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Commentary

The use of distraction, acceptance, and mindfulness-based techniques in the treatment of pediatric pain

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Distraction is a common cognitive-behavioral technique utilized by parents and health care professionals to alleviate suffering associated with pediatric pain (McGrath, 1990; DeMore & Cohen, 2005; Koller & Goldman, in press). Distraction-based techniques are a standard component of well-supported cognitive-behavioral treatments for both acute (Powers, 1999) and chronic pain (Chambers et al., 2004; Robins et al., 2005; Palermo et al., 2009; Noel et al., in press). Studies have generally shown that distraction has small to moderate effects on acute pain in pediatric populations (e.g. Chambers et al., 2009) although there may be discrepancies in its effectiveness due to inconsistency across outcomes measured, treatment setting, child age, and delivery method (Piira et al., 2006; Dahlquist et al., 2007; Koller & Goldman, in press; Verhoeven et al., in press). Although distraction is frequently a component of larger treatment packages for youth with chronic pain, there is currently no evidence that the use of distraction techniques in isolation offers specific benefits for this population.

In recent years there has been an increased focus on the development and utilization of acceptance and mindfulness-based interventions for use with pediatric populations (Thompson & Gauntlett-Gilbert, 2008; Wicksell et al., 2009; Burke, 2010; Feinstein et al., 2011; Masuda et al., 2011). In apparent contrast to distraction techniques, acceptance and mindfulness-based interventions emphasize exposure (rather than distraction or avoidance) to moment-to-moment private experiences, even when these experiences are aversive (e.g. pain), and attempt to teach youth to approach unpleasant experiences in a nonjudgmental and accepting way (Hayes et al., 1999; Bishop et al., 2004). Such practices may include exposure exercises, mindfulness meditation, and cognitive defusion techniques in an effort to increase engagement with and motivation to complete daily activities, despite having pain (Palermo, 2009). Although acceptance and mindfulness-based strategies appear at first glance to be antithetical to distraction techniques, these two strategies may at times be theoretically and practically compatible. In the following commentary, we will review literature related to the use of both distraction and acceptance-based interventions for the treatment of acute and chronic pediatric pain, while exploring both topographical and functional understanding of these approaches. We will integrate commentary on contexts in which they may be most effective, and finally discuss areas for future research and clinical application.

Distraction as a therapeutic intervention for pain

The use of psychological interventions in the treatment of pediatric pain has gained significant momentum in the past few decades. Among these psychological interventions, distraction has been affirmed as a key therapeutic component by many researchers and clinicians (Cohen et al., 1999). Distraction is understood as a process of directing a child's attention away from the noxious stimulus towards an alternative stimulus (Cohen et al., 1999).

Topographically (i.e. what the intervention looks like), this may involve a variety of different activities such as non-procedural talk, guided imagery, books, video games, kaleidoscopes, music, and movies. The function of employing distraction techniques, in addition to redirecting attention, is often to manage or decrease pain (DeMore & Cohen, 2005). Mechanistically, it is hypothesized that diverting one's attention away from the stressful event changes nociceptive responses and triggers an internal pain-suppressing system (McGrath, 1990).

Distraction techniques have been found to be more effective at reducing pain than topical anesthesia during immunizations in both school-age and infant populations (Cohen et al., 1999; Cohen et al., 2006) and research has suggested that a variety of distraction techniques can be useful during acute procedural pain (Koller & Goldman, in press). Thus, distraction appears to be generally effective in reducing procedure-related pain. Moreover, it can be relatively easily taught to health care professionals and parents, does not require a waiting time for its effects to take place, and often has little or no cost associated with its use. Given the numerous benefits associated with the use of distraction techniques, it is clear why distraction has become a popular intervention for acute pain in children.

