COGNITIVE MISPERCEPTIONS AS DETERMINANTS OF DRUG MISUSE

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ABSTRACT

This paper describes the role of four types of cognitive misperception-related variables in the arena of drug misuse: cognitive-information errors, limitations in cognitive processes occurring during a period of experimentation with drug use, belief-behavior congruence maintenance, and situational/contextual distortion. Several current prevention strategies are provided aimed to counteract these misperception-related variables. By addressing each of these variables, novel drug misuse preventive strategies might be uncovered.

Key Words: cognitive misperceptions, addictions, prevention.

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RESUMEN

Este artículo describe el papel de cuatro tipos de variables relacionadas con errores cognitivos en el ámbito del abuso de drogas: errores cognitivos-informativos, limitaciones en los procesos cognitivos que ocurren durante periodos de experimentación con consumo de drogas, mantenimiento de la congruencia creencia-conducta y distorsión situacional/contextual. Diversas estrategias de prevención actuales tienen como objetivo neutralizar estas variables relacionadas con errores cognitivos. El abordaje de dichas variables permitiría el desarrollo de nuevas estrategias preventivas del abuso de drogas.

Palabras clave: adicciones, prevención, errores cognitivos.

INTRODUCTION

The addictions have been referred to as a problem of perception among those in the recovery movement as well as by various researchers (Alcoholics Anonymous, 1976; Chuck C., 1984; Ellis & Harper, 1975; Glynn, Levanthal, & Hirshman, 1994; Gorski, 1989; Johnson, 1980; Meichenbaum, 1977; Sussman et al., 2004; Twerski, 1997). For example, Twerski (1997) discusses the thinking of drug abusers as exhibiting various distortions of thought. He believes that recognition of such cognitive distortions and their remediation needs to come from outside the addict; that the addict may block out certain facts that must be provided by others. However, exactly how it is that selective learning of information occurs, and how it is that subsequent, more accurate, potentially corrective information is not incorporated adequately into one's cognitive repertoire, generally is not described. A better understanding of the formation and maintenance of cognitive misperceptions can come from an integration of several literatures: recovery movement, critical thinking (philosophy), social and cognitive psychology, health psychology, clinical psychology, health behavior research, and sociology. From an examination of cognitive misperception-related phenomena within these literatures, types of cognitive variables may be inferred that are relevant to an understanding of the processes underlying the formation and maintenance of addictions.

First, cognitive misperceptions are created that might make drug use appear to be an attractive option to a perceiver. "Cognition-infor-

mation" errors may facilitate one's interest in trying and experimenting with drugs. Such errors may serve to make drug use appear to be a statistically normative, acceptable, or subjectively desirable behavior. Once one begins drug use, subjective effects of the drugs and peripheral experiences may reinforce continued use. Both explicit and implicit cognitive processes may lead the user to create automatic ties of use behavior to a variety of cues and outcomes that facilitate continued use (Stacy & Ames, 2001). Over time, negative consequences of drug use occur, but often corrective information is not deeply processed and drug misuse behavior does not change. Certainly, corrective information would need to compete with all ready pre-learned information (Sussman & Unger, 2004; Wiers et al., 2004). One's cognitive processing limits may deter successful competition with all ready learned information.

There may also be cognitive processes that actively deter learning new information. First, one may be driven to maintain belief-behavior congruence. One may utilize cognitive processes that serve to either distance the perceiver from incongruence between one's beliefs and behavior, perhaps to keep incongruent information from consciousness, or one may utilize logical-appearing processes that more directly attempt to maintain congruence between behavior (drug misuse) and one's beliefs. Second, one may distort the context of one's lifestyle to normalize one's behavior (situational/contextual distortions).

The following sections of this paper will briefly summarize each of these variables. Cognitive-information error formation is described first. Next, cognition processes occurring during the development of a behavioral relationship with drug use are described (explicit and implicit cognition), and cognitive processing limits are mentioned. These two cognitive variables may facilitate development of a stable pattern of drug misuse. Then, belief-behavior congruence processes are discussed, including "distancing" and other means to maintain congruence (e.g., logical fallacies). Finally, situational/contextual distortion perspectives are offered. These latter two types of cognitive variables may help maintain a stable pattern of drug misuse. Finally, approaches to counteract cognitive-information errors, cognitive variables associated with the development of a behavioral relationship with drug use, belief-behavior congruence, and situational/contextual distortions are suggested for the prevention of drug misuse.

