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The Emerging Evidence Base for Motivational Interviewing: A Meta-Analytic and Qualitative Inquiry

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This article offers a meta-analytic, qualitative, and process review of the empirical literature for adaptations of motivational interviewing (AMIs), a promising approach to treating problem behaviors. AMIs are equivalent to other active treatments and yield moderate effects (from 0.35 to 0.56) compared to no-treatment/placebo for problems involving alcohol, drugs, and diet and exercise. Results do not support the efficacy of AMIs for smoking or HIV-risk behaviors. Conclusions regarding the mechanisms of action for AMIs are limited by methodological problems: confounding motivational interviewing with feedback, unclear definitions of the AMI interventions used, difficulties in therapist training, and limited use of treatment integrity rating scales. Extant research suggests that AMIs are equivalent in efficacy to and briefer than cognitive behavioral skills training (CBST) approaches. Since AMIs focus on readiness to change while CBST targets the change process, AMIs may be useful as preludes or additions to CBST.

Motivational interviewing is a promising therapeutic approach that integrates the relationship-building principles of humanistic therapy (Rogers, 1951) with more active strategies targeted to the client's stage of change (Prochaska, DiClemente, & Norcross, 1992). Since publication of the first edition of the motivational interviewing book (Miller & Rollnick, 1991), empirical research has accumulated on approaches related to motivational interviewing for a variety of clinical problems. The present article will review this research domain, focusing on controlled clinical trials of individually delivered interventions that incorporate the basic principles of motivational interviewing.

In the research literature, the most widely used approach related to motivational interviewing has been one in which the client (often alcohol or drug addicted) is given feedback based on individual results from standardized assessment measures, such as the Drinker's Check Up (Miller, Sovereign, & Kregge, 1988). This feedback, which concerns the client's level of severity on the target symptom compared to norms and associated risk factors, is delivered in a motivational interviewing "style" wherein possibilities for change are elicited from the client in a strategic and non-threatening manner. Discussion of the problem and the client's concerns may extend to one or more sessions that continue to embody the fundamental spirit and methods of motivational interviewing. As described in more detail previously (e.g., Burke, Arkowitz, & Menchola, 2003), we consider MI-based approaches that incorporate structured feedback, as well as briefer and idiosyncratic MI-style interventions, to be "adaptations" of motivational interviewing (AMIs). To date, virtually all of the empirical studies in this area (and therefore in this review) deal with the efficacy of AMIs rather than motivational interviewing in its relatively pure form.

Four previous reviews of motivational interviewing approaches have been published. Noonan and Moyers (1997) reviewed the 11 clinical trials of AMIs available at that time (9 with problem drinkers and 2 with drug abusers) and concluded that 9 of these studies supported the efficacy of AMIs for addictive behaviors. Dunn, DeRoo, and Rivara (2001) performed a systematic review of 29 randomized trials of brief interventions claiming to use the principles and techniques of motivational interviewing (or what we have called AMIs) to change behavior in four areas: (a) substance abuse, (b) smoking, (c) HIV-risk reduction, and (d) diet/exercise. Data on methodological features were tabled, as were calculations of effect sizes and their 95% confidence intervals. The strongest evidence for efficacy was found in the alcohol and drug abuse area, where AMIs appeared to work well for problem drinkers and improved the rate of entry into and retention in intensive substance abuse treatment. AMI effects did not appear to diminish over time, and the effect sizes for AMIs as precludes to other treatments (e.g., inpatient care) were found to be roughly equivalent to those for AMIs as stand-alone interventions.

Burke, Arkowitz, and Dunn (2002) qualitatively reviewed 26 studies that met their specified inclusion criteria. The authors concluded that the research supported the efficacy of AMIs for alcohol problems, drug addiction, hypertension, bulimia, and diabetes treatment compliance. Mixed support was found for AMIs in the areas of cigarette smoking, increasing physical activity, and enhancing dietary adherence in patients with hyperlipidemia. No support was found for AMIs in the reduction of HIV-risk behaviors (e.g., needle-sharing). In general, the AMIs reviewed were superior to no-treatment or placebo control groups and were equal to active comparison treatments. After examining evidence regarding the mechanism of AMIs, Burke and colleagues (2002) reported that the research literature failed to shed light on how the treatment actually worked. For instance, no direct support was found for the idea that AMIs exerted their clinical effects by enhancing the client's motivation to change. In addition, the authors found virtually no data to indicate for whom these treatments were optimal, since most clinical trials of AMIs that looked for aptitude by treatment interactions (moderators) were unable to find them.

