

Common misconceptions about cognitive mediation of treatment change: A commentary to Longmore and Worrell (2007)

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Abstract

The article by Richard J. Longmore and Michael Worrell [Clinical Psychology Review, Volume 27, 2007, pp. 173–187] reviews a selection of studies showing no significant difference between treatment conditions that include formal cognitive restructuring techniques and other behavioral treatment modalities that do not include techniques to directly challenge cognitions. Based on this literature, Longmore and Worrell question the validity of the cognitive behavioral treatment model and argue that changes in symptoms are not mediated by changes in cognitions. Longmore and Worrell's arguments are based on common misconceptions about mediation models of treatment change. This commentary discusses and clarifies these misconceptions.

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The article by Richard J. Longmore and Michael Worrell (Clinical Psychology Review, Volume 27, 2007, pp. 173–187) attempts to examine the question of whether changes in cognitions are necessary to produce treatment change. The authors address a timely question with important theoretical and practical implications. Although a notable effort, the paper shows a number of significant errors, biases, and misconceptions that led to incorrect interpretations of the literature and general conclusions.

The paper is organized around critiques of the cognitive model by Hayes et al. (2004) and Teasdale (1997). Essentially, these critiques question the premise of the cognitive model that changes in cognitions mediate treatment change. Longmore and Worrell's (2007) main argument rests on a review of treatment trials that conducted a

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component analysis and the literature on sudden gains to answer the question of treatment mediation. After reviewing a number of selected studies, Longmore and Worrell (2007) derived the following conclusion:

“Taken together, these findings reveal a worrying lack of empirical support for some of the fundamental tenets of CBT. There is paucity of evidence that cognitive interventions forming the core procedural aspects of CBT are differentially effective in reducing distress. Further, there is a lack of evidence that their effectiveness, such as it is, is mediated cognitively” (p. 185).

I will show here that the authors’ arguments are significantly flawed for the following reasons: (1) a component analysis is insufficient to test mediation; (2) changes in cognitions can occur and mediate treatment change without explicit cognitive challenge procedures; (3) mediation tests of treatment change are uncommon simply because the statistical techniques have only recently been developed; and (4) sudden gains is a special and overly restrictive case of the temporal precedence criterion of mediation.

1. Component analysis and mediation tests

A component analysis cannot answer the question of mediation because cognitions can change and mediate treatment through a number of ways, not only through direct cognitive challenges. Therefore, a trial showing that treatment (or a treatment component) *X* is more efficacious than another treatment (or treatment component) *Y* simply shows that treatment *X* reduces symptoms more than treatment *Y*, but the mechanism of change in treatment *X* or *Y* remains unclear. Similarly, a null finding in the efficacy between two treatments does not rule out differences in mediation between the treatments (also referred to as *moderated mediation*). It is also possible that both or neither treatment components are mediated via variable *Z*.

It is further well known that directly challenging cognitions is not the only way in which cognitions can change. A spider phobic person who exposes herself to spiders without experiencing any of the feared consequences will show a reduction in harm expectancy, even without explicit cognitive restructuring. The crucial question that remains is: do changes in cognitions (e.g., harm expectancy) mediate changes in symptoms (e.g., fear of spiders).

Although the statistical test for mediation (and moderation) in cross-sectional studies has been clarified since the seminal paper by Baron and Kenny (1986), mediation of treatment change is still in its infancy. In contrast to the Baron and Kenny (1986) criteria, mediation of treatment change requires more complex methodological designs and statistical tests. Recently, investigators have proposed criteria to study mediation of change using regression discontinuation and interrupted time series for single-group study designs (Doss & Atkins, 2006), structural equation modeling procedures for longitudinal tests (Cole & Maxwell, 2003), multilevel models (Kenny, Korchmaros, & Bolger, 2003), and linear regression models for randomized controlled trials (Kraemer, Wilson, Fairburn, & Agras, 2002).

The most appropriate mediation tests for the studies included in Longmore and Worrell’s (2007) review are Kraemer et al.’s (2002) criteria. According to Kraemer et al. (2002), a mediational relationship exists if: (1) the proposed mediator correlates with treatment assignment; (2) the mediator has either a main or interactive effect on outcome; and (3) changes in the mediator variable precede changes in the dependent variable. A direct comparison between the treatment modalities in the pre–post effects on the treatment mediator (as in the component analysis) only provides an indirect test of only one criterion of mediation, and the vast majority of studies reviewed by Longmore and Worrell (2007) suggest that this criterion seems to be met. Only a few studies (e.g., Hofmann, 2004; Wilson, Fairburn, Agras, Walsh, & Kraemer, 2002) so far have adopted all of Kraemer et al.’s criteria for the study of mediation.