COGNITION-INFORMATION ERRORS

One prefers to live with certainty; one bases one's ascertainment of predictability and control in one's life based on one's experiences. One's experiences become one's taken-for-granted-world (Schutz & Luckman, 1973). Representativeness or availability heuristics involve basing judgments on one's experiential schema of how representative a case appears to be, or how easily the case comes to mind, rather than relying on further evidence. Thus, errors of frequency or importance occur for *rare* or *vivid* stimuli (Kahneman, 2003), sometimes regardless of the distinctiveness of the stimuli within the encoding context (McConnell, Sherman, & Hamilton, 1994).

Specific theories in health behavior research that have been employed to explain these phenomena that increase one's sense of certainty include the *false consensus effect* (Sherman, et al. 1983), *illusory correlation* (McConnell, Sherman, & Hamilton, 1994), *implicit cognition theory* (Stacy & Ames, 2001), and *unrealistic optimism* (Weinstein, 1982; Weinstein, 1987). The false consensus effect refers to a tendency to believe that one's own attitudes or behaviors are more prevalent than they actually are. Illusory correlation as applied to behavioral phenomena refers to a tendency to overestimate the co-occurrence of two infrequent events or objects, perhaps due to processing mechanisms related to the relatively novelty of their co-occurrence (e.g., drug use behavior and very novel pleasurable events [peak experiences]). Implicit cognition theory, in part, describes tendencies to bias one's automatic outcome associations of consequences of one's behavior based on repeated associations of one's behavior with positive consequences in the past. Unrealistic optimism is the tendency to perceive that one's chances of suffering an (unexpected or undesired) disease is less than is actually the case. Together, the cognitive experiences described by these theories may tend to normalize one's estimates of drug use frequency or appropriateness, lead one to infer greater pleasure of the outcomes of one's behavior than is actually indicated in repeated experience, and lead one to discount likelihood of negative consequences to self from drug use.

There are several specific examples of how cognitive-information errors occur among those at risk for participation in unhealthy lifestyles. Pertaining to errors in frequency estimation, relative overestimation of drug use prevalence, relative overestimation of peer approval of drug use, and relative underestimation of personal risk for negative drug use consequences may lead to (or stem from) problem drug use (Sussman et al., 1988; MacKinnon et al., 1991; Weinstein, 1982; Weinstein, 1987). Rela-

tive overestimation of the normative frequency of one's attitudes and behavior (false consensus) may differ by health area, and may serve positive functions as well as negative functions for health (e.g., in depression it may serve a self-protective function; Tabachnik, Crocker, & Alloy, 1983). In the arena of drug abuse it serves a self-destructive function (e.g., Sherman et al., 1983; Sussman et al., 1988). These frequency errors tend to result from selective exposure to others that use drugs, tendency to more firmly process vivid stimuli, and motivational distortions that conform to one's recent behavior (e.g., Sherman et al., 1983; Sussman et al., 1988).

Further, biased recall may result merely from repeated memory associations (e.g., Stacy & Ames, 2001). For example, mere familiarity with statements about drug effects, no matter whether they are provided as statements of myth or fact, may alter outcome expectancies regarding drug use effects which are consistent with previously learned statements or behavior. Myths may become interpreted as facts subsequently, reinforcing previously pleasurable subjective effects of drug use experiences.

LIMITS IN COGNITIVE PROCESSING AND DRUG USE

There are two general cognitive processing systems that operate during the development of a behavioral relationship with drug use, one's explicit cognitive processes, including executive functioning, and one's implicit cognitive processes. These two cognitive systems operate together to direct one's behavior as a behavioral relationship is forming with drug use. Executive functioning operates to solve abstract problems and to plan one's behavior. Executive function processes detect changes in performance as a function of continued drug use. Decrements in performance may become recognized and logically attributed to drug use if deliberately processed (Sussman & Unger, 2004).

Implicit cognitive processes involve automatically activated cognitions that sometimes can be manifested in one's conscious stream of thought (if unfiltered), as opposed to deliberate processing of information. As such, implicit cognition is rapidly changing and not easily subject to introspection. Implicit cognitive processes act more on a store of information that includes the previous pleasurable effects of drug use as well as memory of decrements in current performance as a function of drug use. Interestingly, explicit and implicit cognitive systems are likely to interact and take different "roles" regarding the contemplation and performance of a behavior. One may observe himself/ herself acting out

of impulse and know that it is self-defeating (executive function), yet keep doing it anyway (implicit cognition function). In this instance, one is acting on implicit cognition, while one's executive functioning is acting as the "observer". It is possible for one to resist drug use through structuring one's time (executive function), although thoughts of drug use and pleasure may keep coming to mind spontaneously (implicit cognition). In this case, executive function is the actor and implicit cognition is the observer. Certainly, context factors as stimuli may influence the relative operation "strength" of explicit or implicit cognition. Stimuli that tend to evoke pleasurable drug-related memories may tend to influence implicit cognition, while stimuli that tend to evoke awareness of negative effects of drug use on current performance may tend to influence explicit cognition, at least until explicit cognitive information becomes later stored as implicit information (Alcoholics Anonymous, 1976; Stacy & Ames, 2001; Sussman & Unger, 2004; Wiers et al., 2004).

