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The role of self-efficacy in the treatment of substance use disorders

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ABSTRACT

Self-efficacy is the belief that one has the ability to implement the behaviors needed to produce a desired effect. There has been growing interest in the role of self-efficacy as a predictor and/or mediator of treatment outcome in a number of domains. The present paper reviews the recent literature on self-efficacy in the substance abuse field. In numerous studies of substance abuse treatment, self-efficacy has emerged as an important predictor of outcome, or as a mediator of treatment effects. Despite these repeated positive findings, the self-efficacy concept has had little impact on the design of treatments. Since the concept was first introduced, there have been numerous suggestions regarding the means by which self-efficacy may be enhanced in clinical settings, but very little by way of empirical tests of those suggestions. This review concludes with a number of recommendations for further research to improve understanding of this potentially valuable concept and its interactions with other variables, and to develop effective strategies for enhancing self-efficacy.

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1. Introduction

In recent decades, there have been a growing number of studies demonstrating the importance of self-efficacy as a predictor and/or mediator of treatment effects in various domains, such as education, sports, chronic medical conditions, psychopathology, and addictive disorders. Nevertheless, despite considerable empirical evidence, the

concept of self-efficacy has yet to become a significant factor in the development of psychosocial treatments. The present paper provides a review of the self-efficacy concept as it has been studied with respect to substance use disorders, and considers why it has thus far had only limited impact.

2. The concept

Bandura (1977) conceptualized efficacy expectancy as the belief that one can successfully execute behaviors needed to produce a

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desired outcome. He distinguished this from outcome expectancy, which is the belief that performing a given behavior will lead to certain outcomes. The latter belief, that a particular behavior will lead to a desired outcome, does not necessarily entail believing that one can successfully perform the activities required to achieve that outcome.

Bandura and Locke (2003) provided a review of 9 meta-analyses that examined self-efficacy beliefs across diverse spheres of behavioral functioning (e.g., work-related performance, academic performance, athletic performance, psychosocial functioning, health functioning). Self-efficacy was found to be a strong predictor of the occurrence of coping behavior, level of performance, and perseverance in the face of difficult problems. It was also found that the relation between earlier performance and subsequent performance was heavily mediated through efficacy beliefs. Bandura and Locke concluded that belief in one's performance efficacy, i.e., the belief that desired results can be achieved by one's own efforts, is necessary to mobilize and sustain coping behaviors. Bandura (1986) noted that self-efficacy can affect actions independently of past behavior, and cited numerous studies in which perceived self-efficacy predicted future behavior better than past performance.

3. Findings with respect to substance use disorders

With regard to substance use disorders, numerous studies have shown a strong relationship between self-efficacy beliefs (often referred to as abstinence self-efficacy) and drinking/drug-use outcomes, following a variety of treatments. As noted by Bandura (1986), people who have both the necessary skills and strong coping efficacy are likely to mobilize the effort needed to successfully resist situations of high-risk for drinking or drug use. In the event of a slip, highly self-efficacious persons are inclined to regard the slip as a temporary setback and to reinstate control, whereas those who have low self-efficacy are more likely to proceed to a full-blown relapse. In what follows, a number of relatively recent studies assessing the role of self-efficacy among abusers of various substances are cited, but the list is not meant to be exhaustive.

The review is organized according to Fig. 1. We first consider studies in which self-efficacy has been shown to be related to outcome, which are by far the most frequent type of studies. We then consider studies in which various interventions have been shown to enhance self-efficacy, followed by studies in which self-efficacy has been shown to be a mediator between treatment and outcome.

3.1. Self-efficacy as a predictor of substance use

Many studies have shown that self-efficacy is a predictor of treatment outcome. In some cases, self-efficacy has been found to predict the quantity of alcohol or drugs consumed. Sitharthan and Kavanagh (1990), Kavanagh, Sitharthan, and Sayer (1996), and Maisto, Connors, and Zywiak (2000) found that self-efficacy significantly predicted alcohol consumption for periods of up to twelve months. However, Dolan, Martin, and Rohsenow (2008) found that higher self-efficacy predicted less drug use only after 3 months but not after 6 months. In a study of the effectiveness of step-down continuing care following residential or intensive outpatient care, McKay et al. (2004) found little evidence to support step-down continuing care itself, but they did find that self-

efficacy levels were strongly associated with the amount of subsequent alcohol and crack cocaine use and also the amount of participation in continuing care.

