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Effects of attentional direction, age, and coping style on cold-pressor pain in children

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Abstract

This study assessed the relative efficacy of two imagery-based attentional strategies for modifying pain experience in children. Children aged 7–14 years ($n = 120$) were randomly assigned to one of three conditions: distraction, sensory-focussing or control (no imagery). The distraction condition prompted children to focus their attention externally; the sensory-focussing condition prompted the child to focus internally on physical sensations. Self-report measures of pain coping style preferences and imagery ability were completed. Children's pain tolerance and perceptions of pain intensity were assessed using a 10 °C cold-pressor task. Results showed pain intensity ratings after 1 min were lower for both intervention conditions than for the controls. Younger children (7–9 years) showed higher pain tolerance in the distraction condition than in the sensory-focussing condition, whereas both interventions were equally effective for older children (10–14 years). Among older children, coping style interacted with the intervention type: in the sensory-focussing condition, pain tolerance was negatively associated with self-reported distraction-based coping style, whereas in the distraction condition this association was positive. The results are interpreted with reference to current models of attention. The implications for use of attentional strategies in helping children to cope with clinical pain are discussed.

Keywords: Attention; Child; Cold-pressor; Coping; Distraction; Pain

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Introduction

Instruction in attentional coping strategies, such as distraction, is often used in the clinical management of children's acute pain. However, the mechanisms by which coping strategies may influence children's pain outcomes are not well understood. Hence, it is not always clear which types of attentional strategies are likely to be most effective in pediatric pain. Two types of attentional coping strategies are considered in this paper: those which divert attention away from the physical sensations associated with the experience (i.e., distraction strategies) and those which focus attention on and attempt to reinterpret such physical sensations (i.e., sensory-focussing strategies).

Distraction may be defined as the deployment of attention away from a primary stimulus or experience (e.g., a painful event) and towards an alternative stimulus. According to "fixed capacity" models of attentional processing (e.g., Kahneman & Treisman, 1984; Pashler, 1995) individuals have a limited pool of attentional resources, the allocation of which are under some degree of conscious control. Thus, diverting attention to competing stimuli should lead to fewer attentional resources being allocated to painful experiences. Moreover, given that attention is required for the identification and perception of stimuli (Lachter, Forster, & Ruthruff, 2004), a nociceptive stimulus should be perceived as less painful if there are insufficient remaining attentional resources to devote to it.

A variety of different distractors have been used in the management of children's pain. Typically, these "distractor" stimuli are engaging and pleasant, and include interventions such as non-procedural talk, toys, bubble-blowing, videos, music, imagery, humor, and virtual reality (Kleiber & Harper, 1999; Piira, Hayes, & Goodenough, 2002). However, because the mechanisms that underlie distraction are currently not well understood (Piira et al., 2002), it is difficult to make a priori predictions about the relative effectiveness of such distractors.

In contrast to distraction techniques, sensory-focussing strategies involve focussing attention on the physical sensations of pain or discomfort in a non-distressing way. Attending to the sensory aspects of the pain experience may enable an individual to acknowledge these sensations in a concrete, non-emotional manner. Leventhal, Brown, Shacham, and Enquist (1979) have suggested that sensory-focussing strategies work by intercepting or disrupting sensation–distress associations.

Sensory-focussing strategies have often been dismissed as counter-intuitive. However, in some contexts, focussing on painful sensations may be more realistic and appropriate than attempting to use distraction-based strategies. Acute pain typically serves the purpose of capturing attention in order to prevent further injury via what may be considered a reflexive, 'bottom–up' process (Pashler, Johnston, & Ruthruff, 2001). Even if the painful experience does not signify a threat of injury, 'top down' cognitive processes that intentionally focus attention away from the pain experience may require effortful switching that is demanding of central attentional resources (Eccleston, 1995). A number of studies with adults have found that, in some contexts, the use of sensory-focussing strategies may result in greater tolerance, lower distress, and/or lower pain intensity ratings than if using distraction-based interventions (Ahles, Blanchard, & Leventhal, 1983; Blitz & Dinnerstein, 1971; Leventhal et al., 1979; McCaul & Haugtvedt, 1982).

One of the few pediatric studies to compare the efficacy of different attentional strategies (Fanurik, Zeltzer, Roberts, & Blount, 1993) found that an imagery-based distraction intervention