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Information enhancement and goal setting: interventions for enhancing motivation

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Information Enhancement and Goal Setting: Interventions for Enhancing Motivation

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ABSTRACT

The research on which this thesis is based examined the effects of sense of control and intrinsic motivation on motivational structure and it determine whether these motivational variables can be experimentally manipulated. Four studies were conducted with social drinkers. The first one ($N = 94$, 44% males) was a questionnaire study, which examined the relationships between participants' sense of control and intrinsic motivation and their adaptive motivational structure and alcohol consumption. The measures included were Personal Concerns Inventory (PCI), Shapiro Control Inventory (SCI), Lester's Helplessness Questionnaire, Alcohol Use Questionnaire (AUQ), Aspiration Index, and Self-Determination Scale. Results showed that sense of control and intrinsic motivation were positively correlated with adaptive motivation and negatively correlated with alcohol consumption. In addition, compared to participants whose maladaptive motivation, those with an adaptive motivational structure (a) were higher on positive and overall sense of control, (b) were lower on helplessness, and they (d) drank less alcohol. Mediational analyses revealed that adaptive motivational structure fully mediated of the relationship between sense of control/intrinsic motivation and alcohol consumption. The second study ($N = 106$; 48% males) tested the effects of experimental manipulations of sense of control and intrinsic motivation on task-specific adaptive motivation, cognitive performance, and implicit and explicit urges to drink. The experimental manipulation used anagrams and a modified, computerized version of Hiroto and Seligman's (1975) Concept-Training Cards. The manipulation techniques included enhancement information (i.e., choice, knowledge, feedback) and goal setting. The measures included task-specific versions of the Personal Concern Inventory (TSPCI), Shapiro Control Inventory (TSSCI), Intrinsic Motivation Inventory (IMI), Urges to Drink Questionnaire, and alcohol-Stroop test. In addition, participants' accuracy and speed of cognitive performance were measured with computerized verbal puzzles and memory quizzes. Participants were randomly assigned to either the No-Intervention Group, Low-Sense-of-Control Group, or High-Sense-of-Control Group. Results showed that the groups differed from one another on none of the measures at the pretest. The post-experimental results showed that high and low levels of sense of control were successfully induced in the different the experimental groups. Moreover, compared to the No-Intervention Group and High-Sense-of-Control Group, the Low-Sense-of-Control Group (a) performed poorer on the cognitive tasks; (b) had less adaptive motivation; and (c) were higher on explicit and implicit measures of urges to drink. Moreover, in terms of improvements on sense of control and intrinsic and adaptive motivation the groups were ordered as follows: High-

Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group. However, on explicit and implicit measures of urges to drink, the order of the groups was reversed. Study Three (N = 144, 38% males) tested the relative and combined effects of enhancement information and goal setting on participants' task-specific adaptive motivation. The design was a 2 x 2 factorial that included pre- and post-test measures, including the TSPCI, TSSCI and TSIMI. The experimental manipulation was the same as the one used in the second study. The results showed that the greatest increase in adaptive motivation resulted from the combined technique and the order of the groups on the post-test was: Combination Group (enhancement information and goal-setting) > Information Group > Goal-Setting Group > No-Intervention Group. In addition, a 45-day follow-up assessment showed that the Combination Group's task-specific adaptive motivation continue to increase after the post-experimental assessment. The fourth study (N = 75, 47% males) tested the influence of mood induction on participants' task-specific motivational structure. Measures included the TSPCI and the Positive Affect and Negative Affect Scale (PANAS) administered at pre- and post-test. Prior to the mood induction, which included music and Bos's technique, participants completed anagrams and tasks with the Concept-Training Cards but without a motivational manipulation (i.e., no choice, no information, no feedback, and no goal setting). The results showed that on the pre-test, the groups differed from one another on none of the measures. The post-experimental results showed that a happy or a sad mood was successfully induced in the two experimental groups. On the post-test, none of the groups had changed from the pre-test on task-specific adaptive motivation. Possible applications of the results of the studies for future research and practice are discussed.

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CHAPTER ONE

Motivational Structure, Motivational Orientation, and Sense of Control

Human beings are goal strivers. They try to achieve things that they want and to get rid of things that they do not want. They can decide how and when to pursue particular goals or give up doing so. Various researchers (e.g., Klinger, 1977; Klinger & Cox, 2004a; Lee, Sheldon, & Turban, 2003) assert that goal striving is a salient aspect of humans' lives, and that pursuing goals determines the meaning of life and the healthy or unhealthy quality of it.

A goal is the object or aim of an action (e.g., to attain a specific standard of proficiency at a skill), which should be attained usually within a specified time. Personal goals are things that an individual would like to achieve or accomplish in a given situation or to get away from them (Wentzel, 1994). Goal pursuit requires an individual's intention, strategy, target, and action in order for the goal to be achieved (Ryan & Shim, 2006). Goal pursuits influence people's mood. People strive to achieve goals that will change their affect. Therefore, it is reasonable to consider goal striving as an important influence on human beings' happiness and well-being. For instance, when people successfully achieve their goals, they feel more competent. Bandura's Self-Efficacy Theory (1977), Rotter's Control Beliefs Theory (1966), and other expectancy theories predict that people who believe that they will attain their goals are usually happier and more satisfied with their lives than those who do not. Considering the importance of goals in emotional regulation and well-being, it is important to determine which factors influence the likelihood that goals will be attained. Goal striving and the factors that influence it have been the subject of considerable theory and research, and two main factors have most commonly been identified. The first factor is the quality of the goals that people set. The quality of a goal is important because it can influence the goal-striving process. Schmuck (2006) believed that people should first learn which goals are most important to them; only then will their goal-striving efforts be maximally effective in increasing their happiness and sense of well-being. People who set meaningful goals are more motivated, happier, and healthier than those who lack such goals (Klinger, 1977). The second factor is the nature of motivational states associated with goal pursuits. When a goal is set, a motivational state begins which influences the goal-striving process. To describe the nature of goal strivings, researchers have used various terminologies. Klinger and Cox (2004a) listed several concepts that refer to motivational states associated with a goal striving: *Einstellung*, *Ustanovka*, or *set* (Uznadze, 1966);

intention (e.g., Gollwitzer, 1990); *quasineed* (Lewin, 1928); *force* (Lewin, 1938); *personal project* (Little, 1983); and *current concerns* (Klinger, 1977, 1996). The concept "current concern" represents a dynamic motivational state that starts with setting a goal. It directs goal-pursuit activities and diminishes after individuals achieve their goals or they disengage from them (see next section). A current concern, as a motivational state, is under the influence of many intra- and inter-personal factors (e.g., heredity, culture, the current situation). The unique combination of these factors determines an individual's chances of success in or failure at goal attainments. To address the dynamics underlying goal-strivings, Cox and Klinger (2002) introduced the construct *motivational structure*. Motivational structure refers to the combination of factors (e.g., knowledge, commitment, emotional involvement) that influence a person's goal strivings. As discussed later in this chapter, an adaptive motivational structure has been shown to be associated with greater success in goal pursuits than a maladaptive one. Maladaptive motivational structure have been shown to reduce people's success in maintaining desirable emotional states, and they increase their decisions to resort to chemicals to regulate their mood. The research for the present thesis was designed to answer questions about the factors that influence the degree to which a motivational structure is adaptive or maladaptive. In addition, the research investigated whether or not these factors can be experimentally manipulated, and it identified the cognitive-behavioural changes that result from such manipulations.

Theory of Current Concerns

Incentives and Goals

One concept that is essential to understanding the meaning of current concern is *incentive* (Cox & Klinger, 1988). Incentives are simply objects or events that attract or repel an individual because they result in positive or negative affective change (Klinger, 1977; Klinger & Cox, 2004a); therefore, incentives are valued positively or negatively. People care about those objects, events, and experiences that are emotionally important to them (Klinger, 1977); they try to obtain those incentives that are valued positively and to get rid of those incentives that are valued negatively.

There is a distinction between incentives and goals. Although incentives are objects or events that are valued, this does not mean that people will work to obtain everything that they value positively or get rid of everything that they value negatively (Klinger, 1977). For example, a woman might value owning an expensive dress but be unwilling to spend the money to obtain one. Although a given dress is an incentive

because it is valued, it is not a goal unless the individual is prepared to put forth effort to obtain it. Similarly, a person might consider one of his habits as undesirable, but be unwilling to change it. When an incentive becomes the target of an intended activity ("to get" or "to get rid of"), a *goal* is set. In other words, although each goal corresponds to an incentive, the opposite is not correct; incentives may or may not become the object of goals.

An animal cannot exist without pursuing incentives. Some incentives such as food, water, and avoidance of pain are necessary for survival, but other incentives are unnecessary for survival (e.g., intimacy, understanding, and political affiliation). Incentives and goals are an integral part of our everyday life. If a person is deprived from obtaining incentives that are important to him or her, the person's life becomes less meaningful (Petri & Govern, 2004); the emotional well-being of such a person may deteriorate.

Incentives are either more intrinsic or extrinsic. Each kind of incentive can result in very different consequences for humans' development and well-being. An intrinsic incentive is one that interests a person for its own sake; an extrinsic incentive is a means of achieving something else. For example, a person might paint a picture because the act of painting is interesting to him/her (it is an intrinsic incentive), or a person may paint a picture simply to sell it to get money (an extrinsic incentive). Because intrinsic incentives increase a person's meaning of life, they are called *enhancing* incentives, and include such things as altruistic activities or other healthy and functional activities. Dawn (1998) showed that intrinsic incentives have a significant, positive effect on learners' motivation. She interpreted her results as supporting Hilgard and Russell's (1950) recommendation that intrinsic motivation be instilled before any learning activity begins. Spruijt-Metz (1995) also showed that having intrinsic incentives predicted quality of health among Dutch secondary-school students (aged 11-18 years).

On the other hand, some extrinsic incentives, such as gambling, which reduce the meaningfulness of a person's life, are unhealthy and dysfunctional (Kasser & Ryan, 1993, 1996; Klinger, 1975; Ryan, et. al., 1999; Sheldon & Kasser, 1998). Such incentives are associated with negative emotions, such as anxiety, stress, frustration, depression, and other negative emotions, which in turn might lead an individual to resort to maladaptive coping mechanisms (e.g., substance use, alcohol abuse) (Klinger, 1977). People normally pursue incentives that they expect will increase their positive feelings or reduce their negative feelings. If people achieve goals that bring them emotional satisfaction, they are less likely to resort to maladaptive ways of acquiring their desired emotional state. As

Cox and Klinger (1988) argued,

"If a person does not have satisfying positive incentives to pursue or is not making satisfactory progress toward reaching goals that produce positive incentives, weight will be added to that person's expectations that he or she can better enhance positive affect by drinking [alcohol]." (p. 174)

Supportive evidence (e.g., Kushner, Sher, Wood, & Wood, 1994; Willinger et al., 2002) shows that high-anxiety students drink significantly more alcohol than low-anxiety students do. MacAndrew (1983) suggested that for some people abusive drinking could become the main source of reward seeking (e.g., socialising) and punishment-avoidance (e.g., coping with stress). In other words, in such a situation, drinking alcohol will be positively or negatively reinforcering. A positive reinforcer is a stimulus that, by its presence, increases the likelihood that a particular behaviour will occur again, whereas a negative reinforcer increases the probability when it is removed (Paul, 1991).

In short, people may drink alcohol or use other substances for two reasons: to enhance their positive emotions (enhancement motives) or to reduce their negative emotions (coping motives) (Cooper, Frone, Russell, & Mudar, 1995). People might develop strong current concerns about drinking, which can influence their drinking behaviour in both overt and covert ways.

Current Concerns and the Automaticity of Goal Pursuits

A current concern is a motivational state within two time points: (a) the point in time when the person becomes committed to pursuing a goal and (b) the point in time when the goal is achieved, or the person gives up trying to do so (Klinger, 1977, 1987b; Klinger & Cox, 2004a). The most important characteristics of current concerns are as follows.

First, current concerns have emotional valence associated with them; the emotional valence is the same as the incentive that underlie the current concern—i.e., positive or negative (e.g., Power & Dalgleish, 1999). Therefore, a current concern is a hypothetical state of mind, which is cognitive in nature but which has strong associations with emotions. Klinger and Cox (2004a) argued that emotions play an important role both in selecting goals to pursue and in influencing cognitive and behavioural processes that are related to goal pursuits. This means that emotions are more than just the subjective feeling (i.e., affect) or the bodily sensations that people usually associate with them. In this sense, affective or emotional regulation can be defined as attempts to

achieve positive emotions or to *get rid of* negative emotions. Although some researchers have distinguished the biological aspects of emotions from the conscious experience of them, in the theory of current concerns, the term *affect* integrates all conscious aspects of emotional experience (Klinger & Cox, 2004a). Humans have the ability to predict affective changes that might occur following achieving a goal or disengaging from it. The expected affective change from achieving a given goal corresponds to the *value* of that goal. In other words, goal seeking can be propelled by expected joy from attaining a goal and expected sorrow from failure at achieving it. Therefore, expected affective change plays a vital role in goal pursuits.

Second, current concerns are *time-binding*. This means that a current concern does not disappear when a person is engaged in other activities or when he or she sleeps (e.g., Nikles, Brecht, Klinger, & Bursell, 1998). An individual might have several current concerns at any one time, but behaviours are selective. In other words, although there might be many current concerns at the same time, the person's behaviour at any given moment in time may not reflect these concerns. It would be peculiar to think of starting each new day with a new list of goals on one's agenda. Moreover, when people have a goal, they cannot remain continuously preoccupied with it. Everyday life is full of various activities that need our immediate attention while we temporarily ignore other activities. Thus, a current concern is not always represented in an individual's consciousness. However, at a *subconscious* level, it continues to have an influence until the person accomplishes the goal or gives it up.

Third, current concerns are *goal-lurking* entities. A current concern is not a passive motivational construct that passively processes goal-related stimuli from the outside world. Instead, it coordinates the psychological processes that are necessary for the goal pursuit. A current concern sensitizes the person to goal-related cues in his or her environment (Klinger & Cox, 2004a). For example, people usually are aware of how many Ford Mondeos are on the streets only after deciding to buy (or after having bought) a Ford Mondeo! Salespeople who sell glasses are more aware of other people's glasses than those who sell shoes, and vice versa.

Current concerns have been the topic of many experimental investigations. There is evidence that waking concerns influence dream content (e.g., Nikles et al., 1998); this supports the hypothesized continuity, or time-binding, nature of current concerns. The pattern of individuals' daily activities reflects their current concerns (Klinger, 1987b). In addition, Nikula, Klinger, and Larson-Gutman (1993) reported that both self-generated, concern-related thoughts and externally presented concern-related stimuli increased

participants' electro-dermal activity. These results suggest that the observed arousal was produced by concern-related thoughts.

There is ample evidence from studies using the emotional Stroop test that supports the automaticity of current concerns as a hidden goal-lurking agent in humans' motivational system (Cox, Fadardi, & Pothos, 2006; Williams, Mathews, & MacLeod, 1996). The emotional Stroop test is a method to study automatic cognitive processes involved in various kinds of psychopathology. In the test, participants are exposed to a series of concern-related stimuli (usually words). The stimuli (e.g., alcohol-related stimuli) appear in different colours. The salient stimuli can be written on a card or be individually presented to a participant by use of computerised programmes. There is always a set of neutral, non-salient words, which serve as control stimuli. The task for participants is to ignore the meaning of each stimulus and respond only to the colour in which it is written as fast and accurately as possible. The test is based on the assumption that concern-related stimuli are more distracting for individuals than concern-unrelated stimuli; hence, it takes longer for people to respond to the colour of their concern-related stimuli than to the colour of neutral stimuli. The difference between mean reaction times to concern-related versus control stimuli is called *interference*, which is an index of people's *attentional bias*.

Stroop studies have been conducted with a variety of clinical disorders and problematic behaviours. Examples include studies with anxious participants (Becker, Rinck, Margraf, & Roth, 2001; Richards, Richards, & McGeeney, 2000), pain patients (Grisart & Plaghki, 1999; Snider, Asmundson, & Wiese, 2000), depressed participants (Bradley, Mogg, Millar, & White, 1995; McNeil, Tucker, Miranda, Lewin, & Nordgren, 1999), smokers (Wertz & Sayette, 2001), and alcohol abusers (Bauer & Cox, 1998; Stormark, Laberg, Nordby, & Hugdahl, 2000). Overall, findings from emotional Stroop studies show that individuals take longer to colour name concern-related stimuli than neutral stimuli. (For a review of addiction-related Stroop studies, see Cox et al., 2006.)

In summary, each current concern is a separate, latent motivational state that binds together the cognitive-behavioural processes needed for effective goal pursuit activities. The concept *current concern* unifies various motivational processes. In addition, it provides a useful framework for studying conscious and nonconscious aspects of psychopathology and for developing psychological interventions. For instance, the theory addresses a variety of factors that influence the nature of people's goals and in the manner in which they go about achieving them.

Factors Influencing Goal Pursuits

Many factors influence people's success or failure with their goal pursuits. Some of these factors are related to characteristics of the individual, whereas others are related to the nature of goals that they select.

First, factors related to an individual include the following: (a) predisposing factors (e.g., genetic make-up that influences the motivation to drink or eat excessively); (b) past experiences related goal-related activities (e.g., positive and negative reinforcement from one's social relationships), (c) current situational factors (e.g., when the desire to drink or eat is elicited by cues in the environment); (d) relative importance of various incentives (e.g., alcohol vs. family); (e) thoughts and beliefs about the outcomes of achieving a given goal; (f) net expected affective changes from achieving a goal versus not achieving it; and (g) attentional processes sensitised by the motivational state of having a certain goal (e.g., hypersensitivity to food- or alcohol-related stimuli (Cox et al., 2006).

Second, there are factors inherent in the goals themselves that influence people's pursuit of them; these are related to the quality and the quantity of the goals (Klinger, 1977). As discussed earlier, one issue related to the quality of goals is whether they are based on intrinsic, meaningful incentives or extrinsic ones. The other issue is related to the compatibility, incompatibility, or different goals with one another. Each goal can influence a person's success, or lack of success, in attaining other goals. Conflict among incompatible goals causes negative affect, which, if it is sustained and becomes intense enough, may lead to unhealthy compensatory behaviours such as heavy drinking. This is the person's attempt to chemically restore the desirable affective state. Goal conflicts can sometimes threaten even an individual's survival, for example, when medical care that is necessary for survival is in conflict with a person's religious beliefs (Samaras & Elrick, 2002). There is evidence (e.g., Emmons & King, 1988; Muldoon & Wilson, 2001; King & Emmons, 1990; 1991) that shows that goal conflict is associated with poorer physical and mental health, which adversely influences an individual's goal pursuits. Failure at goal pursuits, in turn, results in deficits in emotional regulation. There is evidence that failure at emotional regulation plays a vital role in the development of different forms of psychopathology, such as schizophrenia (Poole, Tobias, & Vinogradov, 2000), depression and anxiety (Blaney, 1986; Bradley, 1990), substance abuse (Pandina, Johnson, & Labouvie, 1992), and alcohol abuse (Cox & Klinger, 1988).

Various factors contribute to the incompatibility of goals. One factor is

personality characteristics. Some personality characteristics, such those as reflected in Type A behaviours, promote goal conflicts because the person has a tendency to select a large number of goals at the same time, even though they fall outside the individual's capabilities (Davis & Matthews, 1996). Although "more is better" sounds like an appealing idea to many people, this attitude mostly results from competitive social norms (Samaras & Elrick, 2002). In some cases, "less is better," because some people can more easily and effectively pursue goals when they do not too many goals at the same time.

The other factor determining the degree of goal conflict is an individual's cognitive and behavioural capabilities to use new coping strategies. Humans have the ability to work out new plans to reduce conflict among incompatible situations, in order to achieve their goals more efficiently. However, some people find it difficult to think about new strategies to make compromises among their conflicting goals. The sustaining conflict among their goals causes them to fail to accomplish some or all of their goals. After a few failures at achieving their goals, they may conclude that, "I cannot succeed at anything"; "I am a failure"; or "There is no point in trying harder." Such self-downing attitudes gradually lead them to lose their motivation and to give up trying.

In summary, people differ in their feelings and beliefs about the way that they approach their goals. Some people actively seek out new opportunities in order to succeed; others try mainly to avoid life's miseries; still others resort to the unhealthy use of alcohol or other drugs. Progress towards achieving goals is crucial in affective regulation. To explore further the conditions that underlie people's motivation to pursue their goals, the concept *motivation* needs to be explained in greater detail. The following section does this.

Motivation and Motivational Structure

The word "motivation" is derived from the Latin verb *movere* (to move). Motivation refers to something that gets a person or an animal going, keeps it moving, and helps it get the job done (Pintrich & Schunck, 2002). Motivation is defined as goal-directed psychological processes that include (a) arousal, (b) attention and direction, and (c) intensity and persistence (Mitchell, 1997). "Motivation" is often used to describe processes, such as wants, needs, drives, or desires that underlie goal-directed behaviours (Chaplin & Krawiec, 1974).

Motivation is the force behind most actions of a person. Motivation can influence when and how people choose their goals and what goals they select (Schunk, 1991;

1996). Motivation is a process rather than a product (Pintrich & Schunk, 2002), and it cannot be observed directly; rather, it can be inferred from such behaviour as choices among tasks, effort, persistence, and verbalizations (Winer, 1986). Motivation requires activity—physical or mental. Physical activity entails effort, persistence, and other explicit actions. Mental activity includes cognitive activity, such as planning, practising, organizing, decision making, problem solving, and evaluating progress. Initiating goal-seeking activity is important and often difficult because it involves being committed to make an endurable change in current situations until the goal is attained (Pintrich & Schunk, 2002).

Although it is easy to see the things that people do, it is much harder to know the reasons for their behaviour. A student who studies hard and tries to get good grades may be described as being "highly motivated," whereas his or her friend may find it hard to get motivated to study for an exam or to start an assignment. Motivation has a major influence on the initiation and direction of human behaviour, but knowing that a person is motivated does not tell us how the behaviour became motivated. For example, a student might be working hard because he or she wants to get high marks (perhaps the person is extrinsically motivated), but it might also be that he or she really enjoys studying the subject (perhaps the person is intrinsically motivated). A person may be striving for high marks because he or she wants to impress his or her friends or because the person wants a good job; therefore, the marks themselves are really a step toward another goal.

Cox and Klinger (2004a) provided a concise definition of motivation as follows: "the internal states of the organism that lead to the instigation, persistence, energy, and direction of behaviour towards a goal" (p, 141). Motivation is for a goal that provides the force for and the direction of an action (e.g., "I really want to work on this thesis!"). A goal may not be well articulated, and it may change across time; however, when people are motivated to pursue a goal, they have in mind something that they are trying to attain or avoid (Pintrich & Schunk, 2002).

There are at least three underlying assumptions about human beings with regard to motivation. *First*, humans are goal seekers. That is, people like to set meaningful goals (usually deliberately), and they try to attain these goals. This assumption is closely related to the theory of goal setting (e.g., Locke & Latham, 1990; 2002), expectancy theory (e.g., Vroom, 1964), and self-regulation theory (e.g., Wood & Bandura, 1989). *Second*, humans tend to seek pleasure and to avoid pain. This tendency is also related to the external factors that increase motivation, such as rewards. In this regard, operant conditioning or reinforcement theories (e.g., Skinner, 1953) are relevant. *Third*, humans

prefer having control over what they do rather than feeling that they are out of control.

However, people do not achieve all the goals that they would like to achieve. Failure to achieve goals can result because of two (usually related) reasons: (a) sometimes, external obstacles that are out of our control hinder us from achieving our goals, or they make it very difficult for us to achieve them; (b) sometimes having a faulty, maladaptive motivational structure prevents the individual from achieving his or her goals—of course, a combination of the two reasons is also possible. Maladaptive motivation might occur because of misguided decision-making, manifested as selecting negative goals or conflicting goals, or it may occur because of the manner in which the person pursues the goals.

To measure motivational structure, Cox and colleagues (Cox & Klinger, 2004b; Cox, Klinger, & Blount, 1995; Klinger & Cox, 2004b) developed the Motivational Structure Questionnaire (MSQ). On the MSQ, participants are asked to think about various areas of their lives and to name and describe their current concerns in each area. The life areas include Home and Household Matters; Relationships; Love, Intimacy and Sexual Matters; Self-Changes; Finance and Employment; Leisure and Recreation; and Health and Education. The MSQ is a comprehensive measure of motivational structure, but it is lengthy and time-consuming for respondents to complete. The Personal Concerns Inventory (PCI) is a brief version of the MSQ, which is explained later in this chapter. Administering the MSQ to substance abusers, Cox, Blount, Bair, and Hosier (2000) identified two primary factors, which they called *adaptive motivation* and *maladaptive motivation.*

Cox and colleagues (Cox, Schippers, & Klinger, et al. 2002; Cox & Klinger, 2002; 2004b) have summarised the characteristics of people with an adaptive motivational structure compared to people with an maladaptive structure as (a) having more appetitive than aversive goals, (b) having greater control over achieving their goals, (c) emotional involvement in achieving or failure at achieving their goals,(d) greater commitment to achieving their goals, and (e) less anticipated distance from goal attainment. In several studies (Cox et al., 2000; Cox et al., 2002; Cox & Klinger, 2002; Fadardi, 2003; Fadardi & Cox, 2002), participants with a maladaptive structure compared to people with a adaptive motivational structure had (a) fewer positive incentives, (b) less hope for achieving their goals, (c) less anticipated happiness from achieving their goals and less anticipated sorrow from not achieving them, (d) longer expected distances from their goals, (e) less commitment to their goals, and (f) less perceived personal control over achieving their goals. However, it should be noted that whether a motivational

pattern is adaptive or maladaptive depends on relationships among the motivational indices that are derived from participants' ratings of their goals. For example, a person with a high sense of control would be expected also to have a high sense of commitment to achieving goals, or vice versa, and would be described as having adaptive motivation. A person who scores high on Commitment but low on Control would be described as having maladaptive motivation, just as would another person who is high on Control but low on Commitment (Cox et al., 2002; Man, Stuchlikova, & Klinger, 1998). This suggests that the indices should be combined multiplicatively rather than summed.

Goal-pursuits and emotional regulation. It has been suggested that excessive drinking is a *disorder of motivation* (e.g., Bigelow, Brooner, & Silverman, 1998; Cooper et al., 1995; Cox & Klinger, 1988; Monti, Roshsenow, & Hutchison, 2000; West, 2001), in which problems with *self-control* are apparent (Lyvers, 2000b; Skutle & Berg, 1987). In fact, there is considerable evidence that motivational problems are associated with excessive drinking. A motivational intervention has been frequently described as necessary for recovery from an alcohol problem (Beckman, 1980; Dean, 1958; Deaton, 1975).

As discussed, motivation is in relation to goals pursuits, which, in turn, are vital to emotional regulation, specifically, increasing positive emotional experiences and avoiding negative emotions. However, for many reasons, people may not realize the goals that they strive for. Factors that influence the success of goal pursuits might be external or something over which the person usually has little control (e.g., hurricane Katrina), or they originate from within the person. An example of the latter is low perseverance in pursuing a goal, which might result in the person giving up too soon (Finn, Earleywine, & Pihl, 1992).

When striving for a goal is blocked, disengagement may occur. Klinger (1975) described the emotionally unpleasant experience of disengagement that people might go through as they give up pursuing a goal. The disengagement occurs in a cycle. The stages of the cycle include *invigoration*, *primitivisation*, *aggression*, and *depression*. Invigoration is characterised by increased vigour, taking the form of increased activity to achieve the blocked goal; this may result in over-concern about the blocked goal and a decrease in the relative importance or value of other incentives. For those people who cannot overcome the obstacles, the frustration-aggression stage may begin. This stage can become internally disruptive, and the unexpressed aggression can lead the individual to feel depressed. The experience might be intensified because of the low value of other incentives available to the person, and the altered perceptions of the person during the

depression. These perceptions may include an over-generalised view of the external world and of the person himself or herself. The situation can be exacerbated through an interaction between the person's emotions and cognitive processes, such that the depressed person is less able to recall past positive events and successful experiences, and through his or her cognitive deficits in interpreting new events in productive ways.

To summarise, motivational structure is a construct that is related to people's success in achieving their goals and their positive and negative feelings from their goal-seeking activities. Motivational structure is also related to people's decisions to drink, or not to drink, alcohol.

Motivational model of alcohol use. Some people are unable to compensate for their dampened emotions in adaptive and productive ways; they may resort to alcohol or other drug use to alter their negative emotional state (Cox & Klinger, 1988; 2002). As stated, people with maladaptive motivation are more likely to disengage from their goals than those with adaptive motivation; hence, assessing the person's motivational structure becomes important. The assessment of motivational factors related to problem drinking has been recently emphasized (Miller, 1995). Examples of methods to measure drinkers' motivation are a counsellor's judgments about a client's motivation during treatment (Brown & Miller, 1993; Leake & King, 1977), open-ended questions about motivation for drinking and for change (Miller & Marlatt, 1984), the Alcohol Expectancy Questionnaire (AEQ; Brown, Goldman, Inn, & Anderson, 1980), and the Readiness for Change questionnaire (Heather, Rollnick, & Bell, 1993; Rollnick, Heather, Gold, & Hall, 1992). The Stage of Change Readiness and Treatment Eagerness Scale (Miller & Tonigan, 1996) was designed to measure stages of change with regard to alcohol use. The Alcohol Use Inventory (Horn, Wanberg, & Foster, 1990) also provides information about motivations for drinking and readiness for change.

As discussed earlier, Cox and Klinger (1988; 2004a) introduced an *indirect* way to measure motivational factors underlying drinking behaviour. Based on individuals' differences in the way that they select and pursue goals, Cox and Klinger (2002) argued that the construct "motivational structure" is important for understanding goal-directed behaviour. According to Cox and Klinger's model, the decision to drink may be made when individuals are unable to achieve emotional satisfaction through other goal pursuits or to overcome the miseries that impede their lives. They might drink, for instance, to feel more optimistic or less anxious and depressed (Hussong, Hicks, Levy, & Curran, 2001).

Presumably, dysfunctional motivational structures (see earlier description)

prevent alcohol abusers from achieving their goals in various areas of life, thus exacerbating their motivation to drink. The more maladaptive the motivational structure compared to people with a adaptive motivational structure is, the greater will be the risk of excessive drinking, and the lower the possibility of reducing excessive drinking (Cox et al., 2000; 2002; Cox & Klinger, 2002; 2004a). In fact, research based on the MSQ has demonstrated that maladaptive motivation is associated with excessive drinking (Cox et al., 2000, 2002; Cox & Klinger, 2002, 2004a; Fadardi, 2003; Fadardi & Cox, 2002).

Alcohol treatment and relapse. Hunt and General (1973) reported high rates of relapse among treated alcoholics. They were 70% within three months, but the figure can rise to 90% with longer follow-ups (Helzer et al., 1985; Polich, Armor, & Braiker, 1981). Factors related to treatment outcome include social conformity (Newcomb & Bentler, 1988), personality (Kandel, Kessler, & Margulies, 1978; Stein, 1987), self-efficacy (Bogenschutz, Tonigan, & Miller, 2006), and locus of control (Newcomb & Harlow, 1986; Sadava & Thompson, 1986). Maintenance occurs when the person consolidates the behaviour change over time (McMurran, 2003); to help the person do so is the real challenge in the treatment of all addictive behaviours (Marlatt, Curry, & Gordon, 1988). Most relapses occur after completion of the treatment; therefore, it is essential to help clients during their treatment programme to develop new skills to cope with negative incentives that might underlie the relapse and interfere with the maintenance of a sober lifestyle (Cox & Klinger, 2004a).

Treatment outcome depends greatly on alcohol abusers' motivation to change (Cavanagh, 1991). Sterne and Pittman (1965) found that 75% of alcohol abusers believed that motivation was an important factor in their recovery, and 50% viewed it as essential. Despite the importance of being motivated to change, alcohol abusers' efforts to cut down might also fail if they do not acquire the skills needed to overcome their stressful life situation (Moos, Brennan, Fondacaro, & Moos1990). For example, relapse is more likely if recovering drinkers are unable to cope with negative life events, such as those related to employment, finances, and interpersonal relationships (Vuchinich & Tucker, 1996).

Systematic Motivational Counselling (SMC). Direct relationships have been shown between problem drinkers' ability to change their drinking and the degree to which they have other satisfying incentives to enjoy (Correia, 2004). According to Cox and Klinger (2004b), the main problem with alcohol abusers is not being unable to stop drinking; rather, it is how to maintain abstinence. In other words, abstainers need to be sufficiently motivated to remain abstinent once they have stopped. Cox and Klinger argued that non-relapsers are those who can develop substitute activities to take the place

of drinking. In addition, non-relapsers have more changes in their lives that are positive than relapsers; relapsers often resume their old drinking habits when they feel frustrated in their pursuit of goals in other life areas. Therefore, the emotional satisfaction in other life areas is a critical determinant of recovery

Systematic Motivational Counselling (SMC; Cox & Klinger, 2004c) is a motivational technique that helps clients pursue meaningful goals, overcome their miseries, find joy, and restore emotional satisfaction in their lives. Cox and Klinger believe that there are several determinants of excessive drinkers' motivation to change. For example, for an excessive drinker, drinking alcohol has high incentive value. In order to motivate them to change, drinkers must be shown the negative consequences of drinking (Cox & Klinger, 2002). Another factor is the expected benefits of changing their abusive behaviour. In addition, other positive incentives should be made available to serve as a substitute for drinking (Perri, 1985; Wong, Jones, & Stitzer, 2004). Therefore, the aim of SMC is to maximize the emotional satisfaction that drinkers derive from non-chemical incentives and, thereby, reduce their motivation to seek emotional satisfaction by drinking alcohol (Cox & Klinger, 2004b). The impact of such a motivational enhancement expected to be long lasting and to reduce the risk of relapse.

SMC first identifies a client's maladaptive motivational patterns—as the targets for change—by administering the MSQ or its abridged version, the Personal Concerns Inventory (PCI). SMC uses a series of motivational restructuring techniques to help the person find better ways to resolve important concerns (Cox & Klinger, 2004c). These techniques include setting treatment goals, constructing goal ladders, setting between-session goals, improving the ability to meet goals, resolving conflicts among goals, disengaging from inappropriate goals, identifying new incentives to enjoy, shifting from an aversive to an appetitive lifestyle, and re-examining sources of self-esteem. A SMC counsellor might use a combination of these techniques, depending on the characteristics of a given client's motivational profile.

Expected chances of success are another important factor that affects excessive drinkers' success in controlling their drinking. Several other factors are also relevant. For example, it is important to know how much effort drinkers put forth to change their behaviour and to identify manipulations that can be used to best motivate excessive drinkers to change their behaviour and maintain the change. In other words, how can maladaptive motivation be changed into adaptive motivation, and how can the change be maintained?

Two important components of motivation. The argument advanced in this thesis

is that there are two important characteristics of adaptive motivation. The first is having a *sense of control*. The second is being *intrinsically motivated.*

First, it seems reasonable to expect that sense of control is an important determinant of motivational structure, as Cox and Klinger's motivational model suggests. Sense of control (SOC) is a person's belief that he or she has control over desired outcomes in his or her life; people try to enhance their perceived control over their personal lives (Shapiro, 1994). Seligman (1975, 1994) suggested that sense of control has adaptive value, especially in difficult situations, because it provides and maintains the motivation to work hard to overcome problems. In addition, a feeling of lack of control is related to maladaptive goal pursuits (Frank, 1982; Shapiro & Astin, 1998).

Second, compared to more extrinsically motivated people, those with more intrinsic motivation have greater interest in learning and achieving, which, in turn, tends to be associated with more creativity and cognitive flexibility and stronger positive emotions, and high self-esteem (e.g., Elliot et al., 2000; Kasser, 2002; Milkulincer, 1994). Compared to extrinsically motivated people, intrinsically motivated ones give greater weight to their personal role in making the decision to pursue a goal, give more meaning to their goal-seeking activities, and enjoy doing their tasks more, regardless of their degree of success in achieving their goals and regardless of environmental feedback (Ames, 1992a). They see their mistakes or failures as valuable experiences and opportunities to learn (Kong & Hau, 1996; Simons, Dewitte, & Lens, 2000).

In summary, people's ability to regulate their emotions partly depends on the nature of the goals that they select to pursue (e.g., family relationships vs. gambling; drug use vs. participation in sport). However, another factor that is crucial to people's happiness is their success in achieving their goals. Cox and Klinger's motivational model of alcohol use states that people's success or failure in achieving their alcohol-unrelated goals influences their decisions to drink alcohol. In turn, people's chances of success in achieving their goals depend on the pattern of their goal strivings; this pattern is called *motivational structure*, which can be adaptive or maladaptive. A person with a maladaptive motivational structure has lower chances of succeeding with goal pursuits than other people and, therefore, less satisfaction with his/her life. In turn, this increases the person's risk of deciding to drink alcohol in an attempt to chemically regulate his or her emotional states. For these reasons, it is crucial to identify the factors that affect people's motivational structure, and to determine whether they can be manipulated in order to change the person's motivation.

The present thesis explored two important aspects of people's motivational

structure—their sense of control and their motivational orientation. The remainder of this chapter discusses the importance of sense of control and motivational orientation in the context of the theory of current concerns and motivational structure.

Definition and Importance of Sense of Control

Sense of control is an important motivational construct. Human beings are naturally motivated to gain control in their relationship with their environment (Cook, 1993). People need to have a sense of control over their lives because it provides them with opportunities to better recognize and organise their capacities and resources to enhance chances of achieving their goals (Mirowsky, 1995; 1997). Perceived control refers to people's perceptions or beliefs that events in their lives are controlled either by their own choices and actions or by external factors such as chance, luck, or fate, or by the authority and actions of other powerful people. Controlling one's life means exercising authority and influence over life by directing and regulating it by oneself. Some people feel little control when they encounter problems in their life. They feel little ability to control difficult situations or to prevent bad things happening; some even believe that any good things that happen to them are due only to luck (Mirowsky & Ross, 1990). The relative importance of choice, chance, or authority in people's lives (i.e., the determining factors of sense of control) varies from individual to individual, and from situation to situation. Perceptions of control are related to beliefs, emotions, and behaviours, and how people respond to both aversive and positive situations. Sense of control is a belief that a person gains through having control over desired outcomes in his or her life (Shapiro, 1994).

As Shapiro (1994) stated, sense of control is involved in all aspects of human development, and it is one of the most central topics in human development. Shapiro and Astin (1998) argued that feelings of loss of control, lack of control and subsequent maladaptive efforts to regain a sense of control are at the core of most issues brought to psychotherapists and mental health professionals. A person's sense of control over the environment is of great psychological significance (Cook, 1993; Fincham & Cain, 1986). For example, it is fundamental to interpersonal relationships because a sense of predictability and control of our and other people's behaviours allows us to understand the responses of others and to plan our own reactions (Fiske & Taylor, 1984). Feelings of lack of control reduce individuals' efforts lives and impair their ability to succeed in achieving their goals. Part of the problem might arise because these people do not have a design, or cannot think of one, about how to achieve their goals or complete their tasks

(Shapiro, 1994). Lack of control could then adversely affect the quality of their education, occupation, housing environment, nutrition, and health-related behaviours, all of which are likely to lead to further health-damaging consequences (Seligman, 1990). When people confront frequent uncontrollable events or environments or they experience certain failures repeatedly, they may develop feelings of helplessness and depression (Abramson, Seligman, & Teasdale, 1978; Seligman, 1994).

Authors (e.g., Lachman, Ziff, & Spiro, 1994; Ziff, Lachman, & Lewkowicz, 1996) believe that sense of control is related to physical health. Peterson and Stunkard (1989) argued that people who cannot establish contingent relationships between their actions and the outcomes are more prone to illness and disease—perhaps because they engage in behaviours that are damaging to their health or fail to engage in practices that are health promoting.

Perceived lack of control over one's life is a characteristic of emotional disturbance (Beck, 1979). Impairment in sense of control is a central issue in many psychopathologies, such as depression (Abramson, Garber, & Seligman, 1980; Seligman, 1975); addictions (Marlatt, 1985; Nathan, 1986; Shapiro & Zifferblatt, 1976) including alcohol abuse (e.g., Hemmingsson & Lunberg, 2001); stress and anxiety-related disorders (Courtney, 2005); eating disorders, such as anorexia, bulimia, and obesity (Surgenor et al., 2000; Surgenor, Horn, & Hudson, 2003); and also in adult children of alcoholics (Giglio & Kaufman, 1990).

Seeman and Seeman (1983) reported a longitudinal study in which 1,210 adults were interviewed about health-related information for a year (1976-1977) via telephone call-backs at six-week intervals. It was found that a low sense of control was associated with (a) less self-initiated preventative care, (b) less optimism concerning the efficacy of early treatments, (c) poorer self-rated health, and (d) more illness episodes, more bed confinement, and greater dependence on physicians. There is also evidence (e.g., Greet, Morris, & Pettingale, 1979; Pettingale, Morris, Greer, & Haybittle, 1985) that individuals with a negative sense of control and helplessness show poor recovery in cancer and are significantly more susceptible to illness recurrence and death from the illness.

