Treatment for persons with substance use disorders: mediators, moderators, and the need for a new research approach

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Abstract

This article describes two major studies (i.e. Project MATCH and the US Department of Veterans Affairs Effectiveness Study) of mediators and moderators of drinking behavior change following treatment, and considers alternatives to the dominant paradigm that has guided treatment research for more than two decades. Both studies were designed to test the “Technology Model” of therapeutic change, which postulates that patient attributes and treatment process elements, respectively, constitute mediators and moderators of change in drinking and drug use following treatment. The studies show that matching to therapeutic orientation is not an essential ingredient to substantially enhanced outcomes, as previously believed. They also indicate that the mediational mechanisms underlying several of the most popular therapies are different than what is suggested by their proponents. The inability of the Technology Model to explain, much less improve, the effectiveness of addiction treatment suggests the need for a new paradigm. It may be more fruitful to look for matching in larger populations at the level of communities or treatment systems, where a wider range of settings and therapeutic interventions can be evaluated. Copyright © 2008 John Wiley & Sons, Ltd.

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Introduction

Research on the treatment of addictive disorders has matured over the past 50 years. Attention was initially devoted to the investigation of whether treatment produced abstinence from alcohol. Subsequent research devoted more attention to the question of whether some treatments were more effective than others. A more recent line of research has focused on the extent to which the mechanisms assumed to underlie the effectiveness of different treatments (e.g. acquisition of drink refusal skills in cognitive behavioral therapy) are responsible for the changes in drinking that have been observed in clinical trials (Finney, 1995). Advances in psychological measurement, clinical trials methodology, statistical analysis procedures, and addiction theory have facilitated the evolution of scientific research.

These advances have made it possible to formulate better hypotheses, measure underlying constructs, and evaluate “causal chains” that account for changes in intervening variables assumed to produce reductions in substance use following treatment.

The purpose of the present article is to describe two major studies of mediators and moderators of change in post-treatment substance use, and to consider alternatives to the dominant paradigm that has guided treatment research for over two decades. The first study, Project MATCH (matching alcohol treatments to client heterogeneity), was the largest randomized clinical trial of treatment for alcohol dependence ever conducted (Babor and Del Boca, 2003). This study, completed during the 1990s, evaluated the extent to which patient-treatment matching resulted in better

outcomes than random treatment assignment. The second study was conducted during the same period by the US Department of Veterans Affairs (VA). The VA Effectiveness Study (Ouimette et al., 1999a, 1999b) evaluated patient-treatment matching in a multi-site study of inpatient substance abuse treatment programs using a quasi-experimental research design. Together, these studies provide a powerful evaluation of the mediators and moderators of treatment effectiveness, and they also raise questions about the extent to which treatment matching research has focused on the most appropriate research questions [see Donovan (1999) for a discussion of clinical issues].

According to Finney (1995), "mediators" are defined as intervening variables that transmit the effects of a prior variable onto a subsequent variable. For example, treatment modality, patient involvement in treatment, and therapist characteristics are all considered mediating variables. "Moderators" are variables that affect the strength of the therapeutic relationship, such as pretreatment attributes that influence both treatment compliance and outcome (e.g. gender, dependence severity, coping skills). The investigation of mediators and moderators helps to answer questions about how and why treatment works (mediating effects) and for whom certain treatments work best (moderators).

Project MATCH

Project MATCH was a large multi-site study sponsored by the US National Institute on Alcohol Abuse and Alcoholism. The purpose of the study was to determine whether alcoholics respond to different treatment approaches in ways consistent with the theoretical assumptions behind the matching hypotheses, which predict that treatment outcomes can be improved substantially by matching the treatment approach to patient characteristics.

A total of 1726 patients were recruited from treatment facilities across the US. Patients were divided into two categories. The "outpatient" group was recruited directly from the community and the "aftercare" group consisted of patients who had just completed an inpatient or intensive day-hospital treatment. Data obtained from interviews and other sources were used to measure moderator variables, (e.g. seriousness of alcohol dependence, personality characteristics, psychiatric severity, religiosity, self-efficacy, social functioning, readiness to change, social support for drinking) as well as

mediating factors [e.g. therapist characteristics, exposure to treatment, Alcoholics Anonymous (AA) involvement]. The 80 therapists in this study received careful training and supervision while providing treatment.

