

## **Interventions to Increase Self-efficacy in the Context of Addiction Behaviours : A Systematic Literature Review**

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# Interventions to Increase Self-efficacy in the Context of Addiction Behaviours

## A Systematic Literature Review

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### Abstract

This article describes the effectiveness of interventions aimed at increasing self-efficacy and consequently, changing addiction behaviours. Electronic databases were searched and bibliographies of retrieved references scanned. Ten studies targeting tobacco smoking, alcohol and illicit drug use met the inclusion criteria. The interventions ranged from computer-generated tailored letters to intensive group-based interventions. Seven of the 10 studies reported positive effects of interventions upon self-efficacy. The two that assessed behaviour change reported a significant effect but as neither performed mediation analyses, behaviour change could not reliably be attributed to self-efficacy change. In conclusion, self-efficacy can be increased using a range of methods. There is, however, little evidence to determine whether such increases change behaviour.

### Keywords

- *addiction*
- *alcohol*
- *behaviour change*
- *illicit drug use*
- *self-efficacy*
- *smoking*

## Background

TOBACCO smoking and other addictive behaviours are leading global causes of ill health, disability and death (Stewart & Kleihues, 2003). While effective treatments, based largely upon cognitive-behavioural principles, have been developed, success rates remain modest. For example, quit rates one year after using smoking cessation services in England are about 15 per cent (Ferguson, Bauld, Chesterman, & Judge, 2005). Self-efficacy predicts both initiation and maintenance of addiction-free states. Treatment effectiveness may therefore be enhanced if self-efficacy were specifically targeted.

Self-efficacy is the degree to which an individual believes he or she is capable of performing a particular behaviour (Bandura, 1977). It is closely related to the constructs of perceived control and perceived behavioural control (Armitage & Conner, 2001). Control cognitions including self-efficacy predict intentions to engage in health-related behaviours and actual behaviour. In a meta-analysis, Armitage and Conner (2001) found that perceived behavioural control and self-efficacy accounted for equivalent proportions of the variance in intentions ( $r = 0.44$ ). By contrast, perceived control was more weakly associated with intentions ( $r = 0.23$ ). Controlling for intention, self-efficacy and perceived behavioural control predict an additional 2 per cent of the variance in a range of health-related behaviours (Armitage & Conner, 2001). In a meta-analysis that considered addiction behaviours separately to other health-related behaviours, perceived behavioural control accounted for 25 per cent of the variance in these behaviours (Godin & Kok, 1996). It remains uncertain precisely how control cognitions are related to behaviour change. They may have a direct causal link affecting for example the amount of effort an individual will sustain in the face of obstacles (Bandura, 1997). Alternatively their relationship with behaviour may be mediated by other variables, such as mood. So, for example, smoking abstinence and self-efficacy are lower when negative affect is experienced (Gwaltney et al., 2002). According to Bandura self-efficacy can be elevated, increasing the likelihood of behavioural performance, through enactive mastery experiences, vicarious learning, verbal persuasion and emotive experiences. Evidence that self-efficacy can be altered and that such changes mediate subsequent changes in behaviour would provide much needed validation for theoretical models of behaviour as well as informing interventions designed to change addiction and other health-related behaviours.

No reviews of intervention studies designed to increase self-efficacy in the context of addiction were found at the time of conducting this review. The aim of this review is to describe the effectiveness of interventions aimed at increasing self-efficacy and consequently, changing addiction behaviours.

## Method

The selection criteria and search strategy methods were informed by course material provided by the Institute of Education on systematic research synthesis (Evidence for Policy and Practice Information and Co-ordination Centre) (EPPI) (2005).

### *Selection criteria*

The initial aim of the review was to establish the effectiveness of interventions at increasing self-efficacy and changing behaviour in the context of all health-related behaviours. Given the volume of studies generated, and the fact that this review was primarily intended to inform the content of an intervention designed to increase self-efficacy in the context of smoking cessation, the aim of the review was refocused on addiction behaviours, that is, behaviours in the context of alcohol, tobacco, drug and other addictive substance use. Studies eligible for inclusion were all those that measured self-efficacy pre- and post-intervention. Intervention studies were considered regardless of the duration and intensity of the intervention, but the intervention had to target self-efficacy in the context of behaviour change. When the aim of the study was not clear it was defined by the outcome measures the authors used. For pragmatic reasons, only published, primary studies were included in the review and those published in English. Study design was not limited to RCTs and duplicate data were excluded.

### *Search strategy*

The following electronic databases were searched: PsycINFO (from 1967 to Week 2, 2005); MEDLINE (from 1966 to Week 2, 2005); EMBASE (from 1980 to Week 17, 2005); and ERIC (from 1966 to 2004). The databases were searched no earlier than the 1960s as the term self-efficacy, as used in this context, was not coined by Bandura until after 1970. The search terms used, were combined as follows: [self-efficacy OR perceived control OR perceived behavior?r\$ control] AND [intervention AND (increas\$ OR enhance OR improv\$)]. The

search was limited to humans and English language publications. In addition, the bibliographies of eligible references were scanned for further relevant publications.