Most people, including problem drinkers themselves, know that excessive drinking causes health problems. Individuals with internal beliefs about control over their health can avoid drinking excessively or actively seek help if they are currently drinking too much, whereas individuals with external beliefs would attribute the cause of their excessive drinking to external factors and not to themselves. Those with external beliefs pay little attention to their health and are poorly motivated to find the means to change

their problem drinking. The fact that people who hold beliefs that are more external are more likely to develop a sense of helplessness suggests that, when facing the difficulty of changing their problem drinking, these people would be more likely to give up trying and go back to their old drinking style.

There is a general consensus (e.g., Bandura, 1990; Shapiro & Bates, 1990; Taylor & Brown, 1988) that perceived control can often be as important as having actual control. If individuals even *think* that they have some degree of control, they are more likely to take action even if there is no guarantee they will succeed (Lachman & Weaver, 1998). In fact, in a controlled laboratory study, Weinstein (2000) measured the heart rate and blood pressure of participants while video games were being played and they were being distracted by blasts of irritating noise delivered through headphones. Half of the participants were told that they had control over the noise blasts, and if they tried to perform better on the game this would reduce the amount of noise. The other half of the participants were told that the blasts were totally random and they had no control over their occurrence. The researchers found that participants who perceived themselves as being in control of the noises experienced less stress as measured by heart rate and blood pressure than participants who perceived themselves as having no control. Weinstein, Quigley, and Mordkoff (2002) concluded that this is perhaps the most straightforward evidence to date for the hypothesis that control over a stressful situation can reduce its negative effects on the body. This finding suggests that just thinking that we are in control can make us healthier.

There is evidence (e.g., Adler, Boyce, Chesney, & Cohen, 1994; Lachman & Weaver, 1998) which shows that an increase in sense of control is associated with improvement in one's health. Individuals with a high sense of control are better able to reduce the effects of stressful life events (e.g., Astin, Shapiro, Lee, & Shapiro, 1999; Shapiro & Astin, 1998; Shapiro, Schwartz, & Astin, 1996). A high sense of control has been associated with better health, fewer and less severe symptoms, faster recovery from illness, and longer life expectancy (e.g., Davis, Matthews, Meilahn, & Kiss, 1995; Lachman, 1986; Rodin & Langer, 1977; Rodin, Timko, & Harris, 1985).

One reason for the relationship between sense of control and positive health-related outcomes is that having a high sense of control lowers cortisol and returns it more quickly to its baseline level after a stressful event has been experienced (Seeman & Lewis, 1995; Seeman, Berkman, Gulanski, & Robbins, 1995). In addition, people with a high sense of control also show lower fibrinogen levels, which is related to blood clotting (Davis et al., 1995; Markowe et al., 1985). They also have lower blood pleasure, and

compared with those with a low sense of control, their blood pressure can return more quickly to baseline levels after a stressful situation has been experienced (Seeman & Lewis, 1995). A high sense of control has been also shown to be associated with greater ability of the immune system to withstand illness (Astin et al., 1999; Frank, 1982; Rodin, 1986).

There is also evidence to indicate that people with a positive sense of control have greater resistance to the negative aspects of stress, and they report higher levels of psychological well-being (Abeles, 1990; Shapiro, 1994; Shapiro & Astin, 1998), higher levels of effort, persistence, and success in problem solving (Bandura, 1994), marital satisfaction (Doherty, 1983; Miller, Lefcourt, Holmes, Ware, & Saleh, 1986), and longer life expectancy (Rodin & Langer, 1977). Chou and Chi (2001) reported that sense of control mediated the relationship between the number of stressful life events and depressive symptoms even after the effects of socio-demographic and physical health status had been controlled. They found that sense of control mediated the relationship between stress and its adverse consequences. Livanou et al. (2002) found that improving sense of control in patients with post-traumatic stress disorder (PTSD) increased their personal effort, and it was associated with maintenance of therapeutic gains at follow-up. In addition, evidence (Bandura, 1997; Grob, Little, Wanner, Wraring, & Euronet, 1996; Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) has shown that individuals who had successfully recovered from a post-traumatic stress disorder showed a strong sense of control, which consistently contributed to behaviours that improved their well-being.

Lachman and Weaver (1998) found that sense of control was related to better health, greater life satisfaction, and lower depressive symptoms. Mirowsky and Ross (1990) reported that sense of control and taking responsibility for both success and failure were associated with low levels of depression and helplessness. Individuals with a high sense of control believe that what they do makes a difference; their meaning of life is thereby enhanced, and they behave in healthier ways (Lachman et al., 1994; Rodin, 1986; Ziff et al., 1996). Pereyrag and Mario (1996) also found that compared with alcohol abusers with a low sense of control, those with greater hope and a high sense of control recovered faster from their addiction, showed greater therapeutic gains at follow-ups, and had lower relapse rates.

Henkel, Bussfeld, Moller and Hegerl (2002) found that individuals with a high sense of control perceived that they were more competent. The results of a study conducted by Lachman and Weaver (1998) is also very interesting. They reported that low-income participants perceived greater constraints, had a lower sense of control, and

were in poorer health than those with higher incomes. The low-income participants were also more likely to believe in the role of fate or powerful others, and were less likely to believe in their own worth. Conversely, high-income was related to lower perceived constraints, better health, greater life satisfaction, and fewer depressive symptoms. However, in the lowest income group, those with a high sense of control reported good health and a sense of well-being that was comparable to that of participants in the higher income groups.

Like almost all other characteristics, sense of control varies from one person to another. Some people feel that they can achieve almost anything they put their minds to. They believe that their successes and failures always are in their own hands. If these people fail at something, they do not attribute it to bad luck or other external factors; rather they look at themselves to try to determine how they can improve their performance and avoid repeating the same mistakes (Catherine & Mirowsky, 2003; Mirowsky, 1995). Nevertheless, neither an extremely high nor an extremely low sense of control is healthy; some intermediate level is optimal.

To summarise, sense of control is an important psychological construct. Perceived sense of control not only influences individuals' inner worlds and their relationship with themselves, but also it determines the quality of social relationships, and people's physical and mental health. The degree of sense of control varies from one person to the other.

Development of Sense of Control

Developing expectancies about personal control is a universal human experience (Skinner, 1995). In this regard, childhood is a critical period during which people develop their sense of control through their relationship with their parents (Cook, 1993). Family dynamics play an important role in the early development of a child's sense of control (Maccoby, 1980).

Social learning theory (Rotter, 1966) argues that parents are the first source through which children develop a sense of control. Parents use rewards and punishments to provide their children with opportunities to observe cause-effect relationships (i.e., between their own behaviours and the resulting consequences). Learning these contingencies is believed to result in stable expectations that certain behaviours lead to certain consequences. If parents' behaviours are inconsistent, it is less likely that their children will develop stable, contingent expectations. When there is consistency between

parents' behaviour and that of the child, the child develops a positive sense of control (Cook, 1993). Likewise, if people perceive that their behaviours are related to their outcomes, their sense of control increases; if they perceive their behaviours are unrelated to their outcomes, their sense of control deteriorates (Fincham & Cain, 1986; Seligman, 1990).

Components of Sense of Control

Why do people have different degrees of perceived control over achieving their goals? What are the elements that determine people's perceived sense of control? This section discusses those elements.

Choice and responsibility. There is evidence (Corah & Boffa, 1970; Miller & Iris, 2002; Skinner, 1996) that giving participants' an opportunity to choose their task enhances their sense of control. This implies that a sufficient degree of freedom is important for a positive sense of control to develop. According to Eads, Perlmuter, and Lawrence (2000), having a choice may subsequently enhance motivation to act and strengthen internal attributions for performance. To increase perceived *choice*, external demands should be minimized (Lefcourt, 1993).

Having responsibility fosters the belief that one's behaviour has an effect on the environment or on oneself (Shapiro, 1994). Langer and Rodin (2004) found that people who feel responsible for what they are doing are happier and enjoy a better life. If the loss of responsibility in one's life causes a person to be less happy and healthy, then increasing control and responsibility should have the opposite effect. In fact, this hypothesis was supported in a study by Langer and Rodin (1976). They randomly assigned the residents of a nursing home (elderly people) to one of two groups. One group were allowed to select (a) a day of the week on which they want to watch a movie, and (b) a plant that they wanted to look after themselves. The other group were told the day of the week on which they could watch a movie and they were given a plant to take to their room without being given the responsibility for looking after it. The first group who had been given a choice and personal responsibility reported that they felt happier and were more active than the other group. The first group also showed improvements in mental alertness, activity level, satisfaction with life, and other measures of behaviours and attitudes (Langer & Rodin, 1976).

Choice and personal responsibility affect both happiness and health and wellbeing. Loss of personal responsibility can adversely affect health and happiness (Langer & Rodin, 1976). In addition, having a sense of responsibility for past problems

can reduce the possibility of repeating them in the future (Tennen & Affleck, 1998). Having a high sense of control and responsibility reduces feelings of depression and helplessness when a person faces difficulties (Mirowsky & Ross, 1990).

Goal characteristics. *Goals* are an important regulators and motivators of human performance and action (Austin & Vancouver, 1996). Specific and difficult goals that are challenging but achievable significantly increase people's performance and improve their sense of control (Gauggel, Hoop, & Werner, 2002). The concepts *value* and *goal orientation* (i.e., internal vs. external) are also important. For instance, Menon (1996) found that having goals that were valued and internalized improved employees' productivity, satisfaction, and sense of control.

Effort. It is known that *effort* is associated with persistence and success in problem solving, high sense of control (Bandura & Schunk, 1981; Bandura, 1994), positive expectations about outcomes (Lachman et al., 1997) and greater satisfaction with life (Doherty, 1983; Miller et al., 1986). Therefore, effort is intertwined with people's commitment to pursue their goals.

Knowledge and skill. Knowledge and information increase the ability of a person to successfully complete a task. Knowledge and learning about a task enhances understanding of concepts and fosters a higher degree of sense of control (Baldwin, 1992). Similarly, acquiring necessary skills about how to solve a problem or accomplish a task increases one's sense of control; skill is the ability to use one's knowledge effectively to complete an action or to develop a capacity or ability (Bandura, 1977, 1990).

Knowledge increases sense of control, regardless of a person's age or gender. Bauman, Craig, Dunsmore, and Browne (1989) investigated the severity of asthma in adults with the chronic illness. They found that lack of knowledge and awareness about the illness, poor information about preventative behaviours, and consequent negative moods and beliefs were associated with lower feelings of personal control among the patients. When the patients were taught useful, relevant knowledge about asthma, their sense of control improved immediately and was sustained at that level over time, as demonstrated in long-term follow-ups.

Goodie (2003) reported that people's tendency to take risks increased when they were highly confident in their own knowledge. The researcher also noted that people are often overconfident about their knowledge. Goodie (2004) found that participants were more willing to take risks when they felt they could control the outcome of a situation, even if they had overrated their likelihood of success.

Positive feedback and perceived competence. One process through which interest in goal pursuits can be enhanced is perceived competence. Positive feedback from completing a task increases feelings of perceived competence (Elliot & Harackiewics, 1994). There is evidence (e.g., Bandura, 1990; Elliot & Harackiewics, 1994) indicating that children who perform well on a math exercise will perceive themselves as more competent than children who do not; these children also showed more interest in maths than students who performed poorly. It could be concluded, therefore, that perceived competence is positively associated with people's sense of control over completing a task. The perceived competence, in turn, influences their actual performance on the task (Elliot & Harackiewics, 1994).

Changes in Sense of Control

Sense of control can be increased or decreased during a person's lifetime (Shapiro, 1994). There is evidence (e.g., Mirowsky, 1995; Mirowsky & Ross, 1990) to suggest that people's sense of control is related to the type of occupation that they have, their level of education and income, and their health-related behaviours (e.g., the amount of exercise that they get). Lachman and Weaver (1998) showed that, compared to participants with higher incomes, those with lower incomes had fewer opportunities to enhance their sense of control. There is also (e.g., Burger, 1992; Deneve & Cooper, 1998) that even people who have a desire for control show a greater sense of control than those who do not have the desire.

As explained earlier, if people see the contingency between their behaviour and its outcome, their sense of control increases. If they perceive their behaviour to be independent of its outcome, their sense of control diminishes (Cook, 1993; Fincham & Cain, 1986). When people believe that they do not have enough control over events and that their actions are not related to actual outcomes, their sense of control is diminished. As the frequency of undesirable or uncontrolled events increases, people's sense of control decreases. Examples of these events include losing a job (Pearlin, Menaghan, Lieberman, & Mullan, 1981), divorce, death of a partner, prolonged sickness or serious injury, and severe financial problems (e.g., Mirowsky & Ross, 1990). In brief, uncontrollable environments lead to a sense of helplessness and depression (e.g., Abramson et al., 1978; Seligman, 1994).

Minority-group members, such as members of a given race, ethnicity, or even an immigrant population can suffer from a lower sense of control than members of the majority population can. Elliot and Dweck (1998) reported that members of minority

groups in the United States, such as blacks and Mexican-Americans, felt less in control than did white people.

Functional impairment can also reduce one's sense of control. Functional impairment increases in late life (Maddox & Clark, 1992) and reduces elderly people's sense of control (Baltes, Wahl, & Furstoss, 1990). Mirowsky (1995) showed that older adults with physical impairments, whose level of education was also low, had a lower sense of control than older adults with a high level of education. Ross and Drentea (1998) also showed that retirement was associated with a lowered sense of control, presumably because daily pursuing work-related goals was no longer necessary.

Sense of Control as a Continuum

The amount of sense of control that a person has can be considered to be on a continuum, with maximum sense of control at one end and the minimum at the other end. Moreover, some researchers (Lachman & Weaver, 1998; Seeman & Seeman, 1983) suggest that sense of control can be divided into two levels. The first level is mastery orientation; people with a high sense of control are characterised by mastery orientation, which refers to sense of efficacy or effectiveness in reaching goals (Lachman & Weaver, 1998). The second level is perceived constraints; this indicates the extent to which one believes in obstacles to goal attainment or factors that are beyond the person's control and interference from which he or she cannot stop. Perceived constraints are strongly associated with feelings of learned helplessness. The following section first describes the concept of mastery orientation. Next, because of its importance in psychopathology, this section explains helplessness and outcomes related to it in greater detail.

Mastery Orientation

People with a high sense of control are characterized by mastery orientation (Lachman & Weaver, 1998). According to Parrish (2003), compared to those who are not mastery oriented, people with mastery orientation tend to (a) attribute their success to their efforts; (b) not to relate past failures to future tasks; and (c) have a higher rate of success in achieving their goals than other people. People who develop mastery-oriented attributes believe that their success is due to their own abilities. They feel that they have reasonable control over their environment and hence they are active in dealing with it.

According to goal theories (e.g., Ames, 1992a; Dweck & Leggett, 1988), individuals with mastery orientation tend to develop goals that require new opportunities to learn. These individuals are more likely to learn new things and achieve their goals

than those who focus only on task performance and whose main concern is avoiding criticism (Seligman, 1994). Mastery orientation has been found to be correlated with effective learning strategies, positive attitudes, selecting tasks that are more challenging, higher perceived ability and effort, the use of deep cognitive processes, persistence, achievement and initiation (Archer, 1994; Garcia & Pintrich, 1996; Miller, Greene, Montalvo, Ravindran, & Nichols, 1996; Simons et al., 2000).

Learned Helplessness

The concept learned helplessness was first introduced by Seligman and Peterson in the mid-1960s, during their attempts to test predictions of the two-process learning theory. They did most of their research on learned helplessness with animal subjects. Seligman's theory (1974) was actually based on his laboratory studies of avoidance conditioning in animals.

In a classic avoidance-conditioning paradigm, Seligman put a dog into a shuttle box with two sections. He gave a signal and then, after a few seconds, an electric shock was delivered to the dog. After repeating this sequence several times, the dog learned to avoid the electric shock by escaping to the other side of the box before receiving the shock. In the second part of the study, Seligman gave the shocks immediately after the signals, such that the dog did not have time to escape (Seligman & Maier, 1967). After a few times, the dog learned to passively accept the shocks. Seligman interpreted this outcome as helplessness. Helplessness occurred when the dog's repeated attempts to control outcomes of events were unsuccessful (Seligman, 1974). In addition, Seligman and Beagley's (1975) study with inexperienced dogs showed that they could learn to avoid the shocks faster than dogs that had previous experience with the shock treatment. The dogs that had experienced unavoidable shocks previously did not learn to avoid; they just lay there, and they quickly gave up.

Maier, Peterson, and Schwartz (2000) utilized bursts of white noise as an inescapable aversive event and induced similar helpless responses in humans. Participants who experienced uncontrollability often showed adverse reactions, such as negative affect, more failures in performing the tasks, slower problem solving, and less perseverance.

Therefore, learned helplessness is a motivational state that results from frequent failures in completing one or a few tasks, such that the individual believes that he or she cannot perform well on future tasks or reach his/her goal (Ramirez, Maldonado, & Martos, 1992; Shields, 1997). According to Stipek (1988), helplessness is in conflict with

people's vital drive to control their environment. Seligman (1975) established that learned helplessness occurs when a person believes that he or she no longer has control over certain events.

Helplessness theories argue that uncontrollable events lead to beliefs of response-outcome independence, which in turn produces a variety of deficits and leaves the person feeling miserable. Maier et al. (2000) argued that helplessness results from a disconnection between a given set of learned responses and their expected outcomes.

However, there is evidence (e.g., Seligman, 1994) to suggest that not all people react the same to negative experiences, such as frequent failures. Carrillo (2001) suggested that learned helplessness is inversely correlated with intelligence, job competence, sociability, and physical appearance, the quality of intimate relationships, academic achievement, and job satisfaction. In general, Carrillo (2001) showed that students with higher self-esteem are lower on learned helplessness. Many famous scientists and inventors, such as Thomas Edison, experienced frequent failures before achieving an outstanding success. Authors (e.g., Martinez & Sewell, 2000) believe that individual differences in attributional styles determine people's persistence and perseverance in their goal pursuits.

Attribution Styles and Learned Helplessness

Attribution theory explains people's perceptions of sources of events, including their own or other peoples' successes and failures (Weiner, 1972, 2006). People explain what causes an event, but in doing so, they are not fully aware of the mechanisms underlying their explanations. For instance, they do not check whether or not their explanations of events match reality (Martinez & Sewell, 2000). Finding an explanation for an event or one's behaviour usually happens automatically. The automatic, natural, and routine ways through which people explain causes of events are called attributions or explanatory styles; attributions reflect individuals' perceptions of underlying determinants of their behaviours (Rothman, Salovey, Antone, Keough, & Martin, 1993). People often attribute their performance to factors such as their ability, effort, mood, knowledge, luck, help from others, interest, clarity of instructions, the interference of others, or unfair policies (Calbraith, Ford, Walker, & Ford, 2005). In other words, they attribute the reasons underlying their behaviours to internal or external determinants or a combination of the two.

According to Abramson et al. (1978) explanatory styles provide an attributional reformulation of helplessness theory to explain individual differences in response to bad

events. There are three types of attributional styles that people usually use to explain causes of events in their lives (Abramson et al., 2000; Martinez & Sewell 2000).

First, attributional styles can be identified on a bipolar scale described as internal or psychological (it happened because of me) versus external or environmental (it happened because of something or someone else). An internal attribution claims that the person was responsible for the event. The internal attributes can be further broken into ability and effort (Scanlan & Passer, 1980; Parrish, 2003). Ability is a person's capability or skill to perform a certain task successfully. Effort is the work one puts forth to accomplish a goal (Zumdahl, 1993). A failure attributed to a lack of ability would cause an expectation of uncontrollability (Gernigon, Thill, & Fleurance, 1999). An external attribution claims that factors outside the person caused an event and, therefore, the person assigns causality to an outside agent or force (Rothman et al., 1993), and this leads to loss of one's belief in the benefits of effort (Ames, 1984; Cai- Hong & He-An, 2006) and a defensive style of inaction (Leggett, 1986).

Second, attributional styles can further be identified on a bipolar dimension described as stable (this condition is permanent) versus unstable (this condition is temporary). Seligman argued that a stable-unstable explanatory style refers to the feeling that failure is caused by something that stays around or goes away. For example, a student who fails a test and says "I am dumb!" would have a stable explanatory style (he/she might think of himself or herself as stupid for a long time). On the other hand, if this student says "I tried but I did not do well because I was tired," this statement would be classified as an unstable explanatory style.

Third, attributional styles can also be identified on a bipolar dimension called "global" (e.g., "this will interfere with everything I do") versus "specific" ("this pertains only to this situation"). For example, when people experience a break-up of an intimate relationship, it is common for them to question their self-worth. Many people look into themselves to answer this question: "What is wrong with me?" The more they believe it is their fault, the more they will lose their self-worth. In contrast, a more optimistic approach would be, "There are lots of people in my life who love me and care about me. Unfortunately, this person is not one of them." Here, the focus is specific, for example, "One person, out of many, doesn't love me." Peterson and Seligman (1987) showed that when a person attributes a negative event to global, stable, and internal causes, the risk of learned helplessness increases. There is evidence (e.g., Bruch & Belkin, 2001; Buchanan & Seligman, 1995) that a global maladaptive attributional style, once connected to depression or helplessness as a personality characteristic, will be associated with poor

coping, maladaptation, and lack of well-being. An individual with an internal, stable, and global attributional style is more likely to suffer from learned helplessness than a person whose dominant attributional style is external, unstable, and specific (Seligman, 1994).

There is also a positive association between learned helplessness and pessimistic attribution; that is, increases in one are often accompanied by increases in the other (Peterson & Seligman, 1984; 1994; Seligman, 1996). For example, Jackson, Sellers, and Peterson (2002) reported that pessimistic people are more likely to become helpless. Although most people sometimes tend to find someone or something to blame, a person with a pessimistic attributional style usually blames himself/herself (Seligman, 1992). Due to the importance of adverse consequences resulting from a dominant pessimistic attributional style, the following section discusses this issue in greater detail.

Effects of a pessimistic attributional style. Pessimism and optimism have different effects on health and well-being. A pessimistic explanatory style may lead to poor quality of life in many different domains (e.g., Martinez & Sewell, 2000; Peterson & Barrett, 1987; Martin-Krumm, Sarrazin, Pererson, & Famose, 2003). Whereas an optimistic explanatory style leads to a high quality of life with more hopefulness and encouragement and greater achievement (e.g., Wise & Rosqvist, 2006), evidence indicates that individuals with a pessimistic attributional style respond to stress with more passivity, and they suffer from a higher frequency of illness and depression than optimistic people (Peterson, Seligman, & Vaillant, 1994; Stauber, 1995; Yates, Keeves, & Tiggemann, 2000). For example, Peterson and Seligman (1994) reported that, compared to optimistic individuals, pessimistic people caught twice as many infectious illnesses, visited their doctors twice as often, and had a weaker immune system.

Pessimistic people are more likely to be characterized with an internal, stable, and global explanatory style for bad events than are optimistic people; hence, compared to the latter, the former group are more likely to show emotional, motivational, and cognitive disturbances (Peterson & Bossio, 1991; Peterson, Seligman, Yurko, Martin, & Friedman, 1998). Pessimistic people believe that bad events will last indefinitely and, therefore, they expect a great deal of distress in their lives. Seligman (1994) showed that this pessimistic interpretation of life miseries is a characteristic of depressed people.

In addition, pessimistic people experience the negative consequences of illness more severely than do optimistic people (Dykema, Bergbower, & Peterson, 1995). Gleitman (1995) showed that pessimistic patients, who believe that there is nothing that they can do about their illness, are more likely to yield to it than those who are optimistic. In other words, the influence of pessimism on health is similar to the biological effects of

learned helplessness (Parrish, 2003). Levy, Herberman, Maluish, Schlien, and Lippman (1985) found that pessimistic female patients with breast cancer died sooner than optimistic ones suffering from the same illness.

Pessimism and optimism have different effects on job satisfaction and success. Phelps and Waskel (1993) found that a pessimistic explanatory style was associated with lower levels of job satisfaction. Seligman and Schulman (1986) examined insurance sales agents and found that agents with more pessimistic explanatory styles regarding their failures, which were also internal, stable, and global, had higher rates of drop-out and earned less in sales commissions than agents with a more optimistic explanatory style (i.e., external, unstable, specific).

Explanatory style and athletic performance. Seligman, Nolen-Hoeksema, Thornton, and Thornton (1990) reported that pessimistic world-class swimmers showed considerable declines in their performance during swim tests that followed an experimentally induced failure, whereas their more optimistic peers showed an improvement in their performance.

Litten (1999) designed a programme to overcome learned helplessness and depression. The goal of this programme was to change pessimistic explanatory styles into ones, and thereby reduce the degree of learned helplessness. The programme was designed for high school students. They participated in a 12-week programme to learn new cognitive strategies and social skills and other coping strategies. Their parents and teachers attended a similar programme at the same time to learn the same strategies. This aspect of the programme was designed to improve the quality of the support that parents and teachers provided to the student participants. The parents and teachers encouraged the students with positive feedback, reassurance, and support, and they showed sensitivity to culturally diverse students. At the end of the programme, the student participants showed a reduction in their learned helplessness and depressive symptoms and improvement in their optimistic explanatory style. Researchers followed up the participants over a three-year period, and they found that the reductions in depressive symptoms and learned helplessness were maintained during the period.

Adverse Consequences of Learned Helplessness

There is evidence (e.g., Gernigon et al., 1999; Skinner, 1995) that helplessness results in negative consequences in three domains: cognitive, emotional, and motivational. Cognitively, a helpless individual believes that outcomes are out of his/her control; motivationally, the person's level of activity and effort decreases and gradually

he or she gives up; and emotionally, increasing feelings of sadness, anxiety, and hostility decay the person's emotional well-being. Feelings of not being in control of one's surroundings damages the person's self-efficacy and perceived ability to learn in similar situations (Ramirez et al., 1992).

Learned helplessness has many adverse effects, among these are health-related problems (Nicassio, Schuman, Radajevic, & Weisman, 1999), depression (Peterson & Seligman, 1984), unpopularity among peers (Aydın, 1993), and academic failure (Fincham, Hokoda, & Sanders, 1989). All of these may decrease individuals' satisfaction and happiness. According to Berger (1983), learned helplessness is also associated with poor social skills, feelings of incompetence, low self-confidence, poor problem-solving strategies; all of these result in the individuals' feeling that they are struggling for nothing (Dweck, Davidson, Nelsin, & Enna, 1978). Learned helplessness is associated with psychological disorders, especially with depression (e.g., Gundogdu & Aydin, 1994; Peterson & Seligman, 1984), stress (e.g., Geer, Davison & Gatchel, 1970; Maier et al., 2000), and anxiety (e.g., Gotlib, 1984; Waschbusch, Sellers, LeBlanc, & Kelle, 2003).

Negative emotions may underlie failures in task performance. Heyman, Dweck, and Cain (1992) showed that if children in a nursery expressed negative emotions in response to criticism, they could generalize these feelings toward new tasks. Children experiencing an unpleasant emotional state in test situations are likely to perform poorly on the tests compared to those who do not experience such negative feelings (Sarason & Sarason, 1990).

Feelings of helplessness and academic performance. Fincham et al. (1989) reported that helplessness was consistently correlated with low academic achievement. The relationship between helplessness and poor achievement can be explained on the basis of (a) attributional styles underlying the performance and (b) the cognitive influences of helplessness on academic performance.

First, Fincham et al. (1989) found that helpless students could be identified by their tendency to attribute failure to external factors rather than their own efforts. Students' expectancy of success influences the extent with which they will try in future (Green, 2000). Shiomi (1995) studied the relationship between hopelessness with measures of motivation in 628 Japanese students in primary schools. The results showed that there was a negative relationship between hopelessness and the students' motivational indices.

Second, there is evidence (e.g., Lavelle, Metalsky, & Coyne, 1979; Zatz &

Chassin, 1983) that perceived uncontrollability (i.e., hopelessness) is associated with test anxiety. The cognitive component of test anxiety is similar to that of helplessness in that it creates future failure expectancies (Zatz & Chassin, 1983). It may be concluded that both test anxiety and learned helplessness involve cognitive processes that increase individuals' future failure expectancy (e.g., Gundogdu & Aydin, 1994; Culler & Hollahan, 1980).

Most students identified as helpless give up trying to achieve academically; instead, they may become their class comic or bully or start teasing others as they develop into adolescents; sometimes they try to increase their sense of respect through antisocial behaviours (Berger, 1983). These individuals gradually develop the belief that they are worthless and helpless; they feel unable and incompetent to master new material or tasks; and that feel like a failure (Heyman & Dweck, 1992).

Waschbusch et al. (2003) reported that male adolescents with a primary diagnosis of anxiety had helpless attributional styles that were similar to those of male adolescents with depression as their primary diagnosis. Therefore, it seems that helpless attributions are related to both anxiety and depression. Nevertheless, Gotlib (1984) suggested that helpless students could be labelled as anxious rather than depressed. He also claimed that learned helplessness is primarily a model of anxiety rather that a model of depression.

Motivational Orientation

To reach a goal, an individual needs to be motivated. Motivational orientation is regarded as one of the most important determinants of people's success with goals for learning new information and acquiring new skills (Witkowski, Stiensmeier-Pelster, Kulbat, & Paszkiewicz, 1997). A person's motivational orientation can be identified by uncovering the desires, interests, attitudes and intentions underling that person's decisions or actions. Some people are motivated by forces inside themselves (e.g., they enjoy accomplishing their tasks), whereas other people are motivated by external rewards (e.g., fame, money). In other words, motivational orientation has two dimensions: intrinsic and extrinsic.

Intrinsic Motivation

Reeve (2002) stated that intrinsic motivation is the natural tendency to engage one's interests and to exercise one's capacities and, in doing so, to seek out and overcome challenges. Intrinsically motivated behaviours require no (or minimal) external support

or reinforcement for the behaviour to continue. People with intrinsic motivation concentrate mostly on their task and consider it an activity to be done for its own sake, regardless of the specific outcome (Dev, 1997; Simons, Dewitte, & Lens, 2004). They do not care much about others' perceptions or attitudes about the task at hand. People with intrinsic motivation choose a goal to perform, not from compulsion, but for the satisfaction and joy derived from the activity itself (Pintrich & Schunk, 2002).

Intrinsically motivated people consider their failures as experiences that allow them to improve their goal directed attempts. These people organise their attempts around the task in order to understand it and manage it satisfactorily and independently of its possible outcomes or benefits in the future (Simons et al., 2004). These individuals have a high capacity to take risks and see themselves as capable of undertaking a challenging task (Matusov, 1997).

People with intrinsic motivation show greater interest in learning and achieving their goals than people with extrinsic motivation (Elliot et al., 2000). In addition, compared to the latter, the activities of intrinsically motivated people tend to be associated with more creativity, increased cognitive flexibility, positive emotions, and higher self-esteem (Milkulincer, 1994). These people also give greater weight to their personal role in making a decision to pursue a goal. They also give more meaning to their goal-seeking activities and enjoy performing the task regardless of their degree of success in achieving their goal and regardless of environmental feedback (Simons, Van der Linden, & Duffy, 2000).

There is evidence (e.g., Matusov, 1997; Pugh, Bergin, & Rocks, 2003) that most people with intrinsic motivation feel more competent than those with extrinsic motivation. In addition, children whose definition of success involves competition (i.e., success means doing better than other children do)—and whose perception of their own competence is low—are more likely to show dysfunctional behaviours, such as lack of effort, not participating, and lack of persistence. In a longitudinal study, Sheldon and Kasser (1998) found that participants' well-being was enhanced if they chose intrinsic goals and succeeded in attaining them, whereas succeeding with extrinsic goals provided little benefit. There is also evidence (e.g., Ames, 1984, Dweck, 1986) that also shows that children who are intrinsically motivated and believe in their competence are often physically more active than those with extrinsic motivations are.

Harackiewicz, Barron, Tauer and Elliot (2002) reported that intrinsically motivated students enthusiastically strived to develop their sense of competence through learning and by focusing on acquiring skills. Conversely, although extrinsically

motivated students also tried to achieve their goal to perform well in their schoolwork, they did not enjoy it and their learning did not improve. Instead of enjoying their work, they were trying to demonstrate that their ability was as good as other students; they also tried to conceal their lack of ability. Cocks and Watt (2001) found that intrinsic motivation was related to developing stronger conceptual understanding of task materials, greater attention to the task at hand, and better learning outcomes.

There is evidence that shows that people with intrinsic motivation have greater immunity against feelings of despair and a sense of failure and hopelessness than those with extrinsic motivation (Bandura, 1982; Milkulincer, 1994, Shields, 1997). Compared to extrinsically oriented individuals, intrinsically oriented people show greater commitment to and increased likelihood of achieving their goal (Klinger, 1977). There is evidence (Curry, Wagner, & Grothaus, 1990; Strecher, Kobrin, Kreuter, Roodhouse, & Farrell, 1994) that also suggests that intrinsically motivated people are more successful in quitting an addictive behaviour than extrinsically motivated people. Weigand and Broadhurst (1998) found a positive relationship between perceived competence, intrinsic motivation, and perceptions of control.

Individuals with intrinsic motivation do not fear failure; they do not avoid challenging tasks; and they do not lose their trust in their ability even after failure (Jagacinski & Nicholls, 1987); rather, they put forth more effort (Ames, 1984) and do not give up easily (Elliot & Dweck, 1988). Ryan and colleagues (Kasser & Ryan, 1993; 1996; Ryan et al., 1999) showed that individuals with intrinsic motivation focus mostly on the goal, and if they fail, they see the experience as an opportunity to improve their chances of achieving their goal (Matusov, 1997). In addition, compared to extrinsically motivated people, intrinsically motivated people have greater interest in learning, and their work tends to be associated with more creativity, greater cognitive flexibility, stronger positive emotions, and higher self-esteem (Milkulincer, 1994).

Extrinsic Motivation

Some people's primary source of motivation is extrinsic. Such people may feel that they must do a particular task, even when it is out of their control. The malicious cycle that learned helplessness causes might help to explain the development of extrinsic motivation. If people who are at first intrinsically motivated people repeatedly fail at a task, they may lose their interest in it and avoid trying similar tasks in the future (Milkulincer, 1994). They will lose their ambition and not be challenged by difficult tasks. They believe that because of their failures in the past, they cannot expect success

in the future (Matusov, 1997). People who have developed learned helplessness in this way lose the ability to become motivated intrinsically; instead, they gradually become motivated only through extrinsic sources (Stipek, 1998). Moreover, because extrinsic motivation is based on external rewards, these people try to avoid failure, threats, and punishments in order to satisfy their need for external rewards (Simons et al., 2000).

Extrinsically motivated people are more vulnerable to developing a poor sense of control, helplessness, poor problem solving ability, and emotional problems (Peterson, Maire, & Seligman, 1993; Shields, 1997; Stipek, 1988). Intrinsic motivation has positive consequences for performance and persistence, whereas extrinsic motivation may have the opposite effect (Deci & Ryan, 1985b; Eisenberger & Cameron, 1996). Boggiano (1998) showed that extrinsic motivation was more likely to be associated with maladaptive achievement patterns in students than intrinsic motivation was. In addition, Ryan and colleagues (Kasser & Ryan, 1993, 1996; Ryan et al., 1999) showed that extrinsic motivation was negatively and intrinsic motivation was positively associated with indices of mental health and well-being.

Motivational Enhancement Techniques

From the theory and research discussed so far, the components that are needed in motivational enhancement techniques can now be distilled.

Choice. A person needs to have a feeling of freedom and choice for a positive sense of control to develop. Compared to people who feel no choice in selecting or completing their tasks, people who feel free to do things in a new way, especially if the task is related to their interpersonal goals (Sansone & Smith, 2000), show more initiation and creativity (Ellenbecker, 2003), greater commitment to their goals (Earley & Kanfer, 1985), greater sense of control (Corah & Boffa, 1970; Miller & Iris, 2002; Skinner, 1996), greater personal responsibility, and harder work in pursuing and attaining their goals (Slavin, 1991). To increase one's sense of control, external demands should be minimized (Lefcourt, 1992). Providing people with an opportunity to select their goal is important because having choice stimulates an individual's natural sense of curiosity.

Knowledge. Merriam-Webster's Dictionary (2004) defines knowledge as "the fact or condition of knowing something with familiarity gained through experience or association; acquaintance with or understanding of a science, art, or technique; the fact or condition of being aware of something; or the range of one's information or understanding" (page, 206). The importance of having relevant knowledge for achieving goals is indisputable. One good definition of knowledge is the ideas or understandings,

which an entity possesses, that are used to take effective action to achieve goal (Igonor, 2000). Knowledge is having specific information that can change a person's behaviour—either by causing the person to take action or by making him or her capable of alternative or more effective action (Igonor, 2002).

By contrast, using a trial-and-error approach to achieve a goal is the least effective method. Individuals with sufficient, pertinent knowledge about how to complete their tasks can perform them better than people without such knowledge (Baldwin, 1992; Denning, 2000; Goodie, 2003). Moreover, knowledge about how to perform a task fosters a sense of control (Baldwin, 1992) and increases perceptions of competence (Ochse, 1989). That is the reason that many experts in the field of education (e.g., Slavin, 1991) insist that the main role of teachers is to arouse students' interest, so that the students will try to acquire new knowledge through their lessons. Knowledge is not only about how to achieve goals; it is also about relating new and prior information to one's goal pursuits. Such linkages among the relevant pieces of information lead to insights about how to achieve goals and improvements in individuals' motivation to achieve their goals (Igonor, 2002).

Interestingly, studies (e.g., Miles, Sawyer, & Kennedy, 1995; Warner, 1992) have also shown that people who suffer from medical problems (e.g., asthma, pain) can gain control over their situations when provided with sufficient information about their problems. Moreover, providing them with necessary information helps participants to complete their tasks successfully, and it can also increase intrinsic motivation and positive feelings about the task (Sansone, Sachau, & Weir, 1989). For example, Logan, Olson, and Lindsey (1993) showed that acquiring new knowledge about spelling strategies enhances sense of control and intrinsic motivation, even among champion spellers.

To maximize the effect of acquiring new information, three important factors should converge: *autonomy* to choose personal goals; *opportunities to learn and to master* new knowledge and skills; and sufficient *support* to allow learners to know about their current level of knowledge and whether improvements are required for successful accomplishment of a goal (Haasen & Gordon, 1997).

Feedback. According to Eva et al. (2004), knowledge about performing a task will be more useful if it is accompanied by feedback about how well the person has performed. However, positive and negative feedback have different motivational consequences. Vallerand and Reid (1988) indicated that positive feedback increases both intrinsic motivation and perceived competence, whereas negative feedback reduces both

of them.

In giving feedback, *contingency* and *immediacy* are important factors to consider. Contingent feedback means that feedback should be accurate, consistent with, and relevant to the individual's task performance. According to Slavin (1991), contingent feedback is informative and, if positive, often helps people to be reassured that their goals are specific, attainable, realistic, and timed so that they will not feel discouraged by failing to accomplish their goals. Appropriate feedback should help people to (a) identify their strengths and weaknesses (Gibbons, Roberston, Duffin, & Thomson, 2001); (b) better get involved in performing their tasks (Elliot & Harackiewiez, 1994; 1996); (c) increase their sense of competence (Goudas, Minardou, & Kotis, 2000); (d) increase their interest in and intrinsic motivation to perform a task (West, Welch, & Thorn, 2001); (e) enhance their sense of control over their tasks (Skinner, 1996) and (f) increase their chances of achieving their goals (Gibbons et al., 2001).

West et al. (2001) showed that participants who perceived that they were taking the right steps toward performing their tasks continued to work harder on them—regardless of their increasing level of difficulty—than participants who were not sure about the accuracy of their performance. Bandura and Schunk (1981) reported that children who received contingent, positive feedback achieved their goals on a maths exercise more successfully and perceived themselves as more competent than children who did not receive such feedback. The former group also showed more interest in a task toward in which they had not initially been interested.

Feedback can cause a discrepancy between people's present state and their desired state. The discrepancy results in self-dissatisfaction and it can subsequently increase the motivation to change. For instance, providing relevant feedback is essential to increase people's motivation to learn. An effective teacher knows students' strengths and limitations and in a constructive way provides them with opportunities to see their strengths and acknowledge their limitations (Williams, 1994). In clinical settings, many studies (e.g., Bailey & Sowder, 1970; Baker, Udin, & Vogler, 1975) have shown that videotaped self-confrontations result in negative self-perceptions and distress but that they decrease denial of problems; they generally led to greater post-treatment changes.

Goal-setting. Feedback will be more effective when it is combined with goal-setting (Bandura, 1983; Kanfer, Ackerman, Murtha, & Dugdale, 1994).

