

PSYCHOLOGICAL BASES OF THE TREATMENT OF DRUG-DEPENDENCE

Roberto Secades-Villa, Olaya García-Rodríguez, José Ramón Fernández-Herrida & José Luis Carballo

Department of Psychology. University of Oviedo

There is substantial scientific support for the effectiveness of psychological techniques in the treatment of drug addiction, based on empirical evidence demonstrating that drug use and abuse behaviours are operant behaviours, and that contingencies play a determinant role in their explanation. Behaviour therapy offers empirically validated approaches that are considered essential strategies for the effective treatment of drug addiction. Operant (contingency management), classical conditioning (exposure) and cognitive-behavioural (skills training) techniques – as well as their different combinations – have emerged as critical components of such programmes. Nevertheless, despite this relative effectiveness, relapse rates in the long term (more than one year of follow-up) remain high in all types of addictive behaviours. Therefore, future research lines should aim to remedy some of the deficiencies with a view to improving the long-term results of these programmes.

Key words: Drug Addiction, Reinforcement, Psychological Treatments

Existe un amplio soporte científico que avala la eficacia de las técnicas psicológicas en el tratamiento de la drogadicción. Dicha eficacia se fundamenta en la evidencia empírica que ha demostrado que las conductas de uso y abuso de drogas son conductas operantes y que las contingencias juegan un papel determinante en la explicación de las mismas. La terapia de conducta cuenta con tratamientos empíricamente validados que se consideran estrategias esenciales para el tratamiento efectivo de la drogadicción. Las técnicas operantes (manejo de contingencias), de condicionamiento clásico (exposición), las técnicas cognitivo-conductuales (entrenamiento en habilidades) y las distintas combinaciones entre ellas se muestran como los componentes críticos de estos programas. No obstante, a pesar de esta relativa eficacia, las tasas de recaídas a largo plazo (más de un año de seguimiento) siguen siendo altas en todos los tipos de conductas adictivas. Por tanto, las futuras líneas de investigación han de ir dirigidas a resolver algunas deficiencias que mejoren los resultados a largo plazo de estos programas.

Palabras clave: Adicción a drogas, Reforzamiento, Tratamientos Psicológicos

THE BIOBEHAVIOURAL MODEL OF DRUG USE

The empirical evidence has shown that drug use and abuse behaviours do not depend on a single, isolated factor, but rather develop and are maintained by diverse factors of a multidimensional nature. The so-called bio-psycho-social (or bio-behavioural) model, the contextual framework accepted by the vast majority of authors, permits an analysis of the interactions between the environment and the pharmacological factors involved in drug-use behaviours, regardless of the substance in question. From this perspective, the use or rejection of drugs would be explained by the effects of the substances, by contextual factors and by the vulnerability of subjects themselves.

Thus, no explanatory model valid for all addictive behaviours can be established. Rather, on the basis of these general principles, the specific combinations of their elements that explain the acquisition or not of different

types of addictive behaviour and the variables that control it must be examined in each case and at each stage. This involves using behaviour analysis for identifying, in each particular case, the variables involved and the conditions on which they depend. Relevant in this regard is the bio-behavioural (or bio-psycho-social) model described by Pomerleau and Pomerleau (1987) for explaining the onset and maintenance of smoking behaviour. As the authors themselves point out, although substances may differ in their specific pharmacological action, all are subject to the same general line of analysis. This contextual framework provides the capacity for analyzing consumption behaviours in relation to interactions with the context, individual vulnerability and consequences. The variables classed as belonging to the *context* (exteroceptive and interoceptive stimuli) would be given by the classical and operant learning models, and would combine with the reinforcing variables identified as *consequences*. *Behaviour* would naturally include behaviours related to drug use, but also those related to the rejection of consumption and resistance to it.

Correspondence: Roberto Secades-Villa. Facultad de Psicología. Universidad de Oviedo. Plaza Feijoo s/n 33003 Oviedo. Spain. E-mail: secades@uniovi.es

Vulnerability includes genetic factors and others associated with sociocultural influences and learning history (Secades-Villa & Fernández-Hermida, 2003).

Thorough knowledge of addictive behaviour will also require a functional analysis explaining the relationships between these elements. Thus, there will be critical associations that denote very close relationships, such as those found between reinforcing behaviours and contingencies and the effects of those consequences on the behaviour that precedes them. On the other hand, between other elements there will be an association of a correlational or modulatory nature. For example, the consequences of a behaviour can change the context, triggering a motor behaviour that modifies the environment and the interoceptive state, whilst susceptibility factors can influence not only how the context is affected, but also the intensity and type of behaviour that would occur in particular circumstances, or the nature of the consequences of that behaviour.

The role of reinforcement in drug-use behaviours

In the bio-behavioural model, the contingencies associated with behaviours of drug use or abstinence play a crucial role in their explanation. There is ample empirical evidence that drugs can function effectively as positive reinforcers of search and self-administration behaviours, and that the principles that govern other behaviours controlled by positive reinforcement are applicable to the self-administration of drugs. That is, drug self-administration behaviour is subject to the same laws that govern the "normal" behaviour of all animals in similar situations (McKim, 2000). A basic conclusion to be drawn from the results of such studies is that substance-use disorders can be situated within the body of existing psychological principles, which permit the analysis of such behaviour as a dimensional variable on a continuum from a pattern of sporadic use – practically unproblematic – to a pattern of serious use with many adverse consequences.

Such evidence began to emerge in laboratory studies on drug self-administration in animals and clinical and laboratory studies with drug addicts carried out in the 1960s and 70s (see Bigelow & Silverman, 1999). These studies showed how the self-administration of drugs, like other operant behaviours, was highly susceptible to moulding, and could be increased or reduced by manipulating the same types of variables (e.g., reinforcement programme and magnitude, use of punishment, reinforcement of

incompatible alternative behaviours) that had been shown to be effective in the manipulation of other operant behaviours (Silverman, 2004).

In the case of opiates, many of the demonstrations designed to show the efficacy of reinforcement have been complicated by the presence of physical dependence in the experimental participants. Nevertheless, a considerable number of studies have provided experimental demonstrations of the positive reinforcing effects of such substances without the need for physical dependence (Schuster & Johanson, 1981; Yanagita, 1973).