### *Data collection and analysis*

A summary of the data extracted from each of the studies included in the review is provided in the appendix, including information on the intervention(s), outcome measures and study designs. The study findings are also summarized in the tables including whether a significant effect of the intervention(s) on self-efficacy and any behavioural outcome was reported. Attempts were made to contact the authors directly of eight studies in which important information was missing or unclear (Dijkstra & de Vries, 2001; Dijkstra, de Vries, & Roijackers, 1998; Finney, Noyes, Coutts, & Moos, 1998; Goldberg et al., 2000; Johnson, Budz, Mackay, & Miller, 1999; Kominars, 1997; Winkleby, Feighery, Altman, Kole, & Tencati, 2001; Yen, Wu, Yen, & Ko, 2004). Three responded with data (Finney et al., 1998; Johnson et al., 1999; Yen et al., 2004).

### *Synthesis*

Data from the eligible studies were synthesized in narrative and tabular form. The summary tables were examined to determine whether there were any notable differences between the included studies. A numerical synthesis was not performed as it is not advisable to estimate an overall average effect when there are important differences between the studies concerning participants, interventions, outcomes and methods that potentially relate to study findings (Anderson & Green, 2002). Furthermore, it was not possible to calculate an effect size for all the studies that reported significant findings.

### *Quality assessment*

Each study was initially assessed according to study design, with randomized controlled trials (RCTs) considered the highest quality, followed by other experimental designs.

The quality of the studies with an RCT design was assessed against a comprehensive checklist for RCT studies proposed by the NHS Centre for Reviews and Dissemination (2001). The checklist uses seven criteria applicable to the studies included in the current review (see Appendix C for details). The quality of the other non-randomized studies was assessed using a modified version of the RCT checklist. The quality of all 10 studies included in

the review was assessed independently by two assessors. Where there was disagreement, the assessment outcome was discussed and the opinion of a third party was sought where necessary.

### **Search results**

The search strategy generated 1752 potentially relevant papers. Six hundred and twenty-seven were generated via PsycINFO, 547 from MEDLINE, 377 from EMBASE and 201 from ERIC. Eligibility at this stage was determined by the first author, who examined the abstracts of the studies identified by each database search using the inclusion criteria. Study abstracts that provided ambiguous information were included at this stage. A second person independently checked the abstracts of 30 studies identified by the PsycINFO, EMBASE and MEDLINE database search using the same criteria. Agreement was met on which studies should be included. From the assessment of the abstracts, 413 articles were considered eligible. One hundred and forty-six of these were articles identified via PsycINFO, 140 via MEDLINE, 112 from EMBASE and 15 were identified via ERIC. This number was reduced to 266 after duplicates were removed from which 21 were identified as studying addiction behaviour. From these 21, 14 studies were found to be ineligible (see appendix B for table of excluded studies) and it was not possible to locate the full article for the remaining one study (Watt & Manaster, 2003).

Searching the bibliographies of the six eligible studies identified via the electronic databases resulted in the inclusion of two further studies (Dijkstra et al., 1998; Finney et al., 1998).

Another two eligible studies were identified from other sources. The study by Winkleby et al. (2004) was identified during correspondence with one of the authors of an eligible study, Winkleby et al. (2001), identified by the database search. Goldberg et al. (1996) was cited by MacKinnon et al. (2001), a study identified by the database search and found ineligible (see table of excluded studies). Correspondence with one of the authors of the Goldberg et al. (1996) study identified another eligible study (Goldberg et al. 2000). On closer examination of this more recent study it was concluded that the data presented in Goldberg et al. (1996) were included in the data set used in Goldberg et al. (2000), and Goldberg et al. (1996) was therefore excluded according to the review criteria. Overall, 10 studies were found to be eligible for this review.

Table 1. Characteristics of included studies

Context	Study	Sample	Intervention groups	Design	Outcome	Result
Tobacco	Dijkstra et al. (1998)	General population N = 137	1. Info letter: SE <sup>a</sup> 2. Info letter: outcomes 3. No info control	RCT	SE <sup>a</sup>	+/-
Tobacco	Dijkstra & de Vries (2001)	General population N = 1198	1. Info letter: SE <sup>a</sup> 2. Info letter: outcomes 3. Info letter: SE <sup>a</sup> & outcomes 4. No info control	RCT	SE <sup>a</sup> Behaviour <sup>d</sup>	+/- ++
Tobacco	Winkley et al. (2004)	High school students N = 798	1. Tobacco advocacy programme 2. Control: Existing substance use prevention info	RCT	SE <sup>a</sup>	++
Tobacco	Johnson et al. (1999)	Cardiac patients N = 102	1. Nurse-delivered smoking cessation: 8 sessions 2. Control: Usual care – occasional advice	Quasi	Behaviour <sup>d,e</sup> SE <sup>a</sup>	-- --
Alcohol	Kominars (1997)	Treatment programme outpatients N = 76	1. Relaxation, visualisation treatment & PT: 12 sessions 2. Psycho-education addiction treatment(PT): 12 sessions	Quasi	SE <sup>a</sup>	--
Drugs	Yen et al. (2004)	Treatment programme inpatients N = 145	1. CB <sup>b</sup> : 5 sessions 2. No treatment control	RCT	SE <sup>a</sup>	++
Anabolic steroids	Goldberg et al. (2000)	High school football players N = 2516	1. Adolescents Training and Learning to Avoid Steroids (ATLAS) programme: 8–14 sessions 2. Control: Usual care – anti-steroids pamphlet	RCT	SE <sup>a</sup>	++
Substance use	Finney et al. (1998)	Treatment programme attenders N = 3228	1. CB <sup>b</sup> 2. AA <sup>c</sup> 3. CB <sup>b</sup> & AA <sup>c</sup>	Quasi	Behaviour <sup>d</sup> SE <sup>a</sup>	++ --