Research suggests that while distraction is generally helpful for acute medical procedures, patient characteristics often dictate for whom distraction works optimally and those for whom it does not (e.g. Piira et al., 2002; Verhoeven et al., in press). Research examining moderating factors indicates that discrepancies in the effectiveness of distraction may vary as a function of the child's age and past use of the intervention (Piira et al., 2002), as well as the phase of the medical procedure (e.g. anticipatory, procedure, recovery; Cohen et al., 2006). Also, distraction has been found to be highly effective when children are given preparatory information regarding the sensory aspects of pain they are about to experience (Jaaniste et al., 2007). Supporting this finding, Eccleston and Crombez (1999) theorized that when pain is novel, unpredictable, intense, and interpreted catastrophically, it will place a strong demand on attention, and may reduce the effectiveness of distraction. Experimental evidence suggests that when used with children who have a tendency to catastrophize about pain, distraction may worsen acute pain (Verhoeven et al., in press); however, the type of distraction task chosen in this study (i.e. a tone detection task) may have impacted participants' pain experience, and results may have varied given an alternate distraction task. Thus, it can be understood that while distraction plays in important role in the management and reduction of pain, it has its limitations. The utilization of distraction for addressing chronic pain, pediatric or adult, is one area that is understudied and the extant research is inconclusive.

Using distraction techniques with pediatric chronic pain

Although distraction is often included as part of effective Cognitive-Behavioral Therapy (CBT) treatment packages (Chambers et al., 2004; Robins et al., 2005; Palermo et al., 2009; Noel et al., in press), there is little research directly examining the effects of distraction for chronic pain. A study examining parent-led distraction in pediatric chronic pain patients revealed positive effects on mild experimental pain (Walker et al., 2006). In a study conducted with children with recurrent abdominal pain, guided imagery, a type of distraction that employs relaxation, was also demonstrated to be beneficial (Weydert et al., 2006). No other pediatric research specifically examining the use of distraction for patients with chronic pain has been found.

Findings in the acute pain literature that reflect differences in effectiveness across contexts may also have implications for the use of distraction with chronic pain patients, and suggest that the function of applying distraction also be considered. Evidence indicates that young people who catastrophize about pain are at increased risk of developing chronic pain conditions (Vervoort et al., 2010), and as previously mentioned, it has been found in experimental contexts that increased catastrophizing is associated with decreased effectiveness of some forms of distraction (Verhoeven et al., in press). The fear-avoidance model, which has recently been applied to pediatric populations (Asmundson et al., 2012) postulates that high levels of pain catastrophizing

can lead to pain-related fear and anxiety, as well as reduced activity, increased disability, and increased pain. This model would suggest that if distraction is used in an attempt to reduce the pain or results in avoidance of important activities (e.g. engaging in distraction in place of a valued activity), the implementation of distraction may not improve children's functioning or quality of life, but rather interfere with vital living. Functionally, when distraction is used as a means of helping children with chronic pain to direct their attention away from pain, in the service of continuing engagement in important life activities (e.g. school, spending time with friends) it may, in fact, be beneficial.

Acceptance and mindfulness-based interventions for pain

One of the central tenets behind the newly emerging third-wave behavioral therapies is to live a meaningful life in alignment with one's values. Acceptance and mindfulness-based strategies (e.g. Acceptance and Commitment Therapy [ACT] and Mindfulness-Based Stress Reduction) belong to this new wave and have gained attention due to empirical support established for treating a variety of medical and mental health conditions in both children and adults (Kabat-Zinn, 1994; Hayes et al., 1999; Brown & Ryan, 2003; Dahl et al., 2005; Hayes et al., 2006). Mindfulness is described as, "paying attention in a particular way: on purpose, in the present moment, and non-judgmentally" (Kabat-Zinn, 1994, p. 4), whereas acceptance refers to a willingness to let things be as they are, as soon as we become aware of them (Germer, 2005). Specifically, pain acceptance may be defined as experiencing pain "without reaction, disapproval, or attempts to reduce or avoid it" (McCracken & Eccleston, 2003, p. 198) while simultaneously striving towards living a fulfilling life in accordance with one's values. While pain reduction has often been found to be a byproduct of mindfulness or acceptance-based work, it is not the goal (McCracken et al., 2005). Rather, the goal is to pursue activities in line with one's values, whether or not one has pain.