In the clinical context there are studies that have demonstrated the efficacy of opiates as reinforcers. For example, when methadone is administered contingent upon attendance at therapy the frequency of sessions attended increases (Brooner, Kidorf, King & Bigelow, 1997). It seems clear, therefore, that the positive reinforcing effect of the self-administration of opiates is fundamental in the maintenance of the behaviour, so that physical dependence is not a necessary antecedent for explaining self-administration behaviour.

Likewise, several works have also shown the occurrence of the behaviour of self-administration of cocaine and other stimulants without the presence of withdrawal symptoms (Pickens & Thompson, 1968).

Thus, physical dependence may be important in explaining drug use, but it is not a necessary factor for self-administration behaviours, and nor is it sufficient by itself for explaining the use and abuse of drugs. That is, it can be assumed that drugs are positive reinforcers, independently of withdrawal syndrome and physical dependence.

Even more conclusive evidence comes from the self-administration of a wide range of psychoactive substances for which no signs of withdrawal syndrome have been observed, or for which the symptoms are very mild. Self-administration of drugs without the presence of withdrawal symptoms has been found in a variety of substances, such as ethanol, nicotine, barbiturates, benzodiazepines, opiates or stimulants. Moreover, studies comparing self-administration behaviours in humans and non-humans have found great similarity among species (Yanagita, 1973).

In the area of treatment, the success of clinical trials in the 1970s with alcoholics and addicts to other substances demonstrated the effectiveness of interventions based explicitly on the principles of reinforcement, and that the use of drugs by subjects with severe dependence could be

modified through the systematic use of contingency management (reinforcement and punishment) (e.g., Hunt & Azrin, 1973; Miller, 1975).

Since these early years, this framework of scientific analysis has held a central role in research on drug dependence, especially in laboratory studies with animals. These studies have spanned fields such as those of neuroscience, genetics or pharmacology. In contrast, the road followed by clinical research was markedly different, and interest in the study of reinforcement principles waned during the 1980s, especially in the area of alcoholism. The causes of this are several, but two in particular stand out: the influence of cognitive psychology, which provided an alternative framework of analysis (notably the relapse prevention model), and the development of effective pharmacological therapies for addiction to certain substances (such as methadone treatment) (Higgins, Heil & Plebani, 2004).

However, the 1990s saw a vigorous resurgence of clinical research on the principles of reinforcement in drug abuse, and this renewed interest has continued to the present day. To some extent, the recalcitrant nature of cocaine dependence and the failure of pharmacological and psychological treatments for this addiction led to the consideration of an alternative point of view in the response to the problem of drug abuse.

Behavioural choice theory and drug use

As we have seen, research on the principles of reinforcement in substance addicts, especially cocaine users, carried out since the 1990s has included both laboratory studies and work carried out in clinical and natural contexts. An important research line has focused on the application of the principles of *Behavioural Economics* to the analysis of drug-use behaviours. Behavioural Choice Theory (Vuchinich & Tucker, 1988) emerges from the application of the empirical (behavioural) laws of choice of reinforcers to the problem of drugs, and contributes a highly pertinent analysis of drug-use behaviours within the social context (that of sociocultural factors).

Behavioural Economics has been employed in all fields related to substance abuse, from laboratory research to the drawing-up of government policies (Bickel, DeGrandpre & Higgins, 1993). In order to understand the principles of Behavioural Economics we should consider three concepts: *Demand*, *Price* and *Opportunity Cost*. *Demand* refers here to the search for and

consumption of drugs. The concept of *price* refers to the quantity of resources employed in using the drugs (not just their financial value, but also the effort required to obtain them), as well as the negative consequences of consumption. *Opportunity cost* refers to the alternative reinforcers lost because of the substance use. Thus, demand (search for and consumption of substances) will vary as a function of price and opportunity cost, so that the manipulation of these two variables will be crucial to the development of strategies for reducing drug use. Specifically, increase in price and opportunity cost will result in a directly proportional drop in consumption.

Various studies with animals and humans have demonstrated how, indeed, drug-taking (demand) varied as a function of price (Nader & Woolverton, 1992) and of opportunity cost (Higgins, Bickel & Hughes, 1994).

A considerable number of laboratory studies have set out to examine the influence of alternative reinforcers (other than drugs) on preference and choice in relation to cocaine use. The results of such studies indicate a certain malleability of the reinforcing effect of cocaine, which could become weakened depending on the alternative reinforcer.

In a similar line, an emerging area of research suggests that substance addicts tend to put a lower value on deferred reinforcers and the importance of lost reinforcers, compared to non-users; thus, addicts display greater preference for: a) more immediate and lower-magnitude reinforcers than for more deferred and higher-magnitude ones, and b) more immediate and higher-magnitude losses (punishments) than for more immediate and lower-magnitude ones (Bickel & Marsch, 2001).

Another crucial factor for understanding drug-use behaviours is the role of time delay. In natural contexts, individuals frequently choose between taking drugs in the present and abstaining from their use in order to experience positive consequences in the future. Laboratory studies have shown how a time delay reduces the power of the alternative reinforcer for competing with the immediate reinforcing consequences of using the drug.

PSYCHOLOGICAL TREATMENTS FOR DRUG ADDICTION

A clear implication of this bio-psycho-social and multi-factor model (in which substance use is triggered and maintained by complex interactions between susceptibility, context, behaviour and its consequences) is that substance-use disorders can affect many areas of the

person's functioning, and that, therefore, they frequently require a multi-modal approach, which includes biological, behavioural and social aspects.

Some treatment components may be aimed directly at the effects of the use of the substance, whilst others should focus on the conditions that have contributed to or have resulted from the drug use. Research on the results of psychological treatments (particularly those of contingency management programmes) shows how the principles of reinforcement can significantly increase rates of abstinence from drugs. Thus, contingency management techniques (including, here, skills training strategies, which are basically aimed at increasing the accessibility of reinforcers alternative to the use of drugs) are proposed as the most effective procedures for the treatment of drug-abuse problems.