(Continued)

Table 1. (Continued)

Context	Study	Sample	Intervention groups	Design	Outcome	Result
Drugs Tobacco Alcohol	Winkleby et al. (2001)*	High school students N = 116	Teen Activists for Community Change and Leadership Education (TACCLE): weekend course & 30 sessions	A-B	SE <sup>a</sup> Behaviour <sup>d</sup>	+/- --
Drugs Alcohol	Brown et al. (2002)	Treatment Centre patients N = 131	1. CB <sup>b</sup> : 10 sessions 2. AA <sup>c</sup> : 10 sessions	RCT	SE <sup>a</sup> Behaviour <sup>d</sup>	+/- --

+ : Mainly significant outcomes in favour of SE-targeted intervention, +/-: Mixed outcomes; -- : No significant differences between groups (\* Within-subjects comparison)

<sup>a</sup>: self-efficacy

<sup>b</sup>: cognitive-behavioural

<sup>c</sup>: Alcoholics Anonymous

<sup>d</sup>: self-report

<sup>e</sup>: objective report/biochemical validation

## Results

Ten studies conducted in the USA, Canada, the Netherlands and Taiwan met the inclusion criteria. Four of the studies involved interventions in the context of tobacco smoking, in schools, hospital and community settings. Five studies involved interventions targeting substance use/chemical dependency (tobacco, alcohol and other drugs), in substance abuse treatment centres, school and community settings. The remaining study involved an intervention to target anabolic steroid use in high schools.

## Interventions

Seven of the 10 studies reported an effect of intervention on self-efficacy and two studies reported a significant effect of intervention on behaviour (see Table 1).

The interventions used verbal persuasion and experiential activities to increase self-efficacy perceptions, ranging in intensity from computer-generated tailored letters providing persuasive communication in the form of self-help information to a group intervention involving experiential activities based on social cognitive theory with 30 90-minute sessions and a weekend course. There appeared to be no notable difference in the type of interventions delivered in those studies that reported a significant intervention effect compared to those that did not. Furthermore there appeared to be no difference in the nature of the addiction behaviours that were the target of the studies that reported a significant intervention effect compared with those studies that did not report such an effect.

## Self-efficacy

Of the 10 eligible studies, one used a 'before and after' design (i.e. comprised only one group with measures taken before and after the intervention) and reported some evidence for a significant increase in self-efficacy to refrain from substance use from pre- to post-intervention. The other nine performed between-group analyses, of which six were RCTs (Table 1). These six reported significant effects of intervention(s) on self-efficacy to refrain from substance use compared to a control group or other intervention comparison group. For three it was possible to calculate an effect size using post-treatment mean and standard deviation data for the self-efficacy and behaviour variables. Effect sizes ranged from 0 to 2.0. The remaining three non-randomized studies did not report significant intervention effects on self-efficacy.

Table 2. Quality of RCT and non-randomized studies

	Quality score	Randomization	Treatment allocation	Baseline characteristics	Eligibility criteria	Assessor blinding	Point estimates and variability measure	Intention to treat analysis
Brown et al. (2002)	5/7	Adequate	Adequate	Unknown	Adequate	Adequate	Adequate	Inadequate
Dijkstra et al. (1998)	0/7	Unknown	Unknown	Unknown	Unknown	Unknown	Inadequate	Inadequate
Dijkstra & de Vries (2001)	0/7	Unknown	Unknown	Unknown	Unknown	Unknown	Inadequate	Inadequate
Goldberg et al. (2000)	1/7	Unknown	Unknown	Unknown	Adequate	Unknown	Inadequate	Inadequate
Winkley et al. (2004)	3/7	Unknown	Unknown	Adequate	Adequate	Unknown	Adequate	Inadequate
Yen et al. (2004)	2/7	Unknown	Unknown	Adequate	Adequate	Unknown	Inadequate	Inadequate
Finney et al. (1998)	1/4	Not applicable	Not applicable	Inadequate	Adequate	Unknown	Inadequate	Not applicable
Johnson et al. (1999)	1/4	Not applicable	Not applicable	Inadequate	Adequate	Unknown	Inadequate	Not applicable
Kominars (1997)	1/4	Not applicable	Not applicable	Unknown	Adequate	Unknown	Inadequate	Not applicable
Winkley et al. (2001)	1/3	Not applicable	Not applicable	Not applicable	Adequate	Unknown	Inadequate	Not applicable

### Behaviour

Six of the 10 studies assessed the impact of the intervention(s) on addiction behaviour. Five of these studies were RCTs. Of these five RCTs, two studies reported a significant between-group effect of intervention on behaviour. However, it was not possible to calculate effect sizes. Analyses to assess whether changes in self-efficacy mediated changes in behaviour were not performed in either of these two studies. There were no notable differences in study characteristics between those studies that reported a significant effect of intervention on behaviour and those studies that did not apart from sample size, which was far larger for the two studies that reported a significant behavioural outcome compared with that of the four that did not (see Table 1).