Corrective *executive operations are impaired* by time pressure, concurrent (multiple) task demands, mood fluctuation, or avoidance of having the desire or tendency to plan events (Kahneman, 2003; Matthys & Lochman, 2005). That is, corrective operations are impaired by cognitive processing limits. One acts to the limits of his or her behavioral repertoire, and one's knowledge of behavioral choices. One may or may not be fully aware of living in a world of "free operants" (Epstein, 1992). In other words, one may not be aware that there are several choices one may make to obtain satisfactory life outcomes. This lack of awareness may come from different sources. First, one may be unable to comprehend subtle information, or otherwise interact effectively enough with others so as to obtain needed information. Second, one may have a difficulty keeping two or more options "in mind" in working memory (Stacy & Ames, 2001). Third, one may have difficulty generating and weighing alternatives (Matthys & Lochman, 2005). Finally, one may have a difficulty in decisions related to initiating behavioral change. If one does attempt to initiate change, one may have difficulty observing an impact on others (decision making regarding matching of behavior to context).

BELIEF-BEHAVIOR CONGRUENCE

One prefers to live in harmony between one's beliefs and behavior, at least that which is brought to one's awareness. Twerski (1997) asserts that addicts engage in *perceptual distancing*. According to this formulation, the tendency to distort or discount time and daily experience would insula-

te a person that exhibits self-destructive behaviors from consequences of the behavior to self and others. Such perceptual distancing would be a strong barrier against change.

According to Twerski, drug addicts think in terms of brief chunks of time. Thus, they may believe that changes should happen quickly. For example, stopping use for a month may feel like a very long time to an addict, even though life course changes actually occur much more slowly. A second characteristic, according to Twerski, is that potential addicts may view their experiences as not genuine. The characteristics Twersky describes also may be re-conceptualized as categories of *logical fallacies* (e.g., www.intrepidsoftware.com/fallacy/toc.php [Stephen's Guide to the Logical Fallacies]; Ellis & Harper, 1975; Kahane, 1990; Sussman, Dent, & Stacy, 1996; Twersky, 1997). Three types of fallacies are particularly pertinent. One major set of fallacies are the "fallacies of distraction," in which by processing insufficient information poor decisions result (e.g., misuse of "or", "not", "if-then" or "and" operators; you are either an alcoholic or you are not, and if you are alcoholic then you will tend to be homeless). Not going into treatment because of its location (an example provided by Twersky) might be due to not considering all the potential locations of treatment. A second major set of fallacies are "causal fallacies," in which the identification of the cause of a behavior or event is misplaced (e.g., stress causes smoking versus smoking causes one to feel stress; others complain so that one has to drink versus one drinks and leads others to complain). A third major set of fallacies are "fallacies of ambiguity," in which phrases are used unclearly or inconsistently (e.g., you are sober today, so you are not alcoholic versus you are sober today, but you usually are drunk; you used to be dishonest [lying] and now you quit drinking and think that going into treatment would make you dishonest again since you are not drinking [not necessary]; Twersky, 1997). Once again, these fallacies when used may provide a cognitive-perceptual distance for perceiver from his or her self-destructive behavior.

Aside from distancing from an awareness of discrepancies between one's beliefs and one's behavior, one may more actively attempt to maintain belief-behavior congruence Awareness of equivocation or discrepancies in one's beliefs or desires leads to a tendency to want to reduce them (motivation; Miller & Rollnick, 1991). Two classical social psychological theories are relevant to this belief-behavior discrepancy. *Balance Theory* argues that one seeks to achieve consistency regarding the polarity (+ or -) of relations with others, one's self, and one's own

beliefs (Heider, 1958). If one's beliefs are inconsistent with one's sense of self or with whom one forms a relationship with or attitude about, one will be motivated to change the belief, one's sense of self, or the relationship. Of course, while balanced situations might be relatively easy to remember, they will not necessarily be pleasant unless the polarities created are all positive (West & Wicklund, 1980). Drug users may perceptually distance so as to ignore a cognitive imbalance, or they may change their beliefs to become more favorable toward drug use so as to maintain a relationship with another drug user.