Therefore, a description of psychological treatments for drug addiction should include three types of intervention strategy: operant techniques (contingency management), classical conditioning (exposure) techniques and cognitive-behavioural techniques (skills training).

Contingency Management

Contingency Management (CM) involves the systematic application of reinforcers or punishments contingent upon the occurrence of the target behaviour or its absence.

Interventions based on CM can be understood as actions that directly and systematically increase the opportunity cost (alternative reinforcers) of drug use. This type of programme sets certain conditions under which patients lose potential reinforcers if they consume one or various substances. When patients use drugs during the treatment, in addition to the cost associated with their use, they lose certain reinforcers that would be available to them if they had remained abstinent (Higgins, 1996). CM programmes have employed a wide range of reinforcers, such as clinical privileges, access to jobs or housing, cash, or vouchers and discount tickets for buying goods and services in the community (Petry, 2000).

The type of CM intervention that has received most attention from research is that in which patients earn vouchers exchangeable for goods and services, contingent on abstinence from drug use. Apart from reinforcing abstinence, CM programmes based on the use of vouchers have been employed to reinforce other therapeutic goals, such as increased adherence to medication (naltrexone, antiretroviral therapy, etc.) or treatment retention and attendance at sessions.

Throughout the 1990s, scores of studies were published on the use of vouchers as a reinforcement strategy, and the vast majority (around 85%) reported significant improvements in relation to drug use and associated behaviours (Higgins, Heil & Plebani, 2004). A considerable number of these studies were carried out by Professor S. Higgins' group at the University of Vermont, with cocaine addicts, whilst several studies carried out by Silverman and colleagues replicated and extended these procedures to heroin addicts on methadone treatment programmes who were also cocaine users (Silverman, 2004). The results of the meta-analysis by Griffith, Rowan-Szal, Roark and Simpson (2000), which included 30 studies that used different types of reinforcers (increase of methadone dosage, dose of methadone to take home and incentives contingent upon abstinence), confirmed that contingency management was an effective strategy for reducing drug use in outpatient programmes of maintenance with methadone.

Thus, the research results suggest that incentive programmes based on contingency management are effective for the treatment of addiction to different substances and with different populations (Higgins, Heil & Plebani, 2004; Roozen et al., 2004; Secades-Villa & Fernández-Hermida, 2003). In fact, incentive therapy based on vouchers represents just one of the forms in which operant methods can be employed in attempts to reduce cocaine use and dependence (Higgins et al., 2000). In some programmes this strategy has been applied by means of treatment protocols with very well-defined structure and components, such as those described below.

Community Reinforcement Approach

The Community Reinforcement Approach (CRA) (Hunt & Azrin, 1973) is a pioneering programme in the treatment of severe alcoholism by means of operant methods, whose objective is to reduce alcohol consumption and increase functional behaviour.

CRA seeks therapeutic change by manipulating natural contingencies. In the terms of behavioural economics the treatment would be increasing the opportunity cost, as it would improve the quality of those reinforcers that patients lose when they consume drugs.

This programme is applied in groups or individually, and with both in- and outpatients. Its components vary depending on the clinical population and patients' individual needs, but it usually has the following

components: a) strategies for reducing barriers to treatment, b) vocational counselling for unemployed patients, c) identification of antecedents and consequences of drug use and healthy alternative behaviours, d) behavioural therapy for couples, e) training in skills for reducing the risk of relapse (e.g., rejection skills, social skills, mood management), and f) disulfiram therapy for individuals with alcohol problems.

CRA has strong empirical support obtained through well-controlled studies, so that it can be considered a well-established programme. Moreover, a point in its favour compared to other procedures is that, so far, all the studies aimed at confirming its efficacy have reported positive results. The article by Miller, Meyers and Hiller-Sturmhöfel (1999) provides a good review of research on the effectiveness of CRA.

Community Reinforcement Approach plus incentive therapy

This protocol was initially developed for the treatment of cocaine addicts in outpatient contexts (Buchey & Higgins, 1998; Higgins et al., 1991). CRA + Incentive combines the Community Reinforcement Approach, originally developed as an effective treatment for alcoholism (Hunt & Azrin, 1973), with a contingency management programme, in which patients can earn points exchangeable for certain reinforcers that contribute to the attainment of the programme goals, as long as they stay on the programme without consuming cocaine.

The therapy has six components: incentive therapy, drug-use coping skills, lifestyle changes, relationships counselling, use of other drugs, and treatment of other disorders. The order of these components and the number of sessions devoted to each one vary depending on patient needs.

The incentive therapy sub-component is a contingency management procedure through which retention and abstinence are systematically reinforced. The points or vouchers are earned in exchange for negative urine tests, and the number of points increases with each consecutive negative analysis. The procedure not includes only a reward for each negative urine sample: greater incentives are offered for longer periods of continuous abstinence. Vouchers can be exchanged for certain incentives (goods and services) that help patients to achieve the therapeutic goals and to improve their lifestyle. In no case is money used as a means of reinforcing abstinence.

This multi-component treatment has shown itself to be

effective in several well-controlled studies with adult cocaine addicts in outpatient programmes. For this reason it is currently among the programmes approved by the NIDA (National Institute on Drug Abuse) in the United States. Prof. Higgins' group at the University of Vermont has carried out many clinical trials examining the effectiveness of this programme. In two of these works (Higgins et al., 1991, 1993) CRA + incentive therapy was found to be superior, several months after the treatment, to a traditional psychological counselling programme. In subsequent trials (Higgins et al., 2003; Higgins et al., 1994) it was found that participants who received the complete programme attained significantly higher abstinence rates than those who received just one of the two modules (CRA or incentives). The results also indicate that the efficacy of the programme is maintained over long follow-up periods (Higgins et al., 1995).

Finally, the efficacy of this programme for the treatment of cocaine addiction has also been demonstrated in studies carried out in community contexts in Spain (Secades-Villa, García-Rodríguez, Alvarez Rodríguez, Río Rodríguez, Fernández-Hermida & Carballo, in press; García-Rodríguez et al., 2006).