More recently, Burke and colleagues (2003) conducted a meta-analysis on 30 controlled clinical trials investigating AMIs. The authors concluded that AMIs were equivalent to other active treatments and yielded moderate effects (from 0.25 to 0.57) compared to no-treatment/placebo for problems involving alcohol, drugs, and diet and exercise. Results did not support the efficacy of AMIs for smoking or HIV-risk behaviors. AMIs showed clinical impact, with 51% improvement rates, a 56% reduction in client drinking, and moderate effect sizes on substance-related problems (e.g., legal, social, and occupational; $d = 0.47$). Potential moderators were identified using both homogeneity analyses and exploratory

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multiple regression. The authors found that longer AMIs were more efficacious than shorter AMIs (i.e., a dose-response effect), and that the AMI treatments were more efficacious as precludes to other clinical services rather than as stand-alone interventions.

Because the most recent review (Burke et al., 2003) included 30 of the 38 studies reviewed herein, the aim of the current article is to briefly update and extend those meta-analytic findings, as well as to focus chiefly on three specific issues that Burke and colleagues (2003) did not address in detail: (a) process findings, with a review of what we know about how AMIs may work; (b) methodology, including a review of AMI treatment fidelity and integrity issues; and (c) how AMIs compare to cognitive behavioral skills Training (CBST), along with issues relating to the use of AMIs in combination with CBST. Due to space limitations, the reader is referred to Burke and colleagues (2003) for a detailed description of the methods used here, including specific selection and inclusion criteria, meta-analytic formulae (see also Lipsey & Wilson, 2001), and overall data analytic strategies.

WHAT IS THE COMPARATIVE EFFICACY OF AMIS?

Thirty-eight controlled clinical trials involving AMIs met inclusion criteria for this updated meta-analysis. There were 20 studies investigating AMIs for alcohol problems, 6 for drug addiction, 2 for smoking cessation, 2 for HIV-risk behaviors, 4 for diet and exercise problems, and 1 each for treatment compliance, eating disorders, asthma management, and injury-risk behaviors. The prototypical study was conducted in a substance abuse clinic or hospital and compared two sessions of an AMI to no-treatment or placebo (e.g., 5 minutes of education) for about 200 total participants; the study measured target drinking outcomes in standard ethanol content (SEC) per week over approximately 20 weeks of follow-up with 75% response rates.

Table 1 shows the combined effect sizes for AMI treatments, updated to reflect the 38 studies included herein. In this review, *effect size* (d ; Cohen, 1988) means that a person receiving the AMI treatment improved by an average of " d " standard deviations on that particular measure (from intake to post-treatment) relative to a person in the control group. Compared to no-treatment or placebo control groups, AMIs produced significant effects in the areas of alcohol use (drinking frequency, $d = 0.35$; degree of intoxication, $d = 0.53$), drug use ($d = 0.56$), and diet and exercise behaviors ($d = 0.53$). Furthermore, AMIs have impacted broader problem areas related to substance use in addition to the target symptoms (e.g., legal, social, and occupational realms; $d = 0.34$). However, AMIs have not produced any significant effects for cigarette smoking (nicotine use) or HIV-risk behaviors (e.g., needle-sharing, risky sexual practices) to date. AMIs did not show any additional significant effects when compared to other active treatments for alcohol and drug abuse ($d = 0.07$), although the AMI interventions were shorter than the alternatives by an average of 120 minutes (two sessions). Thus, AMIs work moderately well with most clinical applications tested so far, improving both target symptoms and substance-related problems, and produce outcomes equal to longer alternative treatments.

HOW DOES MOTIVATIONAL INTERVIEWING WORK?

Although a substantial amount of thought, practice, and research has already been devoted to motivational interviewing (Miller & Rollnick, 2002), we are still far from understanding the precise links between its processes and outcomes (Burke et al., 2002). The bottom portion of Table 1 shows a meta-analytic summary of *process measures* from among the 38 studies included in this review. There is some evidence to suggest that AMIs may work by

enhancing motivation or readiness for change, as measured by the Stage of Change algorithm (Prochaska et al., 1992), SOCRATES (Miller & Tonigan, 1996), or URICA (McConaughy, DiClemente, Prochaska, & Velicer, 1989). The overall effect of AMIs on motivation for change compared to no-treatment or placebo groups was small but significant ($d = 0.17$), although no specific mediation analyses were performed in any of the studies. Moreover, the AMI interventions did not differentially increase readiness for change in comparison to other active interventions (Schneider, Casey, & Kohn, 2000; Treasure et al., 1999). Thus, while AMIs increase motivation or readiness for change compared to no-treatment, there is no evidence that this is the specific mechanism of action of AMI treatments, especially since comparison treatments (e.g., CBT) have shown a similar motivational impact.