Cognitive Dissonance Theory argues that people are motivated to perceive a consistency between their decisions/behaviors and cognitions/beliefs. To make cognitions more consistent with decision-related behavior one might discount their importance, change them, or add new consonant cognitions/beliefs (Festinger, 1957). It is possible that discounting one's cognitions is similar to perceptual distancing, and new consonant cognitions may be supplied to support one's drug use.

CONTEXTUAL/SITUATIONAL DISTORTIONS

One likes to perceive his or her lifestyle as normal, appropriate, fun or optimal. One may interpret contexts within which one exists so as to normalize life experience. There are at least three examples of notions that apply to situational distortions. One notion is that of *mystification theory*, which states that meanings of behavior may be become confounded or distorted due to subjective effects interpreted within contexts (Lennard, Epstein, Bernstein, & Ransom, 1971). The process of mystification involves the definition of issues and situations in such a way as to obscure their most basic and important features. In one's social world, behaviors previously defined as normal behavior may become defined as not normal (e.g., mild social anxiety), and drugs may be promoted to fix this behavior. Drugs may achieve their effects by bypassing meaning and means such that the experiential outcome is not the real outcome (e.g., drug induced relaxation is not the same as learning to become more at ease in social situations by learning social skills). Also, the effects of drugs are derived not only by the pharmacological qualities of the drug, but also by beliefs about the drugs and the social context within which drug use occurs. Thus, it is understandable that a variety of myths regarding drug use and its effects can occur. For example, one may view themselves as having formed meaningful friendships just because they use drugs together (Ames, Sussman, & Dent, 1999; Sussman, Dent, & Stacy, 1996).

Another example of mystification is one applied to "getting used to a drug." With some drugs, such as cigarettes, one may become sick when one first uses them. One may be taught by others that, by continued use one will get used to the drug, learn how to use it right; at that point, one will stop getting sick and enjoy use.

A second related notion is that of *perceived effects theory* (Smith, 1980). Most acts are intended to benefit the actor and some consequences of drug use may be grossly misperceived but may explain initiation of drug use because they appear to benefit the actor. For example, one may reinterpret a negative consequence of drug use (e.g., losing one's car in a parking lot) as being positive (e.g., funny). Also, one may interpret a positive consequence of drug use (e.g., spending time with another person) as being more positive than it really is (e.g., true love, meaningful friendship). As escalation of use progresses, greater distortions of reality may justify continued use and abuse.

A third notion, of *delinquent subcultures*, is one on which much work has been completed and on which there are many variants. The basic notion of delinquent subcultures is that differential socialization may lead to group norms that serve to rationalize problem behavior (Akers et al., 1979; Cohen, 1955). These rationalizations, however, reflect norms which exist in opposition to dominant social values and occur in subcultural groups. Cohen, and some sociologists after him (e.g., Bordua, 1962), argued that certain youth subcultures engaged in problem behaviors due to a gross reaction against middle class society, as an expression of a general negativism, and because they found such activities to be a great deal of fun in the short-run.

There are several variants of the deviant subcultures notion. One such variant is *neutralization theory*. A modification of Cohen's perspective, it is asserted that persons who exhibit problem behavior do internalize dominant social norms. However, norms are viewed as qualified guides for action, limited by situational variables (e.g., killing during war is okay; Agnew & Peters, 1986; Dodder & Hughes, 1993; Shields & Whitehall, 1994; Sykes & Matza, 1957). Techniques of neutralization include denial of responsibility (beyond one's control), denial of injury, denial of the victim (deserved it), condemnation of the condemners (e.g., as hypocrites), and appeal to higher authorities (loyalty to persons or causes).

Recent work on "deviant talk" provides exploration into the development of deviant interactions that underlie such subcultural groups. Deviant or rule-break talk is defined as utterances that contain antisocial or norm-

breaking elements. Talk about stealing, lying, aggression, illegal acts, favorable depictions about drug use (i.e., talk about "being bad"), as well as swearing and rude or offensive gestures, removing clothes ("being bad"), and positive reactions to rule-break behavior (e.g., laughing) are exemplars of rule-break topics and deviancy training. While many youth engage in rule-break behavior, those youth who become absorbed more and more in such talk are at increased risk for future problem behavior (Granic & Dishion, 2003). Time spent with deviant peers, positive reactions among deviant peers for rule-break behavior, and processes where deviant youth try to attract attention among lower risk peers, all are aspects of deviancy training which lead to subsequent increases in drug use (Dishion, 2000; Dishion, Poulin, & Burraston, 2001; Poulin, Dishion, & Burraston, 2001).

