Cleveland Clinic

Cognitive treatment of pain: Does thinking make it so?

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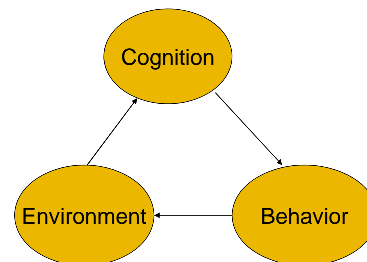
Why cognitive pain treatment?

- Inactivity of pain patients reduces opportunities for reinforcement of adaptive behavior.
- Generalization of therapeutic effects beyond the treatment setting.
- Allows for effective treatment of common psychiatric comorbidities such as anxiety and depression.

Cognitive Therapy Defined

- "Cognitive therapy is an active, directive, time-limited structured approach used to treat a variety of psychiatric disorders (for example, depression, anxiety, phobias, pain problems, etc.). It is based on an underlying theoretical rationale that an individuals affect and behavior are largely determined by the way in which he structures the world. His cognitions (verbal or pictorial "events" in his stream of consciousness) are based on attitudes or assumptions developed from previous experiences." (Beck et al. 1979)

Cognitive therapy defined



From Bandura, 1978

Reported effects of cognitive therapy of pain

- Reduced pain
- Improved functioning
- Reduced disability
- Decreased pain behavior
- Reduced medication use
- Decreased health care utilization
- Improved quality of life
- Decreased depression
- Decreased anxiety
- Decreased unemployment

Cognitive therapy of pain defined

- Relaxation training
- Increasing self-esteem
- Reduced catastrophizing
- Marital & family interventions
- Sleep hygiene training
- Individual psychotherapy for depression, anxiety, stress
- Coping skills training
- Relapse prevention
- Crisis planning
- Medication withdrawal
- Activity pacing training
- Disease education
- Goal setting
- Spirituality
- Biofeedback
- Assertiveness training
- Increased self-efficacy
- Behavioral activation
- Guided exercise
- Hypnosis
- Operant conditioning

Cognitive therapy of pain defined

To what extent do the effects of cognitive therapy actually result from cognitive changes?

"There is nothing either good or bad, but thinking makes it so."

-William Shakespeare

"The scourge of life, and death's extreme disgrace, The smoke of hell,--that monster called pain.

-Sir Philip Sidney

Lessons from the study of pain self-efficacy

Self-efficacy

- Bandura (1977)
  - ***Outcome expectancy***: "A person's estimate that a given behavior will lead to certain outcomes."
  - ***Efficacy expectancy***: "The conviction that one can successfully execute the behavior required to produce the outcomes."
  - Individuals will engage in behaviors only when they believe that the behavior will produce the desired result (outcome expectancy) and when they believe themselves capable of the behavior (efficacy expectancy).

Pain self-efficacy (PSE)

- The degree to which patients believe they have the ability to change the pain itself.
- The degree to which patients they can continue to function.
- The degree to which patients believe they can change symptoms related to pain, such as mood disruption, sleep, etc.
- Distinct from general self-efficacy.

Anderson, 1995;
Tan, 2002

Pain self-efficacy and pain

- Martin & Holroyd (1993) – Among headache patients, PSE predicts fewer physical symptoms , even after controlling for headache intensity, chronicity, and frequency.
- Levin (1996) – Low back pain patients with higher PSE show lower pain severity.

Pain self-efficacy and functioning

- Bucklew et al. (1994 & 1995) – PSE associated with less pain behavior in fibromyalgia patients. Improvements in functioning correlate with improvements in PSE.
- Kaivanto et al. (1995) – PSE predicts higher levels of exercise performance in chronic LBP patients.
- Levin et al. (1996) – In low back pain patients, PSE predicts more activity, more work hours, and lower pain behavior, after controlling for gender, pain duration, and litigation.
- Altmaier et al. (1993) – Improvements in self-efficacy during treatment did not correlate with improvements at discharge, but did at six month follow-up.

Pain self-efficacy and coping

- Jensen & Turner (1991) – PSE predicts greater coping efforts, regardless of patient beliefs about the utility of those efforts.
- Martin et al. (1993) – PSE predicts less use of passive coping methods.
- Lin (1996); Tsopels et al. (1996); French et al. (2000) – The effect of PSE on functioning was entirely mediated by greater use of active pain coping strategies.
- Bond et al. (2002) – Augmentation of SE during treatment lead to greater use of coping strategies, but no marginal improvement in pain, medication use, or functioning as compared to education only, or wait-list control groups.