The positive effects of AMIs as a prelude or adjunct to further clinical services may be at least partially mediated through increased treatment participation. While several studies suggest that AMIs improve future treatment participation (often measured by days in treatment or session attendance; Brown & Miller, 1993; Martino, Carroll, O'Malley, & Rounsaville, 2000; Saunders, Wilkinson, & Phillips, 1995; Swanson, Pantalon, & Cohen, 1999), only one of them (Connors, Walitzer, & Derman 2002) employed specific tests for mediation. Using rigorous statistical analyses, Connors and colleagues (2002) concluded that session attendance mediated the impact of AMIs upon heavy drinking days (during the first 3 months after treatment) but not upon post-treatment abstinence. Moreover, two studies (Dench & Bennett, 2000; Stein, Charuvastra, Maksad, & Anderson, 2002) did not support the hypothesis that AMIs encouraged engagement in or seeking of treatment. As indicated in Table 1, AMIs have had a significant effect on treatment participation overall ($d = 0.37$), but whether this increased participation in fact mediated the outcomes of AMIs has yet to be conclusively determined.

The most immediate question facing research in motivational interviewing is to dismantle AMIs into their two main components—feedback and motivational interviewing—in order to determine relative contributions to outcome. As discussed in prior reviews, we do

TABLE 1. EFFECT SIZES OF ADAPTATIONS OF MOTIVATIONAL INTERVIEWING (AMIs) COMPARED TO NT/PLACEBO

Measure	Effect Size	(<i>d</i>) with 95% CI
Target symptoms		
Alcohol use-SEC (<i>N</i> = 15)	0.35	(0.25, 0.46)
Alcohol use-peak BAC (<i>N</i> = 5)	0.53	(0.20, 0.86)
Nicotine use (<i>N</i> = 2)	0.11	(-0.05, 0.27)
Drug use (<i>N</i> = 4)	0.56	(0.33, 0.79)
HIV-risk behaviors (<i>N</i> = 2)	0.01	(-0.29, 0.31)
Diet and exercise behaviors (<i>N</i> = 4)	0.53	(0.32, 0.74)
Substance-related problems (<i>N</i> = 9)	0.34	(0.23, 0.45)
AMIs compared to active treatments (<i>N</i> = 8)	0.07	(-0.05, 0.18)
Process measures		
Treatment participation (<i>N</i> = 7)	0.37	(0.20, 0.55)
Motivation for change (<i>N</i> = 7)	0.17	(0.03, 0.32)
Effect of AMI versus feedback only (<i>N</i> = 4)	0.57	(0.35, 0.79)
Effect of therapist confrontation (<i>N</i> = 2)	-1.08	(-1.74, -0.43)

BAC = (peak) blood alcohol concentration (a measure of degree of intoxication); CI = confidence interval; NT = no-treatment control group; SEC = standard ethanol content (a measure of drinking frequency).

Effect sizes in bold are significant at $p < .05$.

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not yet know whether feedback, motivational interviewing, or the combination is essential to produce a therapeutic effect. Table 1 shows that AMIs have yielded moderate effects ($d = 0.57$) when compared to feedback interventions alone, indicating that there was benefit to adding an average of 92.5 minutes (one or two sessions) of an AMI to personal feedback delivery. While one study suggested that the feedback component may be more critical than the motivational interviewing component for college student drinkers (Juárez, 2001), two others (Maisto et al., 2001; Sellman, Sullivan, Dore, Adamson, & MacEwan, 2001) provided evidence that motivational interviewing may be a valuable addition to feedback alone. Whether motivational interviewing alone can equal the effects of an AMI (motivational interviewing with problem feedback) remains to be investigated.

An important improvement of AMIs over past feedback delivery approaches is the emphasis on collaborative technique eliciting feedback rather than confronting or labeling feedback. Two studies to date (Miller, Benefield, & Tonigan, 1993; Project MATCH Research Group, 1997, 1998) provide empirical support for the potentially deleterious effects of therapist confrontational behaviors on client outcome. As displayed in Table 1, the combined effect size for the impact of therapist confrontation on drinking at follow-up was negative and large ($d = -1.08$), indicating that non-MI therapist behaviors (such as challenging, disagreeing, head-on disputes, incredulity, and sarcasm) led to poorer client outcomes, compared to empathic/supportive (MI-style) counseling responses.