CORRECTIVE STRATEGIES

One may develop steadfast positive beliefs about drug use through social learning processes (Bandura, 1986), based on subjective experience (Stacy & Ames, 2001), or due to peculiarities of behavior-outcome memory associations learned (Sussman, Dent, & Stacy, 1996). One good illustration is how marijuana use might be justified to regularly co-occur with driving a car. One may develop the cognitive-information error that marijuana use and safe driving are common and appropriate as co-occurrring behaviors (false consensus, unrealistic optimism). One may also develop the belief that marijuana use leads to safe driving (marijuana use-slow down, safe driving-slow down, hence marijuana use-safe driving; stemming from an illusory correlation between frequency of marijuana use and frequency of slow driving, perhaps). Cognitive processing of a favorable relationship between marijuana use, driving, and perceived safety may solidify to the extent that no car accidents initially occur while driving under the influence of marijuana intake. Cognitive processing limits may interfere with being able to process that while marijuana use might lead one to drive slower, one might also feel drowsy or experience a dangerously slower reaction time (Sussman et al., 1996). One may also believe that one should drive safely, so marijuana use is a good drug to use to be able to drive more safely (belief-behavior congruence). Finally, one may view people who deter marijuana users from driving as uninformed villains (contextual/situational distortion). Several preventive strategies have been developed to counteract: cognitive-information errors, cognitive processing limits, belief-behavior congruence, and contextual/situational distortions.

COGNITIVE-INFORMATION ERRORS

There are several examples on how prevention programs have counteracted cognitive-information errors. As one example, drug use prevalence overestimates may be counteracted through an "overestimates reduction" prevention activity. In this activity teens engage in taking a poll on their perceptions of the numbers of their peers that use drugs and their own behavior. They are presented with a comparison of their own perception (e.g., that 74% and 46% of their peers have used marijuana and LSD in the last week, respectively), and their own polled behavior (e.g., only 12% of youth at regular high schools use marijuana in the last week, and only 28% of youth that attend alternative high schools (at-risk youth) use marijuana in the last week, and only 1% report use of LSD in the last week at either type of school environment (Sussman et al., 1995; Sussman, Craig, & Moss, 2002). By understanding that they tend to overestimate their perceptions of others, they realize that not everyone is using drugs "out there," that they don't need to use drugs to fit in with peers, and they may reduce their prevalence estimates.

One can also counteract cognitive-information error-related myth formation through use of elaborative processing (Stacy & Ames, 2001). As operationalized in a curriculum by Sussman and colleagues (Sussman, Craig, & Moss, 2002), first one discusses the kernel of truth in the myth, then one discusses why the myth is a myth. For example, one may discuss the myth of using drugs to be protected from life stresses. The kernel of truth is that one feels as if one is protected at least for awhile. However, the myth is a myth because one is able to think less clearly and is more likely to become victimized and incur greater stresses.

COGNITIVE PROCESSING LIMITS

As consequences begin, many drug experimenters stop use. The literature on "natural recovery" posits that the majority of people who begin to use a range of psychoactive substances cease on their own (Sussman & Ames, 2001). The number and types of consequences that one can incur increase as one grows older (e.g., job and family), and many teen drug misusers will quit use as they reach adulthood because they perceive that they have different priorities or have more to lose. However, cognitive factors also operate to maintain drug use as a lifestyle behavior. One may have structured one's lifestyle schema to acquire and use the drug under numerous life circumstances. To give up drug use may conflict with the thoughts and skills one has nurtured related to primary

daily activities and social networks that are structured around drug use, causing an experiential void. One is an "expert" in communications regarding the drug, and thoughts of pleasurable drug use may continually "pop" to mind (Stacy & Ames, 2001). It may take many annual cycles of a person's life before one can adjust to not using drugs each day. These annual cycles may be needed to create a new implicit cognitive thought flow that does not evoke thoughts about drug use on certain occasions. For example, an individual may need to go through "February 2nd" three or four times before the person no longer links "February 2nd" as a day on which drugs is used. Thus, merely experiencing life over a long period of time without using drugs would be sufficient to create new memory networks that might be protective against future drug use.

Of course, persons may desire to select more direct methods to change the directions of one's thinking and behavior. Practice in decision making-related activity appears essential to drug use prevention and cessation programs (e.g., Fiore et al., 2000; Sussman et al., 2004). Steps of decision making, and practice in decision making using hypothetical scenarios, assist in being able to remediate difficulties in sorting out options and planning self-constructive action. For example, one should practice being able to generate multiple solutions, consider the costs and benefits of each solution to self and others, be able to select a maximally beneficial solution, make a commitment to following through with the solution, and be able to re-evaluate multiple solutions contingent on satisfaction with the outcomes of the selected solution. As one continues to utilize steps of decision making, executive processes involved will begin to become more automatic, and solidify in memory.