Research (e.g., Austin & Vancouver, 1996) has shown that goals are important regulators and motivators of human action. Goal setting has proven to be useful in a variety of settings, including industrial, organizational, and clinical ones (Strecher, Seijts,

Kok, & Latham, 1995). For instance, studies have also found that successful athletes believe in and apply goal setting frequently in their programmes (Weinberg, Burton, Yukelson, & Weigand, 2000). The benefits of goal setting are well documented in research that included more than 40,000 participants who completed 90 varying tasks (Locke & Latham, 1990; Weinberg, Harmison, Rosenkranz, & Hookom, 2005). Thus, the important question is not whether goal setting is a necessary motivational factor; rather the question is how to optimize goal setting in a training programme.

For appropriate goal setting, it is important to acknowledge people's right to choose their goals and what they want to achieve (Sansone & Smith, 2000); goal setting should be both predated and accompanied by pertinent knowledge (Baldwin, 1992), and it should be complemented by contingent, supportive feedback on one's performance (Gauggel et al., 2002). For decades (e.g., Locke, 1982; Locke & Latham, 1990), it has been known that *specific* and *difficult* goals lead to significantly better performance than vague and easy goals, such as "do-your-best" or having no goal at all (Gauggel & Fisher, 2001). Gauggel et al. (2002) showed that (compared to self-assigned, easy goals) experimenter-assigned, specific, and difficult goals significantly improved patients' performance on simple arithmetic tasks. Moreover, it is important to remember that goals should be set in accordance with a person's capabilities and should be consistent with their desires.

Appropriate goal setting helps people to concentrate on their tasks and plan the necessary steps that they should take towards achieving their goals. It helps people to have a long-term vision but short-term motivation. By setting appropriate goals, people can measure their progress towards their goals; feel that they are forward and making progress in what might have previously seemed like a long, useless struggle; and derive pleasure from achieving their goals. In addition, proper goal setting—especially if it is associated with specific and difficult tasks—increases people's interest in the goal, and it can lead to immediate and ongoing feelings of self-confidence (Harackiewicz & Sansone, 1991). Appropriate goal setting helps people to recognize their ability and competence in achieving the goals that they have set (Elliot & Harackiewicz, 1996; Gauggel et al., 2002; Csikszentmihalyi, 1990); it also enhances the salience and value of performance, and it encourages, challenges, and promotes task involvement. These factors are known to enhance intrinsic motivation and sense of control.

Conclusions

Research based on the motivational model of alcohol use suggests that people's

motivational structure affects their decisions about consuming alcohol or using other addictive substances. It has been also shown that alcohol abusers' motivational structure affects their success in reducing their alcohol consumption. Based on these results and those from other studies on motivation, it appears that there are two important components of individuals' motivational structure: sense of control and motivational orientation (i.e., intrinsic vs. extrinsic). There are many reasons for this prediction. First, evidence indicates that people with a strong sense of control feel more excited, committed, and optimistic about pursuing their goals, and they assume greater responsibility for both their successes and their failures than people with a poor sense of control. In addition, there is evidence that shows that a greater sense of control is associated with better health than a poor sense of control, regardless of a person's level of income and financial status. Second, there is evidence indicating that people with intrinsic motivation have greater immunity to feelings of despair and a sense of failure and helplessness. These people also show greater interest in and commitment to pursuing and achieving their goals. Moreover, intrinsic motivation is more strongly associated with indices of good physical and mental health than is extrinsic motivation.

This chapter also discussed how choice, knowledge, feedback, and goal setting are among the factors that influence people's sense of control and their motivational orientation. Thus, it is reasonable to expect that variations in people's sense of control and motivational orientation will co-vary with variations in their adaptive/maladaptive motivational structure. Likewise, it is reasonable to expect that people's adaptive motivation can be increased through the use of techniques that increase individuals' sense of control and their intrinsic motivation.

Goals of the Thesis Research

Despite the alleged importance of motivational orientation and sense of control as determinants of motivational structure (Cox & Klinger, 1988, 2004b), relationships among motivational orientation (i.e., intrinsic/extrinsic motivation), sense of control, and motivational structure have not previously been systematically investigated. Prior to this thesis research, there also was no evidence about whether an intervention aimed at increasing intrinsic motivation and sense of control could help facilitate an adaptive motivational structure. In the thesis research, relationships among sense of control, motivational orientation, and motivational structure were assessed, with an aim of understanding how these relationships are related to the motivation to drink alcohol. The

drink-related aspect of the study helped to validate whether manipulations aimed at changing motivational structure would have the expected consequences on participants' explicit and implicit urges to drink.

Relationships among sense of control, motivational orientation, and motivational structure were established through the following steps. The relationships were studied on two levels: (a) questionnaire study (Study One) and (b) the laboratory studies (Study Two, Study Three, and Study Four).

Study One tested the hypothetical relationships among the three variables (i.e., motivational orientation, sense of control, and motivational structure) using questionnaires that measured each of them. Hence, it assessed whether the theoretical relationships among these variables occurred in the "real world."

Study Two, a laboratory study, assessed cause-and-effect relationships among the variables of interest. Study Two used informational enhancement and goal-setting techniques to manipulate sense of control and motivational orientation, inducing either a low or a high sense of control. The aim of this study was to identify the effects of the manipulations on participants' motivational structure.

Study Three sought to determine whether the most effective technique for increasing sense of control and intrinsic motivation was informational enhancement or goal setting or a combination of the two techniques.

Study Four assessed whether positive and negative mood inductions alone would cause changes in participants' task-specific motivational structure. In other words, Study Four was conducted to isolate the effects of re-structuring techniques from the sheer effects of any positive or negative mood states on post-experimental changes in task-specific motivational structure— i.e., the changes that were observed in the third study.

CHAPTER TWO

Relationships Among Motivational Structure, Sense of Control, Motivational Orientation, and Alcohol Consumption

As discussed in Chapter One, the processes that underlie goal pursuits are referred to as motivation. Recall that the motivational model of alcohol use (Cox & Klinger, 1988, 1990) brings together factors (e.g., heredity, personality, current positive, and negative from non-chemical incentives) that contribute to people's motivation to drink alcohol. The motivational model of alcohol use asserts that people's motivation to drink competes with their motivation for other incentives not directly related to drinking. If people cannot succeed in achieving their alcohol-unrelated goals, their chances of using alcohol to regulate their affect will increase. In this sense, alcohol consumption serves as a maladaptive attempt to overcome a sense of failure or to otherwise restore desirable emotional states. In short, there is evidence that motivational problems are associated with excessive drinking (Beckman, 1980; Cox & Klinger, 2004a; Deaton, 1975).

Cox and Klinger (1988) suggested that motivational problems associated with alcohol abuse result from people's maladaptive *motivational structure*, or the characteristic manner in which each individual pursues his/her goals (e.g., Heckhausen, 1991). Motivational structure varies from one person to another; it is the more-or-less stable way in which each person pursues his/her goals. However, motivational structure is not entirely rigid because a person's current concerns and his or her success with or failure at goal pursuits can modify the way in which the individual strives for other goals in the future. To measure motivational structure, Cox and colleagues (Cox & Klinger, 2004b; Cox et al., 1995) developed the Motivational Structure Questionnaire (MSQ) and an abridged version of the test called the Personal Concerns Inventory (PCI; Cox & Klinger, 2004a). In recent research, researchers have used the PCI rather than the MSQ because the former is easier to administer.

Research using the MSQ and PCI (e.g., Cox et al., 2002; Cox & Klinger, 2002; Fadardi, 2003; Fadardi & Cox, 2002) has indicated that people with an maladaptive motivational structure compared to people with an adaptive motivational as (a) fewer positive incentives, (b) less hope for achieving their goals, (c) less anticipated happiness from achieving their goals and less anticipated sorrow from not achieving them, (d) longer expected distances from goals, (e) less feeling of commitment to their goals, and (f) less perceived personal control over achieving their goals.

As far as the reliability of the PCI is concerned, Fadardi (2003) reported a Cronbach's Alpha, $\alpha = .75$, as a measure of the test's internal consistency. There are also several studies supporting the validity of the MSQ for measuring individual's current concerns and their patterns of goal pursuit (see Cox & Klinger, 2002, 2004a). For example, laboratory research has demonstrated that participants show increased skin-conductance responsiveness to stimuli related to their current concerns (Nikula et al., 1993). Nikles et al. (1998) found that participants' current concerns affect the content of their dreams. The pattern of individuals' daily activities is also related to their current concerns (Klinger, 1987b).

Man et al. (1998) reported that MSQ indices distinguished a clinical sample of alcohol abusers from demographically similar university students. The clinical sample reported (a) 40% fewer concerns than the university students, (b) less commitment to their goals (they needed stronger incentives to get committed to their goals than did the students), and (c) feeling less control over goal attainments. Cox et al. (2000) administered the MSQ to substance abusers in treatment. They used principal factor analysis of the MSQ and derived two primary factors, which they called adaptive and maladaptive motivational structures. Subsequent studies have used similar procedures, and they too have also identified adaptive and maladaptive motivational structures. The PCI has also been used to predict problem drinkers' success in changing their drinking. Evidence suggests that motivational structure predicts treatment outcome for substance abusers (e.g., Cox & Klinger, 2002; Klinger & Cox, 1986). Fadardi (2003) found that motivational structure, as measured by the PCI, predicted the amount of alcohol consumed among a sample of non-dependent drinkers.

To conclude, one important reason that consuming alcohol escalates into an unhealthy and harmful pattern is that excessive drinkers lack the motivational characteristics required to achieve their goals successfully. Therefore, it is important to seek to identify the factors that contribute most to the development of a maladaptive motivational structure. As discussed in Chapter One, two important factors help to distinguish adaptive from maladaptive motivation: motivational orientation and sense of control.

First, compared to extrinsically motivated people, those with intrinsic motivation give more meaning to their goal-seeking activities, and enjoy performing their tasks more, regardless of their degree of success in achieving their goals and regardless of environmental rewards (Kong & Hau, 1996; Simons et al., 2000). In addition, compared

to extrinsically oriented individuals, intrinsically oriented people are more strongly committed to achieving their goals (Klinger, 1977), such as the goal of quitting an addictive behaviour (Curry, Wagner, & Grothaus, 1990; Strecher et al., 1994). In contrast, extrinsically motivated people are more vulnerable to developing a poor sense of control (Chaney et al., 1999), feelings of helplessness, and emotional problems (Stipek, 1988), and they have poorer problem-solving ability (Shields, 1997).

Second, feeling unable to control one's surroundings damages a person's self-efficiency and lowers his or her perceived ability to learn in similar situations (Ramirez et al., 1992). Gernigon et al. (1999) showed that helplessness results from negative experiences that are perceived as uncontrollable. A poor sense of control over one's life is strongly associated with depression, anxiety, alcohol abuse (e.g., Henkel et al., 2002; Korolenko & Kensin, 2001), and even suicide attempts (Surgenor & Snell, 1998). According to Stipek (1988), helplessness is in conflict with humans' vital drive to control their environment. Negative effects of a poor sense of control and helplessness might motivate a person to drink alcohol, which can manifest itself both in an explicit, conscious way and in an implicit, non-conscious way. That is, explicit associations between drinking and changes in mood that drinking causes gradually convert into non-conscious, implicit associations between alcohol and expected effects from drinking; these associations can be measured using various paradigms, such as the alcohol-Stroop test (Cox et al. 2006).

Compared to people with a poor sense of control, those with a strong sense of control feel more enthusiastic and hopeful, and they are more committed to pursuing their goals and more optimistic about achieving them (e.g., Mirowsky, 1995; Shapiro, 1994; Wortman, Sheedy, Gluhoski, & Kessler, 1992). As might be expected, then, a strong sense of control is associated with good physical and psychological health (Davis et al., 1995; Lachman, 1986; Langer & Robin, 2004; Rodin, 1986; Rodin et al., 1985; Thompson, Cheek, & Graham, 1988).

In summary, despite the fact that there is compelling evidence that maladaptive motivational structure is associated with drinking behaviour, the factors that cause motivational structure to be adaptive or maladaptive have not yet been systematically examined. There is also evidence that an extrinsic motivational orientation, a low sense of control, and a sense of helplessness are associated with negative affect, which might well contribute to people's decisions to drink alcohol. However, the relationships among motivational orientation, sense of control, motivational structure and alcohol consumption have not yet been studied. The present study evaluated the ability of motivational

orientation, sense of control, and motivational structure to statistically predict the amount of alcohol that drinkers consume.

Research Hypotheses

The current study aimed to clarify relationships among motivational structure, sense of control, motivational orientation, feelings of helplessness, and the amount of alcohol that drinkers consume. The hypotheses tested were as follows:

1. Sense of control would be positively correlated with intrinsic motivation, but negatively correlated with extrinsic motivation and helplessness.
2. Sense of control and intrinsic motivation would be positively correlated with adaptive motivation and negatively correlated with alcohol consumption.
3. Extrinsic motivation and helplessness would be negatively correlated with adaptive motivation and positively correlated with alcohol consumption.
4. Motivational structure would mediate the relationship between sense of control and the amount of alcohol consumed.
5. Motivational structure would mediate the relationship between motivational orientation (i.e., self-determination) and the amount of alcohol consumed.

Method

Power Analysis and Participants

Thus far, there have been two studies on the relationship between students' motivational structure and their drinking behaviour (Cox et al., 2002; Fadardi, 2003). The effect sizes (ESs) obtained in these studies (f = .12 and .25, respectively) were used to conduct a power analysis for the present study. Based on guidelines provided by Cohen (1992), an ES of .16 and power of .90 were considered suitable for this study. The power analysis was conducted for regression analyses that are necessary steps in testing mediational relationships. G*Power software (Erdfelder, Faul, & Buchner, 1996) with k = 3 (maximum number of predictors in the mediational analyses) revealed that a sample size of 94 participants was adequate for detecting a significant effect.

Therefore, 94 (male = 43.6 %; males' mean age = 20.41, SD = 2.62; females' mean age = 20.07, SD = 1.65) psychology undergraduate students were recruited from the School of Psychology Student Participant Panel. They received course and print credits for their participation. The exclusion criterion was that participants should not be dependent drinkers. This criterion was announced in the recruitment announcement, and no participant in the sample drank more than 27 units per week. Non-drinkers were also

excluded because personality differences between drinkers and non-drinkers have been reported (e.g., King, Bernardy, & Hauner, 2003). Data collection was discontinued when 94 participants meeting the inclusion criteria had been recruited. Only in analyses related to alcohol consumption, four participants were excluded because they indicated that they did not drink alcohol.

Instruments

Personal Concern Inventory (PCI)

In the abridged version of the PCI used in this study (see Appendix 4), participants were not asked to describe the content of their concerns but only to rate their views about their most important goal/s in each area of life (see Cox & Klinger, 2004b). These areas were (a) Home and Household Matters, (b) Relationships, (c) Love, (d) Intimacy and Sexual Matters, (e) Self-changes, (f) Finance and Employment, (g) Leisure and Recreation, (h) Health and (i) Education. After participants had decided whether or not they had a current concern in a particular life area, they were asked to rate on 11 dimensions their goal for resolving each concern they had. The rating scales were (a) Appetitive Action (to "get," "obtain," or "accomplish" the goal); (b) Aversive Action (to "get rid of" or "avoid" the goal); (c) Perceived Control (over achieving the goal); (d) Knowledge (about ways of achieving the goal); (e) Chances of Success (in achieving the goal "if I do my best"); (f) Chances of Success if Not Try ("if I do nothing"); (g) Joy from achieving the goal); (h) Conflict (unhappiness from achieving the goal); (i) Sorrow (from failure to achieve the goal) ; (j) Commitment (to the goal); and (k) Goal Distance (i.e., how long it would take to achieve it). The original version of the MSQ has two additional rating scales, which were not used in the current study. The ratings across a respondent's goals are summarised into motivational indices, from which that respondent's motivational profile can be drawn (Cox & Klinger, 2004b).

Shapiro Control Inventory (SCI)

The Shapiro Control Inventory (SCI; Shapiro, 1994) measures perceived sense of control. It includes 187 items that are scored on ten control scales (overall, positive, negative, domain-specific, positive assertive, positive yielding, negative assertive, negative yielding, desire for control, and Locus of control). The SCI is a multidimensional inventory that provides a control profile comprising four kinds of perceived control. The *first* component measures a person's sense of control and beliefs

about his or her ability to gain control, if desired. Within this domain, *overall* sense of control (Scale 1) gives the broadest view of a person's sense of control, under which its constituent parts are subsumed: (a) *positive* sense of control (Scale 2)—belief in one's ability to attain future control; (b) *negative* sense of control (Scale 3)—sense of loss of control in areas previously experienced as being under control. *Specific overall* sense of control (Scale 4) measures a person's experienced control in particular areas—body, mind, relationships, self, career, environment, or impulse control.

The *second* component comprises *mode of control*, which describes ways of attaining and maintaining a sense of control. Mode of control is defined across two dimensions—*assertive* vs. *yielding* and *positive* vs. *negative*—thus, resulting in four scales. Positive–assertive (Scale 5) measures perceived ability to use an active, altering mode of control (e.g., being decisive and communicating one's needs). Positive–yielding (Scale 6) measures sense of control that is based on active acceptance of a situation (e.g., being patient and accepting). Negative–assertive (Scale 7) measures the extent to which too much active control is exercised (e.g., being manipulative and dogmatic). Negative–yielding (Scale 8) measures the extent to which the person has too little control (e.g., being indecisive and letting others manipulate).

The *third* component encompasses *motivation for control* (Scale 9), which refers to a desire for psychological control over oneself, others, and the environment. The *fourth* component relates to the *agency of control, which* specifies the source from which one's sense of control originates (self and/or others). It is a measure of locus of control. Table 2.1 shows the components, scales, and number of items and give a brief description of each the SCI scales.

Shapiro (1994) reported strong reliability coefficients for the SCI. Twelve different studies have been conducted to determine the SCI's validity. The validity has been demonstrated with both optimal and poor control profiles and their association with participants' level of adaptation, illness and health status, and treatment outcomes in both medical and psychiatric populations. Research (Shapiro & Bates, 1990; Shapiro, Bates, Greensang, & Carrere, 1991) has shown that psychopathology is associated with loss of control, such that patients more frequently endorse statements indicating their lack of or loss of control than they endorse statements reflecting a positive sense of control. In addition, evidence (Shapiro et al., 1993) shows that the SCI can accurately discriminate normal people from clinical groups (i.e., it has sensitivity) and can distinguish among various clinical groups. The discriminative validity of the SCI renders it suitable for clinical use. To conclude, prior studies provide psychometric evidence to support the

reliability and validity of the SCI.

Table 2.1. A brief description of the SCI scales.

Component	Scale Number	Number of items	Scale Name	Description
Sense of Control	1	16	Overall	Measures the broadest view of a person's sense of control
	2	11	Positive	Reflects one's ability to attain future control
	3	5	Negative	Shows one's sense of loss of control in areas previously experienced as controlled
	4	25	Domain-Specific	Gives a measure of the person's views on domains in which sense of control is experienced
Mode of Control	5	16	Positive assertive	Measures perceived ability to use an active, altering mode of control
	6	14	Positive yielding	Measures sense of control that is based on active acceptance of a situation
	7	14	Negative assertive	Measures too much active control
	8	5	Negative yielding	Measures too little control
Motivation for Control	9	11	Desire for control	Measures a desire for psychological control over oneself, others and the environment
Agency of Control	10	2	Locus of control	Assesses the source from which the person's sense of control emanates (self/and/others)

Intrinsic-Extrinsic Motivation

In this study, motivational orientation (i.e., intrinsic vs. extrinsic motivation) was measured with the Aspiration Index and Self-Determination Scale.

Aspirations refer to people's life goals, which can be either intrinsic aspirations (e.g., meaningful relationships, personal growth, and community contributions) or extrinsic aspirations (e.g., wealth, fame, and image). Research has revealed that having strong extrinsic aspirations is negatively associated with mental health indicators, whereas intrinsic aspirations is positively associated with mental health indicators (Kasser & Ryan, 1993; 1996) and with a sense of well-being (Ryan et al., 1999). Furthermore, the

results of a longitudinal study by Sheldon and Kasser (1998) revealed that attaining intrinsic goals enhanced participants' well-being, whereas success in achieving extrinsic goals provided little benefit. Evidence indicates that a controlling and uninvolved parenting style is associated with children's extrinsic motivation; whereas autonomy, supportive, and involved parenting is associated with children's intrinsic motivation (Kasser, Ryan, Zax, & Sameroff, 1995; Williams, Cox, Hedberg, & Deci, 2000).

The Aspirations Index (Kasser & Ryan, 1993, 1996) was used to measure intrinsic-extrinsic life goals. The Aspiration Index comprises six categories of aspirations, with five items in each category. The index comprises three categories of extrinsic aspirations (i.e., *wealth*, *fame,* and *image*) and three categories of intrinsic aspiration (i.e., *meaningful relationships*, *personal growth,* and *community contributions*); the aspiration for *good health* clearly reflects neither extrinsic nor intrinsic motivation. On the Aspiration Index, respondents are required to rate each aspiration on the following dimensions: (a) the *importance* of each aspiration to themselves, (b) their beliefs about the *likelihood* of attaining each aspiration, and (c) the degree to which they have already *attained* each one.

Perceived self-determination is also an important construct (Reeve, Nix, & Hamm, 2003). Self-determination relates to intrinsic motivation, optional functioning, personality integration, social development, and personal well-being (Deci & Ryan, 1991; 2000). The Self-Determination Scale (SDS; Deci & Ryan, 1985a; Sheldon, 1995, Sheldon, Ryan, & Reis, 1996) measures the extent to which people function in a self-determined way. Self-determination is considered a rather enduring aspect of personality, which reflects (a) being more aware of one's feelings and having a sense of self and (b) feeling a sense of choice in one's behaviour. The SDS addresses the degree to which people themselves determine what happens in their lives. The Self-determination scale is a short, 10-item scale, with two subscales containing five items each. The first subscale is called "awareness of oneself," and the second one is called "perceived choice in one's actions." Each of the subscales can be used separately, or they can be combined into an overall Self-Determination scale (Ryan, February 2005, personal communication). The overall Self-Determination scale is a measure of domain-specific intrinsic motivation (Self-Determination).

As Deci and colleagues (e.g., Deci, 1980; Deci & Ryan, 1985b) have argued, choice and awareness are important determinants of intrinsic motivation. According to their research (Deci, 1975, 1981; Deci & Ryan, 2002), individuals' awareness of their goals and having a chance to choose their goals increases their intrinsic motivation.

Iyengar and Lepper (2002) asserted that *choice* is associated with both general and domain specific motivation. Choice also brings other benefits to a person, such as increasing his or her sense of well-being. There is evidence that people's awareness of themselves and their feelings about their own behaviour are strongly and positively related to their intrinsic motivation (e.g., Field & Hoffman, 1994). As noted, to measure motivational orientation, both the Aspiration index and the Self-Determination were used. The reason for using both tests is that together they provide a more complete estimation of an individual's motivational orientation than does either one alone.

Helplessness, Hopefulness and Haplessness

Based on Beck, Weissman, Lester, and Trexler's (1974) widely used measure of depression, Lester (2001) introduced Lester's Helplessness Questionnaire, which is a 30-item Likert-type inventory to measure helplessness (giving-up), hopelessness (pessimism) and haplessness (beliefs in bad luck or misfortune). He reported good reliability for the subscales of the questionnaire ($\alpha > .63$). The subscales have also shown a significant correlation with depression.

Alcohol Use Questionnaire

Alcohol researchers agree that drinkers' self-reports of their drinking are valid, if the importance of giving accurate reports is stressed and the confidentiality of their reports is guaranteed (Sobell & Sobell, 1995). In the present study, participants were encouraged to be as honest as possible in responding to the questions. The importance to the research of accurate answers was emphasized to them, and they were assured about the confidentiality of their data. The Alcohol Use Questionnaire (AUQ, Cox, 2000) was used to assess respondents' quantity and frequency of alcohol consumption during the prior year. The AUQ asks about quantity and frequency of consumption of various types of alcoholic beverages (i.e., beer, wine, spirits and alcopops). It also asks about the number of days since the last drink, the amount of alcohol consumed on the last day of drinking and the age at which the person started drinking regularly. The person's average total consumption can be calculated on a weekly, monthly, or yearly basis. The AUQ yields three indices of drinking: (a) usual consumption, (b) unusual consumption, and (c) overall consumption.

Procedure

All participants were tested in small groups of approximately ten participants each

in a lecture room with normal illumination conditions and minimum background noise. Prior to distributing the questionnaires, the experimenter briefly explained the goals of the study to the participants and how they should complete each questionnaire. Next, participants received a package that included (a) the Information Sheet, (b) Consent Form, (c) Demographic Information Sheet, (d) Personal Concerns Inventory, (e) Shapiro Control Inventory, (f) Self-Determination Scale, (g) Aspirations Index, (h) Lester's Helplessness Questionnaire, and (l) Alcohol Use Questionnaire. After participants had completed the questionnaires, they were given a debriefing sheet and course and print credits and they were thanked for their participation.

Results

Non-drinkers (two males and two females) were excluded only from the data analyses involving alcohol consumption because personality differences between drinkers and non-drinkers have been frequently reported (e.g., King et al., 2003). The drinkers might have reacted to the experimental induction differently than non-drinkers, but in ways that were not related to drinking status per se.

Scoring the Measures

Personal Concern Inventory

As stated earlier, on the PCI respondents rate each of their goals on eleven different scales (e.g., commitment, knowledge). One way to summarize the PCI data is to subject them to Principal Component Analysis (PCA). PCA is not a true factor analysis because factor analysis methods such as Principal Axis Factoring (PAF) take into account only *common* sources of variance, whereas PCA takes into account both *common* and *unique* (i.e., specific plus *error*) sources. This feature of PCA is considered an advantage when summarizing a set of data (Kline, 1994). Comparing PCA and PAF methods, Preacher and MacCallum (2002) concluded that if a researcher is specifically interested in data reduction and seeks a simple structure, PCA using a screen plot for determining the number of factors should be the standard procedure.

Confirmatory factor analysis (Stevens, 1996) would not be suitable for summarizing the PCI data, mainly because the pattern of factor loadings that defines adaptive or maladaptive motivational structure cannot be specified in advance. The results of earlier research using PCA to extract the PCI adaptive and maladaptive components (e.g., Cox et al., 2000; Cox et al., 2002; Cox & Klinger, 2002; Fadardi, 2003)

led to an array of factor loadings for adaptive and maladaptive motivation; nevertheless, there are similarities among the results of the different studies (Klinger & Cox, 2004_b). In other words, the *pattern* of high or low loadings on the PCI indices on each PCA factor can be used to describe one factor as more adaptive than another. Usually, a pattern of positive high loadings on Commitment, Control, Happiness, and Chances of Success If Try suggests an adaptive motivational structure. A pattern of high positive loadings on Happiness and Chances of Success but not on Commitment and Control would suggest a maladaptive motivational pattern. This is because motivationally people should be committed to pursuing goals from which they expect to experience joy and at which they expect to succeed.

In factor analysis, rotation of the factors enhances the clarity of the structure by making a more distinctive picture of the loadings and by maximizing the variance within factors. The two commonly used rotation methods are *orthogonal* and *oblique*. (a) Orthogonal rotation produces independent factors, which, however, may be only theoretical rather than corresponding to reality. For example, it is difficult to believe that motivational structure can be divided into two separate, independent entities: one adaptive and the other maladaptive; rather, any distinction in this regard seems to be along a continuum. (b) Oblique rotation produces factors that are related to each other. In much psychological research, oblique rotation has advantages over orthogonal rotation because in the real world most variables are to some extent related to one another. However, Kline (1994) recommends that if the results of an oblique rotation are similar to an orthogonal rotation, the latter is preferred because the pattern and the structure matrices contain similar loadings.

Although statisticians argue that the reliability of a factor analysis depends on the sample size on which it is based, Bryman and Cramer (2001) argue that there is no agreement on what the sample size should be. Cattell (1978) suggested a minimum of three participants (N) per variable (P), whereas Gorsuch (1983; cited in Kline, 1994) suggested a minimum of five N for each P, but with no fewer N than 100 per analysis. These estimations of the appropriate sample size are known as the N: P ratio.

MacCallum, Widaman, Zhang and Hong (1999) argued that a certain criterion for N or N: P for recovery of population factors is not necessary. They believe that judging the suitability of a factor analysis depends on five criteria: sample size, number of factors retained, number of variables examined, level of communalities (i.e., common variance) and level of model error. Accordingly, Preacher and MacCallum (2002) recommended rules for selecting appropriate sample sizes in behavioural studies. For example, when

recovery of two factors among 10 variables is sought, a sample size in the 20-to-50 range is expected to be associated with a good-to-excellent model fit. For these reasons, the PCI data in the current study were summarized by using PCA without rotation.

Sense of Control Inventory

Each scale score is calculated as the mean of the respondent's answers to the items on that scale, except for the Overall Sense of Control scale, which is calculated by averaging the respondent's score on Positive Sense of Control and the score on Negative Sense of Control. For Scales 1-9, the mean of each scale was calculated as the sum of scores divided by the number of items. Agent of Control has two parts: (a) Self as Agent (Scale 10; Item 20), and (b) Others as Agent (Scale 11; Item19). Because scales 10 and 11 have only one item each, further calculations are not required (see Appendix 5).

Lester' Helplessness Questionnaire

As indicated earlier, Lester's Helplessness Questionnaire measures Helplessness, Hopelessness and Haplessness. It is scored as follows: First, eight of the items (Items 1, 2, 5, 6, 11, 14, 20 and 26) are reverse scored. Then, to derive the score for each subscale, the items on the scale are averaged (see Appendix 8).

Extrinsic and Intrinsic Motivation

(a) Self-Determination Scale. The Self-Determination Scale (Sheldon et al., 1996) comprises 10 items designed to measure a person's perceived awareness of oneself and choice in their lives (see Appendix 6). It is scored as follows: First, Items 1, 3, 5, 7 and 9 are reversed scored. Next, to calculate subscale scores, clusters of five items constituting each subscale are averaged: Awareness of Self consists of Items 2, 4, 6, 8 and 10; Perceived Choice comprises Items 1, 3, 5, 7 and 9; and Overall Self-Determination is calculated by averaging the responses on the10 items (Overall Self-Determination).

(b) Aspiration index. The Aspiration Index comprises seven categories of aspirations or life goals, with five questions for each of the seven life goals. The questionnaire assesses (1) how important each goal is to the person, (2) how likely each goal is that the person wants to attain each goal, and (3) how much the person has already progressed in attaining each goal. Scores for each of the seven life goals are calculated by averaging the person's answers to the importance, likelihood, and attainment items (see Appendix 7).

Previous research (e.g., Kasser & Ryan, 1996, 2001; Sheldon, 1995) has shown

that the seven categories of Aspiration index include three components: (a) extrinsic motivation, which includes wealth, fame, and image; (b) intrinsic motivation, which includes personal growth, relationships and community contributions; and (c) the aspiration for good health, which turned out not to be either clearly extrinsic or intrinsic. In the current study, as in most other studies, only six of these seven aspiration categories were used. Health was the one not used, as is typical. The extrinsic motivation component is calculated by averaging the scores on the three extrinsic motivation subscales, and the intrinsic motivation component is calculated by averaging the subscale scores on the three intrinsic motivation categories.

Participants and their Demographic Characteristics

Ninety-four participants (male = 43.6 %) were included in the analyses. The number of male and female participants and their mean age according to years of university education are shown in Table 2.2. An independent-samples *t*-test showed that males ($M = 20.41$, $SD = 2.62$) and females ($M = 20.07$, $SD = 1.65$) did not differ on age [$t_{(92)} = -1.11$, $p = .27$] or mean years of university education: males ($M = 1.73$, $SD = .74$), females ($M = 1.90$, $SD = .77$), $t_{(92)} = .77$, $p = .44$.

Table 2.2. Means and standard deviations of male and female participants' age according to their year of university education.

	Year of Education					
	First Year (Male = 18; Female =18)		Second Year (Male = 16; Female = 22)		Third Year (Male = 7; Female = 13)	
Gender	*M*	*SD*	*M*	*SD*	*M*	*SD*
Male	19.35	1.42	20.93	3.03	22.67	3.14
Female	18.88	1.07	20.40	2.01	20.94	2.12

Reliability of and Factor Analysis of the PCI

To calculate the reliability of the abridged research version of the PCI used in the current study, Cronbach's Alphas (α) were calculated. Cronbach's Alpha is an index of internal consistency and is one of the most commonly used indices of a test's reliability. In the social sciences and psychology, it is widely accepted that a test with adequate reliability should have a Cronbach's Alpha of at least .70. Two kinds of alphas were calculated for the abridged PCI, one for the entire inventory and one for each of the individual indices (e.g., Likelihood, Commitment). The first kind of Cronbach's Alpha

showed how the PCI indices measured a single unidimensional latent construct. If data have a multidimensional structure, Cronbach's Alpha will be low. Because the polarity of the Aversive Motivation, Chances of Success if Not Try, Unhappiness from Achieving Goals, and Goal Distance scales is opposite to that of the other PCI indices, their reversed values were included in the reliability analysis for the overall PCI. An Unstandardised α of .72 resulted for the test as a whole. The item-specific alphas were also calculated (Bryman & Cramer, 1995), and there was no index, whose removal increased the reliability of the test. To calculate intra-scale reliability, Cronbach's Alphas were calculated for each index individually (e.g., Control, Goal Distance) with the ratings of each concern used as the "scores" (see Table 2.3).

As Table2.3 shows, except for two of the PCI indices, all indices met the traditional .70 criterion for "good reliability," and there was little variation among the size of the alphas from one index to another. This is despite the fact that the PCI is a mixed idiographic-nomothetic assessment of motivation (Klinger, 1987b). It is a different kind of test than traditional tests, which measure such things as traits, talents, or abilities. Although people's ratings of their goals vary from one life area to another, or even among different goals within one life area, the intra- and inter-index reliability of the PCI suggest that the entire inventory provides consistency in respondents' ratings of their goal strivings.

Based on the guidelines described earlier in this chapter and for ease of data analysis, the PCI indices were subjected to Principle Component Analysis (PCA) without rotation, because the rotation methods did not improve the patterns of the loadings. Bartlett's test of sphericity [$X^2_{(55)} = 320.12, p < .005$] indicated that sphericity was not a problem; the test was a measure of each index's elatedness to itself and its lack of relatedness to the other indices. In addition, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy resulted in a medium-to–high value (.72), indicating that the data were suitable for factor analysis (Kline, 1994). The recommended value of .60 (Kaiser, 1974) is considered good enough to proceed with factor analysis of a given set of data.

In conclusion, the preliminary statistical tests indicated that it was appropriate to conduct a PCA on the current data. Similar to prior studies (e.g., Cox et al., 2000; Cox & Klinger, 2002; Cox et al., 2002; Fadardi, 2003), a two-factor solution was selected to summarise the PCI data. Factor 1 (or more correctly, the first component) accounted for 32.54% of the variance, and Factor 2 accounted for 14.91%; together the two factors accounted for 47.45% of the variance. Table 2.4 shows the factor loadings of the PCI

indices on the two factors. Factor scores were used in the subsequent analyses to test the research hypotheses.

Table 2.3. Intra-indices Cronbach's Alphas for the PCI.

The PCI indices	Cronbach's (Alpha α)
Control over achieving goals	.91
Knowledge about how to achieve goals	.72
Chance of success if I try	.77
Chance of success if I do nothing	.87
Happiness from achieving goals	.79
Unhappiness from achieving goals	.82
Sadness from failure to achieve goals	.90
Commitment to achieving goals	.77
Distance from goal achievements	.88
Appetitive motivation	.57
Aversive motivation	.56

Note. Analyses including 94 students who rated their expectancies about achieving their goals on more than five areas of life on the PCI.

Consistent with prior factor analyses of the PCI, Factor 1 reflects *adaptive motivation*. Respondents who scored high on Factor 1 believed that they had control over their goal attainments. They reported knowing what to do to achieve their goals. They believed that their own effort was more important in achieving their goals than was luck. They were also emotionally involved in their goal pursuits, expecting strong happiness if they succeeded and strong sadness if they did not succeed. They indicated that they were highly committed to achieving their goals and that they would achieve their goals in the relatively near future. Motivationally, they were characterised by trying to approach attractive goals rather than avoiding or trying to get away from unpleasant things. In addition, consistent with prior factor analyses of the PCI, Factor 2 reflects *maladaptive motivation*. Participants who scored high on Factor 2 reported not knowing about how to achieve their goals, and they felt little control over achieving their goals. They believed that luck played a more important role in attaining their goals than their own efforts.

They did not report expectations of either happiness from achieving their goals or sadness from failing to achieve their goals.

Table 2.4. Factor loadings of the PCI indices on two factors derived from PCA.

PCI indices	Factor 1	Factor 2
Appetitive motivation index	.66	.45
Aversive motivation index	-.46	#
Control over achieving goals	.68	-.47
Knowledge about how to achieve goals	.49	-.31
Likelihood of achieving goals if try	.62	-.54
Likelihood of achieving goals if not try	-.42	.46
Happiness from achieving goals	.77	#
Unhappiness from achieving goals	-.43	#
Sadness from failure to achieve goals	.64	.31
Commitment to achieving goals	.81	#
Distance from goal achievements	#	.65

Note. # = loadings < .30.

Sense of Control

The means and standard deviations for each of the components of perceived control are shown in Table 2.5.

A series of independent samples *t*-tests was conducted to compare males and females on each of the Sense of Control scales. The results of the *t*-tests were as follows: (a) Overall Sense of Control [$t_{(92)} = -.64, p = .53$]; (b) Positive Sense of Control [$t_{(92)} = -.28, p = .78$]; (c) Negative Sense of Control [$t_{(92)} = 1.50, p = .14$]; (d) Domain-Specific [$t_{(92)} = .01, p = .99$]; (e) Positive Assertive [$t_{(92)} = 1.08, p = .28$]; (f) Positive Yielding [$t_{(92)} = -.45, p = .66$]; (g) Negative Assertive [$t_{(92)} = .88, p = .38$]; (h) Negative Yielding [$t_{(92)} = -.66, p = .51$]; (i) Desire for Control [$t_{(92)} = .84, p = .40$]; and (j) Mode Satisfaction Overall Score [$t_{(92)} = -.73, p = .68$]. Thus, males and females did not differ on any of the control scales

Table 2.5. Means and standard deviations on the sense of control scales, separately for males and females.

	Males ($N = 41$)		Females ($N = 53$)	
Scales	*M*	*SD*	*M*	*SD*
Overall Sense of Control	5.01	1.05	5.13	.79
Positive Sense of Control	5.03	1.10	5.09	.81
Negative Sense of Control	3.00	1.21	2.65	1.08
Domain-Specific	4.59	.68	4.59	.64
Positive Assertive	2.56	.54	2.45	.44
Positive Yielding	2.59	.41	2.63	.43
Negative Assertive	1.88	.43	1.81	.37
Negative Yielding	1.83	.54	1.91	.57
Desire for Control	4.36	.83	4.21	.87
Agency of Control	25.66	9.29	28.94	9.32

Because the SCI has 11 subscales, it was difficult to test the hypotheses for each individual subscale. In an attempt to reduce the number of analyses, relationships among the SCI subscales were assessed by calculating simple bivariate Pearson correlations. Results revealed that Overall Sense of Control was highly correlated with most of the major SOC subscales: (a) Positive Sense of Control [$r_{(94)} = .96, p < .0005$]; (b) Negative Sense of Control [$r_{(94)} = -.87, p < .0005$]; (c) Domain-Specific Sense of Control [$r_{(94)} = .68, p < .0005$]; (d) Positive Assertive [$r_{(94)} = .56, p < .0005$]; (e) Positive Yielding [$r_{(94)} = .23, p < .025$]; (f) Negative Assertive [$r_{(94)} = -.13, p < .032$]; (g) Negative-Yielding [$r_{(94)} = -.30, p < .004$]; (g) Desire for Control [$r_{(94)} = .10, p < .031$]; (h) Motivation for Control [$r_{(94)} = .47, p < .0005$]; and (i) Agency of Control [$r_{(94)} = .41, p < .0005$]. The non-significant relationships are for modes of control (e.g., Positive Assertive), which were not of interest for the subsequent analyses. Thus, to avoid complexities due to using multiple indices of Sense of Control, the Overall Sense of Control was used as a simple, reliable indicator of Sense of Control in the next analyses.

Intrinsic-Extrinsic Motivation

Recall that two measures of motivational orientation were used in this study: (a) the Aspiration Index and (b) the Self-Determination Scale. The means and standard deviations for the intrinsic and extrinsic motivation components of the Aspiration index are shown in Table 2.6.

Table 2.6. Means and standard deviations of the intrinsic and extrinsic motivation components of the Aspiration index, separately for males and females.

components of	Male ($N = 41$)		Female ($N = 53$)	
Aspiration Index	*M*	*SD*	*M*	*SD*
Extrinsic Motivation	4.16	2.22	4.46	1.50
Intrinsic Motivation	6.21	1.66	6.80	1.41

Independent samples *t*-tests indicated that males and females did not differ on either of the Aspiration Index components (i.e., intrinsic and extrinsic goal).