Other studies found that self-efficacy was related to the occurrence or frequency of drinking or drug use. Stephens, Wertz, and Roffman (1995) found that self-efficacy was a relatively strong predictor of post-treatment abstinence and the frequency of marijuana use (see also Hayaki et al., 2011). Greenfield et al. (2000) reported a significant relationship between self-efficacy expectancies during inpatient alcohol dependence treatment and several frequency-related outcome variables: the likelihood of drinking; time to first drink; and time to relapse during the year following treatment. Similarly for outpatient treatment, Allsop, Saunders, and Phillips (2000) found that alcoholics' post-treatment self-efficacy was a predictor of time to relapse, and Vielva and Iraurgi (2001) found that those who had high confidence in their ability to resist drinking were more likely to maintain abstinence for 6 months (see also Borrelli & Mermelstein, 1994; Romo et al., 2009). Brown, Seragianian, Tremblay, and Annis (2002) observed that individuals whose increased confidence in high-risk situations persisted during follow-up had both fewer days of use and reduced alcohol/drug severity. Among untreated binge drinkers, Blume, Schmalig, and Marlatt (2003) found that higher self-efficacy was related to reductions in the frequency of binge drinking episodes over a three month period, but not to changes in total alcohol consumption. Walton, Blow, Bingham, and Chermack (2003) reported a negative relationship between self-efficacy and relapse to alcohol use, but not for relapse to drug use. In a study comparing four treatment approaches for marijuana dependence (Kadden, Litt, Kabela-Cormier, & Petry, 2007; Litt, Kadden, Kabela-Cormier, & Petry, 2008), the duration of continuous abstinence over the course of a year was best predicted by self-efficacy at posttreatment, which was a better predictor than abstinence during treatment.

Similarly, Ilgen, McKellar, and Tiet (2005) found that among alcohol and drug dependent patients in residential treatment, a high level of abstinence self-efficacy at treatment discharge was the strongest predictor of 1-year abstinence, suggesting the clinical importance of developing a high degree of abstinence self-efficacy. Moos and Moos (2006) found that greater self-efficacy (as well as less reliance on avoidance coping) predicted remission from drinking after as long as 3 years, whereas those with less self-efficacy were more likely to relapse. Ramo, Anderson, Tate, and Brown (2005) reported a protective role of coping self-efficacy against relapse among adolescents with both substance use and psychiatric disorders.

Gwaltney, Shiffman, Balabanis, and Paty (2005) assessed abstinence self-efficacy on a daily basis among smokers attempting to quit. They found that self-efficacy increased as abstinence was maintained. They also found that decreases in daily self-efficacy predicted relapse back to smoking. This study demonstrated that self-efficacy can vary within individuals, and that daily fluctuations predict daily behaviors.

Some studies have reported a relationship between self-efficacy and subsequent drinking in terms of both quantity consumed and occurrence/frequency of drinking. Oei, Hasking, and Phillips (2007), Lozano and Stephens (2010), and the Project MATCH Research Group (1997) all reported that self-efficacy predicted both the frequency and volume of drinking. However, when Solomon and Annis (1990) assessed both quantity and frequency outcomes, they found that self-efficacy was strongly associated with the level of subsequent alcohol consumption, but failed to predict the occurrence or frequency of drinking. Studies of dual-diagnosis patients who have both substance use and mental health disorders have also produced mixed results in this regard. In one such study, dual-diagnosis patients' self-efficacy predicted the amount of substance use at follow-up (Warren, Stein, & Grella, 2007), but in another, self-efficacy was found to predict the duration of abstinence (Tate et al., 2008).

In a review paper that broadly explored possible predictors of treatment outcome for alcohol use disorder (utilizing consumption and/or frequency/occurrence measures), Adamson, Sellman, and Frampton

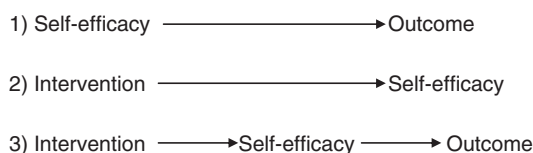


Fig. 1. Causal pathways considered in this review.

