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CHRONIC PAIN AND DISTRACTION: AN EXPERIMENTAL INVESTIGATION INTO THE ROLE OF SUSTAINED AND SHIFTING ATTENTION IN THE PROCESSING OF CHRONIC PERSISTENT PAIN

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Summary—Although there is anecdotal evidence for the psychoanalgesic properties of distraction, research evidence is equivocal. Drawing on the clinical and experimental studies of attention-based coping strategies for pain control, and the theoretically driven 'cognitive' models of the human attention system, two experiments are reported. Experiment One demonstrates that chronic pain patients suffering high intensity pain show significantly impaired performance on an attentionally demanding task when compared to low pain patients and normal controls. Experiment Two tests the hypothesis that the low intensity pain patients in Experiment One are coping with the dual demand of processing the pain and processing the task by switching quickly between these attentional demands. The results of both experiments are discussed in terms of the evidence for the analgesic properties attention based coping strategies with clinical pain populations and re-addresses the literature on coping with pain in terms of cognitive theories of attention.

INTRODUCTION

Anecdotal evidence for the efficacy of distraction as a means of pain-control is commonly reported in the popular literature (e.g. Fairley, 1978; Kortoba, 1983; Melzack, 1973; Melzack & Wall, 1982; Neal, 1978; Wall & Jones, 1991). However, recent reviews of the experimental evidence for the putative psychoanalgesic properties of attention sound a more cautious note and counsel a more circumspect approach to the adoption of attention-based strategies as a means of controlling pain (Tan, 1982; Turk, Meichenbaum & Genest, 1983; Fernandez & Turk 1989). The important question of the putative efficacy of attention-based coping strategies to positively affect a pain experience has been empirically addressed many times over the last thirty years, although the result of this industry is a disappointingly equivocal one. Recently, the response to this equivocation has been somewhat less than stimulating; Cioffi (1991a; p. 27), for example, comments that "... the response, in terms of new research and theory, has been a collective ennui". Perhaps in response to this ennui, Leventhal (1992) has made a concerted attempt to close this debate by suggesting that psychologists should challenge their erroneous intuitions regarding the putative power of distraction to counteract pain, citing in particular the recent evidence of McCaul, Monson and Maki (1992) who failed to find any effect of various distractors on college students' self-report measures of distress to a laboratory-induced pain.

I am not concerned here to review exhaustively the body of evidence for and against the efficacy of attention-based pain coping (see Weisenberg, 1977; Thompson, 1981; McCaul & Malott, 1984; Fernandez & Turk, 1989) and I certainly do not wish to fuel the ennui noted by Cioffi (1991a). Rather, my intention is to invoke a particularly theory-informed but experimental investigation of the possible power of effortful attention over one peculiarly abnormal and disabling form of pain: the theory is a cognitive and functional one and it is employed in exploration of the attentional processing of those patients complaining of chronic persistent benign pain.

PAIN CONTROL

There is a dearth of experimental study of the attentional processing of patients suffering naturally occurring acute or chronic pain. Pearce (1983), in review of the few published chronic

pain studies, concludes that the evidence for the overall efficacy of cognitive coping strategies is poor, citing the plethora of methodological problems in this area as the main reason for this conclusion. She also states quite clearly that "certainly the quality of studies in this area is low" (p. 439). The response to this situation has not been, as one might have hoped, the development of new methodologies for exploring the cognition of pain patients; but rather, interest has turned away from the difficult questions of the micro-cognition of persistent naturally occurring pain and is now concentrated in three cognate areas of study:

(a) the more clinically applicable study of cognitive-behavioral therapy in general (e.g. Turner & Clancy, 1988; Nicholas, Wilson & Goyen, 1991; Keefe, Dunsmore & Burnett, 1992; Turner & Jensen, 1993);
(b) the study of 'coping' in general (e.g. Mullen & Suls, 1982; Fernandez, 1986; Jensen & Karoly, 1991; Jensen, Turner, Romano & Karoly, 1991; Williams and Keefe, 1991); and
(c) the study of controlled laboratory-induced pain (e.g. Devine & Spanos, 1990; McCaul *et al.*, 1992; Crombez, Baeyens & Eelen, 1994).

This last category of study has perhaps gone the farthest to elucidate the micro-cognition of pain processing and pain control.

Most of the studies of laboratory-induced pain are data-driven in nature (Mackay, 1988); that is, they are concerned with the single research task of demonstrating (or failing to demonstrate) a significant reduction in pain perception. One consequence of this unfortunate scientific tunnel-vision is the reliance upon one experimental paradigm: the instruction paradigm. In its simplest manifestation the instruction paradigm requires two groups of *S*s to receive a controlled painful stimulus: one group is instructed to practice a learned coping strategy whilst the second is not instructed in any coping strategy, and both groups of *S*s report subjective measures of pain perception. Most of the studies of pain and attention (with some interesting exceptions, e.g. Miron, Duncan & Bushnell, 1989) have used this paradigm, although many of the parameters have been adapted and elaborated upon. For example, different means of inducing pain have been employed, ranging from the common cold-pressor task (e.g. Kunckle, 1949; Kanfer and Seidner, 1973; Riley & Levine, 1988) to electrical pain (e.g. Walker, 1971; Arntz, Dressen & Merckelbach, 1991) and pressure pain (Forgione & Barber, 1971; Spanos, Hodgins, Stam & Gwyn, 1984; Bruehl, Carlson & McCubbin, 1993). Different ways of measuring pain have been used, the most common of which is tolerance to the nociceptive stimulation (e.g. Kanfer & Goldfoot, 1966) and self-report of pain (e.g. Barber & Cooper, 1972). Many different cognitive strategies have been tested, ranging from emotion-centred tasks (e.g. Avia & Kanfer, 1980; Berntzen, 1987) to attentional tasks, where *S*s are required to focus upon the pain sensation (e.g. Leventhal, Brown, Shacham & Engquist, 1979; McCaul & Haugtvedt, 1982; Ahles, Blanchard & Leventhal, 1983).

The attentional tasks of most interest to the present investigation are those that require *S*s to distract their attention away from the pain sensation via the engagement in an affectively neutral competing task. Numerical distraction tasks are commonly used (e.g. Barber & Cooper, 1972; Beers & Karoly, 1979; Hodes, Howland, Lightfoot & Cleeland, 1990; Devine & Spanos, 1990) as are distracting slide shows (Berger & Kanfer, 1975; McCaul & Haugtvedt, 1982). Less common forms of distraction include the recounting of an interesting lecture (e.g. Jaremko, 1978), watching a black spot on a wall (Stevens & Heide, 1977), listening to white noise (Riley & Levine, 1988) and watching an episode of L.A. Law (Arntz *et al.*, 1991).

Pain and cognition

Data-driven studies that rely on an instruction paradigm, such as those reviewed above, assume pain to be the most important demand upon processing capacity. They further assume that the strategy one instructs a *S* to practice is, by definition, a potential distraction from the central task of pain processing. Cognitive theory of dual task processing, however, has no *a priori* assumptions of the prioritisation of one processing requirement over another (Kahneman, 1973) unless so manipulated (Logan & Zbrodoff, 1982). In other words, in a situation where one is required to