BELIEF-BEHAVIOR CONGRUENCE

People may engage in self-destructive behaviors, that might even be contrary to their basic beliefs about themselves, because they often do not think about the relations of their beliefs and different behaviors. Belief-behavior discrepancies can be brought to awareness to help persons not engage in self-destructive behavior. For example, there are at least four education-format examples which have attempted to make teens aware of their own discrepancies and be induced to reduce them through potentially healthful action. One application is in the arena of stereotyping. Among teens, ingroup-outgroup stereotyping may exist (Fishkin et al., 1993). The notion here is that ingroup members perceive outgroup mem-

bers as more extreme and homogenous than they actually are. For example, high school and college youth are well-aware that they are perceived as more uniformly extreme/deviant ("wild") than they actually are by younger peers or older adults. The stereotyping can lead to a self-fulfilling prophesy if people conform to such stereotypes. Alternatively, awareness of the stereotype can lead to counteracting it by taking on prosocial action and informing others of their taking on healthful pursuits.

In summary, the "logic" of stereotyping remediation is as follows. 1. One takes note that others think (older teens) are losers, deviants, stoners (using adjectives list sheet). 2. One appreciates that, being an older teen, one is somewhat deviant but not that bad (using adjectives list sheet). 3. One (an older teen) concludes that he or she should either give in to a self-fulfilling prophesy or rebel against it.

A second example is derived from Attitudinal Perspective Theory (Upshaw & Ostrom, 1984), another notion from social psychology. The theory posits that there are two different aspects of one's attitudes about behaviors or events. First, one holds a general attitudinal perspective (e.g., as a moderate; most people do tend to perceive themselves as moderate people). Separately, one holds specific attitudes about behaviors or events (e.g., one believes that certain drugs should be legal). It is possible that one's general attitude about self may appear contradictory with one's specific attitude. If one is confronted with the discrepancy, one will tend to try to reduce it which, in the present context, could lead to specific anti-drug use statements. The "logic" of attitudinal perspectives remediation is as follows. 1. One recognizes a general self-attitude that one is a moderate type of person. 2. One also recognizes a specific attitude that risky behavior (e.g., regular recreational drug use) is a behavior that older teens view as radical. 3. One (an older teen) concludes: that one should view him or herself as a radical type of person or don't engage in the specific behavior (abuse drugs).

A third example is derived from a "health as a value" notion (Lau, Hartman, & Ware, 1986; Ritt-Olson et al., 2004; Sussman et al., 1993; Sussman et al., 2004). This notion is that the more a person values health, the more likely the person is to refrain from health compromising behaviors. This construct may moderate the effects of one's perceived control over health as well as act as a motive for engaging in healthy behavior. For example, if one places importance on good health to better help one achieve life goals, one may be motivated to not abuse drugs. More specifically, one may desire goals (e.g., good grades), know they need good

health to achieve these goals, be educated to recognize that drug use may interfere with goal attainment, and therefore need to change goal attainment or drug use. The "Logic" of instilling health as a value is as follows. 1. One considers what one wants to accomplish in the future. 2. One considers if one's health is important to accomplish these goals. (One is likely to agree.) 3. One considers whether a self-destructive pattern of behavior (e.g., drug abuse) can interfere with one's health. (One is likely to agree.) 4. One concludes that he or she should give up one's goals or don't engage or continue to engage in the self-destructive behavior (e.g., abuse drugs).

A fourth example is evident in motivational interviewing. Motivational interviewing is therapeutic tool to induce change in a brief period of time. Eight strategies are identified to motivate the individual to change behavior (Miller & Rollnick, 1991). These strategies are: giving advice, through which the problem is identified, the need for change is clarified, and specific change is encouraged; removing impediments to change, which are mastered through effective problem solving; providing choices, an important antecedent of voluntary commitment to change; decreasing desirability for continuation of present behavior by making its costs explicit; providing empathy regarding the struggle to change; providing behavioral feedback; clarifying goals, especially confronting the individual with discrepancies between his/her future goals and present behavior (perhaps the most important aspect of motivation-enhanced programming); and finally, in active helping, demonstrating genuine interest in the client's change process.