(2009) found a number of successful predictors. Self-efficacy was the most consistent predictor variable among them, with all nine studies that directly investigated this variable showing a significant association, although in one of the studies the effect was counterintuitive, with higher self-efficacy predicting worse outcome. Other successful outcome predictors identified in the Adamson et al. review included dependence severity, psychopathology, motivation, and treatment goal.

Some studies indicate that the role of self-efficacy may not always be straightforward, and that it may interact with other effects. For example, Ilgen, Tiet, Finney, and Moos (2006) found that the quality of the therapeutic relationship interacted with baseline self-efficacy to predict outcome: if clients with low self-efficacy established a strong alliance with their therapist, their alcohol use outcomes were comparable to clients who had high self-efficacy. Bates, Pawlak, Tonigan, and Buckman (2006) reported a strong relationship between self-efficacy and both drinking quantity and frequency, but the relationship was modulated by cognitive impairment, which reduced the impact of self-efficacy.

Not all studies have found self-efficacy to be a predictor of outcome. Wong et al. (2004) reported that although coping self-efficacy increased during cocaine treatment, prior abstinence, and not self-efficacy, was the stronger predictor of future abstinence. Also, Demmel, Nicolai, and Jenko (2006) reported that drink refusal self-efficacy was unrelated to posttreatment drinking.

Despite the few studies that failed to find effects for self-efficacy, the overwhelming majority of studies that measured self-efficacy have reported that it is associated with outcome. The question remains, however, as to whether self-efficacy is truly a mechanism of behavior change in substance abuse, or merely an epiphenomenon of behavior change that has already occurred (or is in the process of occurring). In order to answer that question two conditions have to be met. First, it has to be shown that specific treatments increase self-efficacy, while control treatments do not. Second, it must be shown that treatment-driven increases in self-efficacy result in improvements in outcome. That is, self-efficacy should mediate treatment effects.

3.2. Effects of treatment on self-efficacy

Relatively few treatments have actually been designed specifically to change self-efficacy. Rather, in the substance abuse field, the question of whether treatments enhance self-efficacy has most often been examined via secondary analyses in treatment outcome studies. Thus some studies of substance abuse treatments assess, in addition to the primary outcome variables, whether the treatments also enhance self-efficacy, and whether such enhancement may be related to improved outcomes. In this section, we review treatment outcome studies of that sort. In Section 4 we will consider the issue of designing interventions for the specific purpose of enhancing self-efficacy.

In a literature review, Hyde, Hankins, Deale, and Marteau (2008) identified ten studies that measured self-efficacy at both pre- and post-intervention, in the context of treatment for tobacco, alcohol, or other addictive substance use. Although seven of the ten studies reported positive effects on self-efficacy, these effects were produced by a range of different interventions across studies, preventing the authors from fulfilling their original mission of identifying how best to enhance self-efficacy. Furthermore, despite enhancing self-efficacy, only two of the studies reported a significant effect on addictive behaviors, and those studies failed to analyze whether self-efficacy mediated the change in addictive behaviors.

Stephens et al. (1995) found a greater increase in self-efficacy at the conclusion of relapse prevention treatment than after a social support intervention (see also Allsop et al., 2000). Brown et al. (2002) also found that relapse prevention aftercare treatment resulted in increased confidence in high-risk situations during the course of a 10-week aftercare program, but the increase in confidence did not persist thereafter. DiClemente et al. (2001) reported that in the aftercare arm of Project

MATCH, alcoholic clients who received Cognitive-Behavioral Therapy (CBT) evidenced greater improvements in self-efficacy than clients who received Motivational Enhancement Therapy (MET), regardless of their baseline self-efficacy levels, suggesting the potential value of CBT's coping skills training for enhancing self-efficacy. Finney, Noyes, Coutts, and Moos (1998) reported that not only CBT, but also 12-step interventions, resulted in improved self-efficacy.