As mentioned earlier, the Self-Determination Scale measures respondents' level of intrinsic motivation and is derived from their scores on the Awareness and Choice subscales. Overall Self-Determination is calculated as the mean of Awareness and Choice. The means and standard deviations of the Self-Determination subscales are shown in Table 2.7.

Table 2.7. Means and standard deviations of males' and females' scores on the self-determination subscales.

	Males ($N = 41$)		Females ($N = 53$)	
Self-Determination Scales	*M*	*SD*	*M*	*SD*
Awareness	3.81	1.17	3.90	.86
Choice	3.76	.96	3.75	.81
Overall SD	3.58	.85	3.74	.68

Independent samples *t*-tests indicated that males and females did not differ on either of the subscales of Self-Determination (i.e., Awareness and Choice) or on Overall Self-Determination.

To determine relationships among Choice, Awareness, Overall Self-Determination, Aspiration Index scores (i.e., Intrinsic vs. Extrinsic Motivation), and Overall Sense of Control, simple bivariate Pearson correlations were calculated (see Table 2.8). Awareness was positively correlated with (a) Intrinsic Motivation and (b) Overall Sense of Control. Choice was positively correlated with (a) Intrinsic Motivation and (b) Overall Sense of Control. Overall Self-Determination was positively correlated with (a) Intrinsic Motivation and (b) Overall Sense of Control, but it was negatively correlated with Extrinsic Motivation. Self-Determination Theory conceptualizes motivational orientation on a continuum that ranges from low to high self-determination; lower scores on self-determination indicate a lack of motivation (i.e., *a motivation*);

higher scores on self-determination indicate intrinsic motivation (Li & Harmer, 1996). Thus, people who score high on self-determination are intrinsically motivated. Therefore, to avoid complexities due to using multiple indices of motivational orientation and because self-determination is also an indicator of one's intrinsic motivation, the Overall Self-Determination was used as a simple, reliable indicator of motivational orientation in the subsequent mediational analyses.

Table 2.8. Correlations among choice, awareness, overall self-determination, intrinsic and extrinsic motivation and overall sense of control.

Variables	Awareness	Choice	Overall SD	Intrinsic M	Extrinsic M
Choice	.59**				
Overall SD	.90**	.88**			
Intrinsic M	.37**	.31**	.39**		
Extrinsic M	NS	NS	-.22*	-.21*	
Overall SoC	.63**	.49**	.67**	.47**	-.25*

Note. Overall SD = Overall Self-Determination; Intrinsic M = Intrinsic Motivation; Extrinsic M = Extrinsic Motivation; ** $p < 0.01$, * $p < 0.05$ (2-tailed).

Helplessness, Hopelessness and Haplessness

Recall that Lester's Helplessness Questionnaire measures Helplessness, Hopelessness and Haplessness. The means and standard deviations of Lester's Helplessness Questionnaire subscale scores are shown in Table 2.9, separately for males and females.

Table 2.9. Means and standard deviations of helplessness, hopelessness and haplessness from Lester's Helplessness Questionnaire, separately for males and females.

Subscales	Males ($N = 41$)		Females ($N = 53$)	
	M	*SD*	*M*	*SD*
Helplessness	3.51	1.46	3.37	1.45
Hopelessness	4.08	1.11	4.24	.99
Haplessness	.89	.81	.84	.89

Independent-samples *t*-tests were conducted to compare males and females on these scales. No significant difference was found between males and females on (a)

Helplessness [$t_{(92)} = .46, p = .65$], (b) Hopelessness [$t_{(92)} = -.77, p = .45$], or (c) Haplessness [$t_{(92)} = 1.08, p = .28$]. As stated, Stipek (1988) found that helplessness closely resembles extrinsic motivation. Therefore, to determine the relationships among participants' scores on Lester's Helplessness Questionnaire and their scores on the Overall Self-Determination and Aspiration Index, simple bivariate Pearson correlations were calculated (shown in Table 2.10).

Table 2.10. Correlations between Lester's Helplessness Questionnaire subscale scores and scores from the Aspiration index and overall self-determination.

Scales	Helplessness	Hopelessness	Haplessness	Intrinsic M	Extrinsic M
Hopelessness	.63**				
Haplessness	.51**	.43**			
Intrinsic M	-.39**	-.30**	-.24*		
Extrinsic M	.47**	.32**	NS	-.21*	
Overall SD	-.26*	-.23*	-.26*	.39**	-.22**

Note. Intrinsic M = Intrinsic Motivation, Extrinsic M = Extrinsic Motivation, Overall SD= Overall Self-Determination Scale, * $p < 0.05$, ** $p < 0.01$.

As Table 2.10 shows, Helplessness was negatively correlated with Intrinsic Motivation and Overall Self-Determination, but it was positively correlated with Extrinsic Motivation. Hopelessness was also negatively correlated with Intrinsic Motivation and Overall Self-Determination, but it was positively correlated with Extrinsic Motivation. Likewise, Haplessness was negatively correlated with Intrinsic Motivation and Overall Self-Determination. Therefore, to avoid complexities due to using multiple subscales, the Helplessness subscale of the questionnaire was used as a simple, reliable indicator of helplessness in the subsequent analyses.

Alcohol Consumption

The means and standard deviations of the alcohol consumption indices are shown in Table 2.11, separately for males and females. These indices are weekly usual drinking, weekly unusual drinking, and weekly mean drinking of alcohol.

Independent-samples *t*-tests were conducted to compare males and females on the alcohol consumption indices. Surprisingly, there was no difference between males and females on any of the indices of drinking: (a) Weekly Usual drinking [$t_{(88)} = 5.80, p =$

.24]; (b) Weekly Unusual drinking [$t_{(88)} = .49, p = .63$]; or (c) Weekly drinking [$t_{(88)} = .28, p = .78$]. Because in many studies, males have been reported to drink more than females (e.g., Timmer, Verhoff, & Colten, 1985), the lack of gender differences in the current study was surprising.

Table 2.11. Means and standard deviations of drinking indices, separately for males and females.

	Male ($N = 39$)		Female ($N = 51$)	
Number of units per week	*M*	*SD*	*M*	*SD*
Usual drinking	18.18	28.90	16.04	12.34
Unusual drinking	8.21	8.83	7.56	8.83
Weekly drinking	24.69	33.94	22.56	20.43

Note: The amount of alcohol drunk is in standard units.

Testing the Research Hypotheses

Hypothesis One

The first hypothesis stated that sense of control would positively related to intrinsic motivation, but it would be negatively related to extrinsic motivation and helplessness. Table 2.12 shows the intercorrelations among the different indices of Sense of Control, PCI Adaptive Motivation, Weekly drinking, Intrinsic/Extrinsic Motivation, and Helplessness.

As Table 2.12 shows, Intrinsic Motivation was positively correlated with: (a) Overall Sense of Control, (b) Positive Sense of Control, (c) Domain-Specific Sense of Control, (e) Positive Assertive Sense of Control, and (f) Positive Yielding Sense of Control. On the other hand, Overall Sense of Control was negatively correlated with Extrinsic Motivation and with Helplessness. Negative Sense of Control and Intrinsic motivation were also negatively correlated with each other. Thus, the first hypothesis was supported.

Hypothesis Two

The second hypothesis stated that sense of control and intrinsic motivation would be positively correlated with adaptive motivation but negatively correlated with alcohol consumption. Again, as Table 2.12 shows, Overall Sense of Control and Motivational Orientation (i.e., Intrinsic Motivation and Overall Self-Determination) were positively related to Adaptive Motivational Structure and negatively related to Alcohol Consumption. PCI Adaptive Motivation was positively correlated with: (a) Overall Sense

of Control; (b) Positive Sense of Control; (c) Domain-Specific Sense of Control; (e) Positive Assertive Sense of Control. In addition, PCI Adaptive Motivation was positively correlated with (a) Intrinsic Motivation; and (b) Overall Self-Determination.

On the other hand, Overall Sense of Control and Intrinsic Motivation were negatively correlated with Weekly drinking. The correlations showed a negative relationship between Weekly drinking and: (a) Overall Sense of Control; (b) Positive Sense of Control; and (c) Domain-Specific Sense of Control. In addition, Weekly drinking was negatively correlated with (a) Intrinsic Motivation, and (b) Overall Self-Determination.

In summary, because sense of control and intrinsic motivation were positively correlated with adaptive motivation but negatively correlated with alcohol consumption, the second hypothesis was supported.

Hypothesis Three

The third hypothesis stated that extrinsic motivation and helplessness would be negatively correlated with adaptive motivation and positively correlated with alcohol consumption. The correlations presented in Table 2.12 that are relevant to this hypothesis are as follows:

First, there were positive correlations between Extrinsic Motivation and Helplessness. *Second*, there were negative correlations between: (a) Extrinsic Motivation and PCI Adaptive Motivational Structure; and (b) Helplessness and Adaptive Motivation PCI. *Third*, there were positive correlations between: (a) Extrinsic Motivation and Weekly drinking, and (b) Helplessness and Weekly drinking. Therefore, the third hypothesis was supported.

Table 2.12. Intercorrelations among PCI AM, weekly drinking, indices of sense of control and intrinsic/extrinsic motivation.

Variables	AM	Week d	Overall S	Pos S	Neg S	Dom S	Pos A	Pos Y	Neg A	Neg Y	Desire C	OSD	Intrinsic	Extrinsic
Week d	-.32**													
Overall S	.50**	-.26**												
Pos S	.53**	-.25*	.96**											
Neg S	-.39**	.29**	-.87**	-.73**										
Dom S	.32**	-.30**	.68**	.66**	-.59**									
Pos A	.33**	NS	.56**	.60**	-.36**	.50**								
Pos Y	NS	NS	.23*	.28*	NS	.24*	.30**							
Neg A	NS	NS	-.36**	NS	NS	NS	.39**	NS						
Neg Y	NS	NS	-.30**	NS	.37**	-.27**	-.21*	.28**	NS					
Desire C	NS	NS	.41**	NS	NS	NS	NS	-.21*	.39**	NS				
OSD	.46**	-.30**	.63**	.59**	-.62**	.47**	.43**	NS	NS	-.29**	NS			
Intrinsic	.54**	-.34**	.47**	.48**	-.35**	.38**	.40**	.32**	NS	NS	NS	.39**		
Extrinsic	-.33**	.37**	-.30**	-.25*	.24*	NS	NS	-.22*	NS	NS	NS	-.22**	-.25*	
Helpless	-.29**	.50**	-.30**	-.32**	.24*	NS	-.29**	NS	-.32**	NS	NS	-.26*	-.39**	.47**

Note. AM = PCI Adaptive Motivational; Week d = Weekly drinking; Overall S = Overall Sense of Control; Pos S = Positive Sense of Control; Neg S = Negative Sense of Control; Dom S = Domain Sense of Control; Pos A = Positive Assertive; Pos Y = Positive Yielding; Neg A= Negative assertive; Neg Y = Negative Yielding; Desire C = Desire for Control; OSD = Overall Self- Determination Intrinsic = Intrinsic Motivation; Extrinsic = Extrinsic Motivation; Helpless = Helplessness * $p < .05$ and ** $p < .01$, one-tailed.

Hypothesis Four

The fourth hypothesis was that motivational structure would mediate the relationship between sense of control and the amount of alcohol consumed. This hypothesis was based on the motivational model of alcohol use, which states that people's success or failure at achieving their goals affects their decisions to drink alcohol (Cox & Klinger, 2004b). From a series of studies, Cox and Klinger (2004a) also concluded that one factor that strongly determines people's chances of success in achieving their goals is their motivational structure (see Chapter One). Hence, people's motivational structure is an important, indirect determinant of their decision to drink.

The fourth hypothesis stated that the alleged relationship between sense of control and drinking (e.g., Surgenor, Horn, Hudson, Lunt, & Tennent, 2006) was channelled through motivational structure. To test this hypothesis, a mediational analysis was conducted. Prior to reporting the results of the mediational analysis, mediational analyses will be explained in greater detail.

What is a mediator? A mediator is a qualitative (e.g., gender, ethnicity, social class) or a quantitative (e.g., level of reward) variable that affects the direction and/or the strength of the relationship between an independent (predictor) variable and a dependent (criterion) variable.

What is mediation? Mediational models explain *how* an effect occurs through a causal sequence (MacKinnon, 2000). According to Holland (1988), mediation implies a causal relationship, whereby an independent variable (X) has a causal effect on a mediating variable (M), which, in turn, affects a dependent variable (Y); therefore, the mediator explains how X affects Y (see Figure 1). A simple mediational relationship can be illustrated as X → M → Y, where M is the mediator between the independent variable X and the outcome variable Y. A mediator is also called an intervening variable or a process variable (Kenny, Korchmaros, & Bolger, 2003; Kenny, 2006; MacKinnon, 1994; MacKinnon & Dwyer, 1993).

Once a relationship between two variables becomes clear, a researcher can consider the influence of other variables on the relationship (Katz & Lazarsfeld, 1955). It is worthwhile to note that sometimes simple bivariate, correlations between two variables or a set of factors can be misleading because other uncontrolled factors influence the relationship between the variables. For example, the effects of an intervention to reduce smoking might occur because of changes in social norms related to the behaviour. In this case, a change in social norms would mediate the effects of the intervention on the frequency of smoking.

Full versus partial mediation. A mediational analysis also shows whether a third variable partially or fully mediates the relationship between the other variables. A full mediation occurs when removing the effects of a mediator leads to a non-significant relationship between an independent variable and an outcome variable (dependent variable) (James & Brett, 1984). A partial mediation occurs when the strength of the path from an independent variable to a dependent variable is reduced, but not eliminated, when the influence of the mediator variable is partialled out.

Testing the Fourth Hypothesis

Recall that the fourth hypothesis was that motivational structure would mediate the relationship between sense of control and alcohol consumption. Figure 2.1 shows the hypothesised mediational relationship.

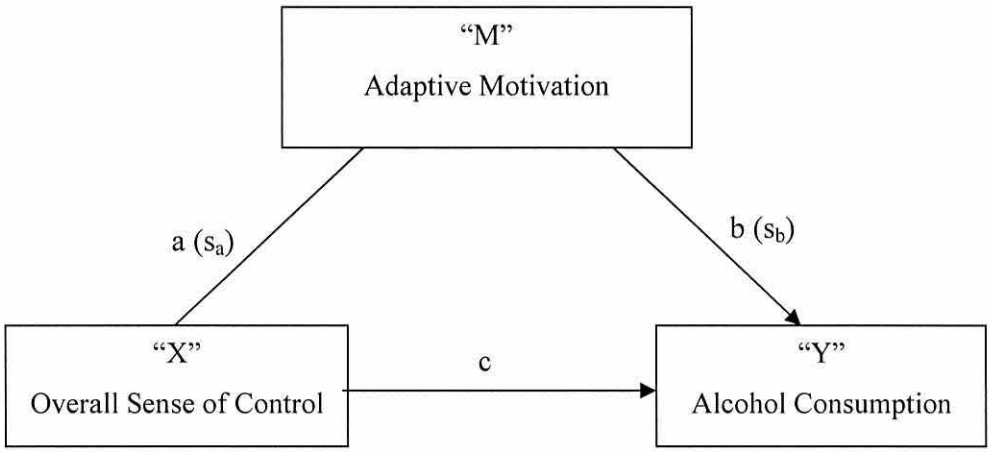

Figure 2.1. The hypothesized relationships among sense of control, adaptive motivation and alcohol consumption.

The reason for selecting Overall Sense of Control as the predictor variable in the mediational analysis was that Overall Sense of Control showed strong correlations with most of the other major subscales of Sense of Control (see Table 2.12). Moreover, limiting the number of variables in this way reduced the complexity of the mediational analysis. Before conducting the analysis, it was useful to test simple correlations among the variables as a preliminary step in testing the mediational relationship. As Table 2.17 shows, there are significant correlations among Overall Sense of Control, PCI Adaptive Motivation, and Weekly drinking.

Table 2.13. Intercorrelations among the overall sense of control, PCI adaptive motivation, and weekly drinking.

Variables	Overall SoC	PCI Factor 1
PCI Adaptive Motivation	.50**	
Weekly drinking	-.26**	-.32**

Note. Overall SoC = Overall Sense of Control; ** $p < 0.01$.

In testing the hypothesized mediational relationship, Baron and Kenny's (1986) and Judd and Kenny's (1981) guidelines were followed. Kenny, Kashy, and Bolger (1998) suggested that four steps should be followed in testing a hypothesized mediational relationship using regression models. These steps are now described and the results from each step are reported.

Step 1: Show that the independent variable is correlated with the dependent (criterion) variable.

In order to test the strength of Path C shown in Figure 2.1 using the first regression model, Weekly drinking (Y) was entered as the criterion variable and Sense of Control (X) as the predictor variable. Table 2.14 shows the results of the regression analysis testing this relationship. As the results show, Sense of Control was a negative predictor of Weekly drinking.

Table 2.14. Results of hierarchical regression analysis predicting weekly drinking from sense of control.

Model	Unstandardised Coefficients		Standardized Coefficients			Correlations	
	B	SE B	β	*t*	Sig.	Zero-order	Partial
(Constant)	62.03	13.52		4.59	.000		
Overall SoC	-7.28	2.62	-.28	-2.78	.025	-.28	-.28

Note. Overall SoC = Overall Sense of Control; ** $p < 0.01$.

Step 2: Show that the independent variable is correlated with the mediator variable. To test Path A shown in Figure 2.1 using the second regression model, PCI Adaptive Motivation (M) was entered as the criterion variable and Sense of Control (X) as the predictor variable (see Table 2.15).

Table 2.15. Results of hierarchical regression analysis predicting PCI adaptive motivation from sense of control.

Model	Unstandardised Coefficients		Standardized Coefficients			Correlations	
	B	SE B	β	*t*	Sig.	Zero-order	Partial
(Constant)	-2.77	.53		-5.26	.000		
Overall SoC	.55	.10	.50	5.40	.000	.50	.50

Note. Overall SoC = Overall Sense of Control; ** $p < 0.01$.

As the results show, Overall Sense of Control was a positive predictor of PCI Adaptive Motivation.

Step 3: Show that the moderator variable (M) predicts the dependent variable (Y) after the predictor variable (X) had been controlled.

In Step 3, it is not sufficient to correlate the mediator (M) with the criterion variable (Y). The correlation between the two variables could be confounded because both are correlated with the independent variable (X). Therefore, it is necessary to control for Sense of Control prior to calculating the strength of the mediator in predicting the outcome variable (see Table 2.16). To test the strengths of Path B over the influence of Path C shown in Figure 2.1, a hierarchical regression analysis was used. In the hierarchical regression model, Weekly drinking was the outcome variable and Sense of Control (the first step of the model) and PCI Adaptive Motivation were entered (the second step of the model) as independent variables. As the results show, PCI Adaptive Motivation was a significant predictor of Weekly drinking, after Overall Sense of Control had been controlled.

Table 2.16. Results of hierarchical regression analysis predicting weekly drinking from PCI adaptive motivation while controlling for sense of control.

Model		Unstandardised Coefficients		Standardized Coefficients			Correlations	
	(Constant)	B	SE B	β	*t*	Sig.	Zero-order	Partial
		62.03	13.52		4.59	.000		
1	Overall SoC	-7.28	2.62	-.28	-2.78	.007	-.28	-.28
2	Overall SoC	-3.99	2.96	-.16	-1.35	.18	-.28	-.14
	PCI Adaptive Motivation	-5.95	2.68	-.26	-2.23	.03	-.34	-.23

Note. Overall SoC = Overall Sense of Control; ** $p < 0.01$.

Step 4: Show whether the moderator (M) completely mediates the relationship between the independent and dependent variables (Paths X and Y). To do so, Weekly drinking (Y) was entered into the fourth regression model as the criterion variable and PCI Adaptive Motivation (X) and Sense of Control (M) as the predictors in Step One and Step Two of the regression model, respectively (see Table 2.17).

Table 2.17. Results of hierarchical regression analysis predicting weekly drinking from sense of control after controlling for PCI adaptive motivation.

Model		Unstandardised Coefficients		Standardized Coefficients			Correlations	
	(Constant)	B	SE B	β	*t*	Sig.	Zero-order	Partial
		25.28	2.34		10.82	.000		
1	PCI Adaptive Motivation	-7.76	2.33	-.34	-3.33	.001	-.34	-.34
2	PCI Adaptive Motivation	-5.95	2.68	-.26	-2.23	.029	-.34	-.23
	Overall SoC	-3.99	2.96	-.16	-1.35	.180	-.28	-.14

Note. Overall SoC = Overall Sense of Control; ** $p < 0.01$.

As the results of the regression analysis show, Sense of Control was no longer a significant predictor of Weekly drinking, after the effects of PCI Adaptive Motivation had been controlled. The next section first summarizes the four steps taken to conduct each of the mediational analyses (see Table 2.18). Each mediational analysis is followed by the results of a Sobel test to determine the size and the direction of the mediational analysis.

Table 2.18. Summary of the four steps in the mediational analysis testing the relationships among sense of control, adaptive motivation, and alcohol consumption.

	Analysis	Visual Depiction
Step 1	Conduct a simple regression analysis with X predicting Y to test for path "c" alone.	X → Y
Step 2	Conduct a simple regression analysis with X predicting M to test for path "a".	X → M
Step 3	Conduct a simple regression analysis with M predicting Y to test the significance of path "b" alone.	M (- X) → Y
Step 4	Conduct a multiple regression analysis with X and M predicting Y.	X (- M) →Y

In summary, to test whether the effect of Sense of Control on Weekly drinking was mediated partially or completely by PCI Adaptive Motivation, four steps were taken (Baron & Kenny, 1986; Miles & Shevlin, 2001). The results of the first step showed that Sense of Control significantly predicted Weekly drinking [$F_{(1, 88)} = 7.72, p < .007$]. The second step showed that Sense of Control also significantly predicted PCI Adaptive Motivation [$F_{(1, 88)} = 29.21, p < .005$]. The third step showed that PCI Adaptive Motivation significantly predicted Weekly drinking, after the effect of Sense of Control had been controlled [$F_{(1, 87)} = 6.51, p < .002$]. In the fourth step, however, Sense of Control failed to predict Weekly drinking, after the effect of PCI Adaptive Motivation had been controlled [$F_{(1, 86)} = 6.51, p = .18$]. These results indicate that PCI Adaptive Motivation played a mediating role between Sense of Control and Weekly drinking.

Finally, Sobel's test was used to determine whether the mediator carried the influence of the independent variable onto the dependent variable. The Z Sobel formula was calculated as $Z = a * b/(\sqrt{b^2 * s_a^2 + a^2 * s_b^2})$, where *a* is the raw (unstandardised) regression coefficient for the relationship between the independent variable and the mediator; s_a is the standard error of *a*; *b* is the raw regression coefficient for the relationship between the mediator and the dependent variable (when the independent variable is controlled); and s_b is the standard error of *b* (see Figure 2.1). In addition, the Sobel test shows the extent to which the effects of the independent variable on the dependent variable are direct or indirect (i.e., they occur through the mediator) (Preacher & Hayes, 2004). A direct effect can be explained as the effect of X (i.e., Sense of Control) on Y (i.e., Weekly drinking) after M (i.e., PCI Adaptive Motivation) has been controlled (see Step 4). An indirect effect (mediated effect) shows the effect of X on Y

when the effects of the mediator M are not excluded. To calculate the direct and indirect effects, the value of Z and to graphically show the mediational relationship among the variables, the software package MedGraph-I was used (Jose, 2003). The Soble Z formula was calculated as $Z = .55^* 5.59/\sqrt{(-5.59^2 * .10^2 + .55^2 * 2.67^2)} = -2.06$ ($p = .04$). The results also indicated that PCI Adaptive Motivation was a full mediator of the relationship between Sense of Control and Weekly drinking. In addition, a Direct Effect = -.10 and an Indirect Effect of -.16 [i.e., -.26 – (-.16) = -.10] were calculated for the model (see Figure 2.2).

To conclude, the results of the mediational analysis confirmed the fourth hypothesis. That is, PCI Adaptive Motivational Structure fully mediated the relationship between Sense of Control and the amount of alcohol consumed. Figure 2.2 displays the results of the mediational analysis.

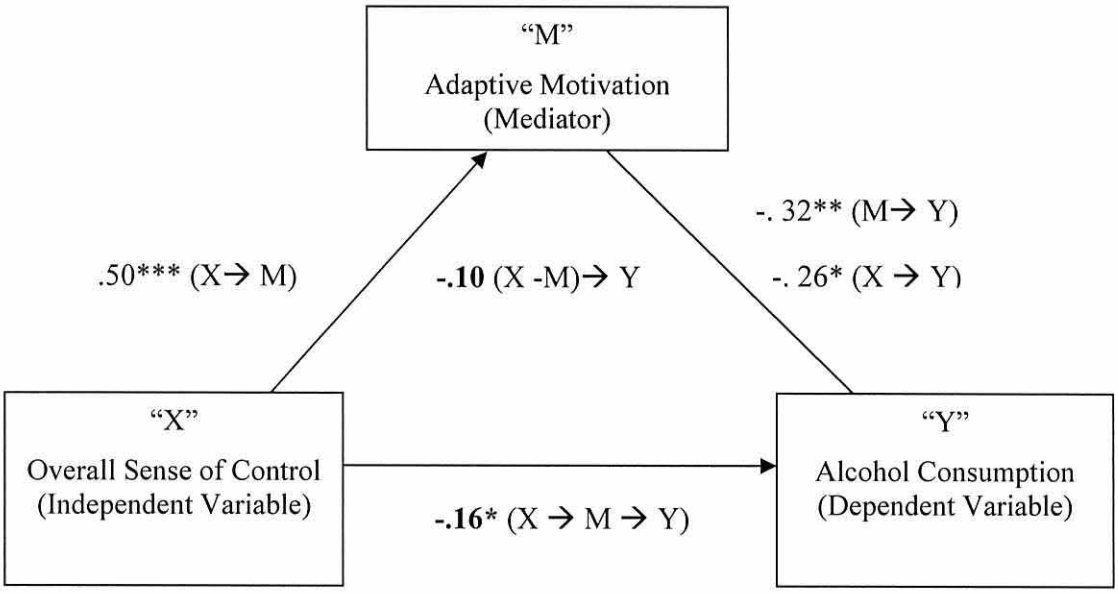

Figure 2.2. Mediational relationship between sense of control and alcohol consumption with PCI Adaptive Motivation controlled. The correlation coefficient in bold is from the Sobel test.

Hypothesis Five

The fifth hypothesis stated that Motivational structure would mediate the relationship between motivational orientation (i.e., Overall Self-Determination) and alcohol consumption. To test this hypothesis, a mediational analysis was also conducted.

As mentioned, Overall Self-Determination scores were selected to represent motivational orientation in the mediational analysis. It was useful first to calculate simple

correlations among the variables as a preliminary step in evaluating the mediational relationship. As Table 2.19 shows, there were significant correlations among Overall Self-Determination, PCI Adaptive Motivation, and Weekly drinking.

Table 2.19. Correlations among overall self-determination, PCI adaptive motivation, and weekly drinking.

Variables	Overall SD	Factor1 PCI
PCI Adaptive Motivation	.44**	
Weekly drinking	-.27**	-.32**

Note. Overall SD = Overall Self-Determination; ** $p < 0.01$ (one-tailed).

As in the previous mediational analysis, the fifth hypothesis was tested by using the methods of Kenny et al. (1998), in which four steps were followed. The steps were as follows:

Step1: Show that the independent variable is correlated with the dependent variable (outcome). In order to test strength of Path C shown in Figure 2.1, using the first regression model, Weekly drinking (Y) was entered as the criterion variable and Overall Self- Determination (X) as the predictor. Table 2.20 shows the results of the regression analysis testing this relationship.

Table 2.20. Results of hierarchical regression analysis predicting weekly drinking from overall self-determination.

Model	Unstandardised Coefficients		Standardized Coefficients			Correlations	
	B	SEB	β	*t*	Sig.	Zero-order	Partial
(Constant)	54.80	10.26		5.34	.000		
Overall SD	-7.72	2.59	-.30	-2.98	.004	-.30	-.30

Note. Overall SD= Overall Self-Determination.

As the results show, Overall Self-Determination was a significant predictor of negative Weekly drinking.

Step 2: Show that the independent variable is correlated with the mediator variable.

To test Path A shown in Figure 2.1 in the second regression model, PCI Adaptive Motivation (M) was entered as the criterion variable, and Overall Self-Determination (X)

as the predictor variable (see Table 2.21).

Table 2.21. Results of hierarchical regression analysis predicting PCI adaptive motivation from overall self-determination.

Model	Unstandardised Coefficients		Standardized Coefficients			Correlations	
	B	SEB	β	*t*	Sig.	Zero-order	Partial
(Constant)	-1.93	.41		-4.70	.000		
Overall SD	.51	.10	.46	4.91	.000	.46	.46

Note. Overall SD= Overall Self-Determination.

As the results show, PCI Adaptive Motivation is a significant predictor of Overall Self-Determination.

Step 3: Show that the moderator variable (M) affects the dependent variable (Y) after the predictor variable (X) has been controlled. To estimate and test Path B beyond the influence of Path C shown in Figure 2.1 using the third regression model, Weekly drinking (Y) was entered as the criterion variable and Overall Self-Determination (X) and PCI Adaptive Motivation (M) as the predictor variables. That is, Weekly drinking was the dependent variable, and Overall Self-Determination and PCI Adaptive Motivation (Factor 1) were respectively entered in the models' Step One and Two as the independent variables (see Table 2.22).

As the results show, PCI Adaptive Motivation was a significant negative predictor of Weekly drinking, after the effect of Overall Self-Determination had been controlled.

Table 2.22. Results of hierarchical regression analysis predicting weekly drinking from PCI Adaptive Motivation while controlling for overall self-determination.

Model		Unstandardised Coefficients		Standardized Coefficients			Correlations	
	(Constant)	B	SE B	β	*t*	Sig.	Zero-order	Partial
		54.80	10.26		5.34	.000		
1	Overall SD	-7.72	2.59	-.30	-2.98	.004	-.30	-.30
2	Overall SD	-4.79	2.86	-.19	-1.68	.10	-.30	-.18
	PCI Adaptive Motivation	-5.73	2.60	-.25	-2.20	.03	-.34	-.23

Step 4: Show whether or not the moderator (M) completely mediates the

relationship between the independent and dependent variables (Paths X and Y).

To do so, Weekly drinking (Y) was entered into the forth regression model as the criterion variable and Overall Self-Determination (X) and PCI Adaptive Motivation (M) were respectively entered into the model as the predictors. The aim was to determine whether Self-Determination still accounted for the variance in alcohol consumption after the effects of PCI Adaptive Motivation had been controlled (see Table 2.23).

As the results of the regression analysis show, Overall Self-Determination was no longer a significant predictor of Weekly drinking, after the effects of PCI Adaptive Motivation had been controlled.

Table 2.23. Results of hierarchical regression analysis predicting weekly drinking from overall self-determination after controlling for PCI Adaptive Motivation.

Model		Unstandardised Coefficients		Standardized Coefficients			Correlations	
		B	SE B	β	*t*	Sig.	Zero-order	Partial
	(Constant)	25.28	2.34		10.82	.000		
1	PCI Adaptive Motivation	-7.76	2.33	-.34	-3.33	.001	-.34	-.34
2	PCI Adaptive Motivation	-5.73	2.60	-.25	-2.20	.030	-.34	-.23
	Overall SD	-4.79	2.86	-.19	-1.68	.097	-.30	-.18

In summary, to test whether PCI Adaptive Motivation mediated the effect of Overall Self-Determination on weekly drinking partially or completely, four steps were taken following the guidelines provided by Baron and Kenny (1986). The results of the first step showed that Overall Self-Determination significantly predicted weekly drinking [$F_{(1, 88)} = 8.90, p < .004$]. The second step showed that Overall Self-Determination also significantly predicted Adaptive Motivation PCI [$F_{(1, 88)} = 24.14, p < .000$]. The third step showed that PCI Adaptive Motivation significantly predicted Weekly drinking, after the effects of Overall Self-Determination had been controlled [$F_{(1, 87)} = 7.07, p < .001$]. The fourth step showed that Overall Self-Determination failed to predict Weekly drinking, after the effect of PCI Adaptive Motivation had been controlled [$F_{(1, 86)} = 7.18$, $p = .10$]. Finally, a Sobel test was conducted to determine whether the mediator carried the influence of the independent variable onto the dependent variable. The Z Sobel was calculated as $Z = -7.72 * .51 / \sqrt{-5.73^2 * 2.59^2 + -7.72^2 * .10^2} = -2.74$. The value of Z

was significant (p = .005). A Direct Effect = -.11 and an Indirect Effect of -.19 [i.e., -.30 – (-.19) = -.11] were calculated for the model (see Figure 2.3). Therefore, the fifth hypothesis was supported. In other words, PCI Adaptive Motivation fully mediated the relationship between Overall Self-Determination (selected as the measure of motivational orientation Overall Self-Determination) and weekly drinking. Figure 2.3 summarizes the results of the mediational analysis.

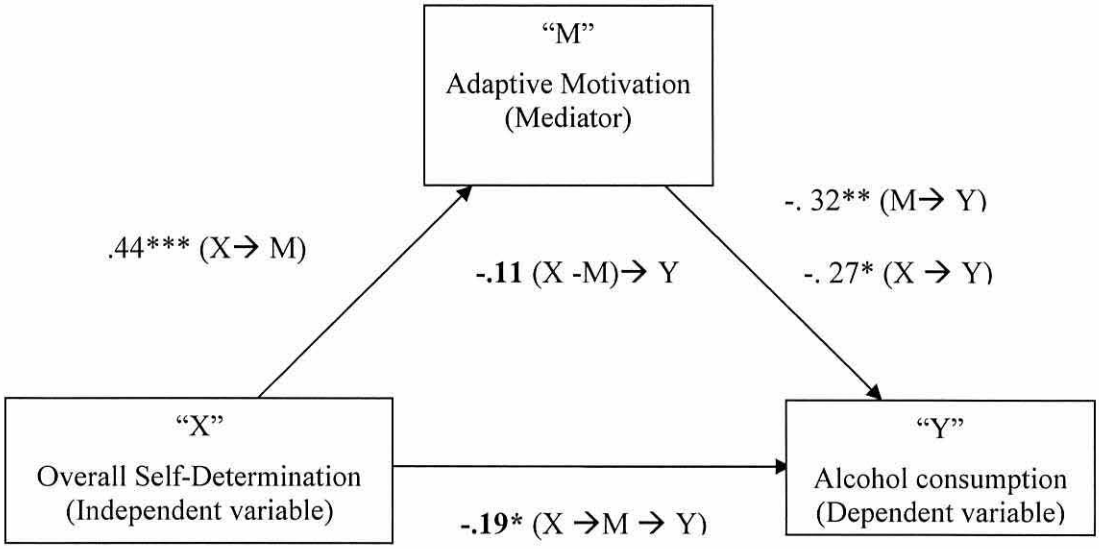

Figure. 2.3. Mediational relationship between overall self-determination and alcohol consumption with PCI Adaptive Motivation controlled. The correlation coefficient in bold is from the Sobel test.

Summary of the Main Findings

The current study aimed to clarify relationships among motivational structure, sense of control, motivational orientation, perceived helplessness, and alcohol consumption. PCI (Cox & Klinger, 2004a), Shapiro Control Inventory (SCI, Shapiro, 1994), Self-Determination Scale (Deci & Ryan, 1985), Intrinsic-Extrinsic Aspirations Scale (Kasser & Ryan, 1993, 1996), Lester's Helplessness Questionnaire (Lester, 2001), and Alcohol Consumption Inventory (Cox, 2000) were administered to student drinkers (N = 94, 44% male). The results supported the hypotheses as follows:

Sense of control was positively correlated with intrinsic motivation, but it was negatively correlated with extrinsic motivation and helplessness.

After the PCI indices had been factor analysed, correlational analyses showed that sense of control and intrinsic motivation were positively correlated with adaptive motivation and negatively correlated with alcohol consumption.

Extrinsic motivation and perceived helplessness were negatively correlated with adaptive motivation and positively correlated with alcohol consumption.

Adaptive motivational structure fully mediated the relationship between sense of control and alcohol consumption.

Adaptive motivational structure fully mediated the relationship between motivational orientation (e.g., Overall Self-Determination) and alcohol consumption.

Summary of the Subsidiary Results

Agency of Control (i.e., Subscale 10 of Shapiro Control Inventory) measures locus of control—the source from which one's sense of control emanates (self versus others). Self-Agency of Control was positively correlated with Intrinsic Motivation from the Aspiration Index and Overall Self-Determination Motivation from the Self-Determination Scale. This finding suggests that intrinsically motivated people believe that they themselves are the source of their control. In contrast, Subscale 7 of the Sense of Control Questionnaire (Negative Assertiveness) was positively correlated with Helplessness. Negative Assertiveness measures excessive active control (using negative manipulative ways), and it has been reported to be damaging to one's health (e.g., Thompson, Cheek, & Graham, 1988). Negative Assertiveness may become a dominant way of preserving one's sense of control in situations where the person substantially loses his/her control over his/her life and cannot retain it in positive ways. In this regard, as Lachman and Weaver (1998) have discussed, sometimes requiring a high degree of sense of control can be a disadvantage—for example an individual who believes that the world should be an entirely controllable and predictable place.

PCI Adaptive Motivation was also positively correlated with four scales from the SCI (Shapiro, 1994): Overall Sense of Control, Positive Sense of Control, Domain-Specific Sense of Control, and Positive Assertive. As expected, PCI Adaptive Motivation was negatively correlated with Negative Sense of Control and Extrinsic Motivation; however, it was positively correlated with Intrinsic Motivation. In summary, as Table 2.12 shows, Overall and Positive Sense of Control were positively correlated with both Intrinsic Motivation and PCI Adaptive Motivation, and the latter two variables were strongly positively correlated with each other. In contrast, Sense of Control was negatively correlated with Helplessness, Extrinsic Motivation, and Alcohol Consumption.

Discussion

The results of this study are consistent with the results of other studies (e.g., Logan, Olson, & Lindsey, 1993) that reported a positive relationship between sense of control and intrinsic motivation. It also supports the result of studies (e.g., Astin, 1997; Chaney et al., 1999; Foy & Mitchell, 1990; Mirowsky & Ross, 1990) that reported negative relationships between sense of control and both extrinsic motivation and helplessness. Moreover, the results support earlier findings (e.g., Peterson et al., 1993; Shields, 1997; Stipek, 1988; 1998) that extrinsically motivated people are more vulnerable to developing a poor sense of control, helplessness, and poor problem solving abilities.

For the first time, the current study showed that intrinsic motivation and sense of control were positively correlated with adaptive motivation. The results of the correlational analysis were elaborated by the mediational analyses (see Tables 2.19 and 2.25). These results point to the conclusion that people with adaptive motivation are intrinsically motivated with respect to the goals that they select, and they have a sense of control over them. These characteristics or people with adaptive motivation can lead to many positive outcomes.

Firstly, people who are intrinsically motivated work on tasks because they find them enjoyable (Pintrich & Schunk, 2002). Intrinsically motivated people focus mainly on their goals, and their behaviour is organized around benefiting from goal attainments; this has positive emotional consequences (e.g., Elliot et al., 2000; Milkulincer, 1994). Moreover, if such people fail to achieve a goal, they see the failure as an opportunity to improve their performance (Bandura, 1982; Shields, 1997); therefore, they become even more strongly committed to achieving their goals (Klinger, 1977). Intrinsically oriented individuals also tend to take risks and undertake difficult tasks (Matusov, 1997). *Secondly*, evidence (e.g., Mirowsky, 1995; 1997; Shapiro, 1994; Seligman, 1991; Wortman et al., 1992) indicates that people with a strong sense of control feel enthusiastic, and are optimistic about being able to achieving their goals in the near future. Characteristics such as having a high sense of control and being intrinsically motivated help people to develop an adaptive motivational structure.

As discussed earlier, evidence based on the motivational model of alcohol use (Cox & Klinger, 1988, 2004b) shows that decisions to drink are more likely when individuals are unable to achieve emotional satisfaction through other goal pursuits or to overcome frustrations in their lives. A maladaptive motivational structure is associated

with individuals' lower chances of achieving their goals and hence increased negative emotional states. As the mediational analyses suggest, positive sense of control and intrinsic motivation play an important role in the development of adaptive motivation. As Klinger (1975) showed, disengagement from a goal leads to invigoration, such that the person gathers all of his or her energy to overcome the obstacles to achieving his/her goal. Failure to achieve a goal despite all the efforts that a person puts into doing so, may lead to feelings of helplessness because the person cannot see a relationship between his/her personal efforts and the outcome that is desired. Thus, a reasonable explanation for the positive relationship between helplessness and drinking is that negative feelings such as helplessness (e.g., due to lack of academic success) leads some individuals to resort to alcohol consumption in an attempt to overcome their negative feelings (Waxman & Huang, 1998).