CONTEXTUAL/SITUATIONAL DISTORTIONS

Mystification may be counteracted by direct confrontation of the mystification process. For example, with cigarette smoking, one may be taught that getting sick at first are bodily warning signals that one is inhaling poisons. The cessation of getting sick is not becoming used to using cigarettes but rather a failing of these signals is the beginning of tolerance. To impart this message among teens, one can have teens read cards to take on roles at different stages of use from trial, experimental, regular, abuse (e.g., see Glynn, Levanthal, & Hirschman, 1985; Sussman, Barovich, et al., 2004).

An example of a means to counteract drug-related experiences discussed by perceived effects theory includes use of humorous cartoons that can be discussed in a group situation (Sussman, Moss, & Craig, 2002). In

one such cartoon, the actor comments on how funny it was when she was arrested, took a drug test, was hand-cuffed and booked, and asked for a retake of the mug shot. The reinterpretation of a very negative social and legal situation is made clear, and a realization of the cognitive misperception is made explicit.

Appeals to personal responsibility and clarification of negative consequences perpetrated are essential to combating neutralization techniques. Use of psychodramas or "talk shows" can assist in accomplishing healthy changes. For example, in a "marijuana panel" talk show in Project Towards No Drug Abuse (Sussman, Craig, & Moss, 2002), various panelists report their experiences. Scripts are provided to all participants in the group. They volunteer to take on various roles, and they can work off the scripts. Participants in this activity either serve as other panelists or as audience members. An ex-marijuana abuser reports that he or she "used to smoke weed everyday. It became a problem." The abuser says "I felt like I couldn't make it through the day without at least one joint. I depended on marijuana to make me feel better. All I wanted to do was to be high and not think about anything. I told myself, and everyone else, that I did it because I was stressed. A lot of the jobs are asking for drug tests. I don't want to miss out on a job that I really want because of using weed. It's not worth it. Since I quit, I feel better. I have more energy and I'm finally taking care of the things in my life." In this script, the marijuana abuser mentions that he or she used to blame continual marijuana use on stress, the neutralization technique of denial of responsibility. Then the person makes an appeal to personal responsibility and clarifies personal consequences suffered due to marijuana use. This may reduce tendencies towards use of techniques of neutralization among all participants in this activity.

INTEGRATION AND CONCLUSIONS

A MODEL OF THE SELF-DESTRUCTIVE PROCESS

Information distortions may lead to retention of "facts" that are in fact, not accurate (e.g., marijuana improves one's driving safety). Limitations in cognitive processing permit solidification of cognitive-information errors. Inaccurate facts may lead to the perception of belief-behavior congruence (e.g., one believes in safe driving-marijuana use can help). Situational distortions may operate to maintain a sense of certainty regarding one's information-belief-behavioral processing of one's world (e.g., bad

people prosecute one for using marijuana; one must go around these people to be able to drive more safely). The combination of these factors leads to, and composes, one's "addictive thinking."

Young children who tend to blame others in conflict situations, appear hypersensitive regarding fulfillment of immediate needs (e.g., food and comfort), and who are not grounded in ongoing supportive and educative interactions with significant other adults, are relatively likely to resort to "acting out" as a means to express their dissatisfaction (Kellam et al., 1989; Shedler & Block, 1990). They may tend to perceive that their acting out behavior is appropriate (cognitive-information errors), their executive functions may be tend towards perseveration of ultimately self-defeating behavior, by blaming others they may tend to show belief-behavior congruence, and their alignment with other such youth may indicate creation of a contextual distortion (Matthys & Lochman, 2005).

Young teens, who are curious regarding solutions to their sense of dysregulation and who are approached by other teens that share a similar curiosity, may seek out or yield to offers to try drugs or engage in other risky behaviors (Sussman et al, 1995). Drug prevalence overestimates, difficulties in decision making, alienation beliefs, and identification with other at risk youth are facets of the four types of cognitive misperceptions that operate in young teens (Sussman, Dent, & McCuller, 2000).

As older teens, youth solidify a sense of self and become more resistant to direct influence externally. They also tend to live in contexts of heterosexual crowds, less mutually dependent on peers. Intra-personal motivations become more important (Sussman et al., 2004). Intrapersonal motivations tend to dominate as a precipitant of risky or health behaviors throughout adulthood. Likewise, for emerging adults, fear or lack of hope that one will be able to satisfactorily settle down into adult roles is a driving source of pressure that might lead one to resort to drug use or other self-destructive behavior. In both of these age groups, cognitive-information errors (e.g., false consensus effect, unrealistic optimism), cognitive processing limitations in terms of the tendency to engage in over-learned, albeit self-defeating behavior, belief-behavior congruence maintenance (e.g., perceived effects), and contextual distortions (e.g., hanging out in bars), all help to solidify and maintain drug use behavior.