Patients were randomly assigned to one of three treatments: (1) Twelve-step Facilitation (TSF) consisted of 12 weekly sessions where therapists encouraged patients to become involved in AA activities, such as finding a sponsor, attending meetings regularly, and reading AA materials. (2) Cognitive-behavioral Therapy (CBT) consisted of 12 weekly sessions where therapists taught skills to enable patients to cope with situations and emotions known to cause relapse. Patients learned how to refuse drinks, manage negative moods, and cope with urges to drink. (3) Motivational Enhancement Therapy (MET) consisted of four sessions over the course of 12 weeks in which therapists used motivational techniques to encourage patients to examine the effects of alcohol on their lives and develop a personal plan to stop drinking.

Main effects of treatment

The results showed that the three treatments were equally effective with a wide range of alcoholics (Project MATCH Research Group, 1997a; Babor and DelBoca, 2003). Drinking and negative consequences declined regardless of which treatment participants received, and the decline in drinking began prior to or at the time of treatment entry. Patients averaged 25 drinking days per month before treatment and decreased to six drinking days per month after treatment. Patients reported less drug use, less depression, and their liver function improved. These improvements continued throughout the 12 months following treatment. Treatment effects for TSF, CBT, and MET endured over time periods from 12 months to 3 years.

Mediator and moderator effects

Four moderator variables (among the 21 tested) showed evidence of matching: psychiatric severity, anger, social support for drinking, and alcohol dependence (Project MATCH Research Group, 1997a, 1997b; Babor and Del Boca, 2003). The matching effects observed in this study suggested that: (1) TSF is better for outpatient clients without psychopathology whose social networks support continued drinking, and aftercare clients high in alcohol dependence; (2) MET is best for outpatients high in anger; (3) CBT is best for aftercare clients low in alcohol dependence. Aside from these four patient

attributes, matching as an overall treatment strategy did not substantially improve results because the matching effects found were of modest magnitude. Regardless of matching effects, the following moderator variables predicted good outcomes: motivational readiness to change, high self-efficacy, and low social support for drinking.

Mediating variables that were investigated included therapist characteristics and treatment participation. Although outcomes differed substantially across therapists, a few "outliers" (interpreted as ineffective therapists) were responsible for the outcome differences, rather than the therapist's gender, recovery status, or personality characteristics. Regarding treatment participation, significant but modest relationships were found for CBT and TSF: the more treatment received, the better the outcomes. But the strength of these relationships declined over time. TSF increased both AA attendance and involvement during and after treatment. Small to modest benefits were associated with AA attendance regardless of therapy modality. At a 39-month follow-up, clients with high social support for drinking did better in TSF because of their AA involvement. Interestingly, meaning-seeking and spirituality were not associated with success of TSF or AA attendance.

The study showed that matching to therapeutic orientation is not an essential ingredient to substantially enhanced outcome, as previously believed, and the mechanisms underlying certain therapies are different than what is suggested by their proponents. Project MATCH also showed that AA may be particularly effective with alcoholics because it helps them to avoid social pressures to drink, rather than increasing their spirituality.

The VA Effectiveness Study

The VA Effectiveness Study compared 12-Step and CBT treatments in a broad range of patients ($N = 1873$) recruited from 10 programs within the national system of health services for US war veterans. The study was designed to investigate patient-treatment matching within representative treatment programs, and thereby provide better external validity than Project MATCH (Ouimette et al., 1999a, 1999b; Donovan, 1999). It was predicted that 12-Step outcomes would be better for patients with low cognitive functioning, abstinence as a goal, intrinsic religiosity, and high alcohol dependence. In contrast, it was expected that CBT outcomes

would be better for patients with fewer coping skills and more psychological symptoms.

The results showed that none of the hypothesized patient-treatment matching interactions were significant, even when the analyses were restricted to participants receiving the "full dose" of treatment and to those exposed to the "purest" programs. Further analyses of the treatment-process data showed that: (1) patients high in alcohol dependence performed more 12-Step behaviors and activities at discharge; (2) being treated in a 12-Step program was positively related to 12-Step behaviors, beliefs, and activities; (3) neither dependence nor 12-Step program activities were correlated with drinking outcomes. In general, patients high or low in the matching attributes improved equally in proximal outcomes after treatment (e.g. coping, 12-Step participation). Moreover, proximal outcomes were only weakly associated with one-year drinking outcomes.

