



# TRAUMATIC INTRUSIVE IMAGERY AS AN EMOTIONAL MEMORY PHENOMENON: A REVIEW OF RESEARCH AND EXPLANATORY INFORMATION PROCESSING THEORIES

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**ABSTRACT.** *Intrusive imagery is both a common response to trauma and a hallmark of Posttraumatic Stress Disorder. However, its features and underlying mechanisms have not been reviewed systematically. This paper delineates the characteristics of intrusions and critically reviews the literature, conceptualizing intrusive imagery as an emotional memory phenomenon. This approach integrates otherwise separate research arenas in emotion and memory, psychobiology, pharmacology, and physiology, which converge to suggest that intrusive imagery is driven primarily by affective arousal and sympathetic nervous system reactivity. These basic and applied research findings are addressed directly by three information processing theories, which are reviewed and critiqued for their heuristic value in accounting for intrusions. Directions for research, treatment, and assessment are presented. © 1997 Elsevier Science Ltd*

SURVIVORS OF trauma frequently report reliving their traumatic experiences through intrusive imagery. This distressing phenomenon is a hallmark symptom of Posttraumatic Stress Disorder (PTSD; American Psychological Association, 1994), and research generally has assessed intrusive imagery as a part of PTSD. However, intrusive imagery frequently is experienced by trauma survivors whose symptom profiles do not warrant a PTSD diagnosis (e.g., Blank, 1993; Foa, Riggs, & Gershuny, 1995). Further, intrusive symptoms often persist even after diagnosable PTSD wanes (e.g., B.L. Green, 1993; McFarlane & Yehuda, 1996). Thus, it is critical to study intrusive imagery as a phenomenon in its own right to advance the clinical research, assessment, and treatment of this trauma response.

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Intrusive imagery has been construed as the activation of trauma memories (e.g., McFarlane & Yehuda, 1996; van der Kolk, 1996). These intruding memories have been found to prompt responses in the self-report (e.g., Kinzie, Fredrickson, Ben, Fleck, & Karls, 1984), physiological (e.g., Southwick et al., 1993), and behavioral (e.g., Agger & Jensen, 1993) systems of emotion (Lang, 1993). Previous research has demonstrated that most of the variance in emotional reports and behavior can be accounted for within a two-dimensional framework (Mehrabian, 1970; Mehrabian & Russell, 1974; Russell, 1980) organized by the axes of valence (negative–positive) and arousal (calm–aroused; Lang, Bradley, & Cuthbert, 1990). Within this scheme, the arousal dimension has been linked specifically to the intensity of self-reported emotion, which accompanies intrusions (e.g., Kinzie et al., 1984), and also to the activation of sympathetic nervous system responding (e.g., Witvliet & Vrana, 1995), which occurs during the activation of trauma memories (e.g., Orr, Pitman, Lasko, & Herz, 1993; Pitman, Orr, Forgue, de Jong, & Claiborn, 1987). In this review, traumas are recognized as not only negatively valent, but also highly intense, or arousing. Physiologically, traumatic responses prompt parallel activation in the closely-related central locus coeruleus (LC) and peripheral sympathetic nervous systems, which have been characterized as branches of a global sympathetic nervous system (e.g., Aston-Jones, Valentino, Van Bockstaele, & Meyerson, 1994). The intensity of these physiological responses and affective self-reports is linked conceptually to the high-arousal activated during traumas (e.g., Aston-Jones et al., 1994) and reactivated during intrusions (see Orr, 1994). Further, the intensity of these responses is considered to have memory-facilitating effects (e.g., Bradley, 1994; Charney et al., 1994). Thus, viewing intrusions as emotional memories can illuminate our understanding of how the phenomenon is initiated and maintained in trauma survivors.

This conceptualization of intrusions as emotional memories suggests two main lines of inquiry. First, it commends an interdisciplinary analysis of trauma research and the otherwise disparate literatures in emotion and memory, psychobiology, pharmacology, and physiology, which all are critical sources for understanding the mechanisms underlying this posttraumatic response. Second, it suggests that information processing theories of emotional memory are valuable frameworks to advance our understanding of intrusive imagery. Especially pertinent theories include Lang's (1979, 1994) bio-informational theory, and two theories that extend Lang's (1979) theory to account for PTSD (Foa, Steketee, & Rothbaum, 1989; Chemtob, Roitblat, Hamada, Carlson, & Twentyman, 1988). All three theories incorporate the self-report, physiological, and behavioral response systems of emotion (Lang, 1993). These theories will be evaluated for their utility to account for the features of intrusive imagery and to explore the thesis that high affective arousal and sympathetic nervous system reactivity drive the phenomenon. In order to evaluate the explanatory utility of these theories for intrusions, this analysis will begin by delineating the characteristic features of traumatic intrusive imagery, followed by a review of the research literatures that elucidate the phenomenon.

### CHARACTERISTICS OF TRAUMATIC INTRUSIVE IMAGERY

Numerous labels and descriptions have been applied to intrusive imagery. Whereas empirical studies generally have used terms culled from the *Diagnostic and Statistical Manual of Mental Disorders* (DSM; see APA, 1980, 1987, 1994) and assessment instruments such as the Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979),

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