Other studies determined that specific treatment-related activities promoted changes in self-efficacy. For instance, Borrelli and Mermelstein (1994) found that achievement of a greater number of behavioral goals (among smokers) was accompanied by increased self-efficacy, which in turn predicted abstinence at follow-up. In a similar vein, Lozano and Stephens (2010) found that active participation in goal setting was associated with greater self-efficacy for goal achievement. Ilgen, McKellar, and Moos (2007) determined that greater participation in skills-building activities (e.g., coping skills and stress-management) during treatment was associated with greater self-efficacy, and that self-efficacy was closely related to treatment outcome. Walton et al. (2003) reported a significant relationship between the frequency/effectiveness of coping and self-efficacy, and Majer, Jason, Ferrari, Olson, and North (2003) reported that the development of self-efficacy was accomplished through the use of active (as opposed to passive) coping strategies. In the study of Kadden et al. (2007) and Litt et al. (2008), coping skills usage during treatment was significantly correlated with posttreatment self-efficacy ($r = .255$; $p < .01$), providing support for the proposition that increasing the use of coping skills is likely to be accompanied by increases in self-efficacy. Thus, several investigators have identified training designed to increase clients' coping repertoire as a strategy for enhancing self-efficacy. In fact, Roffman and Stephens (2005) identified coping skills training and its enhancement of self-efficacy for avoiding/resisting drug use, as central to relapse prevention.

Another source of self-efficacy enhancement may be success experiences. For instance, Gwaltney et al. (2005) determined that as smoking abstinence was maintained over time, self-efficacy improved, and Wong et al. (2004) also reported that abstinence predicted subsequent coping self-efficacy. What has not been shown, however, is a differential effect of treatment on self-efficacy.

3.3. Self-efficacy as a mediator

Although the differential effects of treatments on self-efficacy are rarely tested, there is some evidence that self-efficacy may mediate treatment effects. In some of the studies in which self-efficacy was measured, mediation effects of self-efficacy on outcomes have been reported. For example, Litt, Kadden, Stephens, and Marijuana Treatment Project Research Group (2005) examined both coping skills and self-efficacy as possible mediators of treatment outcome in the multi-site Marijuana Treatment Project trial. The results indicated that marijuana outcomes out to 15 months were predicted by the use of coping skills, but that the coping skills-oriented MET/CBT treatment did not result in greater coping skills acquisition than did the MET comparison treatment in which no skills were explicitly taught. Self-efficacy, or confidence in the ability to refrain from smoking, appeared to be a partial mediator of treatment outcome: increase in self-efficacy from pre- to post-treatment was a more powerful predictor of decreased drug use over the follow-up year than was coping skills change.

In one of the clearest cases of mediation, LaChance, Ewing, Bryan, and Hutchison (2009) found that, of five potential mediators studied (readiness to change, self-efficacy, perceived risk, norm estimates, and positive drinking expectancies), only self-efficacy mediated the effects of treatment on drinking outcomes. This conclusion was based on a full test of mediation: (1) group motivational enhancement therapy (GMET) reduced problem drinking and its consequences (more than two other interventions); (2) GMET enhanced self-efficacy; and (3) improvements in self-efficacy were associated with reduced problem drinking.

Brown et al. (2002) reported that self-efficacy mediated the effectiveness of CBT on drug use outcomes, and Allsop et al. (2000) found that relapse prevention treatment was related to outcome through the intervening variable of posttreatment self-efficacy. Borrelli and Mermelstein (1994) reported that the achievement of subgoals affected outcome through self-efficacy.

In a review of studies of 12-step program participation among dually-diagnosed individuals, Aase, Jason, and Robinson (2008) concluded that increased self-efficacy plays a mediational role between participation in dual-focus 12-step groups and substance use outcomes. Since dually-diagnosed individuals face considerable barriers to sobriety, the enhancement of self-efficacy was thought to be an important finding.

Although, as noted above, Stephens et al. (1995) found that self-efficacy was a relatively strong predictor of post-treatment marijuana use, they reported that at best, self-efficacy only partially mediated the effects of treatment on marijuana use. In more recent research by that group, Lozano and Stephens (2010) found that self-efficacy did not mediate between client-set goals and either reduced drinking or achievement of goals. Maisto et al. (2000) also failed to find a mediating relationship at all: although self-efficacy did predict drinking outcomes, it did not mediate the effects of treatment or of coping skills. They recommended assessing coping and self-efficacy more frequently, over short periods that would more closely approximate real time.