In sum, the Community Reinforcement Approach plus incentive therapy can be considered a first-choice treatment, at least for the treatment of cocaine dependence. Its authors suggest that the programme's long-term effectiveness resides, at least partly, in its capacity for achieving initial periods of abstinence in the majority of patients (Higgins, Badger & Budney, 2000). Furthermore, this strategy has the virtue of combining the manipulation of "artificial" and "natural" contingencies (Higgins, 1996). Natural contingencies would be involved in the therapeutic modules making up the CRA: drug-rejection skills, lifestyle changes, social relations counselling, abuse of other substances and management of associated disorders; Incentive Therapy, on the other hand, would be situated at the pole of artificial contingencies, as a CM programme in which patients earn vouchers they can exchange for different goods and services, as long as they remain abstinent from cocaine.

Treatments located closer to the "natural" pole should have more advantages than those situated at the opposite pole, at least as far as long-term abstinence is concerned, since the "natural" contingencies are those which, in the end, must maintain any therapeutic change that occurs. On the other hand, operant behaviour is highly sensitive to the precision of the contingencies that control it, and

one advantage of treatments closer to the “artificial” pole is that the contingencies can be manipulated more precisely than the “natural” ones.

The above observations suggest that perhaps the best approach would be a combination of natural and artificial contingencies during the first stages of treatment, followed by an attempt to maintain the therapeutic changes through natural contingencies, once an initial period of abstinence has been achieved.

Therapeutic Workplace

A particular version of the use of contingency management with addicts to more than one substance on methadone programmes is the *Therapeutic Workplace* programme, in which salary is used as a reinforcer contingent upon abstinence (from cocaine and heroin) and upon other behaviours linked to participation in an employment module (punctuality, learning, productivity and other “professional behaviours”). Kenneth Silverman’s team at Johns Hopkins University School of Medicine in Baltimore carried out an initial study in which they applied this strategy to a group of unemployed women (recent and expectant mothers) on a methadone programme. After six months, abstinence rates for both substances in the experimental group were double those attained by the control group (Silverman, Svikis, Robles, Stitzer & Bigelow, 2001), and these good results were maintained at the three-year follow-up (Silverman, Svikis, Wong, Hampton, Stitzer & Bigelow, 2002). Its authors conclude that the *Therapeutic Workplace* can be effective in the long term for the treatment of addiction to cocaine and heroin with this type of patient. However, some authors express doubts about the applicability of this procedure in real contexts (due to the complexity of the reinforcement programme) and its true efficacy (since it is difficult to discern the extent to which the decrease in drug use is due to the programme of contingencies or to the mere fact that participants are involved in an activity that can compete with the drug-use behaviour) (Marlatt, 2001; McLellan, 2001; Petry, 2001). That is, the direct reinforcement of abstinence is supported with the reinforcement of behaviours that can compete with the use of drugs, thus, facilitating non-consumption.

Other treatments based on Contingency Management

In addition to these programmes based explicitly on CM, other highly popular treatments also use strategies aimed at manipulating the opportunity cost of drug use

(Higgins, 1996). These would include, for example, brief interventions such as the Motivational Interview (Miller & Rollnick, 1991). The Motivational Interview is a type of approach that has shown itself to be highly effective above all for reducing alcohol consumption and the associated harm in heavy drinkers (with low or moderate levels of dependence) (Saunders, Wilkinson & Phillips, 1995; Stotts, Schmitz, Rhoades & Grabowski, 2001), but also for reducing the use of other drugs (Bien, Miller & Boroughs, 1993; Handmaker, Miller & Manicke, 1999) or increasing treatment retention (Secades-Villa, Fernández-Hermida & Arnáez Montaraz, 2004). The Motivational Interview is a particularly useful technique with those who are resistant to change. Its objective is to break through the denial and ambivalence and activate the user in the direction of change. The strategies of the Motivational Interview are more persuasive than coercive. According to its authors, classical cognitive-behavioural strategies, based on Skills Training, assume that the participant is already at the “action” stage (and therefore motivated for change), so that the emphasis is placed on training people how to change; in contrast, the Motivational Interview sets out to build the commitment to change (the “why” component). Thus, this procedure is based on five general principles: the expression of empathy, the development of discrepancy, the avoidance of arguing, overcoming resistance to change, and increasing self-efficacy. In particular, the development of discrepancy involves the therapist helping patients to identify discrepancies between their current behaviour and their personal aspirations and goals. This exercise implies exploring the potential consequences of patients’ current (drug-use) behaviour – that is, making them aware of the costs of such behaviour.

The Alcoholics Anonymous (AA) programme is also based largely on the principles of reinforcement (Secades-Villa & Pérez Álvarez, 1998). There are at least three practices common in AA and similar 12-step programmes that can be reconceptualized from Behavioural Economics. The companionship and camaraderie characteristic of such self-help groups could be understood as efforts to improve the social life of group members, as in CRA. Also, the fact that members cannot participate in activities if they are under the influence of any substance increases the opportunity cost after consumption, depriving them of the companionship and help they would enjoy if they were sober or “clean”.

Finally, the medals and other means of rewarding continuous abstinence would be related to the increase in price if the patient starts to consume again, since recognition from one's colleagues does not return until the patient demonstrates prolonged abstinence.

Cognitive-behavioural treatments

Programmes based on Cognitive-Behavioural Therapy (CBT) are focused on training in certain skills for responding appropriately to the environmental and individual antecedents and consequences (cognitions and emotions) that maintain the drug-use behaviour. Coping skills deficits and certain maladaptive cognitions are considered the greatest risk factors for drug use. Within this paradigm we can distinguish three intervention models: Coping/Social Skills Training, Relapse Prevention (RP) and family/relationships behavioural therapy.

Coping/Social Skills Training

Coping/Social Skills Training is a wide-ranging and well-established cognitive-behavioural procedure particularly widely used in the treatment of alcoholism. The rationale underlying this therapeutic strategy is that the patient lacks adequate skills for dealing with everyday social and interpersonal situations. Such deficiencies can lead to the appearance of conditions of stress that impede appropriate and effective coping with the social pressure to drink alcohol or use other types of drugs. The main goal of this type of intervention is to equip the patient with sufficient coping and self-control skills to be able to manage risk situations produced by the stimuli that trigger the intense desire to drink.