In summary, research suggests that AMIs may exert their therapeutic effects by enhancing future treatment participation or by amplifying the impact of personalized problem feedback. There is sparse evidence to suggest that AMIs may work by increasing motivation for change, although another article in this special issue will discuss the importance of change talk as a mechanism of action of AMI interventions. In addition, there is evidence that confrontational (non-MI) therapist behaviors may result in reduced treatment efficacy, highlighting the value of the motivational interviewing style. Despite these promising beginnings, we still know rather little about *how* motivational interviewing works. More process studies are necessary in order to elucidate the precise mediators and moderators of AMI treatments.

HOW CAN THE INTERNAL VALIDITY OF MOTIVATIONAL INTERVIEWING RESEARCH BE IMPROVED?

As our prior qualitative review indicates (Burke et al., 2002), there has been an imbalance in methodological quality between internal and external validity in motivational interviewing research to date. It appears that researchers have been more interested in evaluating the extent to which AMIs can be useful with different populations than in constructing rigorous designs to rule out alternative explanations. The most severe threat to internal validity in these clinical trials has been the specification of the *independent variable*. The majority of studies were quite weak in this respect, thereby jeopardizing any strong conclusions. *Treatment fidelity*, or how fairly and faithfully a treatment is represented (Kazdin, 1992), was difficult to ascertain due to the paucity of appropriate treatment manuals for the AMIs. The majority of studies simply referred to the first edition of the motivational interviewing book (Miller & Rollnick, 1991) as the AMI intervention under study, although an increasing number of studies are employing specific treatment manuals (such as the Motivational Enhancement Therapy manual—see Miller, Zweben, DiClemente, & Rychtarik, 1992). In most studies, neither the credentials of the treatment providers nor the specific training procedures were adequately described and were often addressed with a vague statement such as “four upper-level undergraduate psychology students . . . therapist training in MI included the assignment of relevant readings followed by 6 hours of didactic instruction” (Swanson et

al., 1999, p. 632). Further, *treatment integrity*, or whether the therapeutic procedures were carried out as intended (Kazdin, 1992), was rarely assessed in these studies. Integrity checks to measure the implementation of treatment—including videotaping, ongoing supervision, and coding of actual therapist behaviors—were entirely absent from many studies (e.g., Brown & Miller, 1993; Colby et al., 1998; Gentilello et al., 1999; Handmaker, Miller, & Manicke, 1999; Harland et al., 1999; Martino et al., 2000; Smith, Heckemeyer, Kratt, & Mason, 1997; Woollard et al., 1995). Since we repeatedly advise motivational interviewing researchers to attend to issues of treatment fidelity and integrity more closely (Burke et al., 2002, 2003), we will review the emerging literature that pertains specifically to motivational interviewing training and AMI rating/coding schemes.

The issue of psychotherapy training has been a largely overlooked but critical piece in understanding the use and dissemination of treatments (see Atkins & Christensen, 2001, for a review). Across therapies and disorders, randomized clinical trials (RCTs) typically include little information about the training or qualifications of therapists who deliver the interventions under investigation. While research therapists are often highly trained doctoral-level clinicians who go through an intensive period of training and supervision both prior to and during the research study, other common training methods include courses in graduate school and two-day professional workshops with no follow-up supervision. Future research would do well to investigate whether these different training experiences are in fact equivalent in terms of client and study outcomes.

Miller and Mount (2001) evaluated the effectiveness of a two-day workshop in motivational interviewing in the most thorough investigation of AMI training to date. The authors provided 15 hours of training to probation officers and community correction counselors focusing on techniques described in Miller and Rollnick (1991), using both didactic teaching, demonstrations, and small-group practice with coaching. Twenty-four participants completed questionnaires about their background and knowledge of motivational interviewing (MI), and provided an audiotape of a counseling session prior to the training, immediately after the training, and 4 months after the training.

In this study, participants' self-reported knowledge, proficiency, and use of MI techniques all increased following the workshop and were retained at the 4 month follow-up. In addition, participants' responses to open-ended scenarios on the Helpful Responses Questionnaire also demonstrated increased use of reflections and MI-consistent responses, as well as higher reflection-to-question ratios and decreased MI-inconsistent responses from preworkshop to postworkshop.