According to Stipek (1988), feelings of helplessness and a poor sense of control are strongly related to each other and both are associated with poor problem-solving skills (Chaney et al., 1999; McQuillan & Rodriguez, 2000). Therefore, maladaptive motivation, along with helplessness and a poor sense of control, may lead to a vicious cycle, such that the person's negative feelings will reduce the chances of successful goal attainments, which will further intensify the negative feelings. Drinking alcohol excessively would exacerbate the situation still further.

Conclusions

Through the use of questionnaires, this study assessed relationships among sense of control, overall self-determination, motivational structure, and alcohol consumption. Results showed that, compared to people with maladaptive motivation, those with adaptive motivation had (a) greater positive and overall sense of control, (b) more intrinsic motivation, (c) less helplessness, and (d) they drink less alcohol. This study was the first one to demonstrate that motivational structure fully mediates effects of sense of control and intrinsic motivation on alcohol consumption. This finding has important implications for both theory and practice.

Based on the results of this study, it is reasonable to expect that experimental manipulations to change sense of control and intrinsic motivation would affect a person's motivational structure. As discussed in the literature review, it seems likely that a person's intrinsic motivation and sense of control could be changed by altering the person's perceived choice among options and the person's knowledge about how to attain

a goal and by providing feedback about the person's performance and helping him or her to set goals for completing the task. The next study in the thesis research aimed to test (a) the efficacy of an experimental technique (e.g., information enhancement and goal setting) for changing individuals' task-specific sense of control and intrinsic motivation; (b) whether these changes would have beneficial, enduring effects on participants' task-specific motivational structure; and (c) whether the experimental manipulations would affect explicit and implicit measures of their urges to drink.

To conclude, manipulations might be developed to increase people's sense of control and intrinsic motivation, and these changes might cause their motivational structure to become more adaptive. Developing and testing such techniques was the focus of the subsequent experiments in the thesis research.

CHAPTER THREE

The Effects of Induced Sense of Control on Motivational Structure, Cognitive Performance, and Urges to Drink Alcohol

As discussed in Chapter One, the construct *motivational structure* is crucial for understanding goal directed activities. It was discussed that an adaptive motivational structure is associated with greater expected chances of success in achieving one's goals than a maladaptive motivational structure. It was also argued that people's expected chances of success or failure at achieving their goals influences their decisions to drink. Study One (see Chapter Two) replicated previous findings that a maladaptive motivation is associated with greater alcohol consumption. The study also showed (a) that *sense of control* and *intrinsic motivation* were important determinants of motivational structure and (b) how increased sense of control and intrinsic motivation were associated with greater adaptive motivation—which, in turn, was associated with less alcohol consumption. The mediational analyses indicated that motivational structure mediated the relationship between sense of control and intrinsic motivation, as independent variables, and alcohol consumption, as the dependent variable. In other words, the effects of sense of control and intrinsic motivation on alcohol consumption were channelled through participants' motivational structure. However, the results of the first study did not provide firm evidence about whether these relationships are causal and can be manipulated in the laboratory, although this is a very important question to address empirically. Demonstrating cause-and-effect relationships empirically would both bolster the results of the questionnaire study and would encourage the use of such formulations in practical settings (e.g., in therapeutic interventions).

Study Two, therefore, used novel manipulation to experimentally test the influence of sense of control and intrinsic motivation on motivational structure and whether such effects could have an impact on participants' desire to drink alcohol.

Research Hypotheses

The study sought to determine whether experimental manipulation of sense of control and intrinsic motivation would change participants' task-specific motivational structure and explicit and implicit indices of their urges to drink. The hypotheses were as follows:

1. Experimental induction of high sense of control would increase perceptions of control

and intrinsic motivation, and experimental induction of low sense of control would reduce perceptions of control and intrinsic motivation. After the experimental inductions, the groups would be ordered from highest to lowest according to their sense of control and intrinsic motivation as follows: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group.

2. Post-experimentally, the groups would be ordered from the most adaptive to the least adaptive motivational structure as: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group. In addition, increases in sense of control and intrinsic motivation would be associated with increases in participants' adaptive motivation.
3. Post-experimentally, participants' performance on cognitive tasks (i.e., a series of Verbal and Memory tasks) would be ordered from the best to the poorest performance as: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group.
4. After the experimental manipulation, participants' urges to drink alcohol and alcohol attentional bias would be ordered from the greatest to the least as: Low-Sense-of-Control Group > No-Intervention Group > High-Sense-of-Control Group.

Method

Power Analysis and Participants

A power analysis was conducted to determine the sample size needed for the study. Power analysis requires the researcher first to estimate the size of the effect that the study being planned will be able to detect. The results of previous research can be used to decide whether a small, medium, or large effect size is expected.

Motivational structure studies have produced a wide variety of effect sizes from a variety of research designs. In the present study, it was planned that ANCOVA and MANCOVA would be used to test the hypotheses. A medium effect size ($f = .30$) was calculated based on the results of Study One and was deemed suitable to be used in the present power analysis. Using the G*Power programme (Erdfelder et al., 1996), with an expected effect size of $f = .30$ and three groups of participants, a sample size of 106 was calculated.

Sixty undergraduate psychology students (male = 46.7 %, males' mean age = 20.11, $SD = 1.64$; females' mean age = 21.16, $SD = 2.08$) were recruited through the Student Participant Panel of the School of Psychology, University of Wales, Bangor.

Participants received course and print credits for their participation. In addition, 44 students (male = 50 %, males' mean age = 24.74, *SD* = 3.09; females' mean age = 22.91, *SD* = 2.45) were recruited from other departments at the University of Wales, Bangor. They received print credits for their participation.

The inclusion criteria were as follows: (a) being a native speaker of English or a true bilingual speaker of English; (b) having normal colour vision; (c) having abstained from alcohol for at least six hours before the experimental session; and (d) not being dyslexic. Recruitment of participants was discontinued when 106 participants who met the inclusion criteria had been tested. Only for the analyses of the drinking-related indices (i.e., urges to drink and alcohol attentional bias), five participants (two participants in the No-Intervention Group, three participants in the Low-Sense-of-Control Group) were excluded because they indicated that they did not consume alcohol or drank only occasionally (e.g., on Christmas Eve).

Instruments

Two types of instruments were used. The first type included those that were administered to determine changes in participants' sense of control, motivational structure, urges to drink, and cognitive performance as a result of the experimental manipulation. Except for the Task-Specific Intrinsic Motivation Inventory and the alcohol-Stroop test (which were given only at the post-test), these tests were given at baseline (pre-test) and again post-experimentally (post-test). The second type of instrument included the materials that the experimenter used to induce a high or a low sense of control in the two experimental groups.

The pre- and post-test measures were as follows:

- *Self-report measures.* The self-report measures were: (a) the Task-Specific Personal Concerns Inventory (TSPCI), which was used to measure motivational structure; (b) Task-Specific Sense of Control Inventory (TSSCI); (c) Urges to drink Questionnaire; and (d) Task-Specific Intrinsic Motivation Inventory (TSIMI).
- *Objective measures of participants' performance.* The objective measures comprised three computerised tests: (a) Verbal Puzzles to measure the accuracy and speed of problem solving; (b) Memory Quizzes to measure the accuracy and speed of memory retrieval; and (c) the alcohol-Stroop test to measure alcohol attentional bias.

The computerised tasks to measure problem solving and memory retrieval were designed in two parallel formats. Participants' performance on the computerised tasks was measured in terms of their reaction time and the number of errors that they made. These instruments are now described in greater detail.

Self-Report Measures

Task-Specific Personal Concern Inventory (TSPCI)

As discussed in Chapters One and Two, Cox and Klinger (2004a) developed the PCI to identify motivational structures that help people to or prevent them from reaching their goals. For example, the PCI measures (a) knowledge about how to achieve goals, (b) commitment to attaining them, and (c) anticipated emotional satisfaction from goal attainments.

A *task-specific* version of the PCI was developed for this thesis research to be administered at the pre- and post-test assessments (Appendix 12). The pre-test version of the test requires participants first to rate from zero to 10 their familiarity with three types of tasks: (a) Verbal Puzzles (i.e., anagrams); (b) Mathematical Puzzles (i.e., calculations); and (c) Concept-Identification Cards. Next, based on their *anticipation* of their performance on these tasks, participants give ratings from zero to 10 on eleven TSPCI scales. These scales resemble the original PCI ones (see Appendix 12).

Task-Specific Shapiro Control Inventory (TSSCI)

A *Task-Specific* version of the Shapiro Control Inventory (TSSCI; Shapiro, 1994) was also developed for the current study (Appendix 13). The TSSCI comprises three scales: *Overall, Positive*, and *Negative* Sense of Control.

At the pre-test, participants were asked to complete the questionnaire based on their prediction of how much control they would have over completing the experimental tasks (anagrams and Concept Identification). On the post-test, participants were asked to complete the questionnaire based on their actual experience completing the two tasks.

Task-Specific Intrinsic Motivation Inventory (TSIMI)

The *Task-Specific* version of the Intrinsic Motivation Inventory (IMI) is a 22-item multidimensional measure that is designed to assess participants' subjective experience about a target activity in laboratory experiments. It has been used in several experiments related to intrinsic motivation (e.g., Deci, Eghrari, Patrick, & Leone, 1994; Ryan,

Koestner & Deci, 1991; Tsigilis & Theodosiou, 2003). It assesses participants' interest/enjoyment (seven items), perceived competence (five items), felt pressure/ tension (five items), and perceived choice (five items) while performing a given activity. The IMI items can be modified to match the nature of a given experimental task. Participants rate the items on each scale that ranges from one (*Strongly Agree*) to seven (*Strongly Disagree*) (Appendix 14). There is evidence (e.g., McAuley, Duncan, & Tammen, 1987; Tsigilis & Theodosiou 2003) that the task-specific version of the IMI is both valid and reliable.

Urges to Drink Questionnaire

"Urges to drink" is often used to refer to an emotional state in which a person is motivated to obtain and drink alcohol (Rohsenow & Monti, 1999). The Urge to Drink questionnaire (Bohn, Krahn, & Steahler, 1995) is an eight-item, self-report questionnaire that assesses three dimensions of drinking urges: (a) the desire for a drink (four items), (b) the expectation of positive effects from drinking (two items), and (c) the inability to avoid drinking if alcohol is available (two items). Bohn et al. (1995) factor analysed the Urges to Drink questionnaire and reported a single factor that represented 38% of the variance. The authors also reported a high degree of internal consistency and acceptable construct, convergent, and discriminant validity, and test-retest reliability. Drummond and Phillips (2002) reported a alpha of .93 for the reliability of the questionnaire among a British sample of drinkers.

In the current study, the Urges to Drink questionnaire was administered before and upon completion of the experimental tasks (Appendix 11).

Objective Assessment

Alcohol-Stroop Test

On the classic version of the Stroop Test (Stroop, 1935), usually two categories of colour words are used: (a) a category of congruent colour words (e.g., the word *red* in red ink); and (b) a category of incongruent colour words (e.g., the word red in *blue* ink). The task for the participant is to ignore the meaning of each word and to name the colour of ink in which the words appear as quickly and accurately as possible. There is evidence (e.g., May, Cooper, & Kline, 1986; Siegrist, 1995b) to indicate that of the classic Stroop Test is reliable. MacLeod (1991) stated that the popularity of the Stroop colour-word test is due to its "reliability, size, and apparent simplicity of the effect" (p. 165). Classic

Stroop test interference is calculated as a participant's mean reaction time to the incongruent colour words minus the person's mean reaction time to the congruent colour words.

Emotional Stroop tests are modified versions of the original Stroop colour-word test. They comprise salient and emotionally neutral categories of words. The alcohol-Stroop test is a variation of the emotional Stroop test that comprises alcohol-related stimuli, as the salient category, and emotionally neutral stimuli, as the neutral category (Cox et al., 2006). The stimuli are presented individually on a computer screen, each one in one of several different font colours (e.g., red, yellow, blue, or green). Similar to the classic Stroop test, the task for participants is to ignore the meaning of the words and to name the colour in which each word appears as quickly and accurately as possible. Alcohol interference (i.e., attentional bias for alcohol-related stimuli) occurs when participants respond more slowly to the alcohol-related stimuli than to the neutral stimuli.

The alcohol-Stroop test has been used in various studies (e.g., Bauer & Cox, 1998, Cox et al., 2000; Cox et al., 2002; Cox et al., 2003; Cox, Yeates, & Regan, 1999), and its validity as a measure of alcohol attentional bias is widely accepted. There is evidence (e.g., Cox et al., 2006; Siegrist, 1995a, 1997) that interference on the test results from processes that are different from those that underlie interference on the classic Stroop test. Cox et al. (2006) suggest that drinkers show alcohol interference because their concern for drinking alcohol makes alcohol stimuli salient for them. When drinkers encounter alcohol stimuli, they are distracted by them, and this slows their reaction times on the colour-naming task.

Cox et al. (2006) concluded that studies of both heavy social drinkers (e.g., Cox et al., 1999; Cox et al., 2003; Steward, Hall, Wilkie, & Birch, 2002) and alcohol abusers (e.g., Bauer & Cox, 1998; Cox, Pothos, Fadardi, 2002; Ryan, 2002) that used the alcohol-Stroop test had shown that the test is a robust paradigm for assessing cognitive and emotional processes underlying drinking behaviour. The degree of alcohol-attentional bias on the test has been shown to be proportional to participants' current concern for consuming alcohol (Cox et al., 2006). Attentional bias also predicts alcohol abusers' ability to reduce their drinking (Cox et al., 2002).

The alcohol-Stroop test used in the current study was the computerised version of the test that Fadardi (2003) used. The alcohol-related category and neutral category (i.e., control words) each includes 14 words (see Table 3.1).

Fadardi (2003) matched the two categories of words on relevant linguistic dimensions: word length, number of syllables, word frequency, and semantic relatedness.

The neutral words are semantically related to one another because they are all parts of house or objects commonly found in a house. To control for word frequency, Fadardi (2003) used the CELEX data-base, which is the most recent source for the frequency of spoken and written words in British English (Baayen, Piepenbrock, & Van Rijn, 1993).

Table 3.1. Alcohol-related and neutral-words used in the alcohol-Stroop test.

Alcohol-related words	Neutral words
Alcohol	Alcove
Bitter	Carpet
Bourbon	Chimney
Brandy	Doorknob
Champagne	Drainpipe
Liqueur	Garden
Mead	Hall
Pint	Patio
Pub	Radiator
Shorts	Roof
Shot	Shelf
Stout	Socket
Vodka	Stove
Wine	Bath

Verbal Puzzles and Memory Quizzes (Accuracy and Speed of Cognitive Performance)

Participants' cognitive flexibility was measured with computerized verbal and memory tests (Rosenbaum, 2000). The tests were specifically computerized for this study using the Superlab programme (Cedrus-Corporation, 1999).

Two equivalent sets of both the Verbal Puzzles and the Memory Quizzes were developed to be used in the pre- and post-tests. The computer played sound files for both Verbal and Memory tests. It measured participants' speed of initiating a response while solving the Verbal Puzzles and when repeating the Memory Quizzes. It also allowed response duration (in milliseconds) to be recorded while repeating the Memory Quizzes.

To control for the effect of testing order, the sequence of administering the two types of tasks as the pre- and post-tests were counterbalanced. The combinations in which the two tasks were presented was as follows: Memory Version One + Verbal Version One; Memory Version One + Verbal Version Two; Memory Version Two + Verbal Version One; Memory Version Two + Verbal Version Two; Verbal Version One

+ Memory Version One; Verbal Version One + Memory Version Two; Verbal Version Two + Memory Version One; Verbal Version Two + Memory Version Two. Prior to the experimental trials, participants completed "warm-up" trials that included three Verbal Puzzles and three Memory Quizzes. Appendix 17 includes the complete sets of stimuli used for the warm-up and the actual tests, including the two parallel versions of the tests.

Materials Used for the Manipulation Tasks

Computerized Concept–Identification Cards and anagrams were the experimental materials that were used to induce low or high sense of control.

Concept-Identification Cards

The Concept-Identification Cards were originally used by Hiroto and Seligman (1975), Tennen and Eller (1977), and Kofta and Sedek (1989) in their studies of learned helplessness and low sense of control. The present researcher modified the cards and developed a computerized version of them for the current study. Participants were shown a series of cards, each of which contained two geometric patterns (see Figure 3.1).

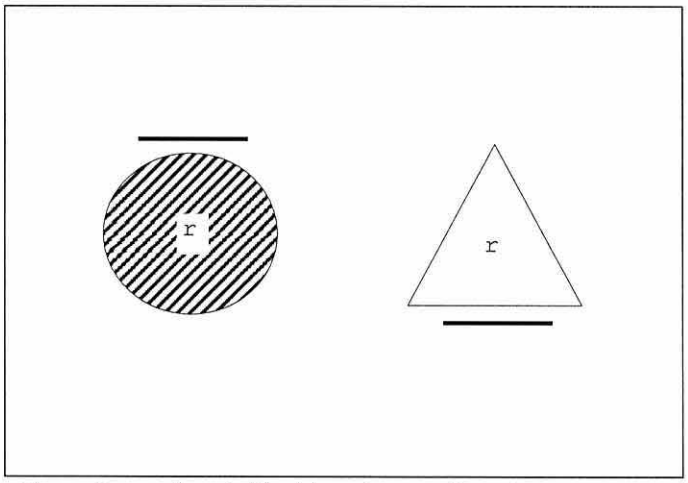

Figure 3.1. Sample card pair that has two values in common. Note that the lowercase *r* and the *size* of the shapes are the same in the two figures.

These two geometric patterns can differ on five dimensions, and for each dimension there are two possible values (see Table 3.2).

Table 3.2. Dimensions and their values in the concept-identification task.

Dimension	First value	Second value
Shape	Circle	Triangle
Size of the shape	Large	Small
Surface of the shape	Striped	Plain
Size of the letter	Large	Small
Position of the line	Above the shape	Below the shape

Anagrams

Anagrams are, of course, scrambled words (Vincent, Goldberg, & Titone, 2006). To solve an anagram, a person must unscramble the letters so that they form a word. In the current study, 36 words were initially extracted from Kucera-Francis's (1967) corpus of written word frequencies. The words were initially placed into three categories based on three levels of word frequency. Based on suggestions by Witte, Freund, and Csiki (2002), words whose lexical frequencies (Kucera-Francis, 1967) ranged from 40 to 50[1] were defined as easy anagrams, those 10 to 39 as moderately difficult, and those 5 to 9 as difficult (see Appendix 16). The words used in the present study ranged in lexical frequency from five (i.e., lowest frequency) to 50 (i.e., highest frequency). Other lexical properties of the words that were controlled were imagery, concreteness, and meaningfulness, number of syllables, and number of letters; these lexical properties were obtained from Kucera-Francis (1967).

The anagrams were presented in five sets, each of which included four anagrams. The order in which the letters in each word were scrambled was pre-determined. The same scrambling order was used across the five sets of words within each difficulty level. In addition, the number of letters was the same in each anagram and in each set. Appendix 16 shows the composition of the sets of anagram. Within each of the three levels of difficulty, five sets of anagrams containing four words each were used, for a total of twenty anagrams (see Table 3.4). Within each of the three levels of difficulty, two anagram sets containing four words each were used for warm-up trials. Participants in the Low-Sense-of-Control Group and No-Intervention Groups received one set of warm-up trials; participants in the High-Sense-of-Control Group received two sets (see page 22). The High-Sense-of-Control Group also received two extra anagram sets for the goal-setting trials to further improve their performance after completing the main anagram sets (see page, 23).

[1] The word frequencies in Kucera-Francis (1967) range from zero to 69,971.

Each participant received five main sets of anagrams: two of the sets contained five-letter words (Group A), and three sets contained six-letter words (Group B). Based on word frequency (Witte et al., 2002), each set in Group A contained one easy word, two words of medium difficulty, and one difficult word, whereas each set in Group B contained two easy words and two words of medium difficulty (see Appendix 16). The reason for using the anagrams with six letters in Group B was to increase the level of difficulty of anagrams across the five sets (see Table 3.3). The sets within each group (Group A and B) were compiled such that they were equal in terms of Kucera-Francis word frequency; imagery, concreteness, and meaningfulness ratings; number of syllables; and number of letters. A *t*-test (comparing Sets 1 and 2) and an ANOVA (comparing Sets 3, 4, and 5) confirmed the equality of the sets within Group A and Group B, respectively. All participants were administered both Group A and B.

Table 3.3. Clusters of anagrams for three groups of participants.

Task	Group	Sets	Words	Scrambled order
Warm-up Set 1	All Groups	1	drama, event, fault, shock	1, 5, 4, 2, 3
Warm-up Set 2	High-Sense-of-Control Group	2	angle, charm, quest, nymph	3, 2, 5, 4, 1
Group A	All Groups	1	baron, demon, owner, folly	3, 5, 1, 4, 2
		2	odour, chaos, devil, maker	5, 2, 4, 1, 3
Group B	All Groups	3	menace, custom, misery, shadow	4, 6, 3, 1, 5, 2
		4	vapour, volume, advice, crisis	3, 1, 6, 4, 2, 5
		5	vigour, humour, victim, safety	6, 3, 5, 1, 2, 4
Goal-setting set	High-Sense-of-Control Group	1	crime, style, bloom, odour	4, 2, 1, 3, 5
		2	decree, misery, colony, origin	2, 4, 1, 6, 3, 5

Procedure

All participants were seen individually in one of the School of Psychology's experimental rooms, the background noise in which was minimal. The room was equipped with a PC. Prior to distributing the study pack, the experimenter briefly explained the goal of the study to the participant. Participants were then asked to study the Information Sheet and sign the Consent Form, if they wanted to proceed with the

experiment. Next, the participant began the baseline assessment by completing (a) the Demographic Information Sheet, (b) Urges to Drink Questionnaire, and (c) task-specific questionnaires. The latter included three measures (a) the TSPCI with 11 rating scales repeated across three tasks (i.e., anagrams, concept-identification cards, and maths), (b) The TSSCI, and (c) the computerised Verbal and Memory Tasks. Upon completion of the experiment, the post-experimental tests were administered. They included those given at baseline and two additional ones: the alcohol-Stroop test and the TSIMI. Table 3.4 shows the sequence of questionnaires and tasks that were administered during the baseline (pre-test)and the post-experimental (post-test) assessments.

Table 3.4. Order of the questionnaires, and tests administered at baseline and post-experimentally.

Sequence	Baseline (pre-test)	Post-experimental (post-test)
1	Urges to Drink	Verbal and Memory tasks
2	TSPCI	Alcohol-Stroop Test
3	TSSCI	Urges to Drink
4	Verbal and Memory tasks	TSPCI
5	----------	TSSCI
6	----------	TSIMI

At the baseline, the participants started with the paper-and-pencil questionnaires and then they were given the computerised tasks (i.e., Verbal Puzzles and Memory Quizzes). The reason for starting with the questionnaires was to help participants to adjust to the experimental situation, and it was also necessary to administer the Verbal Puzzles and Memory Quizzes immediately before (and after) participants had completed the experimental tasks (e.g., anagrams and Concept Identification). This order was expected to increase the precision with which the effects of the experimental techniques on participants' cognitive processes could be measured.

Verbal Puzzles

The pre-test Verbal Puzzles (Rosenbaum, 2000) included five short questions that were played as sound files by the computer (e.g., "Which girl is taller if Jane is shorter than Sara?"; see Appendix 17). Prior to the test, participants received information about the task. They were informed that the computer would play a series of questions through the speakers. They were also instructed to listen to each question carefully and respond to

it as quickly and accurately as possible. They were instructed to respond as follows: "After finishing a question, you should press the spacebar on the keyboard and say your answer as soon as you hear a beep signal." The experimenter recorded the accuracy of the responses; however, the computer recorded their reaction time. Participants received two questions as warm-up trials before they started the actual test.

Memory Quizzes

The Memory Quizzes (Rosenbaum, 2000) included five short sentences (e.g., "Chased by an angry cat, the mouse burrowed deeply into the woodpile"; see Appendix 17). Prior to the task, participants were informed that the computer would play a series of sentences. They were also instructed to repeat the sentence as follows: "After hearing a sentence, you should press the spacebar on the keyboard and repeat the sentence as soon as you hear a beep signal. Then press the spacebar again as soon as you finish the sentence. Be careful, you should repeat the sentence as quickly and closely to the original version as you can." Participants received two sentences as warm-up trials before they started the actual test.

The experimenter recorded the number of errors manually. The computer recorded two types of timed measures: (a) response delay-time or reaction time (RT; the time that elapsed between the beep signal and the key stroke) and (b) response duration (RD; the time between the beep signal and the key stroke in which the participant spent repeating a sentence).

After the baseline tests (pre-test) had been completed, the experimental tasks (i.e., anagrams and Concept-Identification Cards) were administered to all participants regardless of their group membership. However, the instructions that participants received before completing the Concept-Identification Cards and the anagrams depended on the group to which they had been assigned. Full verbatim instructions given to each group are presented in the next section.

Concept-Identification Cards

The Concept-Identification Cards were presented in PowerPoint using the slideshow mode. Participants were first asked to study the instructions that appeared across five slides at the beginning of the task. On Slide One, they read[2]: "You are about to see a series of cards. You will see these cards in pairs. Each card contains five

[2]. The sentences were bulleted on each slide.

dimensions. Moreover, each dimension has two values. You will receive these cards in pairs. The next page shows a pair of cards with the 10 values. Five pairs of cards make a *set*. You will receive five sets. You will receive the 5 sets separately." Slide Two showed a pair of cards with the 10 values (see Table 3.2) accompanied by a full description of these dimensions as follows: "As you see, the five dimensions are *Shape*: circle/triangle; *Size of the shape*: small/large; *Surface*: plain/stripped; *Position of the line*: above the shape/below the shape; and *Size of the letter r*: small r/big r." The title of Slide Three was: "What is the target?" and it included these instructions: "You will receive five pairs of cards; there are two common values in each pair, BUT you should name only one of them. You should listen to the feedback to find the right answer." The No-Intervention Group did not receive the last sentence of the instructions in Slide Three. The title of Slide Four was: "What was repeated most often?" "You should decide about the common value that is repeated most often across the five pairs. Each pair will stay on the screen for only 10 seconds." The No-Intervention Group did not receive the last sentence of the instructions in Slide Four. In addition, because this group did not have a time limit (i.e., the 10 seconds), they were instructed, "On each pair, click or press a key before saying your answer."

The experimental groups read one additional slide that the No-Intervention Group did not see. It included these instructions: "At the end of each set, the experimenter will tell you whether your final answer is correct or incorrect. When you have finished all the sets of cards, the experimenter will tell you how well you have done in comparison to other participants. Are these instructions clear?" The next slide informed the participants that the warm-up trial was about to start and that it would familiarize them with the task. They read "You will receive one set of cards. Try to become familiar with the task. Remember to try to find the answer across five pairs." They were informed that they would see five subsequent slides each of which would present a pair of cards (i.e., a set of five pairs in sequence), and that they should name the one value that was common across each pair on each slide. Each slide remained on the screen for 10 seconds but only for the experimental groups. After 10 seconds had elapsed, the slide was automatically replaced by this sentence: "Please, say your answer!"—which required the participant to announce his/her decision about the common value. The experimenter provided participants with feedback that depending on the participants' answer about the common values across the pairs of cards. However, the type of feedback varied depending on whether the participant was in the Experimental Groups or the No-Intervention Group. Detailed descriptions of the types of feedback, as an experimental manipulation technique, are

provided in the next section. At the end of the warm-up set (as well as the main sets), participants were instructed as follows: "The five pairs are over! Now please tell the experimenter the common value that was repeated most often across all pairs." After giving their answer for the warm-up set and receiving the feedback, they proceeded with the next slide, which said: "That's all for the warm-up. Before you start the experiment, ask the experimenter if you have questions." Next, they saw this instruction: "Ready? Click or press a key to proceed and start!"

The composition of the pairs of cards for all groups of participants was based on the following rules: *First*, all pairs of cards had *two* values in common. *Second*, the same series of cards was administered to all groups. Across each set of five pairs of cards that were presented consecutively, only one common value was repeated three times; therefore, the tasks were: (a) to find *one* common value in each pair, and (b) to report the *common value* that was repeated *most frequently* across the five pairs in each set. For example, if two of the five pairs had a line above the shape, one had a triangle (i.e., the common shape), and three had small-sized shapes, the correct answer was "*small size of the shape*." Participants in the No-Intervention Group and the Low-Sense-of-Control Groups received one warm-up trial, whereas participants in the High-Sense-of-Control Group received two warm-up trials. This was to provide the High-Sense-of-Control Group with more information and more practice with the task. At the end of the main sets, the High-Sense-of-Control Group received two extra sets for the goal-setting part, which was specific to this group (see below).

In summary, the computerised procedure for presenting the Concept-Identification Cards was as follows: (a) participants received an introduction with an example about how they could solve the problem; (b) participants in the No-Intervention Group and the Low-Sense-of-Control Group had a set as a warm-up trial, but the High-Sense-of-Control Group received two sets of warm-up trials; (c) on receipt of each pair, participants had a maximum of 10 seconds (except for the No-Intervention Group, which had no time limit) in which to decide on a dimension that was common to the pair; (d) after this, they were asked to give their answer about the common value; (e) at the end of each set, participants were asked to name the common dimension that had occurred most frequently across all five pairs; (f) participants in the experimental groups received feedback about their answers after each pair on the warm-up or the main-task sets (i.e., within-trials feedback), at the end of each set (i.e., across-sets feedback), and at the end of the entire five sets (i.e., overall feedback).

Manipulation techniques used with Concept-Identification Cards. The

manipulation techniques used for the Concept-Identification Cards comprised six components as follows:

(a) *General information.* As stated above, after completing the pre-test, all participants received general information about the two experimental tasks (i.e., the Concept-Identifications Cards and the anagrams). However, the general information was slightly different for the three groups of participants. The No-Intervention Group was told only, "One of your tasks contains a few patterns and the other contains anagrams." The Low-Sense-of-Control Group was told, "One of your tasks is anagrams and the second task is related to your ability to find similarities." Referring to the "ability" of the participants in this group was important for increasing the chances that they would "self-address" (Kofta & Sedek, 1989) when a sense of failure was induced. The High-Sense-of-Control Group was told, "You will get two tasks to solve, cards and anagrams. The cards have several things in common, such as the size and shape of the figure and the type of surface, and the position of the line (referring to the sample pair on the screen). Your task is to find the common features across these cards. Anagrams are scrambled letters. You will need to unscramble them into meaningful words. Practice on these tasks could have important consequences for your future learning; I expect that they will *benefit* you. Other participants have *enjoyed* doing these tasks, and I am sure you will enjoy them too. While doing these tasks, try to keep calm, it would help you concentrate on the task. It does not matter if you make mistakes, try your best and you will be fine! May I ask you which type of task you would like to begin with?" These instructions were necessary to help them to make a choice between the two tasks and to better understand potential benefits of doing the experiment.

(b) *Specific information and choice.* As mentioned, as general information, the participants were also told that (a) the tasks could possibly *benefit* them and improve their future learning; and (b) other participants had *enjoyed* doing the tasks. Moreover, they were given instructions about *emotional control* (e.g., "Don't worry if you can't find the right answer; staying calm and relaxed will help you do better."). In addition, the High-Sense-of-Control Group received brief but more comprehensive information about the two tasks than the other two groups. They received an additional slide entitled, "To remember things easier." This slide taught the participants that the five dimensions on the cards could be divided into three categories. The first category was about *figures* (i.e., shape, size, and surface). The second category was *size* of the letter, and the third category was *position* of the line. This additional information allowed the concepts to be categorized in a simpler and more effective way. After providing participants in the

High-Sense-of-Control Group with the necessary information about the two tasks, they were asked, "Which task do you want to start with?" Thus, they were given a chance to choose their task.

(c) *Warm-up sets.* Before starting the Concept-Identification Cards, participants were given a set of warm-up trials to familiarise them with the task; however, the High-Sense-of-Control Group received two sets of warm-up.

(d) *Time limit.* The No-Intervention Group had no time limit for finding the common values in the pairs, whereas the experimental groups had a time limit of 10 seconds for each pair.

(e) *Feedback.* All participants in the experimental groups were given feedback after each pair of cards that was contingent on the accuracy of their responses (i.e., within-trials feedback). However, the No-Intervention Group received no feedback on the accuracy of their answers either after each set (i.e., across-sets feedback) or at the end of the task (i.e., overall feedback). Participants in the Low-Sense-of-Control Group received contingent feedback after each set of five cards; however, they neither were encouraged after giving correct answers nor received negative comments after incorrect answers. Instead, at the end of the task, they received overall feedback, which was the percentage of correct responses that they had given; this percentage was usually low—because of the time limit, they did not receive any specific information to enhance their performance, no encouraging feedback when they answered correctly, and no emotional support when they were wrong. On the other hand, the High-Sense-of-Control Group received feedback contingent on their performance after each pair, each set, and at the end of the task. While giving the across-sets feedback to the High-Sense-of-Control Group, the experimenter highlighted participants' success and encouraged them when they were successful. If they made an error, however, the experimenter tried to help them by saying supportive statements, such as "Don't worry, you have time to do better on the next pairs."

(f) *Goal setting sets.* As mentioned before, High-Sense-of-Control Group also received two extra sets of anagrams and cards as goal-setting trials to help them improve their performance after they had completed the five experimental sets. For example, for the Concept-Identification Cards, the experimenter recorded the time that participants took to solve the last two main sets (i.e., Sets Four and Five). The experimenter encouraged them to do the same task again with two more sets, but this time to aim to do it twenty percent faster than the average time that they took on the last two of the five sets (i.e., Sets Four and Five) that they did. That is, if the participant, on average, took 40

seconds to answer Set Four and 38 seconds to answer Set Five (an average of 39 seconds), he or she was encouraged to try to find the correct answer for each of the additional sets in 32 seconds.

Anagrams

All groups received the same sets of anagrams. The procedure for administering them was as follows: (a) participants were told that they needed to unscramble a series of letters (i.e., anagrams) to form meaningful words; (b) they received each set of anagrams on an A4-size paper with the anagrams listed on the left-hand column of a table; the right-hand column provided the participants with a blank space in which to write their answers (i.e., the unscrambled words). Participants in the No-Intervention Group and the Low-Sense-of-Control Group received one set of warm-up trials, but the High-Sense-of-Control Group received two sets of warm-up trials; (c) participants in the experimental groups had a maximum of 40 seconds in which to unscramble each set of anagrams (four anagrams per set); (d) the experimental groups (but not the No-Intervention Group) received feedback on their performance after each anagram set and at the end of the anagram task. The procedure for giving feedback on this task was different for each of the groups. Full verbatim instructions given to each group are presented in the next section.

The manipulation techniques used with anagrams. The manipulation techniques used with the anagrams were based on the same rules as those used for administering the computerized Concept-Identification Cards. These techniques were as follows:

(a) *General information.* The experimenter gave oral instructions for solving the anagrams to all groups.

(b) *Specific information.* The experimenter told participants in the High Sense of Control, "There is a specific order in which the letters are scrambled; this order applies to all anagrams in each set. If you can find one of the orders, you will be able to solve all the anagrams within the set." The reason for giving specific information (i.e., hints) was to increase participants' chances of finding the solution (Chance, 2001). The other groups did not receive any specific information.

(c) *Warm-up sets.* Before starting the anagram task, the Low-Sense-of-Control Group and the No-Intervention Groups received a set of warm-up trial; the High-Sense-of-Control Group received two sets of warm-up trials.

(d) *Feedback.* The No-Intervention Group received no feedback about the

accuracy of their answers, neither after each set nor at the end of the anagram task.

The Low-Sense-of-Control Group received feedback that was contingent on their performance after each set; they were given neither encouragement (after their correct answers) nor any type of negative comments (after their incorrect answers). However, at the end of the task, they received overall feedback about the percentage of their correct responses on the task; the percentage was generally low.

The High-Sense-of-Control Group also received feedback after each set and at the end of the anagram task. When giving the feedback, the experimenter highlighted participants' success; when they made an error, the experimenter encouraged them to continue with the next set.

(e) *Time limit.* The No-Intervention Group had no time limit for unscrambling the anagrams; however, if they spent more than two minutes on a set, the experimenter asked them to proceed to the next set. The experimental groups had a time limit of 40 seconds in which to unscramble each set (of five anagrams). The reason for setting a time limit for the experimental groups was to put more pressure on them. It was assumed that the time pressure, combined with clues about how to solve the anagrams that was accompanied by positive feedback (i.e., for the High-Sense-of-Control Group), would increase participants' sense of competence and control. In contrast, time pressure, that involved no clues about how to solve the anagrams and no encouragement, was intended to foster a low sense of competence and control over the task (i.e., in the Low-Sense-of-Control Group).

(f) *Goal-setting sets.* Participants in the High-Sense-of-Control Group received two extra anagram sets to further improve their performance and their feelings of competence. The experimenter recorded the time that each participant took to solve the last two anagram sets, and she encouraged the person to solve these two extra sets 20% faster than the average time recorded on Sets Four and Five.

Summary of manipulation techniques. Participants in each of the groups received a combination of manipulation techniques as follows:

First, the No-Intervention Group (a) had no time limit; (b) was given no information about how to solve the tasks; and (c) did not receive any feedback. Because no experimental manipulation was used with this group to induce a feeling of success or failure, it was expected that their sense of control and their task-specific intrinsic motivation would not change from the pre-test to the post-test.

Second, the Low-Sense-of-Control Group (a) had a time limit; (b) did not receive any clues about how to solve the anagrams; and (c) received feedback that was contingent

on their performance and with no additional encouragement or discouragement on their success or failure.

Third, the High-Sense-of-Control Group (a) had a time limit; (b) received information about the nature of the task (i.e., hints about how to solve the problems effectively); (c) received emotional advice; (d) received immediate, contingent and positive feedback about their performance; and (e) were asked to set goals to improve their performance on two additional sets.

Post-experimental Assessment

Following completion of the experimental tasks, participants began the post-experimental test package that included the Verbal Puzzles and Memory Quizzes. *Next*, they proceeded with the alcohol-Stroop test, which was followed by the Urges to Drink Questionnaire, TSPCI, TSSCI, and IMI. At the end of the session, participants were debriefed (see Appendix 19) and thanked, and they received their course and print credits. Because the alcohol-Stroop test was administered only post-experimentally, the procedure for administering it is described below.

Alcohol-Stroop Test

The alcohol-Stroop colour-naming stimuli were presented via a PC at the centre of a 17" colour monitor, using Superlab software (Cedrus-Corporation, 1999). The viewing distance was 36-40 cm. The input device was the PC's keyboard (four keys on which were labelled with coloured stickers). All of the word stimuli appeared in one of four colours: *red*, *blue*, *green*, or *yellow*.

The order of the stimuli and the colour in which each stimulus appeared was randomised. The randomisation was based on the software's timing-seed option. This option allows unrepeated, randomised representation of stimuli. In order to prevent the same words from appearing on consecutive trials, they were presented in a ''pseudorandom'' order. If, for instance, the word ''alcohol'' was randomly selected twice in succession, it was rejected the second time, and further random selections were made, if necessary, until a different word was selected.

Prior to the appearance of each stimulus word, a fixation cross "+" appeared at the centre of the display screen for 800 ms (i.e., the inter-trial interval). Participants were asked to ignore the meaning of the stimuli and respond to the colour in which each stimulus appeared as quickly and accurately as possible. The computer automatically recorded participants' RT and the accuracy of their response (i.e., correct vs. incorrect vs.

missed) to each stimulus. Next, mean RTs were computed for responses to the alcohol-related stimuli and the control stimuli after excluding invalid keyboard strokes; the percentage of invalid responses (error and missed responses) was 2.5%.

Prior to the experimental trials, the experimenter checked for colour blindness by asking participants to name the four colours on the sticker labels on the keyboard (i.e., blue, green, yellow, and red); the experimenter also asked them to name the four colours used in the Stroop test on the monitor display. In addition, to help the participants to get used to the task, they received a warm-up set of stimuli comprising 52 colour-patches with which they practiced with the four response keys. Due to the length of the alcohol-Stroop test and because all analyses based on this test were between-participants, the alcohol-Stroop Test was administered only post-experimentally.

Pilot Study

Before the second study was run, a pilot study was conducted to examine how much time the experimenter needed to conduct the entire procedure and to see whether there were any potential problems.

The second study was initially designed to have four groups. Twenty-eight participants (male = 39.28%) were randomly assigned to a No-Intervention Group or one of three experimental groups (i.e., Very-Low-Sense-of-Control, Low-Sense-of-Control or High-Sense-of-Control Groups). The aim was to instil a feeling of either success or failure by varying task difficulty, task-related information, feedback, and goal-setting. Pre- and post-test measures suggested that the manipulation techniques were effective.

Like the other groups, the Very-Low-Sense-of-Control Group received the first two sets of the Concept-Identification Cards and anagrams; however, Sets Three through Five of the tasks were more difficult for this group than for the other groups. For example, in the last three sets of Concept-Identification Cards, there were *two* common values (instead of *one*) that were repeated three times within a set. The reason for including two common values in the each set was to increase participants' confusion and make it virtually impossible for them to find a correct answer. This also guaranteed that there would be at least one alternative "correct" answer (other than the one the participant provided), so that the experimenter could convince sceptical participants that there *was* a "correct" answer that they could not find.