4. Enhancement of self-efficacy

It has been posited that a treatment focus on the development/enhancement of self-efficacy may be a valuable clinical intervention (Rounds-Bryant, Flynn, & Craighead, 1997). Bandura (1986) identified four principal sources of efficacy beliefs: performance attainments; vicarious experiences of observing the performance of others; verbal persuasion to try to convince people that they possess certain capabilities; and physiological states based on which people judge their capabilities, strengths, and vulnerabilities. Among these, Bandura found “performance accomplishments” to be the most influential source of efficacy information: the highest, strongest, and most generalized increases in self-efficacy were developed through repeated success experiences. He also found that increasing levels of self-efficacy gave rise to progressively higher performance accomplishments. Thus, self-efficacy and performance enhance one another.

Theoretically, all treatments for substance use should be expected to enhance self-efficacy, either directly or indirectly. In this regard, Annis and Davis (1988b) asserted that “the aim of treatment is to effect a rise in self-efficacy across all areas of perceived drinking risk.” That is, effective treatments should not only improve a person's ability to maintain sobriety in the face of high-risk situations, but also help them to recognize that improved ability.

A number of the studies cited here have expressed similar thinking. However, despite fairly widespread concurrence with this sentiment, very few substance abuse treatment studies have been designed for the specific purpose of enhancing self-efficacy. In one such study, Yen, Wu, Yen, and Ko (2004) reported that a brief cognitive-behavioral intervention with heroin and methamphetamine users resulted in improved confidence to resist urges in interpersonal, but not intrapersonal, high-risk situations.

In areas other than substance abuse, more studies have focused on directly enhancing self-efficacy. For example, in a study with diabetics, Grey et al. (1998) found that coping-skills training improved diabetes self-efficacy, in comparison to a control group. Izawa et al. (2005) employed an intervention that involved both self-monitoring and performance feedback to enhance self-efficacy in exercise rehabilitation patients who had suffered a heart attack. At 12 months, those in the experimental condition had higher self-efficacy scores than those in the standard cardiac rehabilitation group, and were more likely to have maintained their exercise regimens. In a meta-analysis, Ashford, Edmunds, and French (2010) found that the best ways to enhance self-efficacy for physical

activity were through delivery of feedback on participants' performance and comparing their performance with that of similar others.

In the substance abuse field, it has been postulated, and generally accepted, that if clients are taught coping skills (e.g., problem-solving, social skills, communication skills) and they subsequently experience success as a result of implementing those skills in lieu of using substances, this mastery experience is likely to enhance their efficacy beliefs (Allsop et al., 2000; Annis & Davis, 1988a,b; Curry & Marlatt, 1987; Longabaugh et al., 2005; Martinez et al., 2010; Rounds-Bryant et al., 1997). One aspect of skills training, the assignment of homework practice exercises, has engendered a good deal of interest with respect to its potential for the enhancement of self-efficacy. Annis and Davis (1988b, 1989) and Annis, Schober, and Kelly, (1996) posited that homework tailored to individuals' high-risk situations is the most powerful method for increasing self-efficacy. They identified six aspects of homework assignments that are expected to alter perceived efficacy, along the lines suggested by Bandura (1986): the homework assignments (1) must be challenging, (2) require a moderate degree of effort, (3) require little external aid, (4) success in the assignments should be perceived as part of a pattern of improved performance, (5) the assignments should increase the perception of personal control and decrease reliance on external supports, and (6) the assignments should be relevant to problem situations frequently encountered. Curry and Marlatt (1987) also emphasized the importance of individualizing interventions aimed at enhancing self-efficacy, rather than applying prepackaged interventions, and recommended keeping homework assignments simple, to maximize the likelihood of success, thereby fostering gains in self-efficacy (Van de Laar & van der Bijl, 2001 make similar points for diabetes education). Although all of these various recommendations make good intuitive sense, no data were provided to support any of them.