The central aspects of this procedure include: interpersonal skills, assertiveness and expression of emotions; training in problem-solving; coping with cognitive-emotional states; coping with stressful life events; and coping with drug-use risk situations (Monti, Rohsenow, Colby & Abrams, 1995).

The scientific evidence on the effectiveness of the essential therapeutic components of CSST is extensive, particularly in the case of alcohol. Various reviews and meta-analyses show that Skills Training is preferable to other treatments and to non-treatment, and that it increases the effectiveness of interventions when it forms part of broader programmes (Miller et al., 1995).

Recent years have also seen a proliferation of work employing some variant of cognitive-behavioural therapy in combination with pharmacological therapy (naltrexone

or acamprosate). In the majority of cases the combined therapy was found to be superior to the isolated use of one of the components.

Relapse Prevention (RP)

Marlatt and Gordon's (1985) Relapse Prevention (RP) model can be considered as a kind of particular branch of cognitive-behavioural programmes that has established its effectiveness, so that it can be classed as a first-choice treatment.

RP has three basic elements: (1) Skills training strategies, which include both cognitive and behavioural strategies for coping with risk situations: identification of high-risk situations; training in skills of drug-use coping, self-recording and functional analysis; strategies for coping with craving and thoughts associated with substance use; coping with lapses; assertiveness; stress control; communication skills; general social skills; and problem-solving training; (2) cognitive restructuring procedures designed to provide patients with alternative thoughts to those that lead them to consume, imagination strategies for detecting risk situations and strategies for coping with the effect of breaking abstinence; and (3) lifestyle readjustment strategies (such as relaxation or physical exercise) for increasing activities alternative to drug use.

However, although RP is an originally well-structured intervention procedure, with well-differentiated phases and components, in the majority of studies it has not been applied systematically, but rather used as a general method for coping with relapses. Moreover, in many cases it is difficult to appreciate the differences between the components of a skills training programme and those of an RP programme.

Despite these drawbacks there is currently a solid body of empirical evidence in support of the efficacy of RP in the treatment of alcoholism, compared to no treatment, to placebo control, to traditional medical counselling and to self-control strategies. Likewise, several meta-analytical studies consider RP as the first-choice treatment for alcoholism, and some indicate that RP is more effective in the treatment of addiction to alcohol, compared to other substances (Secades-Villa & Fernández-Hermida, 2006).

In the case of heroin there is clearly a scarcity of well-controlled studies and a dispersion and heterogeneity of components employed. However, as regards cocaine, Cognitive-Behavioural Therapy for Coping Skills, based on RP, has strong empirical support, notably from the work carried out at the Substance Abuse Treatment Unit

of Yale University. The program used there is of short duration and has two basic components: functional analysis and skills training.

The parameters of CBT are perfectly delimited, and according to the authors, the active ingredients characteristic of CBT are as follows (Carroll, 1998): functional analysis of drug abuse, training in recognition of and coping with craving, problem-solving, coping with emergencies, coping skills, examination of cognitive processes related to consumption, identification of and coping with risk situations, and use of extra sessions for skills training.

Family/relationships behavioural therapy

Family/relationships behavioural therapy focuses on training in communication skills and on increasing the rate of positive reinforcement in family relationships. It is actually a multi-component programmes that includes techniques such as functional analysis, identification of conflictive relationships that lead to drinking, assignment of tasks, stimulus control, behavioural contract, contingency management, and training in communication and problem-solving skills.

This procedure has been employed above all in the treatment of alcoholism, and the majority of studies have obtained positive results, indicating that techniques aimed at improving patients' family relationships may be a critical component of treatment programmes for alcoholism. Studies by McCrady's and O'Farrell's groups have set the standard. In three of such studies (McCrady, Longabaugh et al., 1986; McCrady, Noel, et al., 1986; McCrady et al., 1991), participants in the family therapy group obtained better results at the 6, 12 and 18-month follow-ups than the other two treatment groups. Similar results were found in the study by Bowers and Al-Redha (1990), in which the alcoholics in the treatment group that included their wives consumed less alcohol at the 12-month follow-up than those who had received a standard individual treatment.

In various studies by O'Farrell's group, Behavioural Marital Therapy (BMT) was found to be effective in reducing alcohol use, maintaining abstinence in the long term and reducing legal, family and social problems (O'Farrell, Cutter & Floyd, 1985; O'Farrell et al., 1996; Fals-Stewart, O'Farrell & Birchler, 1997; O'Farrell, Van Hutton & Murphy, 1999).

In a recent development of relationships therapy that the authors call Community Reinforcement and Family Training

(CRAFT), Miller, Meyers and Tonigan (1999) included the following components: motivational interview, training in contingency management for reinforcing abstinence, training in communication skills, identification of activities that could compete with drinking, identification of risk situations and identification of activities for reinforcing the couple. CRAFT obtained better results than two other family intervention models (AI-Anon and the Johnson Institute's confrontation-based intervention).

Likewise, Meyers, Miller, Hill and Tonigan (1999) found that this type of relationships therapy increased abstinence and treatment adherence and reduced depression behaviours, anxiety, anger and adverse physical symptoms in people close to the patients.

In sum, it can be deduced from the results of the majority of these studies that techniques oriented to improving patients' family relationships can constitute a critical component of treatment programmes. Indeed, family management techniques are an important part of CRA, one of the alcoholism treatment programmes with the most empirical support at the present time (Secades-Villa & Fernández-Hermida, 2003).

Exposure techniques

Cue Exposure Therapy (CET) uses response conditioning for explaining drug use. Thus, originally neutral stimuli that precede this behaviour can, after repeated pairing, become capable of provoking conditioned responses of drug use. These techniques are aimed at reducing cue reactivity through procedures of stimulus control and exposure. The intervention consists in repeated exposure to cues of pre-ingestion of the drug in the absence of its consumption (response prevention), with the consequent extinction of the conditioned responses.