### Study quality

Problems were identified with the quality of the RCTs (Table 2). These included a lack of detail about the methods used for the randomization process, the reporting of baseline characteristics and the reporting of point estimates and variability measures. Problems were also identified with the quality of the four non-randomized studies (Table 2). Only one of the six studies that assessed behaviour change used biochemical validation in addition to self-report measures.

### Discussion

#### Review objectives

The aim of the current review was to describe the effectiveness of interventions aimed at first, increasing self-efficacy and in turn changing behaviour in the context of addiction.

There was good evidence that the interventions evaluated using RCTs were effective at increasing self-efficacy in the context of addiction behaviour. In line with the approaches proposed by Bandura (1977), interventions incorporating verbal persuasion and experiential activities were found to have such an effect. However, as the interventions ranged in terms of scale and approach, the most effective and efficient ways of achieving such changes remain uncertain. It seems likely that this will vary with the addiction behaviour, the duration of the problem and the co-existence of other problems.

There was some evidence to suggest that the interventions aimed at increasing self-efficacy



could be effective at changing behaviour in the context of addiction, with two of the six studies that assessed behaviour change reporting a significant effect on behaviour. In both studies a significant intervention effect on self-efficacy was also found. Mediation analyses were not carried out in either of these studies. It is therefore not known whether the behaviour change was mediated by changes in self-efficacy. Although the number of studies is small, it is interesting to note that when no significant effect of intervention on self-efficacy is found, no significant behaviour change is reported either. However, if a significant change in behaviour is reported, evidence of an intervention effect on self-efficacy is also found. This suggests that a change in self-efficacy may be necessary but not sufficient for behaviour change. This is supported by systematic reviews that show a moderately strong association between control cognitions and health behaviour (Armitage & Conner, 2001; Godin & Kok, 1996). In sum, while the current review provides some evidence regarding the link between self-efficacy and behaviour, the strength and nature of this association remains unclear.

### *Methodological quality of included studies*

The methodological quality of studies provides an estimate of the extent to which intervention effects may be biased and the degree to which meaningful conclusions can be drawn from the findings reported. For the majority of the RCT studies in the current review details of the randomization process and treatment allocation were indeterminable from the published articles. Absence of details of treatment allocation is associated with an overestimation of treatment effects (Balk et al., 2002; Schulz, Chalmers, Hayes, & Altman, 1995). Furthermore, details of point estimates and variability measures were inadequate in the majority of the studies included in the review despite efforts to contact authors where this was possible to request this information. Such inadequate information meant that it would have been impossible to establish an overall effect size using meta-analysis for the included studies, even if the studies had been homogenous.

### *Review strengths and limitations*

The main strength of this review is that this is the first, to our knowledge, to synthesize the literature on interventions designed to increase self-efficacy in the context of addiction behaviours. The main weakness of the review was in the scope of the search. We did not have the resources to extend the review to include interventions aimed at increasing self-efficacy in the context of behaviours other than addiction. Confidence was not used as a search term as we followed Bandura's conceptualization of self-efficacy, which is distinct from confidence (Bandura, 1977, 1997). The review was also restricted to studies published in the English language. Two reviews of selection biases in systematic reviews suggest that treatment effects may be underestimated if studies published in languages other than English are excluded (Moher, Pham, Lawson, & Klassen, 2003; Song, Eastwood, Gilbody, Duley, & Sutton, 2000).

### **Conclusion**

Self-efficacy can be increased using a range of methods. However, there is an absence of evidence regarding the extent to which such cognitive change leads to behaviour change and how any such change is mediated, whether by self-efficacy or another variable.

### *Recommendations for future research*

Extending the scope of this literature review into other areas of health-related behaviour change could enable more reliable conclusions to be drawn concerning the impact of self-efficacy interventions on self-efficacy perceptions and behaviour change. However, the overall quality of the studies included in the current review has important implications for the design and reporting of intervention studies, if such studies are to contribute to systematic reviews involving meta-analysis. In particular, studies need to be designed to have sufficient power to assess the impact of the intervention upon both behaviour and self-efficacy, and the extent to which the latter mediates any impact of the former.