Of the studies included in Longmore and Worrell’s (2007) review, only the study by Hofmann (2004) examined some of these criteria. This study investigated cognitive mediation by comparing CBT, exposure therapy without explicit cognitive techniques, and a wait-list control condition in their efficacy for treating social phobia. In order to examine whether treatment changes in estimation of social cost (how bad it would be if the social situation did not go well) mediated changes in the dependent variable (social anxiety), patients were assessed at pre-test, post-test, and follow-up. This design limits the mediation analyses because in order to conduct an adequate test of mediation, assessments are necessary at time points when the changes in the proposed mediator are believed to causally affect the changes in the dependent variable. Because of these design limitations, the study was only able to examine whether pre- to post-changes in the proposed mediator (estimated social cost) predict pre- to follow-up changes in the dependent variable (social anxiety). This test was a rough approximation of the temporal precedence criterion of mediation. Nevertheless, the results showed that changes in estimated social cost mediated treatment changes in both treatment

conditions from pre- to post-test, and only participants who received CBT showed continued improvement from post-test to 6-month follow-up. These long-term changes in social anxiety were associated with a reduction of estimated social cost from pre-test to post-test. Interestingly, the results of the simple efficacy data showed that both treatments were superior to the wait-list group in reducing social anxiety but did not differ from one another at post-test. These results suggest that cognitive intervention is mediated through changes in estimated social cost.

Further evidence for cognitive mediation of treatment change comes from a recent study by Smits, Rosenfield, Telch, and McDonald (2006). This study, which was not included in Longmore and Worrell's (2007) review, examined cognitive mediation using multilevel modeling (Kenny et al., 2003). The results showed that reductions in probability and cost biases accounted for significant variance in fear reduction achieved during treatment of social phobia. The study further reported that a reduction in probability bias temporally preceded changes in fear reduction and fully mediated the treatment effect.

2. Sudden gains literature

Langmore and Warren (2007) failed to mention that some studies examining the sudden gains phenomenon are, in fact, consistent with the cognitive mediation model. Nevertheless, sudden gains of cognitive changes before symptom changes are neither a sufficient nor a necessary criterion for treatment mediation, because cognitive mediation can occur in the absence of sudden gains. Sudden gains refer to large, rapid and stable decreases in symptomatology during treatment (Tang & DeRubeis, 1999a). They are typically defined by a set of 3 quantitative criteria: (1) the sudden gain must be large in absolute terms; (2) it must represent at least a 25% reduction from the level of symptomatology before the gain occurred; and (3) the mean level of symptomatology in the three therapy sessions preceding the gain must be significantly higher than the mean level of symptomatology in the three postgain sessions.

Some authors assume that the therapeutic strategies in CBT that encourage cognitive change are responsible for sudden gains in treatment (e.g., Tang & DeRubeis, 1999a,b; Tang, DeRubeis, Beberman, & Pham, 2005; Hollon, 1999; Hofmann, Schulz, Meuret, Moscovitch, & Suvak, 2006). In contrast, other authors assume that common factors, rather than specific cognitive factors, are responsible for sudden gains (Illardi & Craighead, 1994, 1999; Lambert, 2005). Although the criterion of temporal precedence is met if changes in cognitions from prepregain to pregain predict changes in symptoms from pregain to gain, this is neither a necessary nor a sufficient criterion for cognitive mediation because the cognitive model does not predict (and there is no reason to assume) that the changes in cognitions are associated with rapid and large changes in symptomatology. In other words, the findings from the sudden gain literature only provide an extreme case of one criterion of treatment mediation, namely temporal precedence of large symptom changes.

3. Summary

I congratulate the authors for attempting to study the mediating role of cognition in psychotherapy. I agree with the authors that it is important to explore ways to further improve our existing treatment methods. One important way to do this is to identify the mechanism of treatment change. Unfortunately, the authors' approach is inadequate to provide a meaningful contribution to this issue. Moreover, the authors' biased review of the literature led to erroneous interpretations of the existing data. The authors' misconception of mediation is not atypical for our field and shows that more education of the research community is needed on mediation of treatment change.

Cognitive mediation includes, but it is not restricted to, Beckian cognitive restructuring. In the case of anxiety disorders, for example, early models of fear acquisition (e.g., Mowrer, 1939; Seligman, 1971; Watson, 1924, Watson & Rayner, 1920) were revised to include the role of cognitive processes (Mineka & Zinbarg, 2006; Öhman & Mineka, 2001; Rachman, 1976, 1977, 1991). Similarly, it can be argued that exposure therapy is a form of cognitive intervention that specifically changes harm expectancy, which some of us call *cognitions*.

In conclusion, innovative ideas are needed because the precise mechanism of cognitive change is often not known, and because there is clearly room for improvement for the treatments of many psychological disorders. However, not any innovative idea leads to success. The authors promote the so-called *third-wave* movement as an alternative model to CBT. It remains to be seen whether these new models are heuristically useful (i.e., empirically testable) and whether they offer distinct and viable alternatives. In the meantime, and before we dismiss the existing models and adopt new trendy approaches, I suggest that we invest more research effort into testing our existing mediation models with the recently developed methodological guidelines.

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