Moreover, participants in the Very-Low-Sense-of-Control Group were given non-contingence feedback. For example, after each pair of Concept-Identification Cards, they received randomly assigned correct or incorrect feedback. Feedback after each set was

always negative. While giving feedback to this group, the experimenter tried to emphasize the failure without encouraging success. Overall feedback at the end of the task for this group was also always negative; it was not only related to their own performance but also their performance was "compared" with that of the other participants. The experimenter told the participant that his/her results were not very promising; that he/she failed *most* (e.g., four out of five) of the sets, whereas other participants were able to answer at least three of the five sets.

The researcher found that, compared to the other two groups, participants' sense of control and intrinsic motivation in both the Very-Low and the Low-Sense-of-Control Groups were reduced. The Very-Low-Sense-of-Control Group also showed greater reductions in overall sense of control and intrinsic motivation than the Low-Sense-of-Control Group. As regard to the task-specific measures of sense of control, intrinsic motivation, and adaptive motivation, the groups were ordered—from highest to lowest—as follows: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group > Very-Low-Sense-of-Control Group. As expected, the order of the groups was reversed on both urges to drink and alcohol-attentional bias: Very-Low-Sense-of-Control Group > Low-Sense-of-Control Group > No-Intervention Group > High-Sense-of-Control Group. Nevertheless, the aim of the experimental manipulations was to induce high vs. low sense of control but not low vs. very low sense of control. Based on the results of the pilot study and the similarities between the Very-Low and Low-Sense-of-Control Groups, and because of difficult manipulation techniques were required to induce a very low sense of control, the researcher decided that the inclusion of the Very-Low-Sense-of-Control Group in the second study was unnecessary.

Results

It was decided to exclude non-drinkers from the data analyses for the alcohol-Stroop task and urges to drink because measuring urges to drink in non-drinkers seemed irrelevant and because personality differences between drinkers and non-drinkers have been frequently reported (e.g., King et al., 2003). Therefore, two participants (both male) in the No-Intervention Group and three participants (two males and one female) in the Low-Sense-of-Control Group were excluded.

Participants and their Demographic Characteristics

One hundred and six participants (48.1% males) were randomly assigned to the

No-Intervention Group ($N = 35$, 54.3% males); the Low-Sense-of-Control Group ($N = 36$, 44.4% males); and the High-Sense-of-Control Group ($N = 35$, 45.7% males). The number of males and females in the three groups is shown in Table 3.5.

Table 3.5. Sample size and gender composition in each of the groups.

	Gender	
Group	Males	Females
No-Intervention	19	16
Low-Sense-of-Control	16	20
High-Sense-of-Control	16	19
Total	51	55

The nationality of participants was as follows: There were 87 British participants (No-Intervention Group = 26.44%, Low-Sense-of-Control Group = 28.74%, High-Sense-of-Control Group = 33.33%), 19 Welsh or Irish participants (No-Intervention Group = 26.32, Low-Sense-of-Control Group = 42.11%, High-Sense-of-Control Group = 31.58) participants. On the Participant's Demographic Information Sheet, participants were asked to rate their proficiency in reading and listening to English as follows: *weak* (1) , *medium* (2), *good* (3), *as native speaker* (4), or *native speaker* (5). Participants' mean rating on their proficiency in English reading and listening were 4.7 and 5. Participants' mean age and mean years of university education completed are shown in Table 3.6.

Table 3.6. Means and standard deviations of age and years of university education of males and females in three groups.

		Group					
		No-Intervention		Low-Sense-of-Control		High-Sense-of-Control	
Gender		*M*	*SD*	*M*	*SD*	*M*	*SD*
Males	Age	21.00	2.05	21.50	2.07	21.94	2.77
	Education	2.12	.94	2.25	1.18	2.69	1.40
Females	Age	21.44	2.03	22.10	1.92	21.42	2.06
	Education	2.75	1.24	2.80	1.01	2.53	1.02

One-way ANOVAs showed that there were no significant differences among the groups on age [$F_{(2, 103)} = .83, p = .44$]; or years of university education [$F_{(2, 103)} = .30, p = .74$]. A Kruskal-Wallace non-parametric test showed that the groups did not differ on gender, $X^2 (2) = .80, p = .67$.

Scoring the Measures

Factor Analysis of the TSPCI

On the TSPCI, the participants provided ratings on all three tasks (i.e., anagrams, Concept-Identification Cards, and maths) on the pre- and the post-tests. Participants completed the anagrams and the Concept-Identification Cards, but they did not receive the mathematics task. The mathematical component of the task was included in the TSPCI to determine whether participants experience with the anagrams and Concept-Identification Cards affected their ratings of a different task (i.e., the Mathematical Task) that they had not experienced. Therefore, a mean for each of the rating scales for the anagrams and Concept-Identification Cards (TSPCI-AC) was calculated, but the rating scales for the Maths (TSPCI-M) task were calculated separately. Cronbach's Alpha was calculated as a measure of the TSPCI's internal consistency (for all three tasks); this resulted in an alpha of .71.

Based on the guidelines discussed in Chapter Two, participants' scores on the TSPCI were subjected to PCA. On the pre-test TSPCI, to determine whether the TSPCI rating scales for the TSPCI-AC (i.e., excluding the PCI rating scales for Maths) shared a common variance, the matrix of correlations among the rating scales was examined. It revealed that 66% of the variables were significantly correlated with each other. This suggested that many of the rating scales shared a common factor. Bartlett's test of sphericity, a measure of the degree to which a variable is related to itself but not to the other variables, reached statistical significance [$X^2_{(55)} = 455.90, p < .0001$]. In addition, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy resulted in a higher value (i.e., .72) than the recommended minimum value of .60 (Kaiser, 1974), supporting the factorability of the correlation matrix. The results of the PCA showed that Factor 1 (the first PCA component) and Factor 2 (the second PCA component) explained 34.71% and 15.05% of the variance, respectively; together they accounted for 49.76% of the variance.

After completing the tasks (i.e., anagrams and Concept-Identification Cards), participants completed the post-test version of the TSPCI according to their actual experiences with the tasks.

From the TSPCI-AC post-test (for the anagrams and the Concept-Identification Cards), a correlational matrix revealed that 74% of the variables were significantly correlated with each other, again suggesting that many of the rating scales measured a common factor. In addition, Bartlett's test of sphericity was significant [$X^2_{(55)} = 535.79$, $p < .0001$] and the Kaiser-Meyer-Olkin measure of sampling adequacy resulted in a

higher value (i.e., .82) than the recommended value of .60 (Kaiser, 1974)—indicating that a factor analysis of the post-test task-specific data was appropriate. Factor 1 and Factor 2 explained 42.75% and 16.42% of the variance, respectively; together they accounted for 59.17% of the variance. Table 3.7 shows the loadings on the two factors for the TSPCI; that is, the rating scales on the Concept-Identification Cards and the anagram tasks together and the Maths task separately for the pre- and post-test administrations.

For the TSPCI-M, (a) on the pre-test PCI, Bartlett's test of sphericity was significant [$X^2_{(55)} = 403.33, p < .0001$] and the KMO was .74. (b) On the post-test TSPCI-M, Bartlett's test of sphericity was significant [$X^2_{(55)} = 549.27, p < .0001$] and the KMO was .82. Both sets of results confirmed the suitability of a PCA on the pre- and post-test data.

Using PCA, a two-factor solution was selected to summarise the PCI data, based on the results of the Screen plot and interpretability of the factor loadings. As Table 3.7 shows, the patterns of factor loadings from the pre- and post-test PCAs for the TSPCI are very similar. Based on the pattern of factor loadings on both the pre- and the post-test analyses and their interpretability, Factor 1 was defined as *adaptive motivational structure,* and Factor 2 was defined as *maladaptive motivational structure*. The patterns of the factor-loadings are similar to those reported in earlier studies using ordinary versions of the PCI (e.g., Cox et al., 2002; Fadardi, 2003).

Respondents who scored high on Factor 1 (*adaptive motivational structure*) were very optimistic about solving the tasks; scored high on appetitive motivation; believed they had control over completing the tasks; knew what to do to solve the problems; believed in the importance of their individual efforts rather than luck; felt strong commitment to completing the tasks; and believed that it would not take them long to solve the problems. They were also emotionally involved in their goal pursuit, expecting to feel happy if they succeeded but little unhappiness. On the other hand, participants who scored high on Factor 2 (*maladaptive motivational structure*) reported a lack of sufficient knowledge about how to solve the problem; felt little control over completing the tasks; felt that their success would be due to luck; showed little commitment to solving the problems; and they reported mixed feelings about solving the problems. In addition, they did not show a harmonic pattern of emotional involvement in solving the problems (i.e., they expected moderate joy if they succeeded, some conflict about completing the tasks, and no sorrow if they could not succeed). They also reported that they needed a lot of time to complete the tasks successfully.

Table 3.7. Factor loadings for the mean TSPCI rating scales prior and subsequent to the experimental manipulation.

	Anagrams and Concept Identification				Maths			
	Pre-test		Post-test		Pre-test		Post-test	
TSPCI rating scales	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2
Liking the tasks	.77	#	.82	#	.84	#	.83	#
Disliking the tasks	-.69	#	-.82	#	-.79	.37	-.70	.32
Control over success	.63	-.40	.80	#	.72	-.45	.81	#
Know what to do	.60	#	.73	#	.63	.31	.79	#
How likely if try best	.80	#	.83	#	.70	#	.71	#
How likely if lucky	-.51	.40	#	.56	-.36	.62	#	.35
Joy if succeed	.49	.33	.66	.31	.45	#	.70	.42
Unhappiness (conflict)	-.56	.36	-.41	.69	-.35	.47	#	.64
Sorrow from failure	#	-.49	.55	-.54	.57	#	.33	-.61
Commitment	.56	.52	.68	#	.54	-.31	.70	#
Goal distance	#	.57	-.57	.47	#	.43	-.49	.53

Note. TSPCI = Task-Specific Personal Concern Inventory. # = loadings < .30.

It seemed clear that the two sets of factor scores could be used in the subsequent analyses. Interestingly, there was a significant correlation between Factors 1 and 2 extracted for the anagram and the Concept-Identification Cards on the one hand, and Factors 1 and 2 extracted for the Maths task on the other hand, regardless of participants' group membership. Pairwise comparisons showed that there was no difference between factors derived from the TSPCI anagrams and Concept-Identifications cards and those derived from the Maths task. Therefore, it did not seem necessary to use separate factors extracted from the two kinds of tasks. To arrive at a more comprehensive factor analysis of the TSPCI, the mean scores for each of the rating scales across the three tasks were calculated and then subjected to another Principal Component Analysis (PCA).

Table 3.8. Factor loadings for the mean TSPCI rating scales on the pre- and post-test.

	Pre-test		Post-test	
TSPCI rating scales	Factor 1	Factor 2	Factor 1	Factor 2
Liking the tasks	.81	#	.83	#
Disliking the tasks	-.72	#	-.78	.30
Control over success	.66	-.43	.79	#
Know what to do	.61	#	.76	#
How likely if I try best	.76	#	.82	#
How likely if lucky	#	.33	#	.42
Joy if succeed	.47	.46	.68	.43
Conflict (unhappiness)	-.49	.48	-.38	.70
Sorrow from failure	-.30	.64	-.51	.61
Commitment	.54	.54	.70	#
Goal distance	#	.33	-.53	.50

Note. # = loadings < .30.

The correlation matrix for the 11 rating scales (averaged across three tasks) on the pre-test revealed that 69% of the indices were significantly correlated with one another. In addition, the results of a Bartlett's test [X2 (55) = 455.90, $p < .0001$]; the KMO was .73. Hence, a PCA with a two-factor solution was conducted on the mean indices for the rating scales. Factor 1 and Factor 2 explained 34.71% and 15.08% of the variance, respectively; together the two factors accounted for 49.76% of the variance. The correlation matrix for the 11 rating scales (averaged across three tasks) on the post-test revealed that 75% of the rating scales were significantly correlated with each other. The results of Bartlett's test of sphericity [X2 (55) = 535.79, $p < .0001$]; the KMO was .82. Again, a PCA with a two -factor solution was conducted on the post-test rating scales. Factor 1 and Factor 2 explained 42.75% and 16.42% of the variance, respectively; together the two accounted for 59.17% of the variance. The patterns of loadings on the two factors derived from the three tasks were clearly distinguishable from each other. Factor 1 represented adaptive motivation, and Factor 2 represented maladaptive motivation. Table 3.8 shows the TSPCI patterns of loadings on the pre- and the post-test administrations of the inventory, when participants' mean ratings across all three tasks (i.e., anagrams, Concept-Identification Cards and maths tasks) were subjected to a PCA using a two-factor solution.

Calculating a TSPCI Summary Index

The results of a factor analysis are specific to the particular sample on which the data were collected. For example, if a researcher administers the PCI to a given sample and then does so a second time (e.g., conducts a post-test) and factor analyzes both sets of data, the results of the two factor analyses will likely not be the same (unless in the unlikely case that *all* respondents answered *all* questions the same on the two occasions). Moreover, factor scores for a group of participants are relative to each other; each participant's factor score depends on all other participants' scores. For this reason, a particular respondent might have answered the PCI exactly the same on two occasions, yet that participant's factor scores would not remain the same on the two administrations of the test if other participants responded differently on the two occasions. Thus, it would not be legitimate to perform a factor analysis on the two sets of data and then to compare factor scores across the two sets.

Accordingly, a PCI Summary Score was developed that made comparisons across two administrations of the test feasible. The summary score was based on the PCI rating scales that loaded on Factor 1 from the pre-test (see Table 3.5). The rating scales with negative loadings were summed, and the sum was then subtracted from the sum of the rating scales with positive loadings. The formula was: *Adaptive Motivation* = [[(like + control + what to do + try my best + happiness + commitment + sorrow) – (dislike)] /8]. This formula was used to calculate PCI summary scores for both the pre- and the post-test PCI.

Task-Specific Shapiro Control Inventory (TSSCI)

Table 3.9 shows the items on the two scales of the TSSCI. As described in Chapter Two, each scale score is calculated simply as the mean of the respondent's answers to the items on that scale. An Overall Sense of Control is calculated by averaging the scores on Positive and Negative Sense of Control.

Table 3.9 Items on two subscales of the TSSCI.

Questionnaire	Positive SoC	Negative SoC
Items	1, 2, 6, 7, 8, 9,10, 11, 12, 13,16	3, 4, 5, 14, 15

Intrinsic Motivation Inventory

On the IMI, the *Interest* subscale was calculated as the mean of items 1, 5, 8, 10, 14 (reversed), 17, and 20. *Pressure* was calculated as the mean of items 2(reversed), 6,

9(reversed), 13, and 18. *Perceived choice* was calculated as the mean of item 3, 11(reversed), 15, 19 (reversed), and 21(reversed). *Perceived competence* was calculated as the mean of items 4, 7, 12, 16 and 22.

As mentioned, the interest subscale includes more items than the other subscales. According to Deci et al. (1994), perceived choice and perceived competence are positively correlated with intrinsic motivation, and pressure/tension is negatively correlated with intrinsic motivation. Although the IMI items from each subscale have been shown to be factor analytically coherent and stable across a variety of tasks, conditions, and settings, Deci et al. (1994) recommended that researchers perform a factor analysis on their own data sets.

To eliminate the need for using multiple indices of intrinsic motivation in the current study, a summary score was calculated from the individual Intrinsic Motivational Inventory scores. The following formula was created to calculate a summary score for intrinsic motivation (Intrinsic Motivation):

Intrinsic Motivation = [(interest + perceived choice + perceived competence) – (pressure)] / 4.

Urges to Drink Questionnaire

To score the Urge to Drink Questionnaire, Items 1, 3, 4, 5, and 7 were fist reverse scored. Then the mean of those items and Items 2 and 6 was taken.

Familiarity with the Tasks

In the first part of the TSPCI, participants were asked to rate their familiarity with the three types of tasks (i.e., anagrams, maths, and Concept-Identification Cards). Table 3.10 shows the means and standard deviations of participants' ratings of their familiarity with the three tasks, separately for each of the groups.

Table 3.10. Means and standard deviations of participants' ratings of their familiarity with the three tasks.

	Group					
Tasks	No-Intervention		Low-Sense-of-Control		High-Sense-of-Control	
	M	*SD*	*M*	*SD*	*M*	*SD*
Anagrams	6.40	2.37	5.98	2.55	6.57	1.99
Maths	6.69	2.40	6.42	2.31	5.89	2.34
Concept Identification	5.83	2.61	5.42	2.93	5.60	1.98

One-way ANOVAs showed that there were no significant differences among the three groups on their familiarity with anagrams [$F_{(2, 103)} = .63, p = .53$]; maths [$F_{(2, 103)} = 1.05, p = .35$]; or with Concept-Identification Cards [$F_{(2, 103)} = .23, p = .79$].

Performance on Concept-Identification Cards and Anagrams

One-way ANOVAs showed a significant main effect for Groups on both number of correctly answered Concept-Identifications Cards [$F_{(2, 103)} = 38.61, p < .0001$], and number of correctly answered anagrams [$F_{(2, 103)} = 33.06, p < .0001$]. Post-hoc Tukey HSD tests showed that the High-Sense-of-Control Group ($M = 4.08$, $SD = .86$) correctly answered significantly more Concept-Identifications Cards than the No-Intervention Group ($M = 2.54$, $SD = .98$; $p < .0001$) and the Low-Sense-of-Control Group ($M = 2.23$, $SD = .99$; $p < .0001$). There was no a difference between the Low-Sense-of-Control Group and the No-Intervention Group on the number of Concept-Identification Cards that were answered correctly.

Post-hoc Tukey HSD tests revealed that the High-Sense-of-Control Group ($M = 11.18$, $SD = 5.19$) answered significantly more anagrams than the No-Intervention Group ($M = 8.43$, $SD = 4.46$; $p = .03$) and the Low-Sense-of-Control Group ($M = 3.67$, $SD = 3.21$; $p < .0001$). The Low-Sense-of-Control Group answered significantly fewer anagrams than the other two groups ($ps < .0001$).

Therefore, the results confirmed that the manipulation techniques were effective in causing the High-Sense-of-Control Group to be more successful than the other two groups on both of the experimental tasks. Although the Low-Sense-of-Control Group were poorer than the other two groups on the anagrams, this group performed more poorly than only the High-Sense-of-Control Group on the Concept-Identification Cards. The results are shown graphically in Figure3.2.

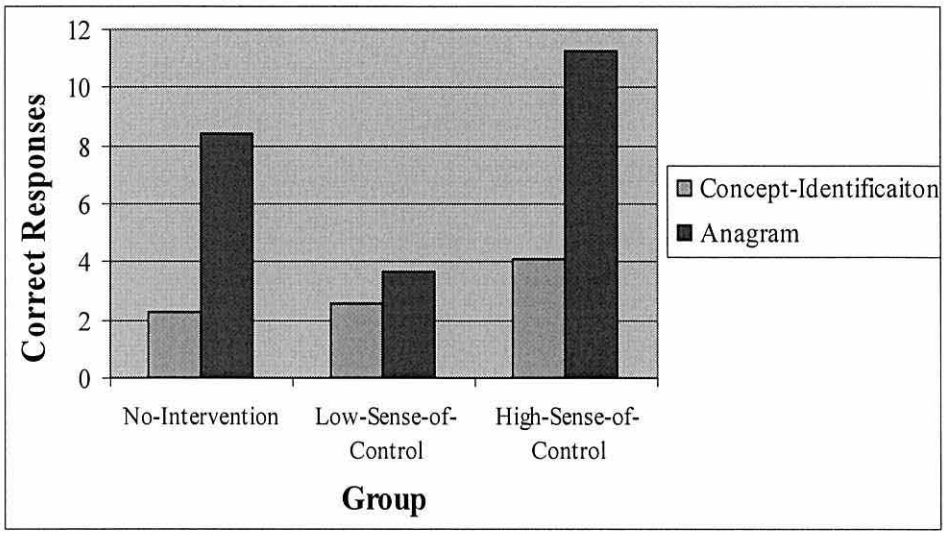

Figure 3.2. Number of concept-identification cards and anagrams correctly solved by each group.

Changes in Sense of Control

The means and standard deviations for the pre- and post-test scores for Task-Specific Sense of Control are shown in Table 3.11. Three one-way ANOVAs showed that there was no difference among the groups on the pre-test Positive Sense of Control [$F_{(2, 103)} = .48, p = .62$]; Negative Sense of Control [$F_{(2, 103)} = .28, p = .76$]; and Overall Sense of Control [$F_{(2, 103)} = .55, p = .78$].

To further determine whether the groups differed from one another on the post-test sense of control, a MANCOVA was conducted. In the model, post-test Positive, Negative, and Overall Sense of Control were entered as the dependent variables; Group (with three levels) was entered as the fixed factor (independent variable); and pre-test Sense of Control was entered as the covariate. Levene's test of equality of variances was significant, indicating the adequacy of the MANCOVA model. The groups differed on the combined dependent variables [$F_{(4, 198)} = 23.70, p < .0001, \eta^2 = .33$, Wilk's Lambda =.46; Power = .94]. When the dependent variables were tested separately, there were also main effects for Group on all three sense of control scales: post-test *Positive Sense of Control* [$F_{(2, 100)} = 57.08, p < .0001, \eta^2 = .53$]; *Negative Sense of Control* [$F_{(2, 100)} = 34.04, p < .0001, \eta^2 = .41$]; and *Overall Sense of Control* [$F_{(2, 100)} = 56.49, p < .0001, \eta^2 = .53$].

Post hoc pairwise comparisons showed that there was a significant difference among the groups on the Sense of Control scales. On Negative Sense of Control, the High-Sense-of-Control Group was lower than the No Intervention Group, and both of

these groups were lower than the Low-Sense-of-Control Group (*p*s < .001). On Positive and Overall Sense of Control, the High-Sense-of-Control Group was higher than the No-Intervention Group, and both of these groups were higher than the Low-Sense-of-Control Group (*p*s < .004).

Additional *t*-tests for paired-samples were conducted to assess changes from the pre- to post-test on Sense of Control scales, separately for each of the three groups. The No-Intervention Group did not change from the pre- to the post-test on any of the Sense of Control scales ($p > .05$). However, the Low-Sense-of-Control Group showed an increase in their Negative Sense of Control from the pre- to the post-test [$t_{(35)} = -4.53$, $p < .0001$, $d = -.66$], but a reduction in Positive [$t_{(35)} = 7.76$, $p < .0001$, $d = .68$] and Overall Sense of Control [$t_{(35)} = 7$, $p < .0001$, $d = .87$]. On the other hand, the High-Sense-of-Control Group showed an increase in Positive [$t_{(34)} = -4.20$, $p < .0001$, $d = -.58$] and Overall Sense of Control [$t_{(34)} = 4.35$, $p < .0001$, $d = .59$], but a reduction in Negative Sense of Control [$t_{(34)} = -4.67$, $p < .0001$, $d = -.71$]. These results are shown graphically in Figure 3.3.

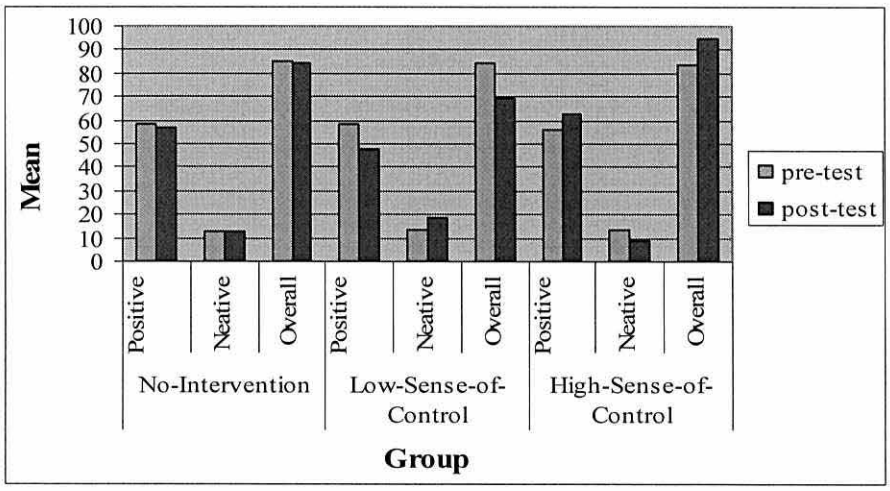

Figure 3.3. Mean sense of control scores for the three groups on the pre- and post-tests.

Table 3.11. Means and standard deviations of three groups on positive, negative, and overall sense of control from the task-specific Shapiro control inventory on the pre- and post-tests.

		Group											
		No-Intervention				Low-Sense-of-Control				High-Sense-of-Control			
		Males		Females		Males		Females		Males		Females	
Sense of Control		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Pre-test	Positive	59.05	8.85	56.63	6.85	60.50	5.79	55.80	8.53	56.06	56.06	55.47	7.08
	Negative	11.74	4.91	13.69	4.44	11.75	4.14	14.85	5.84	12.88	12.88	13.94	6.22
	Overall	87.32	13.20	82.94	9.57	88.75	8.04	80.95	13.80	83.19	83.19	81.78	11.69
Post-test	Positive	58.00	7.75	57.19	6.38	49.75	8.50	46.05	8.06	62.44	62.44	62.37	6.97
	Negative	12.05	5.58	13.31	4.17	17.88	5.66	19.25	5.79	8.56	8.56	9.00	5.60
	Overall	85.95	12.48	83.88	8.82	71.88	13.20	66.80	12.26	93.88	93.88	93.37	11.03

Changes in Intrinsic Motivation

The means and standard deviations of the three groups on four scales of the IMI are shown in Table 3.12.

Table3.12. Means and standard deviations of three groups on interest, pressure, choice, and competence from the task-specific Intrinsic Motivation Inventory.

	Group					
	No-Intervention		Low-Sense-of-Control		High-Sense-of-Control	
Subscales of IMI	*M*	*SD*	*M*	*SD*	*M*	*SD*
Interest	4.54	1.38	3.89	1.44	5.50	1.09
Pressure	3.77	1.26	4.10	1.30	3.33	1.41
Choice	5.83	1.27	5.25	1.50	6.00	1.08
Competence	3.63	1.06	3.06	1.34	4.89	1.18

To test whether groups differed from one another on the subscales of the Intrinsic Motivation Inventory, a series of one-way ANOVAs was performed. The results showed that there was a significant difference among the groups on (a) *Interest Motivation* [$F_{(2, 103)} = 13.34, p < .0001$], with the High-Sense-of-Control Group scoring higher than the No-Intervention and the Low-Sense-of-Control-Groups ($ps < .0001$; all post hoc tests were Tukey HSDs); (b) *Perceived Pressure* [$F_{(2, 103)} = 3.63, p = .03$], with the Low-Sense-of-Control Group reporting greater pressure than the High-Sense-of-Control Group ($p = .02$); and (c) *Perceived Choice* [$F_{(2, 103)} = 3.26, p = .04$], with the High-Sense-of-Control Group believing that they had more Choice than the Low-Sense-of-Control Group ($p = .04$); and (d) *Perceived Competence* [$F_{(2, 103)} = 21.46, p < .0001$], with the High-Sense-of-Control Group perceiving greater Competence than the No Intervention and the Low-Sense-of-Control Groups ($ps < .0001$). The means and standard deviations on the Intrinsic Motivation scales are shown in Table 3.13.

Table 3.13. Means and standard deviations of three groups on intrinsic motivation.

	Intrinsic Motivation	
Group	*M*	*SD*
No-Intervention	2.54	.74
Low-Sense-of-Control	2.02	.94
High-Sense-of-Control	3.32	.69

An ANOVA showed that the groups differed on Intrinsic Motivation [$F_{(2, 103)} = 23.61, p < .0001$]. Post hoc Tukey HSD tests showed that the High-Sense-of-Control Group was higher than the No-Intervention and the Low-Sense-of-Control Groups ($ps < .0001$) on Intrinsic Motivation, but the Low-Sense-of-Control Group was lower than the No-Intervention Group ($p < .02$).

Changes in Adaptive Motivation

The means and standard deviations of baseline and post-experimental Adaptive Motivation (see Page 15) are shown in Table 3.14. A one-way ANOVA showed that the groups did not differ on pre-test Adaptive Motivation [$F_{(2, 103)} = .53, p = .59$]. To further test between-group differences on Adaptive Motivation on the pre-test, a univariate analysis of covariance (ANCOVA) using GLM was conducted, in which Group was entered as the independent variable (fixed factor), and familiarity with the task (e.g., anagrams) were entered as the covariate; and the pre-test Adaptive Motivation was entered as the dependent variable. There was no effect for Group on pre-test Adaptive Motivation ($p = .59$). This indicates that the three groups did not differ from one another on adaptive motivational structure prior to the experimental induction.

To test whether the groups differed from each other on post-test Adaptive Motivation, an ANCOVA was performed. In the model, Group was entered as the independent variable (fixed factor), and the pre-test Adaptive Motivation and Familiarity scores with the tasks were entered as the covariates; and post-test Adaptive Motivation were entered as the dependent variable.

Table3.14. Means and standard deviations of three groups on adaptive motivation on the pre- and post-tests.

	Pre-test		Post-test	
Group	*M*	*SD*	*M*	*SD*
No-Intervention	3.63	1.31	3.55	1.17
Low-Sense-of-Control	3.67	1.30	2.52	1.40
High-Sense-of-Control	3.57	1.23	4.47	0.97

The results showed that there was a significant main effect for Group [$F_{(2, 99)} = 38.96, p < .0001, \eta^2 = .38$], after controlling for the pre-test Adaptive Motivation as a dependent variable [$F_{(1, 99)} = 35.35, p < .005, \eta^2 = .26$]; and the covariates—i.e.,

familiarity with (a) anagrams [$F_{(1, 99)} = .23, p = .63, \eta^2 = .002$]; (b) maths [$F_{(1, 99)} = .02, p = .90, \eta^2 = .0001$]; and (c) Concept-Identification Cards [$F_{(1, 99)} = .36, p = .55, \eta^2 = .004$]. Pairwise comparisons revealed significant differences among the groups (*p*s < .000 for all comparisons); the groups were ordered from the highest to the lowest on the post-test Adaptive Motivation as follows: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group. These results are shown graphically in Figure 3.4.

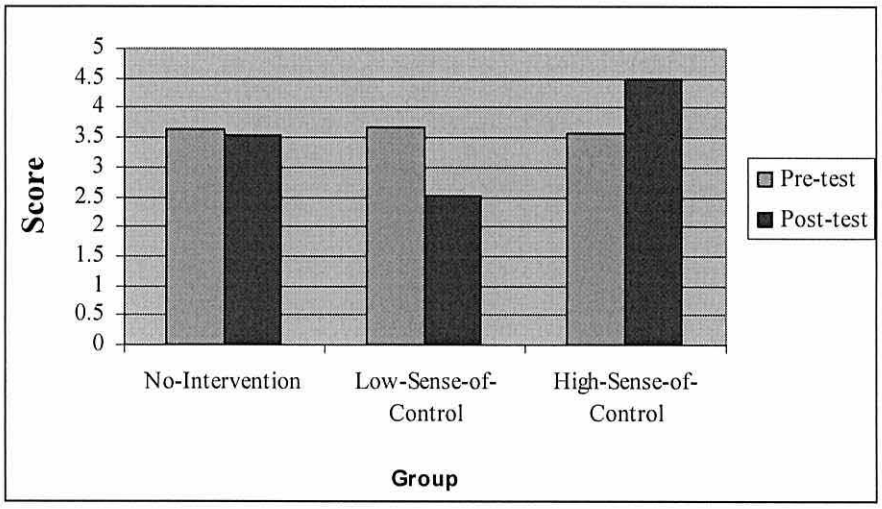

Figure 3.4. Mean Adaptive Motivation for three groups on the pre- and the post-tests.

Although the groups differed from one another on the summary index of adaptive motivation, it was also interesting to identify the particular TSPCI indices on which they different. First, a series of one-way ANOVAs on the 11 pre-test TSPCI indices showed no difference among the groups. To determine whether the groups differed on the TSPCI indices at the post-test, a MANCOVA was again conducted. The post-test indices were entered as dependent variables; Group (with three levels) was entered as the fixed factor; and pre-test indices were entered as covariates. Levene's test of equality of variances was not significant, indicating the adequacy of the MANCOVA model. The groups differed on the combined dependent variables [$F_{(4, 198)} = 23.70, p < .0001, \eta^2 = .33$, Wilk's Lambda = .46; Power = .94]. When the dependent variables were tested separately, there were also main effects for Group on six mean indices of TSPCI: *Control* [$F_{(2, 92)} = 17.88, p < .0001, \eta^2 = .49$]; *What to do* [$F_{(2, 92)} = 8.18, p < .0001, \eta^2 = .63$]; *Try my best* [$F_{(2, 92)} = 14.28, p < .0001, \eta^2 = .61$]; *Joy* [$F_{(2, 92)} = 13.60, p < .0001, \eta^2 = .49$]; *Sorrow* [$F_{(2, 92)} = 34.04, p < .0001, \eta^2 = .59$]; and *Commitment* [$F_{(2, 92)} = 10.80, p <$

.0001, $\eta^2 = .70$]. Moreover, on these six indices, the groups were ordered from the highest to the lowest as follows: High-Sense-of-Control Group> No-Intervention Group > Low-Sense-of-Control Group.

To conclude, the manipulation techniques that participants received (i.e., intrinsic motivation and perceived control) resulted in significant motivational changes from the pre- to post-test. The High-Sense-of-Control Group showed an improvement on the task-specific motivational indices, whereas the Low-Sense-of-Control Group showed a reduction on them. There was no change in the motivational indices of the No-Intervention Group.

How are Sense of Control and Intrinsic Motivation related to Motivational Structure?

A linear regression analysis was conducted to determine whether on the post-test, participants' sense of control and intrinsic motivation were associated with their adaptive motivation. Before entering the variables into the regression analysis, a scatter plot was drawn to depict how the independent variables were related to the dependent variable. The fit line indicated that the data were normally distributed. To identify simple relationships among gender, age, Adaptive Motivation, Overall Sense of Control, and Intrinsic Motivation, bivariate Pearson correlations were computed (see Table 3.15). As the table shows, Adaptive Motivation was positively correlated with both Overall Sense of Control and Intrinsic Motivation, and the latter two variables were strongly positively correlated with each other.

Table 3.15. Intercorrelations among gender, and age and post-test adaptive motivation, overall sense of control, and intrinsic motivation.

Variables	Gender	Age	Adaptive Motivation	Overall SoC
Age	.02			
Adaptive Motivation	-.11	.04		
Overall SoC	-.10	.11	.59**	
Intrinsic Motivation	-.12	.05	.54**	.51**

Note. Overall SoC = Overall Sense of Control; $^{**}p < .01$.

In a hierarchical regression model, Adaptive Motivation was entered as the dependent variable. Of the independent variables, Age and Gender were entered in the first step; Post-test Overall Sense of Control, in the second step; and Intrinsic Motivation, in the third step. Therefore, each step in the model allowed the variance contributed by the variables entered in that step to be estimated that was independent of the variables entered in the earlier steps. The results of the hierarchical regression analysis are shown in Table 3.16.

Table 3.16. Results of a hierarchical regression analysis in which adaptive motivation was predicted from gender, age, overall sense of control, and intrinsic motivation.

Steps	Variables	B	SE B	ΔR^2	β
1	Gender	-.33	.28		-.12
	Age	-.00	.03	.01	.04
2	Overall SoC	.05	.00	.31	.55*
3	Intrinsic Motivation	.66	.12	.44	.44*

Note. $^{*}p < .05$.

Before the results of the regression analysis were interpreted, the model was examined to ensure that its assumptions had been met (see Miles & Shevlin, 2001). *First*, two indices were used to examine the assumption of a normal joint distribution. These were (a) the shape of a standardised residual histogram and its normal curve and (b) the normal P-P plot of the -standardised residuals. Both indices supported the normality assumption. *Second*, to test the homoscedasticity[3] assumption, studentised residuals were plotted against the standardised predicted values. It was clear from the scatter plot of the residuals that the distributions of the variances were equal; therefore, the assumption of

3. The homoscedasticity assumption requires that the variance of the residuals at every set of values for the independent variables is equal. The condition violating this assumption is called heteroscedasticity.

homoscedasticity was not violated. *Third*, to test the assumption of linearity, partial regression plots (i.e., plots of the residuals) were examined. These showed that all of the partial regression plots met the criteria for the linearity assumption. *Fourth*, to check for possible problems with collinearity, tolerance scores were examined. With no tolerance score less than .50, it was confirmed that collinearity was not a problem.

The hierarchical regression analysis showed that in Step 1, gender and age were not significant predictors of Adaptive Motivation [$F_{(2, 103)} = .47$, $t = .08$, $p = .63$]. The second step showed that post-test Overall Sense of Control explained 31% of the variance in Adaptive Motivation [$F_{(3, 102)} = 15.36$, $t = 6.67$, $p < .0001$], after the effects of gender and age had been controlled in Step 1. The third step showed that Intrinsic Motivation predicted an additional 13% of the variance in the Adaptive Motivation [$F_{(4, 101)} = 19.90$, $t = 4.84$, $p < .0001$]. In summary, the results showed that both Sense of Control and Intrinsic Motivation predicted adaptive motivation independently of age and gender.

Performance on Verbal and Memory Tests

Errors on Verbal Puzzles. A one-way ANOVA showed that the groups did not differ on the number of errors that they made on the pre-test Verbal Puzzles [$F_{(2, 103)} = 1.01$, $p = .37$]. This confirms that the three groups were equivalent prior to the experimental induction.

To determine whether the groups differed on number of errors made on the post-test Verbal Puzzles, while controlling for number of errors on the pre-test, a univariate analysis of covariance (ANCOVA) using GLM was performed, in which Group was entered as the independent variable (fixed factor); pre-test errors on Verbal Puzzles was entered as the covariate; and the post-test errors on Verbal Puzzles was entered as the dependent variable. There was a main effect for Group [$F_{(2, 102)} = 15.12$, $p < .0001$, $\eta^2 = .23$], after controlling for the pre-test errors on Verbal Puzzles [$F_{(1, 102)} = 2.82$, $p = .03$, $\eta^2 = .09$]. Pairwise comparisons showed that the High-Sense-of-Control Group ($M = .86$, $SD = .16$) made fewer errors than the No-Intervention Group [$M = 1.54$, $SD = .16$; $p = .011$] and the Low-Sense-of-Control Group [$M = 2.09$, $SD = .16$; $p < .0001$]. Moreover, the Low-Sense-of-Control Group made more errors than the No-Intervention Group ($p = .04$). These results are shown graphically in Figure 3.5.

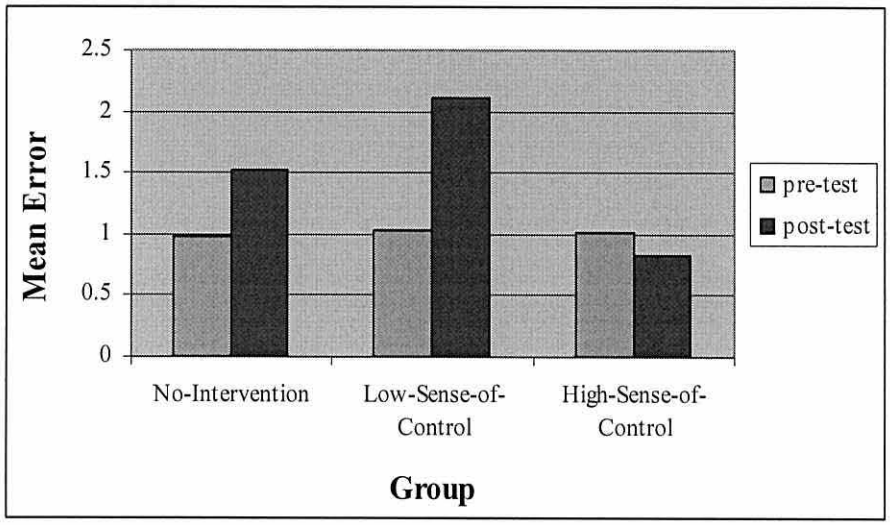

Figure 3.5. Mean errors of three groups on Verbal Puzzle at the pre-and post-tests.

Errors on Memory Quizzes. A one-way ANOVA showed that the groups did not differ on number of errors made on the Memory Quizzes at the pre-test [$F_{(2, 103)} = .21, p = .81$] (see Figure 3.6). This confirmed that the groups were equal at baseline.