Appendix A: Summary of included studies

Study	<i>Brown, Seragian, Tremblay and Annis (2002)</i>
<i>Context</i>	Country: Canada Substance use (alcohol, cocaine, cannabis)
<i>Participants/Design</i>	131 newly admitted patients at three substance abuse treatment centres Mean age 38 years (SD 9.3), 31.3% female, 92.5% Caucasian. RCT: RP condition <i>n</i> = 61, TSF condition <i>n</i> = 70
<i>Interventions</i>	1. Cognitive-behavioural Relapse Prevention (RP). Group format. 10 weekly 90-minute sessions. Focus on identifying high-risk situations for substance use and individualized treatment plans with coping strategies 2. AA's 12 Steps (TSF). 10 weekly 90-minute sessions. Group format. Focus on alcoholism as disease of spirit, mind and body. Included symptom review, and reading and discussion of AA literature
<i>Outcome measures</i>	Alcohol and Drug Use Self-efficacy Scale (ADUSE; DiClemente, Carbonari, Montgomery, & Hughes, 1994). 20 items assess temptation and confidence to resist substances in specific high-risk situations. Two composite scores for how 'tempted' and how 'confident' used in analysis Addiction Severity Index (ASI; McLellan, Luborsky, Woody, & O'Brien, 1980; McLellan, Woody, Luborsky, O'Brien, & Druley, 1983). The two composite scores related to severity of alcohol and drug use over past 30 days
<i>Study findings</i>	No significant main effects of group or time. Significant group-time interaction. Temptation to use substances significantly lower in RP compared to TSF immediately post-intervention (T2). No significant group differences at T3. Confidence to refrain from using substances significantly greater than TSF at T2 No significant difference between groups on substance abuse outcome variable. TSF and RP associated with sig within subject main effects of time, with improvements on all substance abuse outcome measures
<i>Effect size (Glass's Δ)</i>	<i>T2 ADUSE-Temp</i> TSF vs RP = 0.69 <i>T2 ADUSE-Conf</i> TSF vs RP = -0.66 <i>T3 ADUSE-Temp</i> TSF vs RP = -0.05 <i>T3 ADUSE-Conf</i> TSF vs RP = 0.06 <i>T3 ASI alcohol</i> TSF vs RP = -0.23 <i>T3 ASI drug</i> TSF vs RP = 0.14
Study	<i>Dijkstra and de Vries (2001)</i>
<i>Context</i>	Country: Netherlands Tobacco smoking
<i>Participants/Design</i>	1198 smokers, mean age 39.6 years, 61% women RCT
<i>Interventions</i>	Computer-generated smoking cessation self-help materials: 1. Self-efficacy enhancing information. 5-7 pages. Offered skills helpful to ex-smokers for coping with social, emotional and addictive situations

(Continued)

## Appendix A: (Continued)

<i>Study</i>	<i>Dijkstra and de Vries (2001)</i>
<i>Outcome measures</i>	<p>2. Outcome information. 5–7 pages on possible positive outcomes of quitting. Negative outcomes reframed. Focus on health and social consequences</p> <p>3. Both sorts of information. 5–7 pages condensing information provided above</p> <p>4. No information control</p> <p>Items to assess self-efficacy developed by Dijkstra et al. (1998); Mudde, Kok and Strecher (1995). Three self-efficacy scales formed to assess confidence to refrain from smoking in specific situations: Emotional self-efficacy (3 items; <math>\alpha = 0.87</math>); Social (3 items; <math>\alpha = 0.78</math>); Habitual (3 items; <math>\alpha = 0.82</math>). Situation specific. Quitting activity assessed with two items developed by authors: Point prevalence measure of smoking in last seven days (Yes/No) and retrospective report of any quit attempt of at least 24 hours since last assessment (Yes/No)</p>
<i>Study findings</i>	<p>Compared to control, all experimental conditions led to significant increases in social and habitual self-efficacy</p> <p>No significant difference in self-efficacy between the different intervention conditions</p> <p>Only self-help interventions that included self-efficacy enhancing information more effective than control for seven-day quitting activity</p> <p>All three experimental conditions led to significantly more reports of quit attempts than control</p> <p>Quitting behaviour assessed at three months post-test was regressed on changes in cognitions between pre-test and two weeks post-test. For seven-day quit, predictor in the whole sample and main predictor in subgroups was increase in emotional SE. For attempt to quit, predictors in the whole sample included emotional self-efficacy</p>
<i>Effect size</i>	<i>Effect size calculation not possible with published data. Author contacted but no data provided</i>
<i>Study</i>	<i>Dijkstra et al. (1998)</i>
<i>Context</i>	Country: Netherlands Tobacco smoking
<i>Participants/Design</i>	137 smokers RCT
<i>Interventions</i>	<p>1. Computer-generated tailored letter containing self-efficacy enhancing information. 4–6 pages. Aimed to enhance confidence to quit by offering skills helpful to ex-smokers for coping with social, emotional and addictive situations</p> <p>2. Computer-generated tailored letter on outcomes of smoking cessation. 4–6 pages. Aimed to enhance motivation to quit by stressing pros of quitting and negative outcomes reframed. Focus on health and social consequences</p> <p>3. No cessation information control</p>
<i>Outcome measures</i>	Eight items measured self-efficacy to refrain from smoking in social and emotional situations ( $\alpha = 0.89$ ). Items scored from –3 (very sure not able to refrain) to +3 (very sure able to refrain). Scale score = average of the item scores. Situation specific