In addition to coping skills training, various other approaches have also been put forward as possible means of enhancing the self-efficacy of substance abusers. One of them is Motivational Interviewing (MI). Miller and Rollnick (2002) include “supporting self-efficacy” as one of the guiding principles of motivational interviewing, but provide little by way of explicit instructions as to how this is to be accomplished, beyond emphasizing the importance of the treatment provider's belief in the client's ability to change. Nevertheless, MI does incorporate a number of strategies that have been cited in the self-efficacy literature as being supportive, such as expressing confidence in the client's ability to change, reviewing past successes and current strengths, using the confidence ruler technique, presenting a number of change options, and developing explicit strategies for implementing changes (Miller & Rollnick, 2002). However, studies of MI rarely include assessments of self-efficacy. Among the few that have, LaChance et al. (2009) found that college drinkers who completed a single mandated session of group MET (a variant of MI) reported significantly greater self-efficacy to refuse drinks in high-risk situations, and that increased self-efficacy was associated with more positive drinking outcomes. In contrast, however, Romo et al. (2009), while replicating the common finding that high self-efficacy was correlated with longer periods of abstinence, unlike LaChance et al., found that self-efficacy was not affected by a brief motivational intervention. Also, as noted above, DiClemente et al. (2001) reported that MET did not result in as much improvement in self-efficacy as did CBT. Another potential issue was noted in a study of MI implementation by nurses with patients who had alcohol problems (Smith, Hodgson, Bridgeman, & Shepherd, 2003); they found that the nurses adhered to all MI strategies except promoting self-efficacy, suggesting that implementation may be a challenge.

There has also been interest in determining whether participation in 12-step programs enhances self-efficacy. As noted above, Finney et al. (1998) found that participants in 12-step (as well as cognitive-behavioral) programs significantly enhanced their self-efficacy for coping with high-risk situations. Using the Project MATCH data set, Bogenschütz, Tonigan, and Miller (2006) found that Alcoholics Anonymous (AA) attendance was

associated with increased abstinence self-efficacy, and that abstinence self-efficacy was a strong predictor of subsequent abstinence as well as a partial mediator of the effect of AA attendance on abstinence.

The benefits of participation in AA may also be due in part to the social support it provides. In a study focused specifically on social support, Litt, Kadden, Kabela-Cormier, and Petry (2009) found that the presence of social support was accompanied by increased self-efficacy. However, as noted above, Stephens et al. (1995) found that although self-efficacy ratings increased for participants in both social support and relapse prevention interventions, the relapse prevention participants reported significantly greater self-efficacy at the end of treatment than those that received social support.

In the course of exploring potential predictors of self-efficacy, some studies have produced recommendations regarding interventions that might enhance it. In an untreated sample, McKellar, Ilgen, Moos, and Moos (2008) found that improvements in the following variables were predictors of enhanced self-efficacy: drinking, alcohol-related problems, depression, impulsivity, coping, social support, and participation in AA. As a result, they urged clinicians to focus on engaging clients in AA, addressing depression, improving coping, and enhancing social support. In a similar vein, Dolan et al. (2008) also identified correlates of self-efficacy, on the basis of which they recommended teaching skills for coping with high-risk situations, minimizing depressive symptoms, and reminding patients of previous successes with abstinence, as means of enhancing abstinence self-efficacy.

Overall, there have been a considerable number of suggestions regarding strategies that may be utilized to enhance self-efficacy. In some instances there has been promising evidence, particularly with the use of cognitive-behavioral interventions, but thus far there has not been sufficient consistent evidence, nor direct tests of efficacy enhancement, upon which to base confident recommendations of clinical strategies that are likely to be effective for enhancing self-efficacy. Nevertheless, at this time it seems most likely that treatments designed to improve performance accomplishments and provide a sense of mastery will have the best chance of improving self-efficacy. We are currently exploring a treatment for marijuana dependence that carefully monitors and rewards the performance of homework in a way that is intended to improve skills acquisition and the recognition of accomplishment on the part of the patient. We will see if this treatment results in substantial increases in self-efficacy, as intended.

5. Measurement of self-efficacy: operationalization of the construct

One issue that emerges from the literature on self-efficacy is the means by which it has been assessed. Differences in measurement techniques across studies may affect the findings and conclusions that are drawn about self-efficacy, and may account for some of the inconsistencies that have been noted.