A univariate analysis of covariance (ANCOVA) using GLM was conducted to determine whether the groups differed on number of errors on the Memory Quizzes on the post-test, after controlling for their errors on the pre-test (i.e., using this variable as the covariate). The results showed a main effect for Group [$F_{(2, 102)} = 10.24, p = .0001, \eta^2 = .17$], even though the covariate was significant [$F_{(1, 102)} = 225.63, p < .0001, \eta^2 = .69$]. Pairwise comparisons showed that the High-Sense-of-Control Group ($M = 3.49$, $SD = 7.14$) made fewer errors than the No-Intervention Group [$M = 7.69$, $SD = 6.84$; $p = .031$] and the Low-Sense-of-Control Group [$M = 7.69$, $SD = 6.85$; $p = .0001$] (see Figure 3.6). However, the Low-Sense-of-Control Group and No-Intervention Group did not differ ($p > .05$).

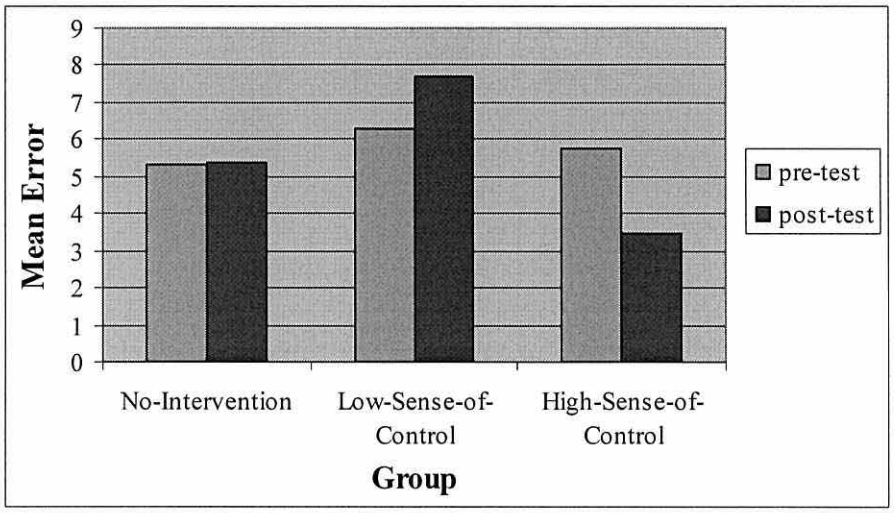

Figure 3.6. Mean errors of three groups on the Memory Quizzes in the pre-and post-tests.

(c) Reaction times on Verbal Puzzles. A one-way ANOVA showed that the groups did not differ on their RTs (i.e., response initiation time) to the pre-test Verbal Puzzles [$F_{(2, 103)} = .36, p = .70$]. This confirmed that the groups were equal at baseline.

To determine whether the groups differed on RTs on the Verbal Puzzles on the post-test, an ANCOVA was performed, in which Group was entered as the fixed factor, while controlling for the pre-test RTs on Verbal Puzzles as the covariate; RTs on Verbal Puzzles on the post-test was entered as the dependent variable. The main effect for Group was *not* significant [$F_{(2, 102)} = 1.03, p = .36, \eta^2 = .02$], after controlling for pre-test RTs. These results are shown graphically in Figure 3.7.

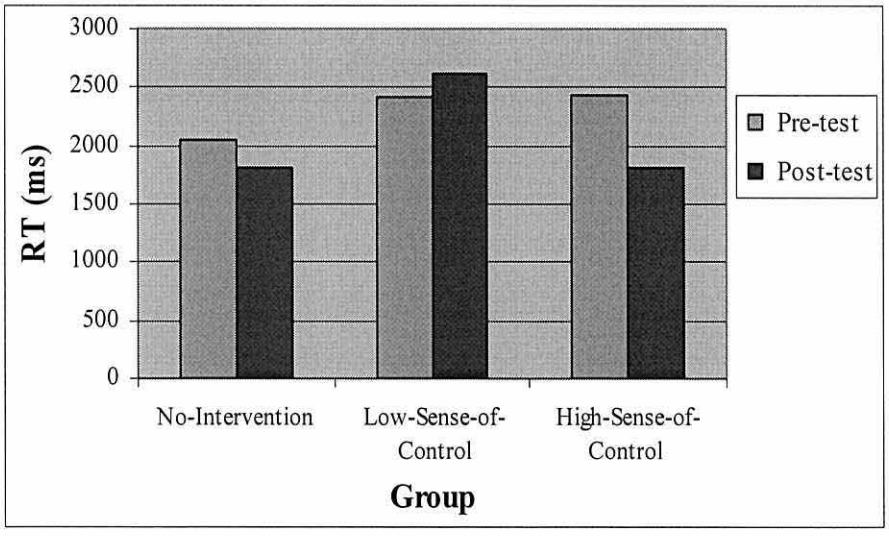

Figure 3.7. Mean reaction time of three groups on the Verbal Puzzles in the pre- and post-tests.

In addition, a MANCOVA was conducted to determine whether there was a difference among the groups on RTs to the individual Verbal Puzzles questions. In the model, Group was entered as the fixed factor, and the pre-test RTs to each of the individual questions (i.e., five questions) were entered as the covariates; post-test RTs to each of the individual questions were entered as the dependent variables. The results showed that there was not an overall main effect for Group [$F_{(10,188)}$ =1.69, p =.09, η^2 =.08; Wilk's Lambda =.84]; however, for the individual questions, there was an effect for Group only on Question Four [$F_{(2, 98)}$ = 4.70, p =.011, η^2 = .19]; the High-Sense-of-Control Group responded faster on this question than the other two groups ($p < .031$). Question Four was a maths question that required participants to calculate a simple division. Form A of the question was: "How many hours will it take to run 21 miles at a rate of three miles per hour?" Form B of the question was: "If a car drove 360 miles in six hours, how fast was the car going in miles per hour?" The two questions were counterbalanced across participants on the pre- and post-tests. That is, a participant who randomly received Form A on the pre-test received Form B on the post-test, and vice versa.

(d) Reaction time on Memory Quizzes. A one-way ANOVA was performed to determine whether the groups differed on pre-test RTs to the Memory Quizzes. The results showed that there was no difference among the groups [$F_{(2, 103)}$ = .17, p = .85].

To determine whether groups differed from each other on post-test RT to the Memory Quizzes, an ANCOVA using GLM was conducted. In the model, Group was the independent factor; RTs on the Memory Quizzes on the pre-test was entered as the covariate; and post-test RTs on the Memory Quizzes was entered as the dependent variable. There was a main effect for Group [$F_{(2, 102)}$ = 5.17, p = .007, η^2 = .09], after controlling for participants' pre-test RTs [$F_{(1, 102)}$ = 54.08, $p < .0001$, η^2 = .35]. Pairwise comparisons showed that the High-Sense-of-Control Group (M = 507.92, SD = 78.27) had faster RTs to the Memory Quizzes than the Low-Sense-of-Control Group [M = 859.93, SD = 78.20; p = .006], but there were no other differences among the groups. Figure 3.8 shows each group's pre- and the post-test RTs on the Memory Quizzes.

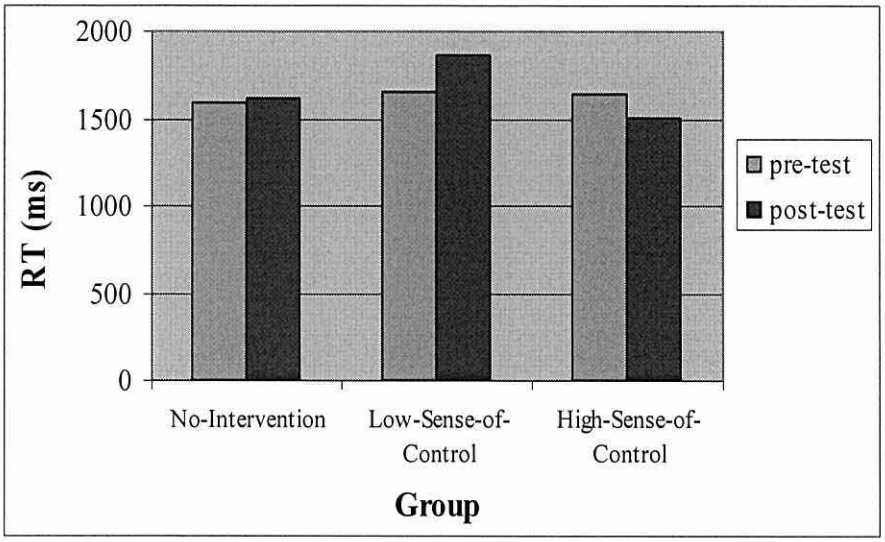

Figure 3.8. Mean reaction time of the three groups on the Memory Quizzes on the pre- and the post-tests.

(e) Response duration on Memory Quizzes. A one-way ANOVA was performed to determine whether the groups differed on Response Durations (RDs) while responding to the Memory Quizzes. The results showed that there was no difference among the groups [$F_{(2, 103)} = .15, p = .86$]. These results are shown in Figure 3.9.

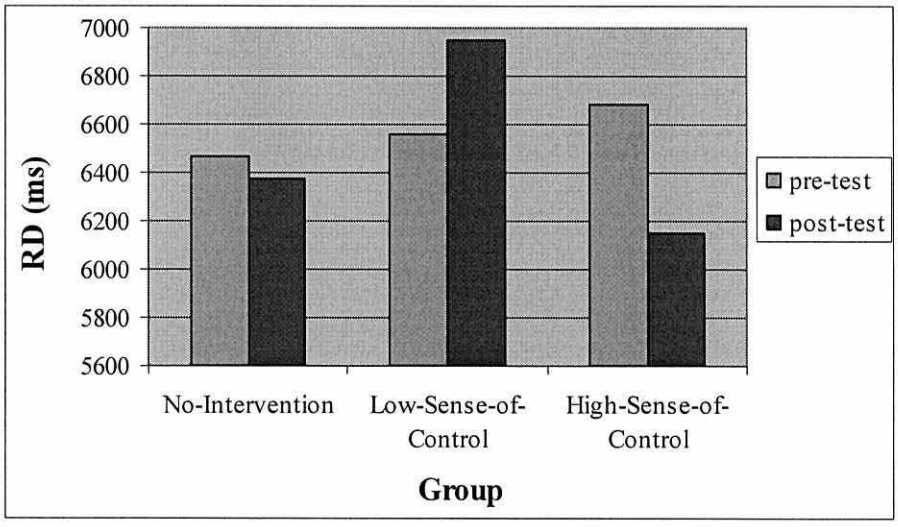

Figure 3.9. Mean response duration of the three groups on the Memory Quizzes on the pre- and post-tests.

To determine whether the groups differed from each other on post-test RDs, an ANCOVA using GLM was performed. In the model, Group was entered as the independent factor; RDs on the pre-test was the covariate; and post-test RDs was the dependent variable. There was a main effect for Group [$F_{(2, 102)} = 7.07, p < .001, \eta^2 =$

.12], after controlling for pre-test RDs [$F_{(1, 102)} = 75.28, p < .0001, \eta^2 = .43$]. Pairwise comparisons showed that the High-Sense-of-Control Group ($M = 6131.24$, $SD = 1123.14$) took less time ($p < .001$) to respond to the Memory Quizzes than the Low-Sense-of-Control Group ($M = 6973.14$, $SD = 1193.42$).

Alcohol-Related Measures

(a) Urges to Drink. Table 3.17 shows each group's means and standard deviations on Urges to Drink at the pre- and post-tests, separately for each group. A one-way ANOVA showed no difference among the groups on Urges to Drink at the pre-test [$F_{(2, 98)} = .68, p = .51$].

Table 3.17. Means and standard deviations of three groups on the pre- and post-tests Urges to Drink Questionnaire.

	Group					
	No-Intervention ($N = 33$)		Low-Sense-of-Control ($N = 34$)		High-Sense-of-Control ($N = 35$)	
Urges to Drink	*M*	*SD*	*M*	*SD*	*M*	*SD*
Pre-test	13.18	6.31	13.21	6.29	12.54	5.14
Post-test	13.00	6.46	19.12	9.33	10.60	4.01

To determine whether the groups differed from each other on the post-test Urge to Drink, an ANCOVA was conducted, in which post-test Urge to Drink were entered as the independent variable; Group was entered as the independent factor; and pre-test Urge to Drink scores was the covariate. The results showed that after controlling for pre-test Urges to Drink [$F_{(1, 97)} = 100.01, p < .0001, \eta^2 = .51$], there was a significant main effect for Group [$F_{(2, 97)} = 19.17, p < .0001, \eta^2 = .28$]. Pairwise comparisons revealed that the Low-Sense-of-Control Group was higher than the No-Intervention Group and the High-Sense-of-Control Group ($ps < .0001$); however, the latter two groups did not differ from each other ($p = .17$). Paired-sample *t*-tests were also conducted to test whether the groups' Urges to Drink changed from the pre- to the post-tests (see Figure 3.10). The results were as follows: (a) the Low-Sense-of-Control Group showed an increase [$t_{(32)} = -4.13, p < .0001, d = -.36$]; (b) the High-Sense-of-Control Group showed a reduction [$t_{(34)} = 3.05, p = .004, d = .27$]; and (c) the No-Intervention Group showed no change [$t_{(32)} = .27, p = .79, d = .02$].

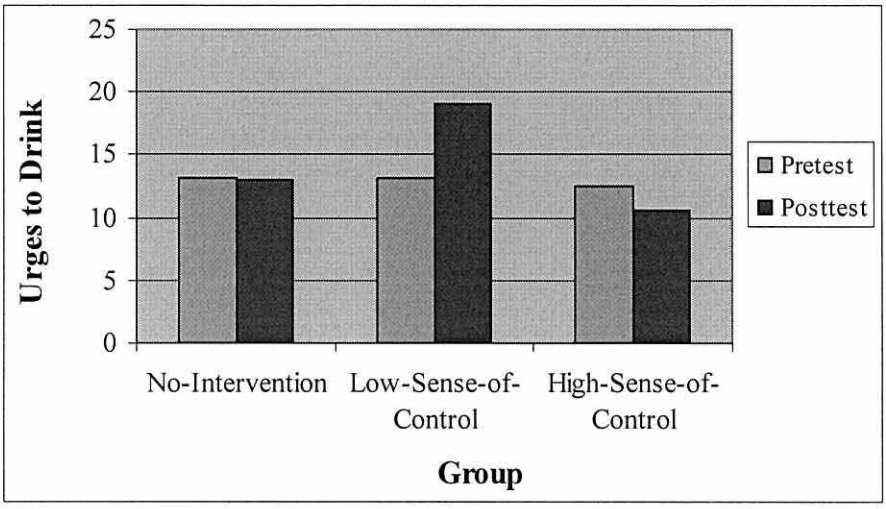

Figure 3.10. Mean Urges to Drink for the three groups on the pre-and post-tests.

(b) Alcohol-Stroop test. Table 3.18 shows the mean percentage of errors on alcohol-related and neutral stimuli on the alcohol Stroop test, separately for each group.

Table3.18. Mean percentage of errors on neutral and alcohol-related stimuli on the alcohol-Stroop test.

	Mean percentage of errors	
Group	Alcohol-Stimuli	Neutral-Stimuli
No-Intervention	2.62%	3.05%
Low-Sense-of-Control	3.19%	2.97%
High-Sense-of-Control	1.68%	1.77%

A one-way analysis of variance revealed that there was no difference among the three groups in the number of errors made across each category of words (i.e., alcohol and neutral) ($p > .05$). Further analysis of the errors was unnecessary because the number of errors was negligible. Table 3.19 shows the means and standard deviations of RTs to the neutral and alcohol-related stimuli and alcohol-interference scores, separately for each group. To identify whether there were differences among the groups' RTs on the alcohol-related and neutral stimuli, a one-way ANOVA was performed. There was a main effect for Group on the alcohol-related stimuli [$F_{(2, 98)} = 7.91, p = .001$], with the Low-Sense-of-Control Group taking longer to respond to these stimuli than the No-Intervention Group ($p < .011$) and the High-Sense-of-Control Group ($p < .001$). There was no main effect for Group on the neutral stimuli [$F_{(2, 98)} = 2.18, p = .12$].

Table3.19. Means and standard deviations of the RTs and interference scores of three groups on the alcohol-Stroop test.

RTs and Interference Scores	Group	*M*	*SD*
RTs to alcohol-related stimuli	No-Intervention	613.82	59.14
	Low-Sense-of-Control	659.09	74.47
	High-Sense-of-Control	602.08	50.76
RTs to neutral-stimuli	No-Intervention	610.90	65.19
	Low-Sense-of-Control	630.79	59.92
	High-Sense-of-Control	601.56	50.45
Alcohol-interference scores	No-Intervention	2.91	39.87
	Low-Sense-of-Control	28.29	40.62
	High-Sense-of-Control	.52	24.77

Alcohol-interference scores were calculated by subtracting each participant's mean RTs to the neutral stimuli from his or her mean RTs to the alcohol-related stimuli. To test whether the groups differed on the alcohol-interference scores, a one-way ANOVA was performed. The results showed a main effect for Group [$F_{(2, 98)} = 6.23, p < .003$]. Post hoc Tukey HSD tests showed that the Low-Sense-of-Control Group had larger alcohol-interference scores than the No-Intervention Group ($p < .013$) and the High-Sense-of-Control Group ($p < .005$); however, the latter two groups did not differ from each other ($p = .17$).

Summary of the Results Testing Each Hypothesis

Hypothesis One

The first hypothesis stated that experimental induction of high sense of control would increase participants' perceptions of control and their intrinsic motivation, but that induction of low sense of control would reduce perceptions of control and intrinsic motivation.

Although the results showed that there was no difference among the groups on pre-test Positive, Negative, and Overall Sense of Control, on post-test Overall and Positive Sense of Control, the groups were ordered from the highest to the lowest as follows: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group. In addition, on Negative Sense of Control, the groups were ordered from highest to lowest as follows: Low-Sense-of-Control Group > No-Intervention Group > High-Sense-of-Control Group.

In addition, within–group comparisons showed that, from the pre- to the post-test, the High-Sense-of-Control Group's Positive and Overall Sense of Control increased and their Negative Sense of Control decreased. Conversely, the Low-Sense-of-Control Group showed an increase in Negative Sense of Control but a decrease in Positive and Overall Sense of Control. No change occurred in the No-Intervention Group's Sense of Control from the pre- to the post-tests.

Therefore, Hypothesis One was supported. The experimental techniques succeeded in changing participants' sense of control and their intrinsic motivation.

Hypothesis Two

The second hypothesis stated that on the post-test, the groups would be ordered as follows on adaptive motivation from the most adaptive to the least adaptive: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group. In addition, increases from the pre-test to the post-test in sense of control and intrinsic motivation would be associated with increases in the participants' adaptive motivation.

Although the groups did not differ on pre-test adaptive motivation, on the post-test, the High-Sense-of-Control Group was higher on adaptive motivation than the No-Intervention and the Low-Sense-of-Control Groups; the latter group was the lowest of all. The results indicate that induced high and low sense of control was associated with changes in the groups' adaptive motivational structure in the predicted direction. Hence, the first part of the second hypothesis was supported. The results of the hierarchical regression analysis also confirmed the second part of Hypothesis Two: Sense of Control and Intrinsic Motivation were associated with increases from the pre-test to the post-test in participants' adaptive motivation, after age and gender had been controlled.

Hypothesis Three

The third hypothesis stated that on the post-test, participants' performance on the cognitive tasks (i.e., Memory Quizzes and Verbal Puzzles) would be ordered from the best to the poorest performance as: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group.

The results showed that on the pre-test the groups differed from one another neither on number of errors or on RTs to Verbal Puzzles and Memory Quizzes. However, on the post-test, the High-Sense-of-Control Group made fewer errors on both the Verbal Puzzles and the Memory Quizzes than the No-Intervention Group and the Low-Sense-of-Control Group. On examining RTs (i.e., response initiation times) on the Verbal Puzzles,

the three groups did not differ from one another except on Question 4 (maths problems), on which the Low-Sense-of-Control Group had slower RTs than the other two groups. On the Memory Quizzes, participants in the High-Sense-of-Control Group had faster RTs and shorter RDs than the Low-Sense-of-Control Group. Therefore, the third hypothesis was largely supported.

Hypothesis Four

The fourth hypothesis stated that after the experimental induction, participants' urges to drink and alcohol attentional bias would be ordered from the largest to the smallest as follows: the Low-Sense-of-Control Group >the No-Intervention Group > the High-Sense-of-Control Group.

From the pre- to the post-tests, the High-Sense-of-Control Group showed a reduction in Urges to Drink, and the Low-Sense-of-Control Group showed an increase in Urges to Drink. The No-Intervention Group was the only group whose Urges to Drink did not change from the pre- to the post-test. On post-test Urges to Drink, the groups were ordered as hypothesised: the Low-Sense-of-Control Group > the No-Intervention Group = the High-Sense-of-Control Group.

It should be noted that the effects of the experimental induction just described might have been due to positive affect or negative affect associated with a high or a low sense of control. That is, negative affect associated with a low sense of control might have caused participants in the Low-Sense-of-Control Group to want to drink in an attempt to cope with their negative affect. On the other hand, an increase in the positive affect of participants in the High-Sense-of-Control Group may have reduced their need to drink.

It is also noteworthy that the urges to drink results are consistent with the alcohol-attentional bias results. That is, on the post-test test, the Low-Sense-of-Control Group showed greater alcohol-attentional bias than the other two groups.

To summarize, the current study aimed to determine whether experimental techniques designed to change participants' sense of control affected their sense of control, intrinsic motivation, adaptive motivational structure, cognitive performance, and explicit and implicit urges to drink. The main results were as follows:

(a) The experimental techniques that were used to change participants' goal-related success led to predicted changes in their perceptions of control and intrinsic motivation. After the experimental inductions, the order of the groups on sense of control and intrinsic motivation was as follows: High-Sense-of-Control Group > No-Intervention

Group > Low-Sense-of-Control Group.

(b) On the post-test, the groups were ordered on task-specific adaptive motivational structure as follows: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group. In addition, sense of control and intrinsic motivation were positively associated with adaptive motivation.

(c) On the post-test, the participants were ordered with respect to their performance on the cognitive tasks (i.e., errors on the Memory Quizzes and the Verbal Puzzles) as follows: High-Sense-of-Control Group > No-Intervention Group > Low-Sense-of-Control Group. However, on RTs on the Memory Quizzes and Verbal Puzzles, the High-Sense-of-Control Group was faster than the Low-Sense-of-Control Group and the No-Intervention Groups, and there was no difference between the latter two groups.

(d) After the experimental induction, participants' urges to drink and alcohol attentional bias (i.e., interference on the alcohol-Stroop test) were ordered from the greatest to least as follows: Low-Sense-of-Control Group > No-Intervention Group > High-Sense-of-Control Group.

In conclusion, the results confirmed the effectiveness of the manipulation techniques for changing participants' sense of control, intrinsic motivation, and adaptive motivational structure in the predicted direction and for influencing various other dependent measures.

Subsidiary Results

The TSPCI was used to measure participants' motivational structure in their anticipation of their performance on (a) Verbal Puzzles (e.g., anagrams); (b) Mathematical Puzzles (e.g., calculations); and (c) Concept Formation (e.g., Concept-Identification Cards). Although participants' motivation to perform was manipulated only for Verbal Puzzles and Concept Formation, the groups changed from the pre- to post-tests on all three of the tasks. As stated earlier, perceived control in one situation can generalize to other situations, especially when the circumstances in the two situations are similar (Hiroto & Seligman, 1975; Ramirez et al., 1992); this is termed "cross-modal helplessness." Several studies (e.g., Goodies, 2003; Zeldow & Makoul, 2006) have shown that people are more willing to take risks in new situations if they have already experienced success in similar situations.

Increases in interest, perceived choice, and competence, along with reductions in feelings of pressure, were specific to the High-Sense-of Control Group, who showed

improvement on sense of control from the pre to the post-test. This finding supports the prior literature, which shows that increases in intrinsic motivation (Shields, 1997), reductions in perceived pressure, and increases in perceived choice (e.g., Eads et al., 2000; Miller & Iris, 2002) and perceived competence (e.g., Boggiano, 1998) lead to increases in sense of control.

Discussion

A key finding of the current study was that high and low sense of control was successfully induced using a combination of tasks and manipulation that had not previously been used. The main assumption underlying the study was that feelings of success would enhance sense of control and intrinsic motivation. Therefore, it was necessary to use strategies to help participants in the High-Sense-of-Control Group to complete their tasks successfully. Participants in the High-Sense-of-Control Group were provided with an opportunity to select the task that they would perform first (they were given a choice); received relevant information about how to perform the tasks (Corah & Boffa, 1970; Eads et al., 2000; Miller & Iris, 2002; Ryan et al., 1991; Skinner, 1996; Tsigilis & Theodosiou, 2003); were given feedback about their performance (Elliot et al., 2000; Goudas et al., 2000; Slavin, 1991): and were asked to set goals that were achievable (Bandura, 1983; Gauggel et al., 2002).

The effects of the four manipulation techniques (i.e., choice, knowledge, feedback, and goal-setting) on increasing sense of control in the High-Sense-of-Control Group supports earlier findings that (a) providing individuals with a chance to choose their tasks increases their sense of control and intrinsic motivation for and commitment to the tasks (e.g., Surrette & Harlow, 1992); (b) providing individuals with sufficient information about tasks that they will perform increases their ability to complete the tasks successfully (e.g., Baldwin, 1992; Harmon, Hedrick, & Wood, 2005); (c) giving them contingent and immediate feedback on their performance increases their interest in and enjoyment from working on the tasks (e.g., Gauggel et al., 2002); and (d) encouraging them to set goals enhances their motivation and performance (e.g., Hwang, Echols, & Vrongistinos, 2002; Locke & Latham, 1990; Young, 2005). Additionally, one reason why participants in the High-Sense-of-Control Group completed the tasks more successfully than those in the other groups could be that the manipulation techniques reinforced their task-related self-efficacy (Bandura, 1994). Prior evidence has shown that there is a direct relationship between self-efficacy and sense of control (Lachman &

Prenda, 2004; Zimmerman, Sprecher, Langer, & Holloway, 1995). Bouffard, Bouchard, Goulet, Denoncourt, and Couture (2005) showed that self-efficacy increases participants' task involvement and their success in achieving their goals; it also increases their positive beliefs about themselves.

The High-Sense-of-Control Group also showed greater intrinsic motivation than the other two groups. These results support those of several earlier studies indicating that people with a strong sense of control feel more enthusiastic about their tasks, more committed to pursuing their goals, and more optimistic about achieving them—all of which fuel feelings of hopefulness and success (Henkel et al., 2002; Lachman & Weaver, 1998; Sharpe & Bryant, 1998; Wortman et al., 1992). Logan et al. (1993) suggested that intrinsic motivation for performing a task boosts individuals' sense of control over completion of the task. They reported that champion spellers showed a strong sense of control over their own learning when they were intrinsically motivated. Intrinsic goals are inherently rewarding to pursue and directly satisfy innate psychological needs, such as competence and autonomy (Deci & Ryan, 2000; Kasser & Ryan, 1996).

Conversely, not using information enhancement (i.e., choice, specific information, supportive feedback) and goal setting might have reduced expected chances of success in the Low-Sense-of-Control Group. Moreover, this group neither were encouraged after giving correct answers nor were given negative comments after making errors; this lack of feedback added to their sense of failure, which was further exacerbated by the time pressure that had been set. This group was the lowest of all the groups on post-experimental perceived competence, intrinsic motivation, and sense of control. This finding is consistent with those of prior studies showing that poor problem solving is associated with low sense of control (Charles & Lester, 1984; McQuillan & Rodriguez, 2000; Secrest & Thomas, 1999).

The techniques used in the current study are among those recommended for enhancing sense of control and intrinsic motivation in classroom settings (Ames, 1992b; Dev, 1997); helping people to cope with chronic illnesses (Miles et al., 1995; Warner, 1992); and treating psychological disorders, such as depression (Chou, 2005; Pierce, 2005), anxiety (Hasson-Ohayon et al., 2006), severe distress (Kim-Goh, Suh, Blake, & Hiley-Young, 1995), and post-traumatic stress disorder (PTSD; Livanou et al., 2002). It would also be interesting to determine whether the positive consequences of increasing people's sense of control and intrinsic motivation in educational and clinical settings are mediated by individuals' motivational structure.

Another interesting finding of the current study was that post-experimentally the

groups differed from one another on the cognitive tasks (i.e., Verbal and Memory tasks). These tasks measured accuracy and speed of problem solving and retrieval of material from short-term memory; hence, they are considered to be measures of executive cognitive functioning (ECF—Mintzer & Stitzer, 2002). ECF plays a decisive role in planning, decision-making and motivation (Noel et al., 2001; 2002).

The High-Sense-of-Control Group made fewer errors on the post-test Verbal and Memory tasks than the other groups, after their performance on the pre-test had been controlled. This result supports the results of several other studies, which showed that improvement in participants' sense of control (Lachman & Andreoletti, 2004; Lachman& Weaver, 1998; Miller & Gagne, 2006; Miller & Lachman, 2000; Pearman & Lachman, 2004) and intrinsic motivation (e.g., Ryan, Deci, Grolnick, & La Guardia, 2006) resulted in improvement in their cognitive performance. There is also evidence that successful performance leads to improvements in ECF, as measured by memory retrieval (e.g., Lachman, 2005; Lawton-Craddock, Nixon, & Tivis, 2003; West & Thorn, 2001; West, Thorn, & Bagwell, 2003).

On RT on the post-test Verbal Puzzles (i.e., the time that elapsed between hearing the signal and responding), the three groups did not differ from one another, except on Question 4, which measured their ability to solve the maths problem. The Low-Sense-of-Control Group had longer RTs than the other two groups. This is consistent with Miller and Gagne's (2006) finding that improvements in participants' sense of control were associated with increases in their speed of reading difficult sentences.

The Low-Sense-of-Control Group had longer RTs and longer RDs on the Memory Quizzes on the Cognitive Performance tasks than the No-Intervention Group. On average, the High-Sense-of-Control Group performed faster on the Memory Quizzes and the Low-Sense-of-Control Group performed slower than the No-Intervention Group. These results support those of several other studies (e.g., Elliott et al., 1996; Kennelly, Hayslip, & Richardson, 1985) that reported that frequent failures on experimental tasks impaired participants' performance on a variety of ECF tasks, including problem solving and retrieval from short-term memory. Similarly, Skinner (1995) reported that feelings of helplessness adversely affected people's cognitive performance and their quality of life because it reduced their motivation (e.g., effort, interest, feelings of competence) and increased their negative emotions (e.g., feeling pressured and anxious).

The relationship between sense of control and cognitive performance is reciprocal. That is, negative experiences that cause a low sense of control adversely affect individuals' cognitive performance, which, in turn, further reduces their sense of

control (Bandura, 1997; Miller & Lachman, 2000). Of clinical interest, Reivich, Gillham, Chaplin, and Seligman (2005) suggested that promoting accurate cognitive performance and problem-solving skills can help individuals to prevent or overcome feelings of low sense of control and depression.

One of the important finding in the current study was that participants in the High-Sense-of-Control Group showed greater improvement on task-specific motivational structure than the other two groups. This specific result has not previously been reported; however, it indirectly supports Williams, Burden, and Al-Baharna's (2001) finding that students' sense of control over and self-confidence in reaching their goals affected their motivation.

Although there are many factors that affect individuals' goal-strivings (e.g., choices that they have, their feelings of competence), their sense of control plays a central role (Bandura, 1997). People who believe that they are in control are more likely to engage in adaptive behaviours (e.g., Lachman & Firth, 2004) and are more likely to achieve their desired outcomes (Lachman, 2005). Therefore, there are motivational similarities between people who are high on sense of control and intrinsic motivation and those with an adaptive motivational structure. Similarly, people who are low on sense of control and intrinsic motivation share many motivational features with those who have a maladaptive motivational structure. For example, both kinds of people have fewer positive goals that they strive for, little hope of achieving their goals, and little commitment to pursue them

It should also be noted that the groups differed from one another on six of the post-test TSPCI indices, after the pre-test TSPCI indices had been controlled. These indices were *control over completing the tasks*, *knowing what to do, chances of success if try*, *Sorrow anticipated of failure, commitment*, and *joy if succeed.* On all these indices, the High-Sense-of-Control Group scored higher than the other two groups. Interestingly, Klinger et al. (2007) concluded that high scores on commitment, anticipated joy from success, anticipated sorrow from failure, and expected chances of success have been most characteristic of adaptive motivational structure. Among other factors, commitment to goals is particularly important because it fosters developing concrete plans for reaching goals (Sheeran, Webb, & Gollwitzer, 2005), and it also facilitates goal-related cognitive processes (e.g., attention, memory, and thoughts; Klinger & Cox, 2004a).

One reason why motivation improved the High-Sense-of-Control Group could be that, unlike the other two groups, this group felt *stronger involvement* in their tasks. Their greater task involvement could have resulted from the fact that they had an opportunity to

choose their first task, received specific information, received contingent and immediate feedback, and were encouraged to set goals. When people have an opportunity to select their goals, they show more interest in (Thomas, 2000) and greater commitment to their goals (Earley & Kanfer, 1985), and they tend to work harder to achieve them (Slavin, 1991).

Relevant information helps people to complete their tasks more successfully than other people, and it increases their joy from succeeding (Sansone et al., 1989). Specific information increases people's involvement with their tasks (Tsigilis & Theodosiou, 2003) and their confidence towards pursuing them. Goodie (2003) found that being highly confident in one's knowledge increases the persons' tendency to take risks. In addition, contingent and immediate feedback help people to evaluate their performance more accurately.

West et al. (2001) showed that participants who received immediate and contingent feedback took steps that were more accurate and continued to work harder on their tasks—regardless of their increasing level of difficulty—than those who were left unsure about the accuracy of their performance. Contingent and immediate feedback helps participants better evaluate their performance while pursuing their goals.

In addition, Goal setting improves people's concentration on their tasks and encourages them to do their best. It helps people make a plan about the necessary steps that they should take towards achieving a goal. By goal setting, people can measure their progress towards their goal, and feel moving forward and making progress in what might have previously seemed a long, useless struggle. It helps them enjoy from achieving their goals in a systematic way. In addition, goal setting—especially if it is associated with specific and difficult tasks—increases people's interest in the goal and can lead to immediate and ongoing feelings of self-confidence (Gauggel & Hoop, 2004). In summary, appropriate goal setting helps people to (a) recognize their ability in achieving their goals (Elliot & Harackiewicz, 1996; Gauggel et al., 2002); (b) enhances the salience and value of their performance; (c) encourages challenge; and (d) promotes their task involvement and competence.

On the other hand, compared to the other groups, the Low-Sense-of-Control Group was higher on implicit and explicit measures of the urges to drink alcohol at the post-test. The reason for this could be that the Low-Sense-of-Control Group experienced stronger negative emotions because of the reductions in their sense of control (i.e., negative sense of control) than the other two groups. Their negative emotions perhaps increased their urges to drink because they believed that alcohol would reduce their

negative affect. This interpretation is consistent with the motivational model of alcohol use (Cox & Klinger, 1988, 2004b), which holds that decisions to drink are more likely when individuals are unable to overcome miseries and frustrations in their lives. The Low-Sense-of-Control Groups' greater alcohol attentional bias than that of the other two groups is consistent with Cox et al's (2006) interpretation of the source of interference on the addiction Stroop test. The authors suggest that it takes longer for people to colour-name words that are related to their current concerns, such as drinking alcohol. The current study was the first one to show that manipulations that increased the urges to drink were accompanied by in increase in an implicit measure of the desire to drink (i.e., alcohol attentional bias). This supports the "current-concerns" account of alcohol attentional bias (Cox et al., 2006).

The Low-Sense-of-Control Group also showed less adaptive motivation in the post-test than the other two groups. Prior evidence (e.g., Cox et al., 2002; Man et al., 1998) has shown that participants with less adaptive motivation are likely to consume more alcohol than those with a more adaptive motivational structure. Motivational characteristics such as having a low sense of control, little hope for success, and little expected happiness if successful (but greater expected sadness if unsuccessful) and long expected distance from goals might contribute to a person's negative mood; people tend to consume alcohol when they experience negative feelings. The increase in the Low-Sense-of-Control Group's Urges to Drink from the pre- to post-test supports the idea that the risk of developing alcohol problems increases because of individuals' negative experiences (e.g., Edwards, Dunham, Ries, & Barnett, 2006). For example, the risk of developing alcohol abuse increases when people lack a feeling of control over their work (Hemmingsson & Lundberg, 2001).

A low sense of control not only contributes to drinking problems but also is at the core of the problem. Although alcohol abuse has been defined from various viewpoints—behavioural (Roberts & Koob, 1997), cognitive (Tiffany, 1990), and biological (Milam, 1992)—researchers agree that it reflects a lack of perceived control (e.g., McCusker, 2001; Robinson & Berridge, 2001, 2003; Tiffany & Conklin, 2000; West, 2001). Individuals' desire to drink might increase when they experience negative emotional states (Rohsenow & Monti, 1999), such as anxiety (Morris, Stewart, Ham, 2005), depression (Crum, Storr, & Chan, 2005), and a sense of helplessness (Cooney et al., 1997; Fouquereau, Fernandez, Mullet, & Sorum, 2003; Greeley, Swift, & Heather, 1992). As discussed earlier, learned helplessness is a negative emotional and motivational state, which can lead to an increased desire to drink. In addition, negative mood sates such as

depression or stress increase recovering alcohol abusers' risk of relapse (Litman, Stapleton, Oppenheim, Peleg, & Jackson, 1983; Marlatt & Gordon, 1980; Pickens, Hatsukami, Spicer, & Svikis, 1985).

As discussed in the literature review, the motivational model of alcohol use (Cox & Klinger, 1988, 1990, 2004b) acknowledges the role of various factors, including social, psychological, cultural, and personality, but it asserts that their impact on decisions to drink can be summarized into the term *motivation*. Therefore, the person himself/herself makes decisions to drink or not to do so. Decisions to consume alcohol are less likely to the extent that the person obtains satisfaction from his/her goal pursuits. The model holds that obtaining enduring happiness, which usually come form pursing and reaching important goals, is often in conflict with decisions to drink alcohol.

According to the model, individuals are more likely to decide to drink alcohol when they cannot achieve emotional satisfaction through other goal pursuits or to overcome their frustrations. Therefore, drinking alcohol might become a way to increase their positive feelings or to reduce their negative feelings (e.g., Hussong et al., 2001). In fact, excessive drinkers who are able to find alternative sources of enjoyment are more likely to change their drinking behaviour.

Alcohol abusers might not succeed in gaining control over their behaviour, if they lack necessary skills to cope with their miseries (Moos et al., 1990). People tend to crave alcohol more when they have little control over a situation than when they feel that they are in control. Some researchers have reported that among excessive drinkers who enter treatment, as many as 70% relapse within three months of completing their programme (e.g., Whitworth et al., 1996), indicating their *lack of control* over their drinking (Lyvers, 2000b). The lack of perceived control might fuel abusive drinking, leading to a persistent preoccupation with drinking alcohol (McCusker, 2001; Roberts & Koob, 1997). Drinking alcohol could become a dominant concern of people who feel that they lack control. For example, relapse is more likely to occur if recovering alcohol abusers are unable to cope with their problems, such as those related to employment, finances, and interpersonal relationships (Vuchinich & Tucker, 1996).

In summary, having a poor sense of control over one's life has been shown to be associated with feelings of depression, anxiety, and alcohol abuse (e.g., Henkel et al., 2002; Korolenko & Kensin, 2001). The negative affect resulting from poor sense of control and a feeling of helplessness might increase the motivation to drink both implicitly and explicitly (Cooney et al., 1997; Wiers et al., 2002). According to many researchers, excessive drinking can be explained as a *disorder of motivation* (e.g.,

Bigelow, Brooner, & Silverman, 1998; Cooper et al., 1995; Cox et al., 2006; Cox & Klinger, 1988, 1990; Monti et al., 2000; West, 2001), with drinkers' problems with self-control at the core of the disorder (Lyvers, 2000b; Skutle & Berg, 1987).

To conclude, this study indicated that helping participants to increase their sense of control and intrinsic motivation (by increasing their ability to solve tasks successfully) led to increases in their task-specific motivational structure and reductions in urges to drink.

Limitations of the Current Study and Implications for Further Research

In the current study, participants were university students whose age ranged from 18 to 25years. It has been reported that the use of alcohol to cope with negative emotions is more likely to occur in early adulthood than among older adults (Tyssen, Vaglum, Aasland, Gronvold, & Ekeberg, 1998). In addition, Lachman and Weaver (1998) found that sense of control is age-related, with younger participants reporting greater feelings of being in control than older ones. Additionally, Klinger et al. (2007) reported that motivational structure varies with age. For example, older participants name fewer goals than younger participants do, and they report less expected sorrow if they fail and less expected optimism about succeeding in their goal pursuits. He also concluded that adaptive motivation tends to be lowest at about age 40.

Therefore, one limitation of the current study is that its results might not be generalizable to older adults. Young people's sense of control could be easier than older people's because of a few experiences of success or failure. Because the initial analyses in the current study showed that age was unrelated to the other variables measured, age was not considered further. However, the lack of an effect for age could be due to the homogenous age range of the participants. Future studies might be conducted to determine whether the same experimental techniques are effective with other age groups.