Studies on treatments that incorporate the cue exposure methodology in alcoholism present promising results, but there are still very few of them. The works by Childress, McLellan and O'Brien (1986), Kasvikis, Bradley, Powell, Marks and Gray (1991) or Powell, Gray and Bradley (1993) are good examples of the application of exposure. Even so, in several works exposure has not shown itself to be so effective (e.g., Dawe et al., 1993).

However, this strategy has been more widely used in work on problems of opiate addiction, and although these studies present encouraging results, there are still considerable doubts about the parameters of exposure, which should be addressed in future research. For example: time of exposure in relation to drug abstinence

and use, duration and frequency of exposure sessions for ensuring habituation and extinction, selection of stimulus cues, or method of cue presentation.

Furthermore, many of these studies refer to the difficulty represented by a significant obstacle: generalization of the stimuli outside the treatment framework. In this regard, some authors propose that the fundamental utility of passive extinction is to improve the use of coping skills, often undermined by intense reactivity (anxiety) when faced with stimuli related to the drug. Thus, passive exposure would constitute the initial phase of the intervention, which should be complemented by active intervention strategies (active exposure), such as social skills or coping skills training (Secades-Villa & Fernández-Hermida, 2003).

CONCLUSION: THE EFFICACY OF PSYCHOLOGICAL TREATMENTS

Despite the dominance in recent years of pharmacological treatments, it is appropriate and fair to underline the importance of psychological treatments for drug addiction. This importance is indeed borne out by the reports and treatment handbooks promoted in the last few years by such prestigious bodies as the American Psychological and Psychiatric Associations or the National Institute on Drug Abuse (NIDA). Thus, for example, among its so-called 'principles of effective treatment', the NIDA stresses that psychological therapies are critical components of the effective treatment of addiction, whilst pharmacological treatment is an important element for many patients, especially when combined with behavioural therapies (NIDA, 1999). It should be noted that while pharmacological treatments are beneficial for certain patients, psychological therapies are essential in any combination treatment programme, and that this is in acknowledgement of the central role of such treatments in therapeutic intervention.

Thus, there is substantial scientific support for the efficacy of certain psychological techniques in the treatment of addictive behaviours. Behavioural therapy employs empirically validated treatments that are considered essential strategies for the effective treatment of drug addiction (NIDA, 1999). Operant techniques (contingency management), classical conditioning (exposure) and cognitive-behavioural techniques (skills training), and the different combinations between them, emerge as critical components of such programmes (Secades-Villa & Fernández-Hermida, 2006).

As we have seen, the factors related to the development and maintenance of addictive behaviours are multiple and diverse in nature. Following from this is the clear utility of employing behavioural strategies as part of multi-component programmes; this would include, within such programmes, the possible use of pharmacological therapies (by means of agonist or interdictor substances). It is assumed that the two approaches function by means of different mechanisms and that they affect different (though closely related) aspects of the problem (Secades-Villa & Fernández-Hermida, 2003), so that pharmacological and psychological therapies should be understood not as competitive, but rather as complementary strategies. Programmes such as CRA perfectly encapsulate this point of view.

Nevertheless, despite this relative efficacy, relapse rates in the long term (more than one year of follow-up) continue to be high in all types of addictive behaviours. Therefore, future research lines should aim to remedy some of the deficiencies that affect the long-term results of these programmes.

ACKNOWLEDGEMENTS

This article was produced thanks to a project financed by the Government Dept. for the Spanish National Plan on Drugs (Ref.MINT-03-01), by a pre-doctoral grant from the University of Oviedo (Ref. UNIOVI-04-BECDOC-05) and by a pre-doctoral grant from the Foundation for the Promotion of Applied Scientific Research and Technology (FICYT) of Asturias (Spain) (Ref. BP05-002).

REFERENCES

- Bickel, W. K., DeGrandpre, R. J. & Higgins, S. T. (1993). Behavioral economics: a novel experimental approach to the study of drug dependence. *Drug and Alcohol Dependence*, 33(2), 173-192.
- Bickel, W.K. & Marsch, L.A. (2001). Toward a behavioural economic understanding of drug dependence: delay discounting processes. *Addiction*, 96, 73-86.
- Bien, T.H., Miller, W.R. & Borougs, J.M. (1993). Motivational interviewing with alcohol outpatients. *Behavioural and Cognitive Psychotherapy*, 21, 347-356.
- Bigelow, G.E. & Silverman, K. (1999). Theoretical and empirical foundations of contingency management treatments for drug abuse. In S.T. Higgins & K. Silverman (Eds.), *Motivating behavior change among*

