Defensive Mobilization in Specific Phobia: Fear Specificity, Negative Affectivity, and Diagnostic Prominence

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Background: Understanding of exaggerated responsivity in specific phobia—its physiology and neural mediators—has advanced considerably. However, despite strong phenotypic evidence that prominence of specific phobia relative to co-occurring conditions (i.e., principal versus nonprincipal disorder) is associated with dramatic differences in subjective distress, there is yet no consideration of such comorbidity issues on objective defensive reactivity.

Methods: A community sample of specific phobia ($n = 74$ principal; $n = 86$ nonprincipal) and control ($n = 76$) participants imagined threatening and neutral events while acoustic startle probes were presented and eyeblinks (orbicularis occuli) recorded. Changes in heart rate, skin conductance level, and facial expressivity were also measured.

Results: Principal specific phobia patients far exceeded control participants in startle reflex and autonomic reactivity during idiographic fear imagery. Distinguishing between single and multiple phobias within principal phobia and comparing these with nonprincipal phobia revealed a continuum of decreasing defensive mobilization: single patients were strongly reactive, multiple patients were intermediate, and nonprincipal patients were attenuated—the inverse of measures of pervasive anxiety and dysphoria (i.e., negative affectivity). Further, as more disorders supplanted specific phobia from principal disorder, overall defensive mobilization was systematically more impaired.

Conclusions: The exaggerated responsivity characteristic of specific phobia is limited to those patients for whom circumscribed fear is the most impairing condition and coincident with little additional affective psychopathology. As specific phobia is superseded in severity by broad and chronic negative affectivity, defensive reactivity progressively diminishes. Focal fears may still be clinically significant but not reflected in objective defensive mobilization.

Key Words: Anxiety, chronicity, comorbidity, corrugator, depression, EMG, emotional reactivity, facial expressivity, fear, heart rate, imagery, mental imagery, narrative imagery, psychophysiology, SCL, skin conductance, specific phobia, startle

Specific phobia is considered the prototypical anxiety disorder of defensive hyperreactivity, a view supported by extensive evidence of pronounced mobilization to fear cues—in reflex psychophysiology (1–4), electrocortical response (5,6), neural circuitry activation (7–10)—from a variety of elicitation procedures (e.g., pictures [2], movies [11], imagery [3], and conditioning [7]). Surprisingly, however, this literature does not include examination of the broader clinical constellation within which specific phobias are often embedded. Much of the research is based on nonpatient samples, and the minority of physiological investigations addressing clinically significant specific phobia have assessed presence or absence of the disorder irrespective of its severity relative to co-occurring conditions. As such, there is a dearth of research utilizing objective measures of emotional responding that considers critical features such as diagnostic primacy/prominence and comorbidity. In phenotypic studies, careful consideration of ranked severity (i.e., principal versus nonprincipal problem) across anxiety disorders has revealed important variation in liability for co-occurring disorders. For example, in a sample of over 1,000 anxiety patients, Brown *et al.* (12) observed that as a whole, 70% of patients with a specific phobia diagnosis had a comorbid anxiety or mood disorder. The comorbidity rate dropped to 33% among the subset of patients for whom specific phobia was the principal disorder. In other words, whether specific phobia is the principal (i.e., worst) disorder or not covaries dramatically with the level of functional interference and, perhaps, the burden that affective psychopathology imposes on defensive reflex physiology.

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Narrative Imagery

The current investigation of specific phobia examines whether the presence/absence as well as number of fears and gradations in diagnostic primacy (i.e., principal, secondary, tertiary) reflect differences in defensive reflex physiology during narrative imagery. Script-driven emotional imagery is a valuable tool in studies of anxiety disorders, permitting presentation of both standard and idiographic threat challenges, akin to methods of imaginal exposure therapy (13). Physiological arousal during aversive imagery parallels anticipatory reactions to threatening events (14), similarly mobilizing the autonomic nervous system (e.g., heart rate, skin conductance), communicating threat through facial musculature (e.g., corrugator frown muscle), and prompting somatic reflexive action (e.g., startle potentiation [15,16]). Animals confronting survival threat show similar reactions, mediated by the brain's defense circuit (centered on the amygdale [17,18]), and neuroimaging studies suggest a comparable circuit (19–21) underlies human fear.

In a series of imagery investigations, Lang *et al.* (22–32) assessed differences in defensive arousal within several anxiety disorders. In general, each principal diagnostic group (e.g., social phobia, posttraumatic stress disorder [PTSD], panic disorder) showed greater defensive reactivity than control participants. However, consideration of within-diagnosis features revealed dramatic differences in defensive mobilization. That is, reactivity was robust in patients with focal affective disruptions (e.g., social phobia limited to structured performance situations), whereas reactivity was increasingly reduced as the principal disorder features were more generalized (e.g., apprehension extending to routine social interaction) and coinci-

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dent with increased disorder severity and duration, poorer prognosis, and higher anxiety and depressive disorder comorbidity. Blunted reflex responding was also related to symptom elevations across numerous domains including anhedonia, unspecified/trait anxiety, anger, and functional interference. The confluence of dimensional and categorical dysphoria was termed negative affectivity (26–28) to highlight the synergy of multiple pathologies as opposed to isolated disorders in modulating defensive reflex physiology. Taken together, these findings suggest that defensive engagement during imagery might be compromised by prolonged and diffuse anxious hyperarousal and accompanying negative affectivity (29–32).

The Research Problem

In the current study, a similar distress-related reflex pattern was expected within specific phobias—varying as a function of phobia precedence and comorbid symptomatology. First, principal specific phobia patients were compared with control participants with the expectation that similar to preceding studies (2–10), principal phobia would be characterized by exaggerated defensive mobilization (i.e., potentiated startle and autonomic action) during imagery of idiographic fear narratives, whereas patients and control participants would react similarly during threatening imagery for which defensive mobilization is normal and adaptive (e.g., facing an attacking animal).