The authors provided the following interpretation of their findings: (1) the specific mechanisms responsible for lasting change in the 12-Step and CBT models have not yet been identified; (2) post-treatment environmental variables such as social resources have a strong influence on outcomes that override everything else.

Implications of large-scale matching research trials

The two studies described in this article have important implications for the understanding of mediators and moderators of behavior change among excessive drinkers. Both studies were designed to test the "Technology Model" of therapeutic change, which postulates that patient attributes and treatment process elements, respectively, constitute mediators and moderators of changes in drinking and drug use following treatment. According to 12-Step treatment philosophy, alcohol dependence is a disorder with physical, mental, and spiritual aspects; relief comes with "hitting bottom," spiritual re-awakening, and "working the steps." Moderating factors are assumed to include spirituality and social support for abstinence. CBT, however, assumes that substance abuse is a learned, maladaptive behavior that has led to distorted beliefs and inadequate coping responses. Moderating factors include self-efficacy, psychological expectancies, and coping skills. MET assumes that motivation level can be enhanced by certain therapeutic techniques, which in turn will improve treatment outcomes.

There are at least three possible reasons for the lack of matching effects in these studies, and why the hypothesized treatments failed to mediate changes in drinking behavior. The first reason is theory misspecification. This means that the active ingredients of treatment may be less specific than expected, and suggests that the Technology Model does not apply well to the psychotherapy process as a means to change alcohol consumption. The findings suggest that motivational and cognitive-behavioral therapies may not work according to theory. In the case of 12-Step approaches, the assumption that recovery starts with spiritual conversion was not supported, but the belief that the post-treatment social network affects recovery was supported. Thus in general, the Technology Model of (psychotherapy) treatment effectiveness may be flawed as it applies to alcohol dependence. Instead of distinct, non-overlapping elements, therapy may work through common mechanisms, such as empathy, an effective therapist–client alliance, a desire to change, inner resources, a supportive social network, and the provision of a culturally appropriate solution to a socially defined problem (see Cooney et al., 2003).

A second reason for the lack of matching effects is research design features, such as multiple assessments, frequent follow-ups, and site differences. Although these factors could have obscured matching effects in Project MATCH, they do not explain the lack of matching in the VA Effectiveness Study, which was conducted under more naturalistic conditions. A third reason for the lack of matching effects is that matching works outside of therapy, but not within. There was some evidence for this interpretation in the Project MATCH findings regarding the effect of social support for drinking on participants who were or were not exposed to AA. This suggests that the post-treatment environment may be more important than individual differences, and may interact with the kinds of therapy received.

Another implication of these studies is that because the decision to enter treatment is associated with considerable reductions in drinking, the value of having different treatment modalities may be to convince clients that treatment is going to help them. As noted in the interpretation of Project MATCH findings (Cooney et al., 2003), a key ingredient of the success of any therapy may be its ability to attract clients and generate enthusiasm among therapists. Thus, access to treatment may be as important as the type of treatment

provided. These findings suggest that it is important to engage alcoholics in treatment as soon as possible, and that most patients improve regardless of the type of treatment they receive.

The search for mediators and moderators of treatment outcomes for alcohol dependence has dominated the treatment research agenda for more than two decades. The inability of the technology model of treatment efficacy to explain, much less improve, the effectiveness of addiction treatment suggests the need for a new paradigm to guide future work in this area. While some have argued for continued investigation of micro-level variables and mechanisms that explain the underlying dynamics of treatment (Finney, 1995; Donovan, 1999), others (Bühner, 2006) have suggested that a complementary approach be initiated to study treatment from a broader population perspective. To that end, it may be more fruitful to look for matching in larger populations at the level of communities or treatment systems, where a wider range of settings and therapeutic interventions can be evaluated. In this approach, research would be directed at how formal treatment and mutual help societies alter the long-term drinking career and accelerate the natural recovery process. Research methods have improved to the point where it may be possible to consider the population-level impact of treatment as well as its individual effects. Finally, the failure of treatment matching research using the technology model of psychotherapeutic change may direct us toward more fruitful investigation of ways to increase access to treatment through resource allocation as well as individual marketing.

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Declaration of interest statement

No conflict of interest declared.

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