- illicit drug abusers: Research and contingency management interventions (pp. 15-31). Washington, DC: American Psychological Association.
- Bowers, T.G. & Al-Redha, M.R. (1990). A comparison of outcome with group/marital and standard/individual therapies with alcoholics. *Journal of Studies on Alcohol*, 51, 301-309.
- Brooner, R.K., Kidorf, M., King, V.L. & Bigelow, G.E. (1997). Using behaviorally contingent pharmacotherapy in opioid abusers enhances treatment outcome. In L.S. Harris (Ed.), *Problems of drug dependence 1996* (NIDA Research Monograph, 174). Washington, DC: US Department of Health and Human Services.
- Budney, A. J. & Higgins, S. T. (1998). A Community Reinforcement Plus Vouchers Approach: Treating Cocaine Addiction. Rockville: National Institute on Drug Abuse.
- Carroll, K.M. (1998). A Cognitive-Behavioral Approach: Treating Cocaine Addiction. Rockville, MD.: National Institute on Drug Abuse.
- Childress, A.R., McLellan, A.T. & O'Brien, C.P. (1986). Conditioned responses in methadone population: A comparison of laboratory, clinic and natural setting. *Journal of Substance Abuse Treatment*, 3, 173-179.
- Fals-Stewart, W., O'Farrell, T.J. & Birchler, G.R. (1997). Behavioral couples therapy for male substance-abusing patients: a cost outcomes analysis. *Journal of Consulting and Clinical Psychology*, 65, 789-802.
- García-Rodríguez, O., Secades-Villa, R., Alvarez Rodríguez, O., Río Rodríguez, A., Fernández-Hermida, J.R., Carballo, J.L., Errasti Pérez, J.M. & Al-Halabi Díaz, S. (2006). Efecto de los incentivos sobre la retención en un tratamiento ambulatorio para adictos a la cocaína. *Psicothema*, 19, 134-139.
- Griffith, J.D., Rowan-Szal, G.A., Roark, R.R. & Simpson, D.D. (2000). Contingency management in outpatient methadone treatment: a meta-analysis. *Drug and Alcohol Dependence*, 58, 55-66.
- Handmaker, N.S., Miller, W.R. & Manicke, M. (1999). Findings of a pilot study of motivational interviewing with pregnant drinkers. *Journal of Studies on Alcohol*, 60, 285-287.
- Higgins, S. T. (1996). Some potential contributions of reinforcement and consumer-demand theory to reducing cocaine use. *Addictive Behaviors*, 21(6), 803-816.
- Higgins, S.T., Badger, G.J. & Budney, A.J. (2000). Initial abstinence and success in achieving longer term cocaine abstinence. *Experimental and Clinical Psychopharmacology*, 8, 377-386.
- Higgins, S. T., Bickel, W. K. & Hughes, J. R. (1994). Influence of an alternative reinforcer on human cocaine self-administration. *Life Sciences*, 55(3), 179-187.
- Higgins, S.T., Budney, A.J., Bickel, W.K., Hughes, J.R., Foerg, F. & Badger, G.J. (1993). Achieving cocaine abstinence with a behavioral approach. *American Journal of Psychiatry*, 150, 763-769.
- Higgins, S.T., Budney, A.J., Bickel, W.K., Badger, G.J., Foerg, F.E. & Ogden, A.D. (1995). Outpatient behavioural treatment for cocaine dependence: one-year outcome. *Experimental and Clinical Psychopharmacology*, 3, 205-212.
- Higgins, S.T., Delaney, D.D., Budney, A.J., Bickel, W.K., Hughes, J.R., Foerg, F. & Fenwick, J.W. (1991). A behavioural approach to achieving initial cocaine. *American Journal of Psychiatry*, 148, 1218-1224.
- Higgins, S.T., Heil, S.H. & Plebani, J. (2004). Clinical implications of reinforcement as a determinant of substance use disorders. *Annual Review of Psychology*, 55, 431-461.
- Higgins, S. T., Sigmon, S. C., Wong, C. J., Heil, S. H., Badger, G. J., Donham, R., Dantona, R. L., & Anthony, S. (2003). Community reinforcement therapy for cocaine-dependent outpatients. *Archives of General Psychiatry*, 60, 1043-1052.
- Hunt, G.M. & Azrin, N.H. (1973). A community-reinforcement approach to alcoholism. *Behaviour Research and Therapy*, 11, 91-104.
- Kasvikis, Y., Bradley, B., Powell, J., Marks, I. & Gray, J.A. (1991). Postwithdrawal exposure treatment to prevent relapse in opiate addicts: A pilot study. *International Journal of the Addictions*, 26, 1187-1195.
- Marlatt, G.A. (2001). Integrating contingency management with relapse prevention skills. Comment on Silverman et al. (2001). *Experimental and Clinical Psychopharmacology*, 9, 33-34.
- Marlatt, G.A. & Gordon, J.R. (Eds.) (1985). Relapse prevention. Maintenance strategies in the treatment of addictive behaviors. New York: The Guilford Press.
- McCrary, B.S., Longabaugh, R., Fink, E., Stout, R., Beattie, M. & Ruggieri-Auethlet, A. (1986). Cost effectiveness of alcoholism treatment in partial hospital versus inpatient settings after brief inpatient treatment: 12-month outcomes. *Journal of Consulting and Clinical Psychology*, 54, 708-713.

