Attention, Memory, Intrusive Thoughts, and Acceptance in PTSD: An Update on the Empirical Literature for Clinicians

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Information processing theory suggests that cognitive changes following trauma are common and hypothesized to have an impact on attention, memory, and intrusive thoughts. There is an ever-expanding empirical literature where cognitive features of posttraumatic stress disorder (PTSD) are being explored. However, it can sometimes be difficult for front-line clinicians to stay abreast of this literature and how it impacts the treatment s/he provides. The goal of this paper is to provide an overview of some recent basic and applied research on information processing in PTSD and the implications of these findings for cognitive-behavioral clinicians. In particular, we explore recent findings regarding attention, memory, intrusive thoughts/thought suppression, and acceptance as they relate to clinical work in patients with PTSD.

As estimated 50% to 60% of individuals in the United States will experience at least one traumatic event in their lifetime (e.g., Kessler, Sonnega, Bromet, Hughes, & Nelson, 1995; Ozer, Best, Lipsey, & Weiss, 2003). In the immediate aftermath of a trauma, symptoms of posttraumatic stress disorder (PTSD), including reexperiencing of the trauma (e.g., intrusive thoughts, nightmares, flashbacks), emotional numbing (e.g., feelings of detachment, disinterest, and restricted range of affect), avoidance of trauma cues, and symptoms of excessive arousal (American Psychiatric Association [APA], 2000) are quite common. However, these symptoms tend to decline naturally in the first 3 to 6 months following the event (Blanchard et al., 1995; Delahanty et al., 1997; Ehlers, Mayou, & Bryant, 1998; Rothbaum, Fo, Riggs, Murdock, & Walsh, 1992; Valentiner, Fo, Riggs, & Gershuny, 1996), with some survivors of trauma even making positive changes in their lives (e.g., Linley & Joseph, 2004). Unfortunately, not all survivors follow a trajectory of recovery and/or growth after the event, with between 5% and 30% going on to develop chronic PTSD (e.g., Breslau et al., 1998; Kessler et al., 1995; Ozer et al., 2003).

As a whole, cognitive behavioral therapy (CBT) for PTSD has been recommended by the International Society for Traumatic Stress Studies (Foa, Keane, & Friedman, 2000), the APA (Ursano et al., 2004), the National Institute for Clinical Excellence (Bisson et al., 2005), and the Departments of Veterans Affairs and Defense (2003) as the standard of care for PTSD. Further, large treatment effect sizes are noted with CBT for PTSD in meta-analytic reviews (e.g., Butler, Chapman, Forman, & Beck, 2006). However, even with PTSD being considered a treatable disorder (e.g., Bradley, Greene, Russ, Dutra, & Westen, 2005), chronic PTSD can be persistent (e.g., Rothbaum et al., 1992; Zlotnick et al., 1999) and resistant to treatment relative to other anxiety disorders (e.g., Foa, 2000). Clearly, more research is needed to fine-tune and improve the efficacy of CBT for PTSD.

Information processing theories (e.g., Foa & Kozak, 1986; Litz & Keane, 1989; Mathews & MacLeod, 1994) provide one framework for hypothesis-driven, basic research with relevance for CBT clinicians. Most readers will be familiar with this conceptualization, which argues that traumatic memories are constructed of a network of information about the trauma, including cues (e.g., discrete physical cues and contextual reminders of the trauma), internal responses (e.g., emotional and physiological responses), and meaning-making elements (e.g., trauma-related beliefs or assumptions). These theories further propose that trauma memories are stored in an
excessively fragmented, disorganized network, isolated from other information networks, relative to “normal” memories. Hypothetically, the atypical storage and retrieval of trauma memories may result in attentional problems, memory disruption, and intrusive thoughts (Brewin, 2001; Ehlers & Clark, 2000; Foa & Kozak, 1985; Foa & Riggs, 1993; van der Kolk et al., 1994). Thus, the features of PTSD reviewed in this paper are believed to be a by-product of the unusual circumstances in which traumatic memories are formed and stored.

