does. In fact, from verbal report (SUDs scale) or conscious threat perception one may conclude that the two groups (H-H vs. M-L) do not differ in threat perception. Hence, from a DSM-III-R-type clinical interview or verbal report MMPI, it may be possible to conclude that there are no differences in threat perception, neuroticism, or negative affectivity (e.g., anxiety, depression, etc.) between these patient groups, but our electrodermal or physiological data indicate that "out of mind" is not "out of body" (Wickramasekera, 1979, 1988, 1993a, in press). The inference of elevated, implicit or unconscious (Kihlstrom, 1987) anxiety or threat in the H-H group is reflected in their elevated (p<.01) EDR level. What is missing in verbal report (SUDS) or consciousness is present in the body (e.g., EDR). I predict that within 25 years it will be unethical to diagnose or treat somatization without concurrent psychophysiological monitoring.

The High Risk Model of Threat Perception recognizes three pathways (Palsson, 1992; Remler, 1990; Wickramasekera, 1979, 1990, 1992, 1993a,b) that can blockade the perception of threat from consciousness: (1) high hypnotic ability as in hypnotic analgesia (Hilgard & Hilgard, 1975; Hilgard, 1977); (2) high "self-deception" or repression (Janmer et al., 1988; Weinberger, 1990) as indicated by a high lie or self-deception score (e.g., >75%) on the Eysenck Personality Inventory and a low score on neuroticism (e.g., <35%); and (3) low (0-4) hypnotic ability. Low hypnotic ability somatizers are common but rarely seen outside the medical surgical sector. Only two of these pathways are represented in this study. The elevated (p<.0001) mean lie score (68%) of our H-H group is hypothesized to have partially attenuated their verbal perception of anxiety (mean SUDS report) through a mechanism orthogonal to high hypnotic ability. There is also physiological evidence (EDR) that the H-H group is significantly (p<.01) more activated. Hence, we have two markers indicating that the verbal report or explicit perception of threat is inaccurate.

Incidentally, we have noticed that a small subset of our patients can have access simultaneously to two of these orthogonal pathways (Wickramasekera, 1990, 1992, 1993a) through which the explicit perception of threat can be abolished from consciousness: (1) high hypnotic ability and (2) high lie score and low neuroticism scores (e.g., repression). These patients demonstrate a very potent, durable, and therapy-resistant type of somatization, which cannot be investigated without concurrent physiological monitoring to reveal unconscious

I have hypothesized that unconscious threatening perceptions, memories, and moods drive the bulk of chronic somatizations through the above three mechanisms (particularly low hypnotic ability) in primary medical care (Wickramasekera, 1979, 1986, 1988, 1992, 1993a). These patients will seldom or never enter the mental health sector without special role-induction procedures like the Trojan Horse procedure, described elsewhere (Wickramasekera, 1988, 1993a). These patients stimulate the practice of defensive medicine, overuse expensive high-tech medical tests, and often receive iatrogenic injury from invasive unproductive tests and multiple surgical interventions (Smith, 1990; Jencks, 1985; Wickramasekera, 1988). These somatizers have been called medicine’s “blind spot” (Quill, 1985) or medicine’s “unsolved problem” (Lipowski, 1987). Somatizers are estimated to constitute at least upwards of 50% of all patients who visit primary care physicians (Barsky & Klerman, 1983; Brown, Robertson, Kosa, & Alpert, 1971; Garfield, Collen, Feldman, Soghiikan, Richart, & Duncan, 1976; Jencks, 1985). They seldom show gross pathophysiology or overt psychopathology (Jencks, 1985; Smith, 1990; Kellner, 1991; Wickramasekera, 1988). They seldom meet the DSM-III-R criteria for somatoform disorders (Katon et al., 1991; Smith, 1990; Escobar et al., 1987), criteria which are based on verbal report. Hence, a substantial proportion of patients in the medical and psychiatric health care systems do not fit neatly into existing categories of mental or physical disease. Their distress is “out of mind” but not “out of body,” as indicated by sensitive psychophysiological testing, which is omitted from both DSM-III-R criteria for diagnosis of somatization and from standard medical tests in primary care (Wickramasekera, 1988, 1993a, in press).

I propose that psychophysiological disorders may be treated with the “skills-for-pills” approach of psychophysiological psychotherapy (Wickramasekera, 1988, 1990, 1993a, in press), which reverses the direction of activity of one of the very mechanisms (high hypnotic ability) generating psychophysiological disorders. Charcot proposed a similar hypothesis over 100 years ago. I take one ingredient that contributes to patients’ disorders (high hypnotic ability), turn it around, and use specifically that ingredient to heal them through uncovering, interpretation, desensitization, and cognitive reappraisal of negative affect (threat). Theoretically, this proposal has some slender elegance. Physiological monitoring during hypnotherapy helps to uncover and to reduce unconscious threats that may be marked by physiology. This can be called truth detection or uncovering the threatening secrets somatizers keep from their mind but from not their body (Wickramasekera, 1988, 1993a, in press).

References


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