However, the observational data based on video and audiotapes provided equivocal evidence of the effects of training. On the one hand, global ratings of therapist behavior (e.g., acceptance, egalitarianism, empathy) derived from the Motivational Interviewing Skill Code (MISC; Miller, 2002) reflected positive improvement following the workshop and 4 months later. Yet, specific behavioral codes revealed that actual therapist behavior was not changing dramatically and was not being sustained over time. For example, while reflections per minute and ratios of reflections to questions both increased following the workshop, they had returned to nearly preworkshop levels by 4 months postworkshop. In addition, behavioral improvements fell far short of the levels obtained by experts in motivational interviewing, particularly in the areas of percentage of open questions and percentage of complex reflections. Finally, clients' verbal reports in session were coded for change-indicative and change-resistant talk. There were no differences in client behavior across the study, which led the authors to conclude that, ". . . whatever was changing in counselor practice behavior, it was not enough to make a difference for their clients" (Miller & Mount, 2001, p. 466). Of even greater concern to the authors was that counselors left the workshop viewing themselves as fairly proficient in the approach, and therefore perceived little need for further training (Miller & Mount, 2001, p. 468).

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Rubel, Sobell, and Miller (2000) also examined the efficacy of a two-day workshop in motivational interviewing for 44 addictions counselors. Participants' knowledge of motivational interviewing and MI-consistent responses to open-ended vignettes improved following the workshop. However, only 38% of the 115 workshop participants provided data prior to and following the workshop. In a somewhat different setting, Saitz, Sullivan, and Samet (2000) studied the effect of a half-day workshop on motivational counseling on the behavior of health care providers. At a follow-up interview, high percentages of participants reported assessing alcohol and drug use in their patients as a result of the workshop. Preintervention data were not available, however, complicating the interpretation of these self-reported data.

Thus, there is neither a great quantity of data on motivational interviewing training nor any solid evidence that the most common method of disseminating therapy skills (i.e., professional workshops) leads to lasting behavioral change in therapists and their clients. In the face of these sobering reflections, there is cause for optimism on two counts. One reason for optimism is the ongoing study of an AMI (motivational enhancement therapy) via the Clinical Trials Network (CTN), which is one of the largest and best designed studies of psychotherapy training to date (Carroll et al., 2002). To address the concern that clinical trials (and MI training studies) often use a skewed sample of highly motivated therapists (i.e., "eager volunteers"), therapists of different educational and therapeutic backgrounds were selected from community treatment centers and randomly assigned to learn the AMI or to the treatment-as-usual condition. The clinicians being trained in the AMI received a two-day workshop along with ongoing supervision, beginning with several "training" cases. Interestingly, during the training, many clinicians initially expressed the view that their current therapy methods were quite similar to motivational interviewing. However, the subsequent training cases demonstrated that most clinicians were *not* already doing motivational interviewing and needed significant supervision to become proficient. This anecdotal evidence provides another example of the disconnection between self-reported knowledge and actual therapist behavior, and the study will likely provide useful data about how to bridge that gap in order to optimally train clinicians in the skilled practice of motivational interviewing.

A second reason for optimism is the Motivational Interviewing Network of Trainers (MINT). This is an international group of therapists who have participated in a "training of trainers" workshop and are committed to the teaching and dissemination of AMI methods. The assets of the MINT include an active listserv, annual meetings, and a website with helpful information regarding AMI training (www.motivationalinterviewing.org/training/trainers.html). The MINT provides an ideal vehicle for ongoing studies of training in AMI and encourages good practice, communication, and collaboration among the international AMI community. Thus, while the existing data on training in AMI may be insubstantial, we are encouraged by a therapist community devoted to AMI training, supervision, and training research.

The data on measures of treatment adherence to AMI protocols are also at a nascent stage of development. At the present time, there are no published data on such measures. However, several rating scales exist and studies are currently underway to explore their reliability and validity. We will briefly mention two of the most widely used scales. The "gold standard" for measuring MI-consistent behavior in therapy is Miller's (2002) Motivational Interviewing Skills Code (MISC), which requires three separate passes through a tape. On the first pass, global ratings are made of both therapist and client, covering such areas as acceptance, egalitarianism, empathy, genuineness, warmth, and spirit for the therapist, as well as affect, cooperation, disclosure, and engagement for the client. There are also two global interaction scales: collaboration and benefit. On the second pass, each utterance by both therapist and client is classified into mutually exclusive and exhaustive categories including both MI-consistent (e.g., therapist reflection or support, client change talk) and MI-inconsistent (e.g., therapist

confrontation, client arguing) behaviors. Summaries of the two classes of behaviors as well as the percentage of MI-consistent behaviors are calculated. On the third and final pass, the amount of talk time is calculated for both therapist and client.