The basic and translational information processing literature has direct implications for the applied treatment setting. Theoretically, it is believed that approach-based treatment techniques assist in the habituation to the emotions (generally fear) associated with the trauma-related thoughts (Horowitz, 1986; Lang, 1977; Rachman, 1971). From a behavioral perspective, a process of extinction learning is hypothesized to take place. Specifically, through approach of the trauma-related material, new learning occurs which specifies that this material (e.g., thoughts, emotions, and images related to the event) is not dangerous and that the fear reaction need not be activated when these reminders are encountered (see Keane, Zimering, & Caddell, 1985). From an information processing standpoint, the incorporation of new information into the trauma memory network (e.g., information that specifies when a particular trauma cue is no longer dangerous and does not need to be avoided), and the formation of new beliefs such as “this is only a memory and what happened is in the past and cannot harm me” are important to recovery (Foa, Steketee, & Rothbaum, 1989). Thus, the new learning often involves a cognitive element where the individual develops more adaptive ways of reacting to thoughts and feelings. However, for this process of habituation and/or new learning to take place, a trauma survivor must be willing to face feared stimuli, including trauma memories, rather than avoid feared stimuli.

In this paper, we review some recent findings from the basic, translational, and applied information processing literatures that have implications for CBT practice. In particular, exciting new research in the areas of attention, memory, intrusive thoughts, and thought suppression/acceptance may help clinicians to refine their practice for patients with PTSD.

**Attention**

Attention is fundamental to perception and encoding of new information. As such, attention is a necessary component for taking in new information such as psychoeducation, therapeutic strategies, and coping skills. Most therapists are aware that attention is affected in PTSD. Indeed, there is a large literature suggesting that individuals with PTSD show attentional biases toward threat-related information, primarily when tested using the modified Stroop paradigm (Stroop, 1935). The modified Stroop paradigm has been used to study cognitive disinhibition of trauma-related material in trauma survivors by comparing participants’ latency to name the color of words related to their trauma (e.g., COMBAT: correct answer is “black”), to their latency to name the color of neutral words. The trauma-related Stroop delay has been demonstrated in a variety of populations, including sexual assault survivors (Cassiday, McNally, & Zeitlin, 1992; Foa, Feske, Murdock, Kozak, & McCarthey, 1991), childhood sexual abuse survivors (Bremner et al., 2004; Field et al., 2001), war veterans (Litz et al., 1996; McNally, English, & Lipke, 1993; McNally, Kaspi, Riemann, & Zeitlin, 1990), survivors of a ferry disaster (Thrasher, Dalgleish, & Yule, 1994), and motor vehicle accident survivors (Beck, Freeman, Shipherd, Hamblen, & Lackner, 2001; Bryant & Harvey, 1995). Trauma-related delays on Stroop tasks have also been demonstrated in child and adolescent trauma survivors (Freeman & Beck, 2000; Moradi, Taghavi, Neshat Doost, Yule, & Dalgleish, 1999). It is clear from the Stroop literature that there is some type of attentional problem with patients who have PTSD, perhaps due to the activation of the trauma memory and/or associated fear. However, without a better understanding of the specific qualities of these attentional problems, this research literature has been difficult to apply in clinical practice. Fortunately, more recent studies parsing the particular types of attentional difficulties in PTSD may better inform CBT strategies for addressing these problems.

**Facilitation Versus Interference**

A problem in the attention literature is that the methods employed (e.g., the Stroop task) do not elucidate whether individuals are demonstrating attentional biases due to enhanced detection (facilitation) of or difficulties disengaging from (interference) threatening stimuli (e.g., Derryberry & Reed, 2002). Differentiating between these two types of attentional biases is clearly important for informing treatment and understanding the exact nature of attentional biases in PTSD. More recently, studies using paradigms that disambiguate facilitation from interference effects have found support for attention interference but not for facilitation in PTSD (Pineles, Shipherd, Yovel, & Welch, 2007; Pollack & Tolley-Schell, 2003). Although this literature is new and requires replication, it seems that patients with PTSD tend to “get stuck” on trauma stimuli, rather than having attention drawn quickly to the stimuli.

Attentional interference can affect concentration, interfere with task-performance, and lead to an overvaluation of threat-relevant information. Trauma-related cues can include both internal (e.g., thoughts) and external (e.g.,
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