For older adults, one's purview of life as one in which to achieve a subjective sense of wisdom versus a subjective sense of despair (Erickson, 1968), as shaped by social-environmental experiences such as amount of free time, lack of structure, and number of significant others remaining

in one's social circles, may drive one to resort to constructive or destructive behavior. Here, too, the same four types of cognitive variables may influence drug misuse among the elderly. In each of these developmental periods, one may seek out available resources, take a logical consideration of options, and make decisions that are life-fulfilling to self and others. Alternatively, one may begin or continue to process information in potentially distorted ways.

CONTERACTING THE SELF-DESTRUCTIVE PROCESS: A TAXONOMY

A taxonomy of drug abuse prevention strategies is needed; effective programming may vary by risk; one should detail program strategies as a function of type of programming (e.g., universal, selective, indicated) or other factors (e.g., stage of development, modality of implementation) as a start. Just as with Mendelov's table in chemistry, integrative descriptive work is a reasonable starting point for program-based theoretical development (Sussman & Sussman, 2001). Certainly, across any type of programming, there are some common features that are likely to apply including trust building among facilitator and participants, facts about the health behavior and consequences information, knowledge of high risk situations, general social communication skills or enhancement, decision making, and interactive learning. Also, there appears to be some programming that might be intrinsically universal such as making a public commitment (as opposed to a private commitment) and normative restructuring or prevalence overestimates reduction (in which most of the population demonstrates healthy lifestyles). Targeted programming appears to involve strategies that make use of equivocation, motivate change, instructs cognitive and behavioral coping, including mood management, and provides information on recovering from damage all ready experienced due to not pursuing a health course of behavior (e.g., Sussman & Ames, 2001). Certainly, age-specific counteraction of the four types of cognitive variables presented herein, which likely overlap with type of programming (targeted programs are relatively likely to be applied to older teens and emerging adults), should be considered in such a taxonomy, and could advance prevention/cessation science.

FINAL COMMENTS: A PREVENTION STRATEGY THAT OPERATES ON ALL FOUR COGNITIVE PROCESSES

The four cognitive misperception-related processes discussed were composed into four processes due to their discussion in distinct research

and popular literatures, and potential differences in their operations as a function of stage of drug abuse development. This does not mean that these processes are necessarily different or non-overlapping. For example, cognitive-information errors could be accounted for in part by errors in recall related to one's implicit cognition associational network. Certainly, all of the other three types of cognitive processes are constituents of implicit or explicit cognitive processes, the latter being general categories of cognition. (The interplay of implicit and explicit cognition and processing limits was the emphasis of the implicit-explicit processing discussion here.) One could argue that all cognitive misperceptions are due to cognitive processing limits. Rather than enter into a whole variety of arguments, this presentation serves to begin a taxonomy of cognitive misperception processes that includes information from both applied and basic research. Certainly, much additional work is needed and will provide clarification over time on the input provided in this paper.

Also, a variety of preventive strategies were described. It would be more economical if there was a single type of strategy that might counteract multiple cognitive misperception processes at one time. One potential candidate strategy is conscientiousness. Conscientiousness refers to a propensity to follow socially prescribed norms of behavior (e.g., social responsibility, traditional, or virtue), to be goal-directed (e.g., industriousness), and to delay gratification (e.g., constraint, order, or self-control). In a review of a database of studies resulting from an article search consisting of consciousness-related terms and health-related behavior, Bogg and Roberts (2004) located 194 studies that were quantitatively examined. Conscientiousness-related traits were negatively related to all risky health-related behaviors uncovered (e.g., drug use, unhealthy eating, risky driving, risky sex, violence) and positively related to all beneficial health-related behaviors (e.g., job attainment, exercise, healthy eating). While Bogg and Roberts did not provide an overall theoretical explanation of why these relations should exist, it does appear to be the case that social responsibility beliefs, a desire to contribute to the workforce and to others, and a willingness to sacrifice immediate pleasure, are consistently related to health and healthy behavior. Also, while they took a trait perspective in their discussion of conscientiousness, this construct is central to the recovery movement and many public works strategies (community service; Alcoholics Anonymous, 1976; Swisher & Hu, 1983). There is an old saying in the recovery move-

ment: when the light is green, go, when the light is red----learn. Perhaps, a willingness to be restrained enough to learn the best ways to live out situations is what helps people to be the most healthy. Also, in service to a group one may bypass one's own individual miss-wiring.

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