Pain self-efficacy & functioning

Pain self-efficacy & functioning

- French et al. (1997) – Manipulated headache patients' PSE through false norms regarding biofeedback performance. While the induction succeeded in changing PSE, it had no effect on subsequent headache severity or medication use.
- Manning & Wright (1983) – PSE predicted lower pain during childbirth, in women *without previous pregnancies.*

Pain self-efficacy and functioning

- Rejeski et al. (2001) – In a longitudinal study of 480 elderly adults with chronic knee pain, low PSE predicted decline in functioning across the 30 month observation interval. However, this result was found only in those patients with low baseline leg strength.

Pain self-efficacy: Conclusions

- Higher PSE has been demonstrated to favorably impact both pain as well as physical functioning in several painful conditions and multiple studies.
- There is significant, although not conclusive evidence, that this effect is mediated by the use of coping strategies.

Lessons from the study of Pain Catastrophizing

Pain catastrophizing defined

- Rumination regarding pain
- Symptom magnification
- Helplessness

Pain catastrophizing and acute pain

- Pain catastrophizing predicts higher levels of pain in:
  - College undergraduates remembering past pain (Sullivan et al., 2004)
  - Patients recovering from abdominal surgery (Granot & Ferber, 2004)
  - Normal women during menses (Walsh et al., 2003)
  - Women recovering from C-Section (Strulov et al., 2007)

Pain catastrophizing and chronic pain

- Pain catastrophizing predicts higher levels of pain in:
  - Headache patients (Drahovzal, et al., 2006)
  - Rheumatoid arthritis patients (Keefe, et al., 1989)
  - Osteoarthritis patients (Keefe, et al., 2000)
  - Mixed chronic pain patients (Severeijns, et al., 2001)

Catastrophizing and experimental pain

- Pain catastrophizing predicts higher pain in undergraduates in cold pressor test (Sullivan et al., 1995, 2004)
- No differences in pain among community volunteers in cold pressor test (George et al., 2006; Hirsh et al., 2008).
- Experimentally induced catastrophizing did not predict cold pressor pain, community sample (Severeijns & van den Hout., 2005).

Pain catastrophizing and functioning

- High pain catastrophizing predicts greater self-reported disability in mixed chronic pain patients (Severijns et al., 2001).
- High pain catastrophizing predicts greater disability in acute low back pain, but only when rated by the patient. Objective physical performance was not affected by catastrophizing. (Sinkels-Meewisse et al., 2006)

Mechanisms – Coping and social support

- Hanley et al. (2008) – In spinal cord injury patients undergoing treatment, improvements in functioning coincide with decreases in pain catastrophizing, but this was not mediated by differences in use of coping strategies, nor by differences in social support

Mechanisms - Affect

- Bartley et al. (2007) found that experimental manipulation of affect altered pain perception, nociceptive flexion reflex, skin conductance and heart rate acceleration.
- None of these variables were predicted by catastrophizing.

Mechanisms – Physiological arousal

- Catastrophizing was positively correlated with pain in chronic low back pain patients.
- Catastrophizing did not predict greater lumbar paraspinal muscle arousal at rest, nor greater reactivity in muscle arousal.
- However, high catastrophizing accompanied by high resting tension led to higher pain ratings, as compared to low catastrophizing and/or low muscle tension.

Wolff et al. (2008)

Mechanisms - Attention

- High catastrophizers demonstrate longer engagement with pain-predicting cues (Van Damme et al., 2002)
- fMRI results revealed higher activation of brain areas related to attention, anticipation, and emotional responses in in high catastrophizing fibromyalgia patients, compared to low catastrophizing patients (Gracely et al., 2004).
- High catastrophizers showed higher activation in brain areas related to attention during cold pressor test, compared to low catastrophizers (Seminowicz et al., 2006).

Mechanisms - Attention

- Deliberate pain focus and suppression increased pain, distraction caused reduced pain. However, catastrophizing did not explain significant additional variance in pain. (Quartana et al., 2007).

Catastrophizing – Conclusions

- Catastrophizing leads to reliable increases in both acute and chronic pain conditions.
- This link, however, is much more tenuous in experimental pain.
- Multiple sources of evidence suggest that the link between catastrophizing and pain is mediated by attention to pain, but not coping strategies, or simple physiological arousal.

So what about Shakespeare?

Does thinking make it so?

- As predicted, alterations in pain-related cognition were associated with significant changes in pain and functioning.
- These effects were mediated by both changes in behavior and attention.

Thank you!

"Our revels are now ended. These our actors, as I foretold you, were all spirits and are melted into air, into thin air; And, like the baseless fabric of this vision, The cloud-capped tow'rs, the gorgeous palaces, The solemn temples, the great globe itself, Yea, all of which it inherit, shall dissolve, And, like this insubstantial pageant faded, Is rounded with a sleep."