(Continued)

Appendix A: (Continued)

<i>Study</i>	<i>Dijkstra et al. (1998)</i>
<i>Study findings</i>	<p><i>SE vs no info</i>                  Significant increase in self-efficacy for SE info group compared to no information (<math>p &lt; .05</math>)</p> <p><i>OC vs no info</i>                  No significant increase in self-efficacy for outcome group than no inf group</p> <p><i>OC vs SE</i>                  No significant increase in self-efficacy for SE info group vs outcome info group</p>
<i>Effect size</i>	<i>Effect size calculation not possible with published data. Author contacted but no data provided</i>
<i>Study</i>	<i>Finney et al. (1998)</i>
<i>Context</i>	Country: USA Substance use
<i>Participants/Design</i>	3228 males from substance abuse treatment programmes Mean age 43 years. 48% black, 46% white Non-randomized quasi-experimental
<i>Interventions</i>	<ol style="list-style-type: none"> <li>1. Cognitive-behavioural treatment (C-B). Aim to enhance self-efficacy to remain abstinent in high-risk situations through coping skills training</li> <li>2. Traditional AA based 12-step treatment. Aims for acceptance of addict identity and sets abstinence as goal. Involves attending meetings, getting a sponsor, working the steps</li> <li>3. Eclectic (both)</li> </ol>
<i>Outcome measures</i>	Self-efficacy assessed using 14 of 39 Situational Confidence Questionnaire items (Annis & Graham, 1988). Response range 'Not confident at all' scored 0 to 'very confident' scored 5. Total scores range 0–70. $\alpha = .96$ for intake sample. Situation specific
<i>Study findings</i>	Significant increase in SE for all three conditions over time ( $p < .001$ ). No significant difference between conditions for SE
<i>Study</i>	<i>Goldberg et al. (2000)</i>
<i>Context</i>	Country: USA Anabolic androgenic steroids (AAS)
<i>Participants/Design</i>	Male football players: 1371 in control condition, mean age 15.42 years (1.20), 80.7% white 1145 in Intervention condition, mean age 15.48 years (1.19), 77.1% white Prospective RCT
<i>Interventions</i>	<ol style="list-style-type: none"> <li>1. Adolescents Training and Learning to Avoid Steroids (ATLAS). Programme integrated into training sessions. 5–7, 45-minute classroom session, 3–7 weight-room sessions. Classroom curriculum (physiology and effects of steroids. Benefits of strength training and nutrition alternatives. Health promotion messages created and drug refusal role-play) and weight-room training sessions. Written support materials</li> <li>2. Control. Commercially produced, anti-AS pamphlet emphasizing adverse effects of AS and benefits of sports nutrition diet</li> </ol>

(Continued)

## Appendix A: (Continued)

<i>Study</i>	<i>Goldberg et al. (2000)</i>
<i>Outcomes measures</i>	Two measures developed by authors to assess self-efficacy. Likert agreement scales used: Strength training self-efficacy (6 items, $\alpha = 0.86$ ); Ability to turn down drugs (4 items; $\alpha = 0.88$ ). Alpha data reported in Goldberg et al. (1996). Situation specific Cumulative lifetime AAS use determined by pre-test use and new reported use at season's end and one-year follow-up
<i>Study findings</i>	Intervention group reported enhanced strength training self-efficacy compared to controls at season's end and one year ( $p < .001$ ) Intervention group reported greater ability to reject drug offers from peers at season's end ( $p = .004$ ) and one year ( $p < .03$ ) Intervention group reported lower intent to use AS than controls at end of football season ( $p < .05$ ) and at one year ( $p < .03$ ) More new AS users in control group than intervention at end of season ( $p < .04$ ) and at one year ( $p < .072$ )
<i>Effect size</i>	<i>Effect size calculation not possible with published data. Author contacted but no data provided</i>
<i>Study</i>	<i>Johnson et al. (1999)</i>
<i>Context</i>	Country: Canada Tobacco smoking
<i>Participants/Design</i>	102 smokers Control ( $n = 52$ ), mean age 55.4 (12.97), 78.8% male Intervention ( $n = 50$ ), mean age 54.8 (12.56), 72% male Quasi-experimental design
<i>Interventions</i>	1. Nurse-delivered smoking cessation intervention. Two contacts with the nurse during hospital stay followed by six telephone contacts (5 mins–1 hr duration) during first three months after discharge (weekly then monthly for last two months). Hospital contacts included video and worksheet on effects of smoking and importance and process of smoking cessation. Written support materials. Quit date set, cessation plan including strategies for dealing with smoking triggers. Telephone contact encouraged and reinforced cessation efforts 2. Control condition. Usual care. Occasional advice to quit smoking
<i>Outcome measures</i>	Self-efficacy assessed using Smoking Abstinence Self-Efficacy Scale (DiClemente, 1981; Prochaska, DiClemente, Velicer, Ginpil, & Norcross, 1985). 20 items on challenging situations including: positive/social ( $\alpha = 0.82$ ); negative/affective ( $\alpha = 0.92$ ); habit/addictive ( $\alpha = 0.85$ ). Five-point Likert scale from 1 'not at all confident' to 5 'extremely confident'. $\alpha$ from 0.88 to 0.92 (DiClemente, 1981; Prochaska et al., 1985; Velicer, DiClemente, Rossi, & Prochaska, 1990). Situation specific Smoking status assessed by self-report. Items derived from the Smoking Follow-up Questionnaire (Prochaska, DiClemente, Velicer, & Rossi, 1993)
<i>Study findings</i>	No significant difference between treatment and control group SE scores at follow-up, controlling for baseline scores No significant difference in smoking status between intervention and control conditions