In the context of acute pain treatment, it has been suggested that interventions that help the individual attend to pain in a more objective and non-judgmental fashion (e.g. using acceptance and mindfulness) may be an effective alternative when distraction has failed (Verhoeven et al., in press). For example, when having a child listen to music or watch a movie in order to provide distraction from the pain associated with a medical procedure has failed, that child may be taught to objectively focus on bodily sensations, rather than focusing on how much it will hurt or avoiding the experience itself. Early work with children examining sensory-focused methods (i.e. techniques bearing similarities to mindfulness) found that having children attend to physical sensations in an objective manner, was as effective as distraction in older children (i.e. those over 10 years of age; Fanurik et al., 1993; Piira et al., 2006). More recently, researchers have begun to develop interventions designed to help children pay attention to acute pain in a mindful and accepting manner, with encouraging preliminary results (Petter et al., 2012). Furthermore, brief interventions designed to increase acceptance of acute pain during experimental studies have been shown to be as effective as distraction-based interventions with adult populations (e.g. Hayes et al., 1999; Keogh et al., 2005).

Using acceptance and mindfulness-based approaches with pediatric chronic pain

Although, to date, the majority of research on acceptance-based interventions for chronic pain has been conducted with adults, the pediatric literature is developing. In adult chronic pain populations, researchers have found that acceptance of pain is significantly associated with reduced disability, depression, and pain-related anxiety, among a host of other physical, psychological, and social outcomes (McCracken & Eccleston, 2003; McCracken et al., 2010). In adolescents with chronic pain, acceptance has been linked to greater quality of life (Feinstein et al., 2011), and has been shown to be more predictive of disability than pain intensity, depression, and anxiety (Wallace et al., 2011). A recent case study examining an ACT-based intervention with an adolescent with pain related to sickle cell disease demonstrated improvements in daily functioning and quality of life (Masuda et al., 2011). Furthermore, a

randomized controlled trial of an acceptance-based intervention for adolescents with chronic pain (which focused on acceptance through cognitive defusion and other methods) was found to be more effective than standard CBT-based treatment, not only in reducing pain intensity and discomfort, but also in decreasing pain-related disability and fear of pain (Wicksell et al., 2009). Contrary to classical CBT approaches, which place a focus on reducing or controlling symptoms of chronic pain (through techniques such as distraction, cognitive-restructuring, progressive muscle relaxation, guided imagery; Eccleston, 2001; Chambers et al., 2004; Robins et al., 2005), acceptance-based approaches, such as ACT (Hayes et al., 2006) emphasize living a valued life with pain, while accepting aspects of chronic pain that cannot be easily changed (e.g. pain intensity, fatigue, negative emotions). Thus, the focus is shifted from eliminating pain, to living a meaningful life, even in the presence of pain (Wicksell, 2007).

Acceptance-based therapies, particularly ACT, help patients identify personal values and encourage them to engage in activities in accordance with these values. They emphasize exposure to private experiences they previously avoided (e.g. pain, distress), in the service of engaging with life even during times when these private internal experiences cannot be down-regulated. These interventions also teach defusion techniques and mindfulness strategies as methods for enhancing acceptance of experiences that cannot be changed and inciting action despite thoughts or emotions that would otherwise encourage avoidance (see Hayes et al., 1999).

In the context of pain, defusion techniques facilitate the process of distancing oneself from thought content related to the pain when the patient has become overly fused with or entangled with thoughts. Instead of trying to restructure the thoughts or eliminate them, as is common in more traditional CBT approaches (Beck, 2011), defusion is a method of distancing from one's thoughts and decreasing the believability of thoughts, so that the patient is not held back by or controlled by distressing thoughts. Case Example 1 outlines how acceptance can be helpful in working with a child suffering from a chronic pain syndrome.