Clearly, the MISC provides a wealth of information on therapy process and its mutually exclusive and exhaustive format provides the opportunity for a complex understanding of therapy process both qualitatively and quantitatively. However, because the coding is incredibly time consuming (5+ hours for a single session), it is unlikely to be used outside of a research project. These concerns led to the development of the 1-PASS coding system (Resnicow, 2002). The 1-PASS, which can be coded in a single pass of the tape, is based on the MISC but codes only therapist behavior. This more parsimonious version of the MISC allows the 1-PASS to be used for supervision and for less detailed ratings of adherence. However, the single pass provides only global ratings and does not allow any specific behavioral counts or precise calculations of talk time.

Research studies sometimes employ "quicker" adherence checks such as therapist self-ratings (e.g., Stein et al., 2002), which are of limited value due to the insignificant correlation between self-report and actual MI-consistent behaviors (as noted above). Our review indicates that accurate AMI integrity checks can only be accomplished using rating scales of actual therapist behaviors (e.g., MISC, 1-PASS). Given the equivocal data on the success of motivational interviewing training workshops, it is difficult to estimate whether the AMI treatment under investigation is indeed being properly implemented without the safeguards of these rating scales firmly in place.

HOW DOES MOTIVATIONAL INTERVIEWING COMPARE TO COGNITIVE-BEHAVIORAL APPROACHES?

Cognitive behavioral skills training (CBST) has an over 30-year history of empirical testing in the treatment of clients with alcohol problems and other behavioral health issues. Motivational interviewing (MI) has a briefer (20-year) research history, but one that is similar in its primary aims and methodology. In the realm of substance abuse, CBST and AMIs are the treatment approaches with the most empirical evidence for their efficacy, as well as two of the most cost-effective modalities (Miller & Hester, 1986). Interestingly, they have contrasting styles and target different aspects of the therapy process. The therapeutic style of CBST might be characterized as collaborative but assertively instructive, with its central methods being the assessment of high-risk situations and the teaching of specific coping skills. In contrast, the therapeutic style of AMIs has been characterized as quiet and eliciting, and the central method involves using reflective listening to build trust and assess motivation while eliciting client statements of desire and commitment to change. As such, CBST targets the "how" of change whereas AMIs target the "why" of change. CBST assumes that the client's core problem centers around inadequate problem-solving and maladaptive responses to his/her situation, while AMIs see the core problem as unresolved ambivalence about putting to use the skills that, to some extent, the client already has.

STUDIES ALLOWING DIRECT COMPARISON OF THE EFFECTS OF AMIs AND CBST

Because the therapeutic styles and goals of CBST and AMIs are clearly different, it is important to determine which one works better and for whom. To begin to answer these questions, we identified four substance abuse studies that allow for direct comparisons between the effects of AMIs and CBST.

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Heather, Rollnick, Bell, and Richmond (1996) assessed the effects of these two forms of brief counseling on 123 heavy drinkers hospitalized for related medical problems. After undergoing an assessment interview, patients received 30 to 40 minutes of either an AMI, CBST, or treatment as usual (control). The AMI included exploration of the pros and cons of heavy drinking, information on alcohol's effects, eliciting patients' concerns, a summary of the pros and cons, and a discussion of future drinking behavior. CBST included normative feedback on consumption, the same information on alcohol's effects, and tips for self-monitoring and handling heavy-drinking situations. Six-month follow-up interviews completed with 71% of patients revealed no differences between counseling groups in weekly alcohol consumption, both of which reduced their consumption by significantly more than the control patients. The only significant difference between the AMI and CBST treatments was that patients who were least ready to change at baseline benefited most from the AMI.

Project MATCH (1997, 1998), whose chief purpose was to identify optimal matches between client traits and three different treatments, nevertheless allowed for direct comparisons to be made between an AMI (motivational enhancement therapy; MET) and CBST. Both treatments were manualized and the methodological quality was the highest of all studies reviewed in this paper in terms of follow-up rates, counselor training, and treatment integrity.

CBST clients received 12 consecutive weekly 1-hour sessions and MET clients received four one-hour sessions spaced over the same 12 weeks. Both groups showed marked improvement in drinking for up to 3 years after treatment ended. By 3 months, there was a fourfold increase in abstinent days and a fivefold decrease in drinks per drinking days. About 20% of all clients reported continuous abstinence at 15-month follow-up. No substantial treatment differences were found in percent of days drinking or drinks per drinking day. However, MET was more cost-effective than CBST because it required fewer sessions.