(Continued)

Appendix A: (Continued)

Study	<i>Kominars (1997)</i>
<i>Context</i>	Country: USA Chemical dependency
<i>Participants/Design</i>	76 outpatients from chemical dependency treatment programme, aged over 18 years, with diagnosis of alcohol abuse/dependency. Quasi-experimental design
<i>Interventions</i>	1. Combined progressive relaxation and visualization treatment (VT) programme. Included visual, auditory, tactile, gustatory and olfactory imagery exercises, and visualizing high-risk situation with successful outcome without using alcohol. Six 75-minute group sessions and then six psycho-educational addiction treatment (PT) group sessions 2. Psycho-educational addiction treatment (PT) programme. Based on counseling theory and adult education and 12-step fellowships. 12 group sessions
<i>Outcome measures</i>	Self-efficacy assessed using modified Situational Confidence Questionnaire (Annis, 1982). Situation-specific
<i>Study findings</i>	No significant difference in SE between VT and PT groups
<i>Effect size</i>	Significant pre–post-test differences in SE in VT and PT groups <i>Effect size calculation not possible with published data. Author contacted but no data provided</i>
Study	<i>Winkleby et al. (2001)</i>
<i>Context</i>	Country: USA Substance use (tobacco, alcohol, other dugs)
<i>Participants/Design</i>	116 students 97% completed assessment Mean age 14.6 years, 79% women. Mixed ethnicity Within subjects design
<i>Interventions</i>	Teen Activists for Community Change and Leadership Education (TACCLE). Programme taught by youth co-ordinator. Weekend advocacy institute and 30, 90-minute meetings throughout school year. Based on social cognitive theory. Focus on how environmental factors contribute to substance use, strategies to create change in schools and communities, and skills to initiate community projects for achieving change No comparison group
<i>Outcome measures</i>	Self-efficacy assessed using five items with five-point Likert scale to measure perceptions of ability to perform specific advocacy actions ( $\alpha = 0.91$ ). Situation specific Substance use assessed using items on alcohol, tobacco and other drug use in last 30 days (from measurements in large-scale surveys: Johnston, Bachman and O'Malley (1997)
<i>Study findings</i>	Significant increase in self-efficacy for girls from pre–post-intervention. Increase in self-efficacy for boys, but not statistically significant Change in substance use between pre and post-test not significant for boys or girls
<i>Effect size</i>	<i>Effect size calculation not possible with published data. Author contacted but no data provided</i>

(Continued)

## Appendix A: (Continued)

<i>Study</i>	<i>Winkleby et al. (2004)</i>
<i>Context</i>	Country: USA Tobacco smoking
<i>Participants/Design</i>	798 students from 10 High Schools: 367 in TA condition, mean age 17.0 (0.2) years, 56.5% female 431 in DAP condition, mean age 17.1 (0.1) years, 43.7% female. RCT
<i>Interventions</i>	1. Intervention condition: Tobacco Advocacy Intervention programme (TA). Advocacy activities to counter environmental-level smoking influences in community. Intervention delivered in 60–90 minute classes in school hours. Curriculum based on social learning and empowerment theory. Designed to modify social influences on cigarette smoking, build awareness of and modify environmental influences (e.g. advertising). Small group activities including community project (e.g. developing educational materials). Skills training (e.g. persuasive communication) 2. Control condition: Existing Drug and Alcohol Abuse Prevention information (DAP)
<i>Outcome measures</i>	Self-efficacy assessed using eight items with five-point Likert scale to measure perceptions of ability to perform specific advocacy actions ( $\alpha = 0.89$ ). Situation specific Cigarette smoking assessed by self-report. Options: non-smoker (never smoked or former smokers); Light smokers (< 1 pack per week); Regular smokers (1 or more packs a week). Self-report validated by carbon monoxide monitor
<i>Study findings</i>	Perceived self-efficacy increased in treatment schools at post-intervention. No change in control schools. Significant net change between groups ( $p < .01$ ) No significant differences in smoking status between intervention and control conditions
<i>Effect size (Glass's <math>\Delta</math>)</i>	= 2.0
<i>Study</i>	<i>Yen et al. (2004)</i>
<i>Context</i>	Country: Taiwan Drug use
<i>Participants/Design</i>	145 Male drug users: 40 heroin and 30 MAMP in intervention group, 38 heroin and 37 MAMP in control Mean age in years: Intervention/heroin: 30.43 (6.18), Intervention/MAMP: 27.83 (5.68), Control/heroin: 30.0 (6.0), Control/MAMP: 29.03 (8.0)
<i>Interventions</i>	1. C-B intervention to provide skills to enhance self-efficacy to remain abstinent in high-risk situations. Five 60–80 minute group sessions with psychiatrist and psychologist. Included motivational interviewing, C-B coping strategies and relapse prevention, role-playing risky situations and dealing with cravings 2. No treatment control condition
<i>Outcome measures</i>	Self-efficacy assessed using Situational Confidence Questionnaire (SCQ; Annis, 1982) modified to assess situations related to heroin (52 items) and MAMP use (51 items). SCQ