Among the studies cited in this paper, over half (55%) of them used some form of the Situational Confidence Questionnaire (SCQ; Annis & Davis, 1988b). The SCQ assesses confidence in one's ability to resist drinking heavily in eight categories of high-risk situations, based on the relapse-risk taxonomy developed by Marlatt and Gordon (1980). The categories are organized into either intrapersonal (negative or positive emotional states, negative physical states, urges/temptations, and testing personal control) or interpersonal (interpersonal conflict, social pressure, and positive emotional states) situations of potential high risk.

Three other assessment scales were utilized in at least a few of the studies cited in this paper. While differing from each other in various ways, they too are all based, to a greater or lesser degree, on the Marlatt and Gordon (1980) risk categories. Like the SCQ, the Alcohol Abstinence Self-Efficacy Scale (Diclemente, Carbonari, Montgomery, & Hughes, 1994) was derived from Marlatt and Gordon, but this scale

focuses on estimation of one's ability to abstain from drinking (as opposed to resisting heavy drinking). It assesses four categories of drinking situations (negative affect, social/positive, physical and other concerns, withdrawal and urges) using two separate scales: one for temptation to drink in each of these categories of situations and the other assessing confidence to abstain within each category. The Drink Refusal Self-Efficacy Questionnaire (Young, Oei, & Crook, 1991) was developed using items from previous self-efficacy measures, relapse situations selected from the Marlatt and Gordon taxonomy, and items derived from interviews with young problem drinkers. This scale is composed of three factor-analytically derived subscales: situations of social pressure, negative emotions, and situations that present drinking opportunities. Another assessment scale that was used in several studies, the Self-Efficacy for Drinking Control Scale (Sitharthan & Kavanagh, 1990), is based on the Marlatt & Gordon taxonomy and the SCQ.

The remainder of studies cited in this paper utilized idiosyncratic scales, which were developed or modified for use in a particular study. Three of the reviewed studies employed just a single item to assess self-efficacy. Even among the studies that utilized the scales mentioned above, there were variations in the number of their items that were included in each study, and the scales were sometimes modified to accommodate special populations (e.g., adolescents, drug users). Only seven studies appear to have utilized the same version of the SCQ.

Given this amount of variability, and the small number of studies that utilized each variant of a particular assessment instrument, it would be difficult to determine the extent to which inconsistencies among findings may be due to differences in the measures used. Attempts to identify factors that might account for some of the variability among findings would be complicated by differences in other variables. However, only a minority of studies reported having controlled for other variables. A few studies mentioned controlling for mediator and outcome variables, and a few others mentioned controlling for demographic factors or substance-related variables such as age of first use, level of use at intake to the study, alcohol or drug expectancies, or AA attendance. Most studies that reported having controlled for such factors found that self-efficacy was robust and not diminished by including these other variables in the analyses.

In some ways the current means of assessing self-efficacy, using questionnaires administered weeks or months apart, may be deeply flawed. Such questionnaires put a premium on patients' memories when they are asked to recall their level of confidence in high-risk situations which they have encountered. The likely result is that respondents are averaging their general levels of confidence, or in other cases speculating about their future reactions. To the extent that this happens, the questionnaires may be assessing self-efficacy more as a tendency or a disposition than as the situationally specific appraisal that it was originally conceptualized to be.

Interestingly, new technologies are allowing assessments of self-efficacy expectancies closer in time to critical events. The study by Gwaltney et al. (2005) discussed above, for example, employed ecological momentary assessment (EMA) technology to obtain daily assessments of self-efficacy for abstinence from smoking. A decline in self-efficacy rating predicted the occurrence of a lapse on the following day; continuing low ratings predicted the onset of a full relapse to smoking.

Similarly, Cooney et al. (2007) used EMA methods to examine alcohol-tobacco interactions and relapse precipitants among alcohol-dependent smokers, in a trial of concurrent alcohol and tobacco treatment. After discharge from treatment, participants completed 14 days of electronic diary assessments of mood, self-efficacy, urges to drink or smoke, and drinking or smoking behavior, four to six times per day. Drinking relapse episodes were predicted by electronic diary ratings of low self-efficacy to resist drinking, and high urge to smoke, in the hours prior to the relapse episode.

A systematic review of the differences and shortcomings among measures of self-efficacy, their impact on findings related to self-efficacy and its effects, or the impact of other variables on study findings, is beyond the scope of the present paper. The advancement of the field may, however, rest with new technologies that enable assessment of self-efficacy in near-real time.