With few exceptions, most of the matching variables in Project MATCH (1997, 1998) did not predict outcome of particular treatments as hypothesized (e.g., stage of change, readiness to change, level of alcohol dependence, or antisocial personality). During the 12-week course of treatment, a matching effect was found for only one client trait: self-efficacy regarding abstinence. Clients low in self-efficacy fared better in CBST than MET; however, once treatment ended, this advantage disappeared. The most stable and robust interaction effect, significant at both 1- and 3-year follow-ups, was that angry clients fared better with MET than CBST. Surprisingly, clients lower in initial motivation did better with CBST at 4 months; however, this trend reversed itself into the expected direction by 15 months post-treatment.

In a treatment entry facilitation study (Booth, Kwiatkowski, Iguchi, Pinto, & John, 1998), 196 injecting drug users were randomized to receive five 30-minute sessions of an AMI that presented treatment entry as an action option, or the same "dose" of CBST, a risk reduction intervention that targeted injecting behaviors placing people at risk for HIV but did not explicitly bring up treatment entry. There were no differences in rates of treatment entry between the AMI group (40%) and the CBST group (43%). Offering free treatment had a greater effect on treatment entry than did either of the two interventions, and readiness to change at baseline predicted treatment entry better than did intervention type. Most recently, Stephens, Roffman, and Curtin (2000) compared a two-session individual AMI stand-alone treatment for marijuana dependence with a 14-session cognitive behavioral group treatment (CBST) and a delayed treatment control group. There were no significant differences in outcomes between treatment groups, although both groups fared better than the control group. Relatively large treatment effects ($d = 0.70-1.10$) were found in both treatment groups for marijuana use and dependence symptoms.

Across the four studies reviewed above, meta-analysis revealed no significant differences in efficacy between AMIs and CBST ($d = 0.03$; 95% confidence interval: $-0.11, 0.16$). Thus, in these four studies, AMIs and CBST exerted equal influences over substance abuse and treatment entry when they were compared within identical samples and settings. However,

the AMIs were shorter in duration, on average, than the CBST treatments to which they were compared (e.g., Project MATCH, 1997, 1998). This suggests that AMIs may be more cost effective than CBST, although further studies investigating the efficacy of shorter CBST interventions are certainly warranted before drawing any firm conclusions in this regard.

IS IT EFFICACIOUS TO COMBINE AMIs AND CBST?

Do AMIs and CBST share a common mechanism of action that is stimulated by different means, or do they in fact stimulate different mechanisms of action as theory would suggest? If they exert different mechanisms of action, then one might expect them to have additive effects when combined in the same sample. As Heather and colleagues (1996) suggested and theoretical mechanisms imply, it is feasible that AMIs may work best to boost motivation for change and when someone is in the early stages of change, whereas CBST may provide people with the necessary skills to prepare for change and take useful action. In the research literature to date, this theoretically-driven combination has taken the form of comparing an AMI used as a prelude or an adjunct to CBST to either an AMI-only or a CBST-only treatment condition.

Two clinical studies have evaluated the effects of adding an AMI to a CBST-based outpatient program. Stotts, Schmitz, Rhoades, and Grabowski (2001) tested the effects of adding a two-session AMI intervention to a 12-session, CBST relapse prevention outpatient treatment program. Rates of cocaine-positive urine screens were lower for AMI clients over the course of the CBST program, but the AMI had no effect on drop out rates during the CBST program. Notably, AMI clients made greater use of cognitive behavioral coping skills during the CBST program than clients not receiving the AMI prelude. Follow-up did not extend beyond the end of the treatment program.

Connors and colleagues (2002) compared three different conditions before 126 treatment-seeking clients began a 12-week CBST outpatient treatment program consisting of weekly group and individual sessions. A control condition with no treatment preparation was compared to a 90-minute AMI condition and a similar duration of role induction (RI), in which clients were educated about what treatment does and how to behave during treatment. Several advantages were found for the AMI over the control and RI conditions: Clients assigned to the AMI attended significantly more treatment sessions and drank heavily on significantly fewer days during and 12 months after treatment. Moreover, AMI clients had significantly more abstinent days during treatment and for up to 3 months after, although this advantage disappeared by 12 months' follow-up.