(Continued)

Appendix A: (Continued)

Study	Yen et al. (2004)
<i>Study findings</i>	<p>assesses eight categories of drug use situations divided into two major classes: intrapersonal determinants (psychological or physical), and interpersonal determinants (significant influence of another individual). Six-point Likert scale: 1 = 'not at all confident' to resist urge to use again, to 6 = 'very confident'. Highest score = 48. For heroin users of intrapersonal SCQ <math>\alpha = 0.95</math>, interpersonal <math>\alpha = 0.91</math>. For MAMP users of intrapersonal SCQ <math>\alpha = 0.95</math>, interpersonal <math>\alpha = 0.90</math>. Situation specific</p> <p>Intervention significantly more effective than control in improving confidence in ability to resist urges to use heroin and MAMP in stressful interpersonal situations and to use MAMP in intrapersonal situations. No significant difference between groups in confidence to manage heroin use in intrapersonal situations</p>
<i>Effect size (Glass's <math>\Delta</math>)</i>	<p>MAMP intrapersonal = 0.25                      MAMP interpersonal = 0.21                      Heroin intrapersonal = 0.07                      Heroin interpersonal = 0.22</p>

Appendix B: Characteristics of excluded studies

Study	Reason for exclusion
Allen (1996) Borrelli et al. (2002) Eisen, Zellman and Murray (2003) Etter and Perneger (2001) Fossum, Arborelius and Bremberg (2004)	Self-efficacy not measured as outcome variable No data available. Study not yet completed Intervention does not aim to increase self-efficacy Self-efficacy not measured as outcome variable Self-efficacy not measured as outcome variable
Goldberg et al. (1996) Loudenburg and Leonardson (2003) MacKinnon et al. (2001)	Duplicate data with Goldberg et al. (2000) Self-efficacy not assessed in the context of addiction behaviour Focus not on impact of intervention on self-efficacy but on constructs mediating the effect of the intervention on the outcome variables. Goldberg et al. (1996) cited as detailing the effect of the intervention on the study outcome variables including self-efficacy
McMahon and Jason (1998) Schumacher et al. (2000)	Self-efficacy not assessed in the context of addiction behaviour Intervention not in the context of self-efficacy for addiction behaviour. Focus on self-efficacy of physicians to manage patients who use drugs Self-efficacy not measured as outcome variable
Simon, Solkowitz, Carmody and Browner (1997) Teichman (1988) Van Hasselt, Hersen, Null and Ammerman (1993) Warnecke et al. (2001)	Self-efficacy not measured as outcome variable No data available. Article presents project proposal
Washington (1999)	Self-efficacy not assessed at baseline and intervention does not directly target self-efficacy Intervention not in the context of self-efficacy for addiction behaviour. Focus is participants' employability and role in society



Appendix C: Study quality assessment criteria (see Table 2 for study scores)

Criteria	Explanation	Scoring options
<i>Randomization</i>	Was the assignment to the treatment groups random? Adequate approaches: computer-generated random numbers, random number tables Inadequate approaches, use of alteration, patient record numbers, birth dates, week days	Adequate = 1 Inadequate = 0 Not known = 0 Not applicable
<i>Treatment allocation</i>	Was the treatment allocation concealed? Adequate approaches to concealment of randomization: centralized randomization, on-site computer-based system with randomized sequence unreadable until allocation Inadequate approaches: open random number lists, birth dates, days of the week, serially numbered envelopes	Adequate = 1 Inadequate = 0 Not known = 0 Not applicable
<i>Baseline characteristics</i>	Were the groups similar at baseline in terms of the dependent variables?	Adequate = 1 Inadequate = 0 Not known = 0 Not applicable
<i>Eligibility criteria</i>	Were the eligibility criteria specified?	Adequate = 1 Inadequate = 0 Not known = 0 Not applicable
<i>Assessor blinding</i>	Were the outcome assessors blinded to the treatment allocation?	Adequate = 1 Inadequate = 0 Not known = 0 Not applicable
<i>Point estimates and variability measure</i>	Were the point estimates and measure of variability presented for the primary outcome measure?	Adequate = 1 Inadequate = 0 Not known = 0 Not applicable
<i>Intention to treat analysis</i>	Did the analyses include an intention to treat analysis?	Adequate = 1 Inadequate = 0 Not known = 0 Not applicable

Source: Adapted from NHS Centre for Reviews and Dissemination (2001) quality assessment criteria

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