6. Future directions

This review has identified a number of issues that require more systematic study. It is clear from a considerable number of reports that high levels of self-efficacy are associated with better outcomes. Systematic investigation of the impact of different levels of self-efficacy would be useful, to determine whether more self-efficacy is always better (as suggested by some studies), or whether there is an optimal level in terms of impact on outcome. This review has noted differences in the impact of self-efficacy depending on the particular outcome assessed, so systematic study employing different outcomes (e.g., abstinence, time to first drink, frequency of drinking, quantity consumed), as well as different outcome assessment durations, would be valuable. Furthermore, additional stringent mediational model testing (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) is needed, to determine the extent to which self-efficacy mediates the effects of various interventions on treatment outcomes. Such testing, it is hoped, would also definitively establish the extent to which self-efficacy is determinative of behavior change, or is merely a cognition accompanying behavior changes that are occurring for other reasons.

Despite numerous recommendations as to how self-efficacy may be enhanced, there are few empirical studies of this topic. Systematic studies are needed to assess the efficacy of various interventions for enhancing self-efficacy, and determine how long the effect lasts. Candidates suggested by this review include Cognitive Behavioral treatments (Relapse Prevention, coping skills training, and investigating the parameters of homework assignments), Motivational Interviewing, and 12-step interventions. Another factor to be studied would be the extent to which successful outcomes of these treatments enhance self-efficacy. As noted above, our group is trying to determine if self-efficacy enhancement can result from systematically encouraging performance accomplishments.

Insufficient attention has been paid to the role of moderating variables, both in studies of the effects of self-efficacy on outcomes, and in studies of the enhancement of self-efficacy. Investigation of potential moderators should be included in the design of future studies, with particular attention to cognitive functioning variables. Since self-efficacy enhancement depends on gaining additional mastery over circumstances and recognizing that mastery and incorporating it to alter self-appraisals, individuals who are cognitively impaired may be less able to engage in those appraisals.

As for the assessment of self-efficacy, a number of useful measures have been developed and many of them have common elements, but there are also substantial differences among them that are a hindrance to further study. Investigation of the relative value of the existing instruments, perhaps even including some of the single-item measures that have been used, would provide a more sound basis for advancing knowledge regarding self-efficacy.

Two of the studies reviewed here utilized daily or more frequent assessments of self-efficacy and other behaviors, and produced findings of considerable interest. As noted above, near-real time assessments have become increasingly feasible in this electronic age; a number of different technologies have been developed and are being employed in various areas of investigation. The ubiquitous availability and low cost of cell phones make the implementation of electronic assessment technologies quite practical. As already demonstrated by Gwaltney et al. (2005) and Cooney et al. (2007), this type of technology offers the prospect of moving assessments of the role of self-efficacy from

evaluations of broad impact to the level of daily, and even momentary, analyses.

7. Conclusions

There is no shortage of interest in self-efficacy. Considerable evidence has emerged demonstrating a predictive relationship between self-efficacy and outcome for substance use disorders, as well as some evidence for a mediational role for self-efficacy as well. However, very few studies have focused on the widely-held assumption that self-efficacy can be directly enhanced by clinical interventions, and among the few studies that have tested this idea, the results have been mixed. At this time, there are too few studies of self-efficacy enhancement and too little consistency among them to recommend any intervention with confidence. Although some of the few studies that provide direct tests of self-efficacy enhancement are promising, further studies of possible interventions and their parameters are needed.

Perhaps the absence of reliable procedures for enhancing self-efficacy is a major reason why this very promising concept has not become a major factor in clinical treatment development. A number of recommendations have been made to get a better empirical grasp on the concept of self-efficacy, which would provide a foundation for studies to determine how best to enhance it. These include assessment of the optimal parameters for maximizing the impact of self-efficacy on outcomes, and more stringent studies of the role of self-efficacy as a mediator of outcomes. Considerable research will be required to investigate and implement strategies for enhancing self-efficacy in substance abusers. The use of advanced communications technology may help in these various endeavors by providing more fine-grained analyses of the relationships that impact and are impacted by self-efficacy.

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Conflict of interest

Both authors declare that they have no conflicts of interest.

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