Case Example 1: Encouraging action through ACT

Mary, a 13-year-old girl with a history of recurrent abdominal pain has withdrawn from social activities and is fixated on fearful thoughts about having pain if she joins her friends on a shopping outing. She has not had pain in over 3 months; however, her fear of pain holds her back from engaging in her valued activity (e.g. spending time with her friends). An ACT intervention was used to teach her a combination of mindfulness and cognitive defusion techniques to help her relate differently to her thoughts about her pain syndrome and related behavioral action steps. Specifically, she was instructed in a mindfulness technique that facilitates an awareness of her ongoing thought processes (e.g. Leaves on a Stream technique, see Hayes et al., 1999), as well as a self-talk strategy designed to help her to distance herself from the thought content to which she was fused (e.g. becoming aware "I am having the thought that I will have pain if I go to the mall", as a way to distance from the recurrent thought "I will have pain if I go to the mall"; Wicksell, 2007). These strategies have been helpful in encouraging her to pursue behaviors related to valued living even when she has distressing thoughts about her pain.

How distraction and acceptance-based techniques can be used in tandem

Although an acceptance and mindfulness-based approach is not necessarily at odds with the use of distraction (i.e. distraction may be used if it helps an individual pursue valued goals in the presence of pain), proponents of acceptance-based approaches may argue against the use of distraction or any other intervention if it is being used in an attempt to reduce pain at the expense of engaging in valued activities. Indeed, even strict adherence to interventions that are commonly used within acceptance-based protocols (i.e. mindfulness exercises, exposure) would be discouraged if they impede an individual's ability to act flexibly and in

alignment with their values. Thus, it is crucial to not only consider the type of intervention being utilized with pain patients, but also what function that particular intervention serves. For example, is distraction being used as a form of avoidance or disengagement from activities that may or may not increase pain, or is it being used as a way for patients to engage in valued activities despite the pain they are experiencing? A distraction activity would be consistent with an ACT intervention when the function of the activity is to enhance meaningful life experience. If a mindfulness activity is employed as a way to zone out and not deal with making important life decisions related to moving towards values, this would also be inconsistent with the acceptance- and mindfulness-based work. Topographically, these methods can be applied across a number of contexts and may address the patient's short-term goal of pain reduction. Particularly in the context of chronic pain, employing these strategies with an understanding of their function, may additionally help improve a patient's quality of life, especially in the long-term, as personal values are taken into consideration.

In the ACT literature, the ability to make conscious choices in alignment with one's value system is reflective of psychological flexibility, which is defined as the ability to adapt, change, or persist in behavior when doing so serves one's chosen values (Hayes et al., 1999). Being able to flexibly employ coping strategies that move one closer to one's values is one of the foundations of this work. The distinction between topography and function is imperative for guiding treatment with a patient experiencing acute or chronic pain. Case Example 2 illustrates the importance of understanding the function of such techniques and more specifically, how distraction techniques can be used within the framework of an acceptance-based approach to help treat an adolescent with chronic pain.

Case Example 2: A musical distraction: Acceptance and distraction harmonized

Bryan, a 15-year-old male with chronic headaches, has been unable to consistently attend school for the past 2 months and has discontinued many of the extracurricular activities in which he previously engaged. For example, he is no longer participating in band activities (i.e. playing the guitar), and is no longer a member of the basketball team at his school. Bryan attributes his disengagement from these activities to his chronic pain. Bryan's primary coping strategies for dealing with pain has been to rest and engage in relaxation; however, he often found himself spending large amounts of time using his coping strategies in an attempt to eliminate his pain, and when he was unsuccessful, ruminating on his pain and focusing on how it was adversely impacting his life. In an effort to improve the overall quality of Bryan's life in the long-term, Bryan's therapist encouraged re-engagement with valued activities. He helped him to generate a list of the experiences in life he valued most. Bryan's list included playing guitar, spending time with friends, and being a good student. His therapist helped him to see that he could either devote his time to trying to get rid of the pain (which he had previously attempted and had been unsuccessful), or spend his time trying to engage in his valued activities, knowing that he may have some pain along the way. One assignment given to him was to play his guitar for a predetermined amount of time each day, even when he had pain. Bryan liked this idea because he stated that, "as soon as I get really into the guitar, I almost forget about my pain". This assignment allowed Bryan to engage in an activity that he values, while simultaneously providing a distraction from his pain, without focusing on the reduction of pain as a primary goal.