There have been two clinical trials to date that have evaluated the effects of adding CBST to an AMI. Baker, Heather, Wodak, Dixon, and Holt (1993) compared two treatment conditions for injecting drug users enrolled in a methadone maintenance program to treatment-as-usual for their effects in reducing HIV-risk behaviors. The AMI group received a single 60 to 90 minute session aimed at reducing needle sharing, using dirty needles, and risky sexual practices. The AMI/CBST group received this same AMI session plus five more sessions of cognitive behavioral relapse prevention therapy aimed at imparting coping skills to prevent injecting drugs and practicing unsafe sex. Follow-up rates were good (84%) for the 6-month assessment point, although no information was provided on quality control of the AMI intervention. With the exception of a reduction in time since last injecting, the entire sample reported no other improvements in needle- or sexual-risk taking. At 6 months, no significant differences in risky behaviors were detected among the three groups, possibly due to a floor effect and/or low statistical power. In this study, therefore, the more intensive AMI/CBST program did not outperform the AMI only group.

Budney, Higgins, Radonovich, and Novy (2000) compared three treatment conditions for marijuana dependence, each spanning a 14-week period. The AMI group received four AMI sessions spaced over 14 weeks. The AMI/CBST group received 14 weekly sessions, 4 of which

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were AMI and 10 of which were CBST. The third group received the same treatment as the AMI/CBST group but was also rewarded for negative marijuana urine screens with vouchers for retail merchandise. At the end of the 14-week period, there were no significant differences in marijuana abstinence between the first two groups, suggesting that CBST had no additive effect beyond that of only AMI. However, the voucher group did better than either of these two groups both in duration of abstinence during treatment and percentage of clients abstinent at the end of treatment. Treatment retention was the same across all three groups.

Does this evidence suggest that, when combined, AMIs and CBST have additive effects and therefore might work through different mechanisms? The four studies above actually raise more questions than they answer. Stotts and colleagues (2001) failed to follow-up beyond the end of the 12-week program, but there seemed to be a mild additive effect during the course of treatment. A stronger effect for adding an AMI to CBST was found in the Connors and colleagues (2002) study at 1-year follow-up. In Baker and colleagues (1993), however, neither the AMI alone nor in combination with CBST was highly effective in reducing HIV-risk behaviors. Budney and colleagues' (2000) findings complicate the picture because, at the end of a 14-week program, 4 sessions of an AMI had done as well as 4 AMI sessions plus 10 CBST sessions, suggesting that CBST had no effect in this sample, although reward vouchers made a bigger incremental difference in marijuana abstinence. Effect size calculations revealed that, across these four studies, when an AMI was used combined with CBST, there was a modest but significant additive effect ($d = 0.31$, 95% confidence interval: 0.06, 0.56). We conclude that combining AMIs with CBST for substance abuse problems is promising and merits further testing.

Regarding both treatments, we are left for now in the exciting but disquieting state of not yet knowing how these efficacious treatments work. Morgenstern and Longabaugh (2000) concluded that CBST works as well as but no better than other viable alcohol treatments, that it has very promising results when combined with non-CBST treatments, and that its central hypothesized mechanisms (e.g., enhancing coping skills) do not seem to explain how it works. Identical conclusions were reached by reviewers of the AMI literature (Burke et al., 2002; Dunn et al., 2001). Without more careful process analyses during randomized trials as well as specific dismantling studies, researchers are likely to remain in the dark.

CONCLUSION

Research into the efficacy of motivational interviewing and related approaches is quite promising. AMIs are consistently efficacious for substance abuse problems and generally equivalent in efficacy to longer treatments for substance abuse, including CBST. AMIs also demonstrate potential in other problem areas, such as medical treatment compliance, health behavior change (i.e., diet and exercise), and bulimia. However, evidence for the efficacy of AMIs in these areas is not yet sufficient. AMIs may work to increase treatment participation or enhance the efficacy of problem feedback. In addition, there is evidence that confrontational therapist behaviors may result in reduced treatment efficacy, highlighting the value of the motivational interviewing style. However, methodological problems limit conclusions regarding the precise mechanism of action of AMIs. Our recommendations for improving the methodology of AMI research include: dismantling the motivational interviewing component from problem feedback; carefully describing the treatment protocol; providing training and ongoing supervision of project therapists; and using observer rating scales to verify treatment integrity. Theoretical formulations of AMIs and CBST suggest that these two treatment approaches may be optimally effective when used together—with AMIs targeting the why of change and CBST targeting the how. Yet further research is needed to understand if these theoretical mechanisms are reflected in actual clinical outcomes.

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