Next, principal phobia patients were distinguished according to whether they endorsed a single or multiple specific phobias. Further, another set of patients who had at least one specific phobia exclusive of their principal problem (i.e., nonprincipal/additional phobia) were identified. Concerning number of fears within principal phobia, competing hypotheses were tested: as shown in a nonpatient investigation of individuals endorsing solitary or numerous fears (24), multiple phobia patients might be putatively more fearful than individuals with an isolated phobia and hence show the most robust physiological reactivity during aversive imagery. Alternatively, in a clinical sample, greater negative affectivity could be expected with multiple fears and correspondingly, reduced reactivity. These debilitating symptom features might be yet more extreme in the nonprincipal phobia group whose foremost difficulties could include far more generalized anxiety and dysphoria (e.g., generalized anxiety disorder [GAD], panic disorder with agoraphobia [PDA]), thus prompting the most pronounced attenuation of defensive action.

Methods and Materials

Participants

Participants were assessed at the University of Florida Fear and Anxiety Disorders Clinic: 160 treatment-seeking adults with a diagnosis of specific phobia ($n = 74$ with principal specific phobia; $n = 86$ with non-principal/additional specific phobia[1]) and 76 healthy community control participants. Fear focus was distributed as follows: animal 19.4%, blood-injury-injection 15.6%, situational 40%, natural environment 18.1%, and other 6.9%.

Diagnostic Classification

Diagnostic groups were established using the Anxiety Disorder Interview Schedule for DSM-IV (33), a structured interview for assessing current anxiety, mood, substance use, and somatoform disorders and for screening psychosis and major physical disease. For multiple Axis I disorders, diagnostic primacy was determined by clinician-rated severity (ranging from 0 = no features present to 5 = diagnosis present; severe) reflecting both distress and interference. Control participants denied current or lifetime diagnoses of psychiatric illness. Interrater reliability (via videotape) was calculated for 20% of patients, yielding agreement at 100% for principal and 82.35% for nonprincipal phobia diagnosis among three masters- or doctoral-level clinicians.

Patients whose foremost clinical complaint was specific phobia (i.e., principal phobia) were further classified according to whether the patient indicated a single phobia ($n = 50$) or multiple phobias ($n = 24$).[2]

Procedure

The University of Florida Institutional Review Board approved the study. Participants provided informed consent and completed questionnaires and interviews in the morning; psychophysiological assessment and clinical debriefing followed in the afternoon.

Experimental Stimuli. Twenty-four narrative imagery texts were used (34). Analyses focused on two idiographic, personal threat narratives representing each participant's primary clinical fear or for control participants their worst fear experiences. Standard scenes included two panic attack (crowded checkout line, driving alone), four survival threat (physical attack by animal/human), and two neutral (watching documentary, reading magazine) events. Filler scripts were low arousal or engaging pleasant scenes to impede an overall unpleasant arousal context. Scripts were ~20 words designed to quickly reveal affect and reflect active participation. A woman recorded the scenes using minimal prosody for presentation over earphones (Telephonics TDH-49; Telephonics Corporation, Huntington, New York).

Imagery Assessment. Seated in a quiet, dimly lit room, with electrodes placed, participants were instructed to listen to the auditory scripts with eyes closed, vividly imagining the events described as if actively involved. Throughout the recording session, soft tones cued participants to relax, breathe slowly, and silently repeat the word "one" to stabilize between-trial physiological activity (35). Imagery scripts were interspersed every 36 seconds in the tone series, with content pseudorandomized so that no more than two stimuli of the same hedonic valence (pleasant, neutral, unpleasant) or content category (e.g., panic attack) were presented consecutively. The script series was repeated in a counterbalanced order.

Trials consisted of a 1-second baseline, a 6-second auditory script, and 12 seconds of imagery. Startle probes (50-msec 95 dB[A] white noise, instantaneous rise time) were presented at 4 to 5.5 seconds or 10 to 11.5 seconds postscript onset, or both, and on 25% of intertrial intervals (ITIs), at 22 to 23.5 seconds postimagery offset.

Following imagery assessment (approximately 45 minutes) participants rated each scene for experienced pleasure and emotional arousal (36).

Experimental Control and Data Collection

A computer running VPM software (37) controlled stimulus presentation and data acquisition. Bioamplifiers recorded electro-

[1]Among the nonprincipal specific phobia group, principal disorders were limited to anxiety, mood, and adjustment disorders: GAD 24.4%; PDA 19.8%; PTSD secondary to repeated trauma 14.0%; generalized social phobia 12.8%; obsessive-compulsive disorder 9.3%; panic disorder without agoraphobia 8.1%; PTSD secondary to single trauma 4.7%; anxiety disorder not otherwise specified 4.0%; adjustment disorder with mixed anxiety and depression 1.2%; recurrent major depressive disorder 1.2%; depressive disorder not otherwise specified 1.2%; and circumscribed performance phobia 1.2%.

[2]The vast majority (78%) of principal specific phobia patients were diagnosed only with specific phobia(s). More specifically, 82% of the single, principal phobia patients endorsed no other disorders, while the remaining 18% were diagnosed with a range of disorders, typically anxiety, adjustment, and/or mood syndromes, of lesser intensity than the specific phobia. Among the principal phobia patients with multiple disorder-level phobias, 62.5% met criteria for two phobias and no other disorders and 8% endorsed three phobias and no other disorders. The remaining patients endorsed two (16.7%) or three (12.5%) specific phobias in addition to a range of less severe Axis I disorders.