Conclusions and future directions

Distraction techniques have been utilized by mental health professionals to treat both acute and chronic pain within the pediatric population for decades (McGrath, 1990). Evidence to date suggests that distraction is particularly effective as an intervention for young children (Piira et al., 2006) who do not view pain as highly threatening (Verhoeven et al., in press), and are undergoing acute pain procedures such as venipuncture and immunizations (Powers, 1999; Uman et al., 2008).

Although often included in larger CBT treatment packages (Chambers et al., 2004; Robins et al., 2005; Palermo et al., 2009; Noel et al., in press), little evidence currently exists regarding the direct effects of distraction on chronic pain in pediatric populations.

More recently, research has begun to examine the use of mindfulness and acceptance-based approaches for pain. These interventions take a rather different theoretical approach to the management of acute and chronic pain. In the context of acute pain, these approaches encourage children to attend to pain in an objective and accepting manner. While several studies with adults have demonstrated that acceptance and mindfulness-based interventions are as effective as distraction for acute experimental pain (Hayes et al., 1999; Keogh et al., 2005), preliminary findings with children undergoing experimentally induced pain have also yielded encouraging results (Petter et al., 2012). In the context of pediatric chronic pain, there is also growing evidence for the use of interventions that include acceptance and mindfulness components (Wicksell et al., 2005; Wicksell et al., 2007; Wicksell et al., 2009; Masuda et al., 2011).

Given that the effectiveness of pain interventions is contingent on and impacted by a number of individual and pain-specific variables, it will be crucial to understand what strategies work, for which populations, under what conditions. Just as research has begun to tease apart the conditions under which distraction works optimally, it is important that these same lines of research be explored for acceptance and mindfulness-based strategies. Specifically, we propose that both distraction and acceptance/mindfulness-based techniques be investigated within specific chronic pain populations (e.g. juvenile idiopathic arthritis, recurrent abdominal pain, headache), as we anticipate that effectiveness may differ both within and between different pediatric pain populations. Moreover, future research should consider individual and parental characteristics that may impact a child's pain experience (e.g. child's developmental level, temperament, parental anxiety, parental pain history), and may help identify subgroups that respond best to distraction or acceptance-based modalities. Mediational analyses that explore processes by which these therapeutic modalities work may also contribute to improving psychological interventions for youth with pain (Wicksell et al., 2011).

With regard to those delivering such interventions, it will be important for practitioners to be aware of the nuances of both the theory behind the techniques as well as the actual interventions employed. As described above, the function of mindfulness and acceptance strategies is to assist patients in embracing unpleasant sensations (e.g. pain) so that the patient's life is not dictated by trying to avoid feeling pain or arranged around decreasing pain at the expense of participating in other important life activities. From an acceptance-based perspective, the goal is ultimately for pain patients to take steps towards living a life of value and meaning, even in the face of pain (see McCracken, 2005). Distraction is often successfully used as a method for down-regulating pain in acute and procedural instances, though as described above, variability of effectiveness is evident. When distraction is applied in chronic pain contexts, functional utility is more complex, and an understanding of how utilizing such a technique will move a patient towards or away from their values is important. If, for a patient, participation in valued activities becomes contingent upon reducing pain, and if, as practitioners, our goals are contingent on reducing or eliminating our patient's pain, there is less likelihood of being consistently successful given the range and intensity of chronic and recurrent pain in children. Given that techniques may help move one patient towards values, and another away from values, understanding the function of such techniques is critical.

Ultimately, the hope is that practitioners who work with pediatric pain populations will strive to teach strategies that help children fully engage in life activities that are important to them. The rising prominence of acceptance and mindfulness-based techniques may provide a forum to question whether our primary goal is to eradicate pain symptoms or help a child experiencing pain to fully engage with life. To help that child embrace the idea that a worthy goal of intervention is their participation in valued life activities despite pain

may be a challenging yet rewarding objective. The theory, upon which acceptance and mindfulness-based approaches are based, may assist us in changing the lens through which we view our successes, and in the process, help patients revise theirs.

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