- McCrary, B.S., Noel, N.E., Abrams, D.B., Stout, R.L., Nelson, H.F. & Hay W.M. (1986). Comparative effectiveness of three types of spouse involvement in outpatient behavioral alcoholism treatment. *Journal of Studies on Alcohol*, 47, 459-467.
- McCrary, B.S., Stout, R., Noel, N.E., Abrams, D.B. & Nelson, H.F. (1991). Effectiveness of three types of spouse-involved behavioral alcoholism treatment. *British Journal of Addictions*, 86, 1415-1424.
- McKim, W.A. (2000). Drugs and behavior. An introduction to behavioral pharmacology. Upper Saddle River, NJ: Prentice-Hall.
- McLellan, A.T. (2001). Moving toward a "third generation" of contingency management studies in the drug abuse treatment field. Comment on Silverman et al. (2001). *Experimental and Clinical Psychopharmacology*, 9, 29-32.
- Meyers, R.J., Miller, W.R., Hill, D.E. & Tonigan, J.S. (1999). Community reinforcement and family training (CRAFT): engaging unmotivated drug users in treatment. *Journal of Substance Abuse*, 10, 291-308.
- Miller, P.M. (1975). A behavioural intervention program for chronic public drunkenness offenders. *Archives of General Psychiatry*, 32, 915-918.
- Miller, W.R., Brown, J.M., Simpson, T.L., Handmaker, N.S., Bien, T.H., Luckie, L.F., Montgomery, H.A., Hester, R.K. & Tonigan, J.S. (1995). What works? A methodological analysis of the alcohol treatment outcome literature. In R.K. Hester & W.R. Miller (Eds.), *Handbook of alcoholism treatment approaches. Effective alternatives*. Needham Heights, MS.: Allyn & Bacon.
- Miller, W.R., Meyers, R.J. & Hiller-Sturmhöfel, S. (1999). The Community-Reinforcement Approach. *Alcohol Research and Health*, 23, 116-119.
- Miller, W.R., Meyers, R.J. & Tonigan, J.S. (1999). Engaging the unmotivated in treatment for alcohol problems: a comparison of three strategies for intervention through family members. *Journal of Consulting and Clinical Psychology*, 67, 688-697.
- Miller, W. R. & Rollnick, S. (1991). *Motivational interviewing: Preparing people to change addictive behavior*. New York, NY: Guilford Press.
- Monti, P.M., Rohsenow, D.R., Colby, S.M. & Abrams, D.B. (1995). Coping and social skills training. In R.K. Hester & W.R. Miller (Eds.), *Handbook of alcoholism treatment approaches. Effective alternatives*. Needham Heights, Massachusetts: Allyn & Bacon.
- Nader, M. A. & Woolverton, W. L. (1992). Effects of increasing response requirement on choice between cocaine and food in rhesus monkeys. *Psychopharmacology (Berl)*, 108(3), 295-300.
- National Institute on Drug Abuse (1999). *Principles of drug addiction treatment*. Washington: U.S. Department of Health and Human Services.
- O'Farrell, T.J., Cutter, H.S. & Floyd, F.J. (1985). Evaluating behavioral marital therapy for male alcoholics: effects on marital adjustment and communication from before to after treatment. *Behavior Therapy*, 16, 147-167.
- O'Farrell, T.J., Choquette, K.A. & Cutter, H.S., Floyd, F.J., Bayog, R., Brown, E.D., Lowe, J., Chan, A. & Deneault, P. (1996). Cost-benefit and cost-effectiveness analyses of behavioral marital therapy as an addition to outpatient alcoholism treatment. *Journal of Substance Abuse*, 8, 145-166.
- O'Farrell, T.J., Van Hutton, V. & Murphy, C.M. (1999). Domestic violence before and after alcoholism treatment: a two-year longitudinal study. *Journal of Studies on Alcohol*, 60, 317-321.
- Petry, N. M. (2000). A comprehensive guide to the application of contingency management procedures in clinical settings. *Drug and Alcohol Dependence*, 58(1-2), 9-25.
- Petry, N.M. (2001). Challenges in the transfer of contingency management techniques. Comment on Silverman et al. (2001). *Experimental and Clinical Psychopharmacology*, 9, 29-32.
- Pickens, R. & Thompson, T. (1968). Cocaine-reinforced behavior in rats: Effects of reinforcement magnitude and fixed-ratio size. *Journal of Pharmacology and Experimental Therapeutics*, 161, 122-129.
- Pomerleau, O.F. & Pomerleau, C.S. (1987). A biobehavioral view of substance abuse and addiction. *Journal of Drug Issues*, 17, 111-131.
- Powell, J., Gray, J. & Bradley, B. (1993). Subjective craving for opiates: evaluation of a cue exposure protocol for use with detoxified opiate addicts. *British Journal of Clinical Psychology*, 32, 39-53.
- Roizen, H. G., Boulogne, J. J., van Tulder, M. W., van den Brink, W., De Jong, C. A. & Kerkhof, A. J. (2004). A systematic review of the effectiveness of the community reinforcement approach in alcohol, cocaine and opioid addiction. *Drug and Alcohol Dependence*, 74, 1-13.
- Saunders, B., Wilkinson, C. & Phillips, M. (1995). The

- impact of a brief motivational intervention with opiate attending a methadone programme. *Addiction*, 90, 415-424.
- Schuster, C.R. & Johanson, C.E. (1981). An analysis of drug-seeking behavior in animals. *Neuroscience and Biobehavioral Reviews*, 5, 315-323.
- Secades-Villa, R. & Fernández-Hermida, R. (2003). Guía de los tratamientos psicológicos eficaces para la drogadicción: alcohol, cocaína y heroína (pp.107-139). In M. Pérez, J.R. Fernández-Hermida, C. Fernández & I. Amigo, Guía de Tratamientos psicológicos eficaces. Madrid: Pirámide.
- Secades-Villa, R. & Fernández-Hermida, J.R. (2006). Tratamiento cognitivo-conductual. In G. Cervera, J.C. Valderrama, J.C. Pérez de los Cobos, G. Rubio & L. Sanz, Manual SET de Trastornos Adictivos. Madrid: Editorial Médica Panamericana.
- Secades-Villa, R., Fernández-Hermida, J.R. & Arnáez Montaraz, C. (2004). Motivational interviewing and treatment retention among drug abuse patients: a pilot study. *Substance Use & Misuse*, 39, 9, 1369-1378.
- Secades-Villa, R., García-Rodríguez, O., Álvarez Rodríguez, H., Río Rodríguez, A., Fernández-Hermida, J.R. & Carballo, J.L. (in press). El Programa de Reforzamiento Comunitario más Terapia de Incentivo para el Tratamiento de la Adicción a la Cocaína. *Adicciones*.
- Secades-Villa, R. & Pérez Álvarez, M. (1998). Análisis conductual de los procesos de cambio en Alcohólicos Anónimos. *Análisis y Modificación de Conducta*, 24, 98, 883-904.
- Silverman, K. (2004). Exploring the limits and utility of operant conditioning in the treatment of drug addiction. *The Behavior Analyst*, 27, 209-230.
- Silverman, K., Svikis, D., Robles, E., Stitzer, M.L. & Bigelow, G.E. (2001). A reinforcement-based Therapeutic Workplace for the treatment of drug abuse: Six-month abstinence outcomes. *Experimental and Clinical Psychopharmacology*, 9, 14-23.
- Silverman, K., Svikis, D., Wong, C.J., Hampton, J., Stitzer, M.L. & Bigelow, G.E. (2002). A reinforcement-based Therapeutic Workplace for the treatment of drug abuse: three-year abstinence outcomes. *Experimental and Clinical Psychopharmacology*, 10, 228-240.
- Stotts, A.L., Schmitz, J.M., Rhoades, H.M. & Grabowski, J. (2001). Motivational interviewing with cocaine-dependent patients: a pilot study. *Journal of Consulting and Clinical Psychology*, 69, 858-862.
- Vuchinich, R.E. & Tucker, J.A. (1988) Contributions from behavioral theories of choice to an analysis of alcohol abuse. *Journal of Abnormal Psychology*, 97, 181-195.
- Yanagita, T. (1973). An experimental framework for evaluation of dependence liability of various types of drugs in monkeys. *Bulletin of Narcotics*, 25, 57-64.