People's sense of control develops through repeated successful or unsuccessful attempts across time to control the outcome of events. Although the temporarily induced high or low sense of control in the laboratory affected participants' motivational structure and their urges to drink, the stability and globality (two of the elements in learned helplessness theory) of these changes outside the laboratory remain unknown and requires longitudinal studies to answer. Clearly, studies that decrease people's sense of control and which would have enduring effects outside the laboratory would be unethical to conduct.

Another limitation of the current study is that it was restricted to healthy university students, a group that has been shown to have a more adaptive motivational structure than problem drinkers (Man et al., 1998). Therefore, one might question whether the same results would be replicable with problem drinkers. Problem drinkers or other people with a maladaptive motivational structure might respond differently to the experimental techniques used in the present study or and to changes in their sense of control that might occur naturally outside the laboratory. Questions such as the following await future investigation: How does sense of control influence problem drinking and alter drinking treatment outcomes? Is enhancing sense of control a cost-effective way to change unhealthy drinking patterns?

Conclusions

The current study assessed relationships among sense of control, intrinsic motivation, motivational structure, and urges to drink alcohol. The experimental techniques for manipulating sense of control and intrinsic motivation—and in turn, motivational structure and urges to drink—were based on principles identified in prior research; these techniques were used in a novel combination under experimental conditions. The techniques (i.e., choice, knowledge, feedback, and goal setting) were successfully used to induce a high- or a low-sense of control. Compared to the High-Sense-of-Control Group, participants in the Low-Sense-of-Control Group showed (a) lower intrinsic motivation, (b) poorer cognitive performance, (c) less adaptive motivation, (d) stronger self-reported urges to drink, and (d) greater attentional bias for alcohol-related stimuli.

This study was the first to demonstrate that sense of control, intrinsic motivation, and motivational structure affect urges to drink both explicitly and implicitly. The results showed that manipulations to enhance sense of control and intrinsic motivation changed participants' motivational structure, and that change influenced their urges to drink.

One implication of these findings is that increasing excessive drinkers' sense of control and their intrinsic motivation might help them to counteract negative feelings that underlie their desire to drink and actual drinking. The results also support the notion that improvements in people's motivation can reduce the chances that they will make decisions to drink alcohol (Cox et al., 2000; 2002; Cox & Klinger, 2002; 2004b). The next chapter compares the effectiveness of two types of manipulations (i.e., information enhancement and goal setting) for increasing participants' sense of control, intrinsic motivation, and adaptive motivation.

CHAPTER FOUR

Increasing Adaptive Motivation through Information Enhancement and Goal Setting

The results of the previous study (Chapter Three) showed that the experimental manipulation was effective in changing the participants' sense of control. Participants in the High-Sense-of-Control Group showed a larger increase in sense of control from the pre- to the post-test than participants in either the No-Intervention or the Low-Sense-of-Control Groups. It was assumed that the motivational techniques enabled the High-Sense-of-Control Group to complete the tasks (i.e., Concept-Identification Cards and anagrams) with a greater feeling of success and joy than participants in the other two groups. It was also assumed that the experience of success and joy were caused by the High-Sense-of-Control Group's increase in sense of control and intrinsic motivation. The results also showed that increases in participants' sense of control and intrinsic motivation were associated with increases in their adaptive motivational structure, which, in turn, was associated with reductions in their explicit and implicit urges to drink. To increase sense of control, two types of intervention techniques were used. These were information enhancement and goal setting. However, it was not clear which of the techniques was more effective in enhancing sense of control and intrinsic motivation. Therefore, the current study used a 2 X 2 design to test the effectiveness of the two types of interventions individually and in combination in improving sense of control and intrinsic motivation. Next, the durability of the induced sense of control and intrinsic motivation was tested over a 45-day period.

Research Hypotheses

It was hypothesised that after the experimental induction, the expected effects of the experimental manipulations on sense of control, intrinsic motivation, and task-specific motivational structure would be ordered from the highest to the lowest as follows: Combination Group (i.e., combined intervention of information enhancement and goal setting) > Information Group > Goal-Setting Group > No-Intervention Group.

Method

Power Analysis and Participants

A power analysis was conducted to determine the sample size needed. It was planned that ANCOVA and MANCOVA would be used to test the hypothesis. A medium effect size ($f = .30$) was calculated based on the results of Study Two and was deemed suitable to be used in the present power analysis. Using the G*Power programme (Erdfelder et al., 1996), with an expected effect size of $f = .30$ and four groups of participants, a sample size of 144 (i.e., 36 participants in each group) was calculated.

One hundred and forty-four psychology students (male = 33.3 %, males' mean age = 21, $SD = 4.75$; females' mean age = 19.68, $SD = 3.96$) were recruited through the Student Participant Panel of the School of Psychology, University of Wales, Bangor. Each participant was randomly assigned to one four groups until each group had 36 participants. Participants received course and print credits for their participation. The inclusion criteria were as follows: (a) being a native speaker of English or a true bilingual speaker of English; (b) not having participated in the previous experiment (i.e., Study Two), and (c) not being dyslexic.

Instruments

Similar to the previous study (see Chapter Three), two types of instruments were used. The first type included the questionnaires that were administered in Study Two and which were used to measure changes in participants' motivational structure, intrinsic motivation, and sense of control as a result of the experimental manipulation. Except for the Task-Specific Intrinsic Motivation Inventory (TSIMI; which was given only at the post-test), all the tests were given at baseline (pre-test) and again post-experimentally (post-test). These questionnaires are described in detail in Study Two (see Chapter Three). The second type of instrument included the materials that the experimenter used in Study Two to induce sense of control in the experimental groups.

Procedure

All participants were seen individually in one of the School of Psychology's experimental rooms. The background noise in the experimental room was minimal. The room was equipped with a PC and a 17-inch colour monitor. Prior to distributing the study pack, the experimenter briefly explained the goal of the study to the participant. Participants were then asked to study the Information Sheet and sign the Consent Form if

they wanted to proceed with the experiment. In the Information Sheet, they were also informed that they might be asked to attend a 45-day follow-up session to complete data collection for the current study. Next, the participants began the baseline assessment (pre-test) by completing the (a) Demographic Information Sheet, (b) TSPCI, and (c) TSSCI. Upon completion of the experiment, the post-experimental assessment (post-test) measures were administered; the pack contained all measures that were administered at baseline, as well as the TSIMI. Table 4.1 shows the sequence in which the questionnaires were administered during the pre- and the post-experimental assessments.

Table 4.1. Order of the questionnaires and tests administered at the baseline and post-experimental assessments.

Sequence	Baseline	Post-experimental
1	TSPCI	TSPCI
2	TSSCI	TSSCI
3	----------	TSIMI

Note: TSPCI = Task-Specific Personal Concern Inventory; TSSCI = Task-Specific Sense of Control; TSIMI = Task-Specific Intrinsic Motivation Inventory.

The procedures for administering the Concept-Identification Cards and anagrams in the four groups were as follows:

(a) *No-Intervention Group.* The procedure followed for the No-Intervention Group was the same as in Study Two. That is, participants did not receive the information enhancement, and they were not given a specific goal for completing the tasks.

(b) *Goal-Setting Group.* Participants in the Goal-Setting Group did not receive the information enhancement for completing the tasks, but they received two additional sets of anagrams and Concept-Identification Cards as goal setting trials to help them to improve their performance after they had completed the five experimental sets. Participants were asked to complete the two additional sets as accurately as possible but 20% faster than the average time that they had taken on Set Four and Set Five. For example, if the participant, on average, took 37 seconds to answer Set Four and 35 seconds to answer Set Five (mean = 36 sec), he/she was encouraged to find the correct answers for each of the additional sets in 30 seconds.

(c) *Information Group.* Participants in the Information Group were provided with information enhancement. That is, they were told, "practice on these tasks could have important consequences for your future learning, and the tasks could benefit you. Other participants have enjoyed doing these tasks, and I hope you will enjoy them too."

Participants were also provided with key information about how to solve the tasks (see Study Two). They also were given the opportunity to choose the order in which they completed the tasks, and they received information on the importance of exercising emotional control while completing the tasks. They were told, "Relaxation has a vital role in doing well. If you are not calm, you cannot concentrate on your tasks. Whenever you feel you have no control over performing a task, just leave it." Moreover, while completing the tasks, participants received supportive, contingent feedback on their performance. Participants received *within-sets*, *across-sets*, and *overall* feedback that was contingent on their actual performance. However, the focus was on highlighting the participant's success. If a participant made a mistake, the experimenter said, "If you try, you will get it right next time." If a participant gave the right answer, the experimenter said, "That is absolutely right!"; "You did well!"; or "Well done!"

In addition to the general information presented to all participants regardless of their group membership (see Study Two), they were given helpful clues about how to solve the anagrams, such as, "Bear in mind that there might be a specific pattern or order of the letters that applies to all the anagrams in each set. If you can find the pattern or the specific order, then you should be able to solve all of the scrambled words in the set."

In addition to the general instructions given to all participants about the Concept-Identification Cards (see Study Two), participants in this group were provided with some additional information. It was a clue about how to look for similarity across five pairs of cards. They were shown a table in which the five dimensions were divided into *three categories.* It was explained to them that the first category was about figures; it combined *shape*, *size*, and *surface* of the shape. The second category showed the *size of the letter*, and the third category showed the *position of the line*. Participants in this group also received an extra warm-up trial over what the other groups received.

(d) *Combination Group.* Participants in the Combination Group received both information enhancement and goal setting, as described above. The procedure for administering the tasks (i.e., Concept-Identification Cards and anagrams) was the same as for the High-Sense-of-Control Group in Study Two.

Results

Participants and their Demographic Characteristics

One hundred and forty-four participants (33.3% male) were randomly assigned to the No-Intervention Group (38.9% males), the Goal-Setting Group (33.3% males), the Information Group (30.6% males), and the Combination Group (30.6% males). The number of males and females in the four groups is shown in Table 4.2.

Table 4.2. Sample size and gender composition in each of the groups.

	Gender	
Group	Males	Females
No-Intervention	14	22
Goal-Setting	12	24
Information	11	25
Combination	11	25
Total	48	96

The nationality of participants was as follows: There were 114 British participants (No-Intervention Group = 23.67%, Goal-Setting Group = 25.44%, Information Group = 27.19% and Combination Group = 23.67), and 30 Welsh or Irish participants (No-Intervention Group = 30%, Goal-Setting Group = 23.33%, Information Group = 16.67% and Combination Group = 30%). On the Participant's Demographic Information Sheet, participants were asked to rate their proficiency in reading English on a continuum as follows: *weak* (1), *medium* (2), *good* (3), *as native speaker* (4), *native speaker* (5). Participants' mean rating of their proficiency in reading English was 4.8.

Participants' mean age and mean years of university education completed are shown in Table 4.3. One-way ANOVAs showed that there were no significant differences among the groups on age [$F_{(3, 140)} = .94, p = .42$], or years of university education [$F_{(3, 140)} = .58, p = .63$]. A Kruskal-Wallace non-parametric test was conducted to test whether the group differed from one another on gender. The results showed that the groups did not differ, $X^2 (3) = .75, p = .86$.

Table 4.3. Means and standard deviations of age and years of university education of males and females in four groups.

		Group							
		No-Intervention		Goal-Setting		Information		Combination	
Gender		*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Males	Age	21.43	4.16	21.13	3.36	21.55	3.19	20.73	2.87
	Education	1.71	0.73	1.75	0.71	2.00	0.77	1.73	0.79
Females	Age	19.73	1.72	18.89	1.70	20.28	3.84	19.72	1.95
	Education	1.82	0.73	1.71	0.71	1.92	0.86	1.88	0.73

Scoring the Measures

Factor Analysis of the Task-Specific PCI (TSPCI)

As mentioned, on the TSPCI, the participants provided ratings on all three tasks (i.e., anagrams, Concept-Identification Cards, and maths) on the pre- and the post-tests. As with Study Two, after completing the pre-test TSPCI, participants received the anagrams and the Concept-Identification Cards to complete, but they did not receive the mathematics task. Therefore, the means of the TSPCI rating scales were calculated for the anagrams and the Concept-Identification Cards (TSPCI-AC) for use in a PCA. The TSPCI rating scales for the maths tasks (TSPCI-M) were used in a separate PCA. First, to determine whether the pre-test TSPCI-AC rating scales shared a common variance, the matrix of correlations among the rating scales was examined. It showed that 69% of the scales were significantly correlated with each other. This suggested that many of the rating scales shared a common factor. Bartlett's test of sphericity, a measure of the degree to which a variable is related to itself but not to other variables, reached statistical significance [$X^2_{(55)} = 485.64, p < .0001$]. In addition, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy resulted in a higher value (i.e., .79) than the recommended value of .60 (Kaiser, 1974). The results of the two tests supported the factorability of the correlation matrix. Based on the guidelines discussed in Chapter Two, participants' scores on the TSPCI were subjected to PCA. Using PCA, a two-factor solution was selected to summarise the TSPCI data, based on the results of the Screen plot and interpretability of the factor loadings. The PCA showed that Factor 1 (the first PCA component) and Factor 2 (the second PCA component) explained 33.93% and 16.69% of the variance, respectively; together they accounted for 50.62% of the variance. The pattern of loadings showed that Factor 1 could be interpreted as adaptive motivation and Factor 2 as maladaptive motivation. The patterns of the factor loadings were very similar to those reported in the previous chapters (see Chapter 2 and Chapter 3); hence, a detailed

description of the loadings distinguishing the two factors seems unnecessary here.

Second, a correlational matrix of the post-test TSPCI-AC rating scales revealed that 82% of the scales were significantly correlated with each other, again suggesting that many of the rating scales measured a common factor. In addition, a Bartlett's test [$X^2_{(55)} = 583.68, p < .0001$] and the KMO measure of sampling adequacy resulted in a higher value (i.e., .82) than the recommended value of .60 (Kaiser, 1974)—indicating that a factor analysis of the post-test TSPCI data was appropriate. From a PCA, two factors were extracted: Factor 1 and Factor 2 explained 39.66% and 14.40% of the variance, respectively; together they accounted for 54.06% of the variance. Based on the factor loadings, Factor 1 was interpreted as measuring adaptive motivation and Factor 2 as maladaptive motivation.

With respect to the TSPCI-M, (a) on the pre-test, Bartlett's test of sphericity was significant [$X^2_{(55)} = 596.92, p < .0001$]; and the KMO was .76. Factor 1 and Factor 2 explained 38.82% and 13.50% of the variance, respectively; together they accounted for 52.32% of the variance. (b) On the post-test TSPCI-M, Bartlett's test of sphericity was significant [$X^2_{(55)} = 607.88, p < .0001$], and KMO was .79. Factor 1 and Factor 2 explained 33% and 14.27% of the variance, respectively; together they accounted for 47.27% of the variance. Both sets of results supported the suitability of conducting PCA on the pre- and post-test data. Table 4.4 shows the loadings of the TSPCI indices on the two factors; the TSPCI-AC rating scales and for TSPCI-M rating scales are presented separately. Again, the patterns of the factor loadings were similar to those reported in the previous chapters, and also resembled those reported in earlier studies using ordinary versions of the TSPCI (e.g., Cox, et al., 2002; Fadardi, 2003).

Pairwise comparisons showed that there was no difference between the factors derived from the TSPCI-AC rating scales (i.e., anagrams and Concept-Identification Cards) and those derived from the TSPCI-M (i.e., maths task). Interestingly, there was a significant correlation between Factors 1 and 2 extracted for the anagrams and the Concept-Identification Cards on the one hand, and Factors 1 and 2 extracted for the maths task on the other hand, regardless of participants' group membership. Therefore, it did not seem necessary to use separate factors extracted for the two kinds of tasks. It seemed clear that the two sets of factor scores should be used in the subsequent analyses. To arrive at a more comprehensive factor analysis of the TSPCI, the mean scores for each of the TSPCI rating scales across the three tasks were calculated and then subjected to another PCA.

Table 4.4. Factor loadings for the mean TSPCI rating scales before and after the experimental manipulation.

	Anagrams and Concept-Identification Cards				Maths			
	Pre-test		Post-test		Pre-test		Post-test	
TSPCI rating scales	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2
Liking the tasks	.80	#	.82	#	.87	#	.87	#
Disliking the tasks	-.70	#	-.78	#	-.77	#	-.78	#
Control over success	.76	-.40	.73	#	.72	-.32	.65	-.35
Know what to do	.79	#	.79	#	.81	#	.47	#
How likely if try best	.79	#	.64	#	.73	#	.67	.38
How likely if lucky	#	.40	-.35	.62	#	.35	#	.49
Joy if succeed	.46	#	.65	#	.52	#	.50	.31
Unhappiness (conflict)	-.32	.67	-.59	.39	-.47	.68	-.48	.42
Sorrow from failure	#	-.73	.51	-.64	#	-.84	#	-.59
Commitment	.46	-.42	.65	#	.61	-.31	.71	#
Goal distance	-.47	.57	-.64	.35	-.58	.33	-.54	.41

Note. # = loadings < .30.

The pre-test correlation matrix for the 11 TSPCI rating scales (averaged across the three tasks) revealed that 72% of the rating scales were significantly correlated with each other. In addition, Bartlett's test of sphericity was significant [$X^2_{(55)} = 485.64, p < .0001$] and the KMO was .79. Again, a PCA was conducted on the TSPCI mean rating scales, which yielded a two-factor solution. Factor 1 and Factor 2 explained 33.93% and 16.69% of the variance, respectively; together they accounted for 50.62% of variables.

The post-test correlation matrix for the 11 TSPCI rating scales (averaged across three tasks) revealed that 78% of the rating scales were significantly correlated with each other. The Bartlett's test of sphericity was significant [$X^2_{(55)} = 583.68, p < .0001$] and the KMO measure of sampling adequacy resulted in a higher value was .82, indicating that a factor analysis of the post-test TSPCI data was appropriate. Factor 1 and Factor 2 explained 39.66% and 14.39% of the variance, respectively; together they accounted for 54.05% of the variance. Table 4.5 shows the pattern of loadings on the pre- and the post-test TSPCI, when participants' mean ratings across all three tasks (i.e., anagrams, Concept-Identification Cards and maths tasks) were subjected to a PCA.

Table 4.5. Factor loading for the mean TSPCI on three tasks at the pre- and post-test.

	Three tasks			
	Pre-test		Post-test	
TSPCI rating scales	Factor 1	Factor 2	Factor 1	Factor 2
Liking the tasks	.84	#	.85	#
Disliking the tasks	-.74	#	-.78	#
Control over success	.74	-.36	.69	#
Know what to do	.80	#	.63	#
How likely if try best	.76	#	.65	#
How likely if lucky	#	.38	#	.45
Joy if succeed	.49	#	.58	#
Unhappiness (conflict)	-.40	.68	-.54	.41
Sorrow from failure	#	-.78	#	-.63
Commitment	.54	-.37	.68	#
Goal distance	-.53	.45	-.59	.38

Note. # = loadings < .30.

Calculating a TSPCI Summary Index

As with Study Two, a repeated measures analysis of variance could not be performed on the two sets of factor scores derived from the pre- and post-test administrations of TSPCI. Accordingly, TSPCI summary indices were calculated, from which comparisons across the two administration of the test could be made. The summary index was based on the TSPCI pre-test rating scales that loaded on Factor 1 (see Table 4.5). The rating scales with negative loadings were summed, and the sum was then subtracted from the sum of the rating scales with positive loadings. The formula was Adaptive Motivation = [[(like + control+ what to do + try my best + happiness + commitment) - (dislike + unhappiness + how long)]/ 9]. This formula was used to calculate Adaptive Motivation for both the pre- and post-test TSPCI. The means and standard deviations for the pre- and post-tests Adaptive Motivation are shown in Table 4.6.

Table 4.6. Means and standard deviations of four groups on the pre- and post-tests adaptive motivation.

	Pre-test		Post-test	
Group	*M*	*SD*	*M*	*SD*
No-Intervention	3.25	1.17	3.14	.97
Goal-Setting	3.35	1.25	3.42	1.08
Information	3.23	1.16	3.77	1.06
Combination	3.31	1.11	4.54	1.03

Calculating Summary Scores for Intrinsic Motivation

In a similar way to Study Two, a summary score was calculated from the IMI subscales to eliminate the need to use multiple indices of intrinsic motivation (see Chapter Three).

Familiarity with the Tasks

As described in Study Two, the first part of the TSPCI asked participants to rate their familiarity with three types of tasks: anagrams, maths, and the Concept-Identification Cards. Table 4.7 shows the means and standard deviations of participants' ratings of their familiarity with the three tasks at the pre- and post-tests, separately for each of the groups.

Table 4.7. Participants' mean rating of their familiarity with the three tasks at pre- and post-test.

	Anagrams		Maths		Concept-Identifications	
Group	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
No-Intervention	5.89	6.56	6.70	7.33	6.14	5.89
Goal-Setting	5.31	5.94	6.39	6.81	5.20	5.50
Information	5.75	6.61	6.28	6.58	5.00	5.94
Combination	6.01	7.04	6.56	6.67	5.36	5.58

One-way ANOVAs showed that there were no significant differences among the four groups on their pre-test familiarity with anagrams [$F_{(3, 140)} = .72, p = .54$]; maths [$F_{(3, 140)} = 2.27, p = .08$]; or Concept-Identification Cards [$F_{(3, 140)} = 1.87, p = .14$]. To further test whether the groups differed from one another on post-test familiarity with anagram, math, or the Concept-Identification Card, a MANCOVA was conducted. In the model, Group (with four levels) was entered as the independent variable (fixed factor), and pre-test familiarity with anagrams, maths, and Concept-Identification Cards were entered as

the covariates, and post-test familiarities with anagrams, maths, and Concept-Identification Cards were entered as the dependent variables. The groups did not differ on the combined dependent variables [$F_{(9, 328)} = .86, p = .60, \eta^2 = .02$]. In addition, when the dependent variables were tested separately, there were no main effects for Group on any of the familiarity ratings: anagrams [$F_{(3, 137)} = 1.36, p = .26, \eta^2 = .03$]; maths [$F_{(3, 137)} = .27, p = .85, \eta^2 = .006$]; or Concept-Identification Cards [$F_{(3, 137)} =. 89, p = .41, \eta^2 = .02$].

Performance on Concept-Identification Cards and Anagrams

One-way ANOVAs showed a significant main effect for Groups on both number of successfully solved Concept-Identification Cards [$F_{(3, 140)} = 49.34, p < .0001$], and number of successfully solved anagrams [$F_{(3, 140)} = 34.64, p < .0001$]. For the Concept-Identification Cards, post-hoc Tukey HSD tests showed that the Combination Group ($M = 4.22$, $SD = .51$) solved significantly more card sets than the No-Intervention Group ($M = 2.88$, $SD = .79$), the Goal-Setting Group ($M = 3.44$, $SD = .76$; $p < .0001$), and the Information Group ($M = 3.65$, $SD = .81$; $p < .002$). The No-Intervention Group solved significantly fewer card sets than each of the experimental groups ($ps < .0001$), but there were no other differences among the groups.

Regarding the anagrams, post-hoc Tukey HSD tests revealed that the Combination Group ($M = 12.94$, $SD = 2.29$) solved significantly more anagrams than the No-Intervention Group ($M = 7.47$, $SD = 2.20$; $p < .0001$), the Goal-Setting Group ($M = 9.11$, $SD = 2.76$; $p < .0001$), and the Information Group ($M = 10.48$, $SD = 2.40$; $p < .008$). The No-Intervention Group solved significantly fewer anagrams than each of the experimental groups ($ps < .0001$). The Information Group solved significantly more anagrams than the No-Intervention Group and the Goal-Setting Group. Therefore, the results confirmed that the manipulation were effective in causing the Combination Group to be more successful in completing the experimental tasks than the other three groups. The results are shown graphically in Figure 4.1.

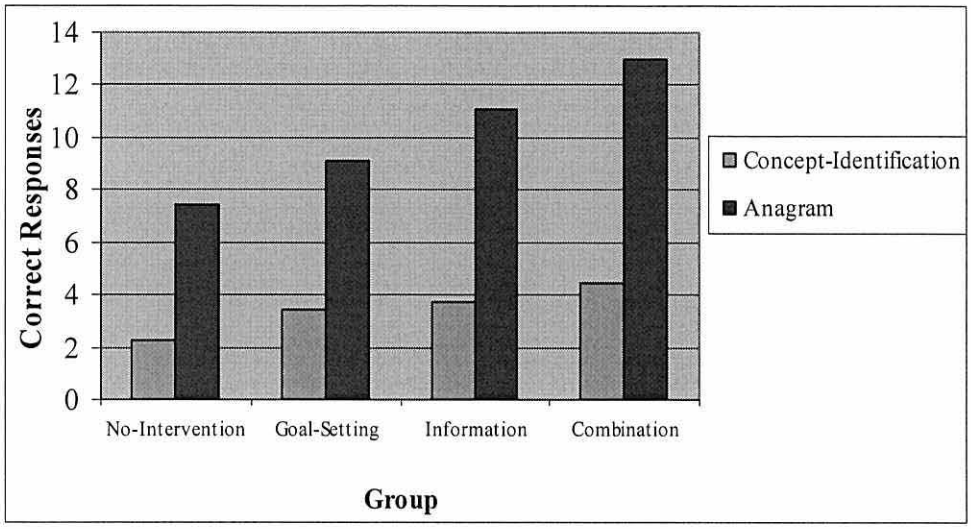

Figure 4.1. Number of Concept-Identification Cards and anagrams solved by each group.

As described earlier, the Goal-Setting Group and the Combination Group received two additional sets of Concept-Identification Cards and anagrams. To determine whether there was a difference between the two groups on the number of successfully solved additional tasks, a series of independent *t*-tests was conducted (all tests one-tailed). The results showed that the Combination Group ($M = 1.97$, $SD = .17$) solved significantly more card sets ($M = 1.97$, $SD = .17$; $t_{(70)} = -4.15$, $p < .0001$) and anagrams ($M = 7.40$, $SD = .90$; $t_{(70)} = -4.50$, $p < .0001$) than the Goal-Setting Group.

Changes in Sense of Control

It was hypothesised that the groups would be ordered, from highest to lowest, on post-test sense of control as follows: Combination Group > Information Group > Goal-Setting Group > No-Intervention Group. The means and standard deviations for the four groups on the TSSCI subscales at the pre- and post-tests are shown in Table 4.8. Three one-way ANOVAs showed that there was no difference among the groups on pre-test Positive Sense of Control [$F_{(3, 140)} = .30$, $p = .83$]; Negative Sense of Control [$F_{(3, 140)} = 1.06$, $p = .37$]; or Overall Sense of Control [$F_{(3, 140)} = .63$, $p = .60$].

To further test whether the groups differed from one another on the post-test subscales of the Sense of Control Inventory, a MANCOVA was conducted. In the model, Group (with four levels) was entered as the independent variable (fixed factor), pre-test Positive, Negative, and Overall Sense of Control were entered as the covariates, and post-test Positive, Negative, and Overall Sense of Control were entered as the dependent variables. Levene's test of equality of variances was not significant, indicating the

adequacy of the MANCOVA model. The groups differed on the combined dependent variables [$F_{(6, 274)} = 16.82, p < .0001, \eta^2 = .27$; Wilk's Lambda = .53; Power = .94]. When the dependent variables were tested separately, there was also a main effect for Group on all three types of sense of control: post-test *Positive Sense of Control* [$F_{(3, 138)} = 34.21, p < .005, \eta^2 = .43$]; *Negative Sense of Control* [$F_{(3, 138)} = 22.69, p < .005, \eta^2 = .33$]; and *Overall Sense of Control* [$F_{(3, 138)} = 38.32, p < .005, \eta^2 = .45$].

Table 4.8. Means and standard deviations of four groups on pre- and the post-test positive, negative, and overall sense of control.

		Group							
		No-Intervention		Goal-Setting		Information		Combination	
	SoCI	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Pre-test	Positive	55.39	8.43	55.67	7.42	54.08	9.37	55.75	7.58
	Negative	14.67	5.64	14.03	4.51	16.31	6.86	15.03	5.12
	Overall	80.72	12.77	81.14	10.32	78.78	13.59	80.72	11.46
Post-test	Positive	53.86	8.95	60.75	6.82	60.97	9.25	65.19	5.43
	Negative	14.67	4.95	12.01	3.73	11.88	6.13	9.17	3.13
	Overall	79.19	12.17	89.02	10.28	89.33	12.11	96.03	7.74

Note. SoCI = Sense of Control Inventory; Positive = Positive sense of control; Negative = Negative sense of control; Overall = Overall sense of control.

Post-hoc pairwise comparisons showed that there was a significant difference among the groups on the subscales of the TSSCI. On Negative Sense of Control, the Combination Group was lower than each of the other groups, and that No-Intervention Group was higher than each of the other groups (*ps* < .0001). The Goal-Setting and Information Groups did not differ from each other. On Positive and Overall Sense of Control, each of the experimental groups was higher than the No-Intervention Group (*ps* < .0001), but the Combination Group was higher than each of the other groups.

Additional *t*-tests for paired-samples were conducted to assess changes from the pre- to the post-test on the subscales of the Sense of Control Inventory, separately for each of the four groups. The No-Intervention Group did not change from the pre- to the post-test on any of the subscales of the Sense of Control Inventory (*ps* < .46). However, from the pre- to the post-test the Goal-Setting Group showed an increase in Positive [$t_{(35)} = -6.58, p < .0001, d = -.50$] and Overall Sense of Control [$t_{(35)} = -7.60, p < .0001, d = -.51$], but a decrease in Negative Sense of Control [$t_{(35)} = 4.65, p < .0001, d = .38$]. The Information Group showed an increase in Positive [$t_{(35)} = -8.60, p < .0001, d = -.48$] and Overall Sense of Control [$t_{(35)} = -8.75, p < .0001, d = -.55$], but a decrease in Negative

Sense of Control [$t_{(35)} = 6.71, p < .0001, d = .50$]. The Combination Group showed an increase in Positive [$t_{(35)} = -8.65, p < .0001, d = -.98$] and Overall Sense of Control [t (35) = -8.90, $p < .0001$, $d = -.97$] but a decrease in Negative Sense of Control [$t_{(35)} = 7.45, p < .0001, d = .94$]. In summary, the results showed that the manipulation was most helpful to participants in the Combination Group in terms of an increase in Positive and Overall Sense of Control and a decrease in Negative Sense of Control compared with other groups. These results are shown graphically in Figure 4.2.

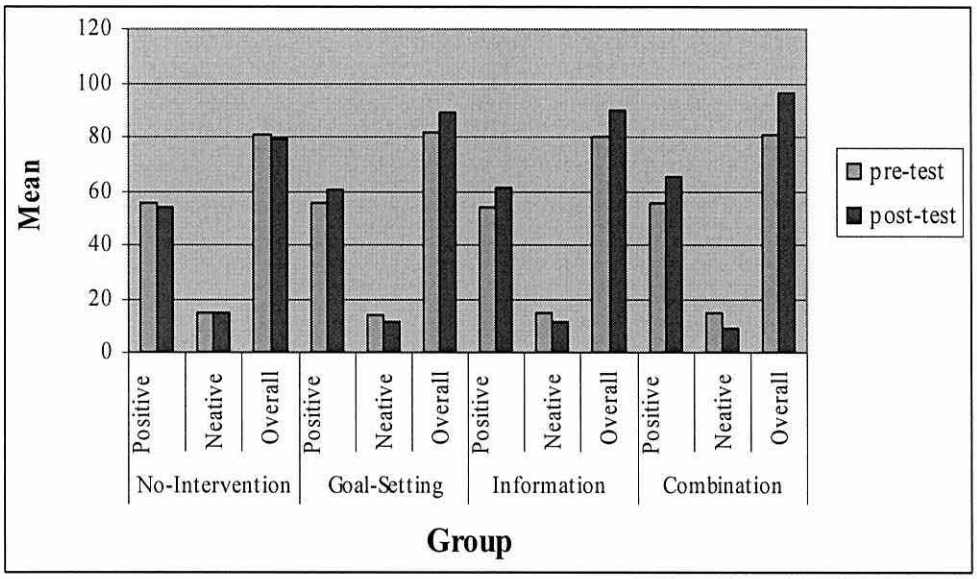

Figure 4.2. Mean subscales of sense of control for the four groups at the pre- and post-tests.

Changes in Intrinsic Motivation

It was hypothesised that the groups would be ordered from highest to lowest on intrinsic motivation as follows: Combination Group > Information Group > Goal-Setting Group > No-Intervention Group. As mentioned, the IMI was administered only at the post-test. The means and standard deviations for the subscales of the IMI are shown in Table 4.9.

Table 4.9. Means and standard deviations of intrinsic motivation, perceived pressure, choice, competence, and intrinsic motivation of the four groups.

	Group							
	No-Intervention		Goal-setting		Information		Combination	
Subscales of IMI	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Interest	1.81	0.84	2.35	0.74	2.51	1.05	3.18	0.81
Pressure	3.43	1.07	3.40	1.22	3.19	1.47	2.47	0.88
Choice	4.96	1.01	5.17	1.07	5.44	1.05	6.05	0.76
Competence	3.50	1.18	4.34	0.97	4.74	1.20	5.70	0.89
Intrinsic Motivation	1.71	0.82	2.21	0.85	2.38	1.06	3.03	0.86

To test whether the groups differed on the subscales of the IMI, a series of one-way ANOVAs was performed. The results showed that there was a significant difference among the groups on (a) *Interest Motivation* [$F_{(3, 140)} = 14.93, p < .0001$]; the Combination Group was higher than each of the other groups and the No-Intervention Group was lower than each of the other groups ($ps < .0001$), while there was no difference between the Goal-Setting and Information Groups ($p = .85$). (b) *Perceived Pressure* [$F_{(3, 140)} = 5.23, p = .002$]; the Combination Group was lower than the No-Intervention and Goal-Setting Groups. (c) *Perceived Choice* [$F_{(3, 140)} = 8.76, p < .0001$]; the Combination Group believing that they had more Choice than each of the other groups ($ps < .0001$). (d) *Perceived Competence* [$F_{(3, 140)} = 26.26, p < .0001$]; the Combination Group perceiving the greatest ($ps < .0001$) and the No-Intervention Group perceiving the least amount of competence—but there was no difference between the Goal-Setting Group and the Information Group ($p = .38$). Moreover, the results of an ANOVA showed that the groups differed on Intrinsic Motivation [$F_{(3, 140)} = 14.00, p < .0001$], the Combination Group was higher than each of the other groups and the No-Intervention Group was lower than each of the other group ($ps < .0001$), while there was no difference between the Goal-Setting and Information Groups ($p = .61$). These results are shown graphically in Figure 4.3.

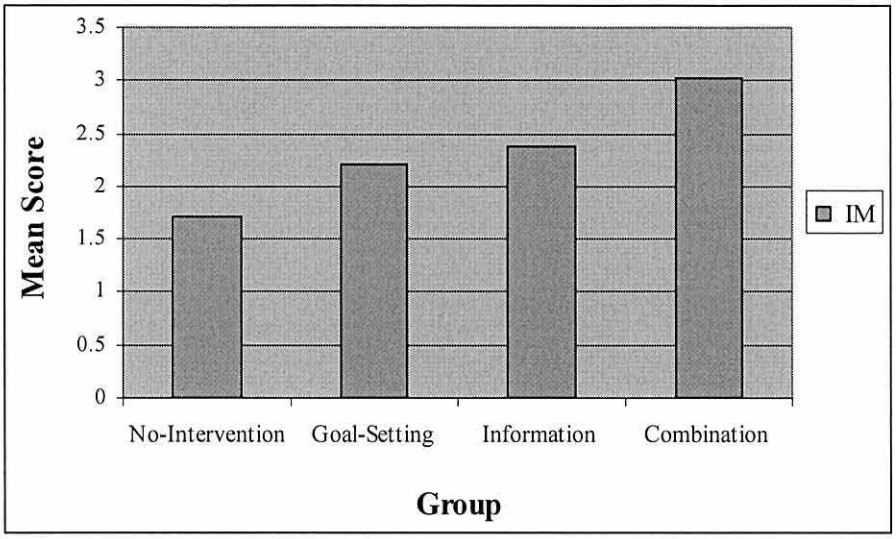

Figure 4.3. Mean intrinsic motivation in the four groups.

Changes in Adaptive Motivation

It was hypothesised that the groups would be ordered from highest to lowest on post-test Adaptive Motivational Structure as follows: Combination Group > Information Group > Goal-Setting Group > No-Intervention Group. A one-way ANOVA showed that the groups did not differ on pre-test Adaptive Motivation [$F_{(3,140)} = 1.09, p = .07$]. To determine whether there was a difference among the groups on the post-test Adaptive Motivation, a univariate analysis of covariance (ANCOVA) using GLM was conducted, in which Group was entered as the independent variable (fixed factor), familiarity with the tasks (e.g., anagrams) was entered as the covariate, and pre-test Adaptive Motivation was entered as the dependent variable. There was no effect for Group on pre-test Adaptive Motivation ($p = .42$), indicating that the four groups did not differ from one another on adaptive motivation prior to the experimental induction.

To test whether the groups differed from each other on post-test Adaptive Motivation, an ANCOVA was performed. In the model, Group was entered as the independent variable (fixed factor), and pre-test Adaptive Motivation and Familiarity with each task were entered as the covariates, and post-test Adaptive Motivation was entered as the dependent variable. The results showed that there was a significant main effect for Group [$F_{(3,136)} = 18.89, p < .001, \eta^2 = .38$], after controlling for the covariates—i.e., (a) pre-test Adaptive Motivation [$F_{(1,136)} = 45.80, p < .001, \eta^2 = .25$]; Familiarity with (b) anagrams [$F_{(1,136)} = .009, p = .93, \eta^2 = .001$]; (c) maths [$F_{(1,136)} = 1.48, p = .23, \eta^2 = .011$]; and (d) Concept-Identification Cards [$F_{(1,136)} = .029, p = .86, \eta^2 = .006$]. Pairwise comparisons revealed significant differences among the groups (*p*s

< .0001, for all comparisons); the Combination Group was higher than each of the other groups (*p*s < .0001). Moreover, the Information Group was higher than the No-Intervention Group. There was no difference between the Information Group and the Goal-Setting Group or between Goal-Setting Group and the No-Intervention Group. The results are shown graphically in Figure 4.4.

Additional paired-sample *t*-tests were conducted to assess changes from the pre- to the post-test Adaptive Motivation, separately for each of the groups. Neither the No-Intervention Group nor the Goal-Setting Group changed from the pre- to the post-test on Adaptive Motivation ($p > .005$). However, both the Information Group [t (34) = -3.04, $p < .004$, $d = -.45$] and the Combination Groups [t (34) = -7.32, $p < .0001$, $d = -.58$] showed an increase in Adaptive Motivation from the pre- to the post-tests.

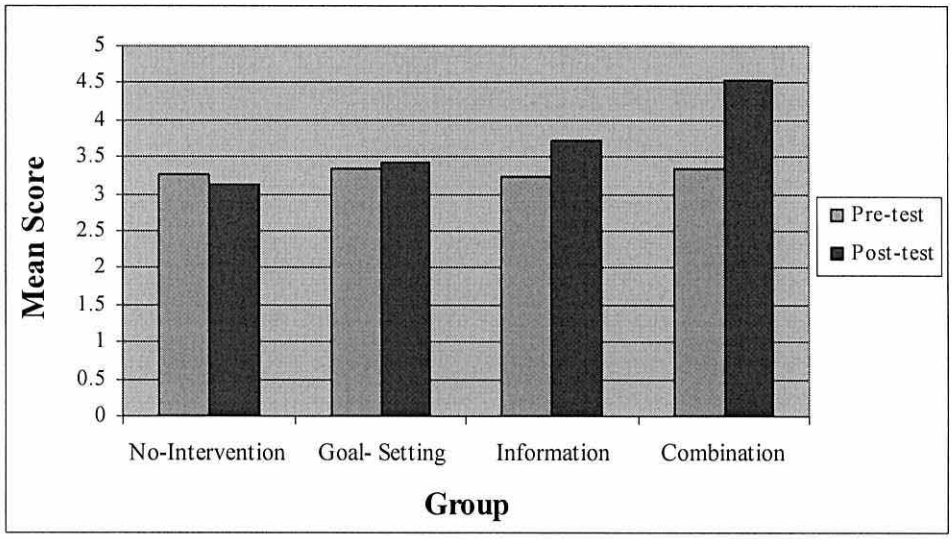

Figure 4.4. Mean adaptive motivation for the four groups on the pre- and post-tests.

How are Sense of Control and Intrinsic Motivation related to Motivational Structure?

A linear regression analysis was conducted to determine whether on the post-test, participants' sense of control and intrinsic motivation were associated with their adaptive motivation. Before entering the variables into the regression analysis, a scatter plot was drawn to depict how the independent variables were related to the dependent variable. The fit line indicated that the data were normally distributed. To identify simple relationships among gender, age, Adaptive Motivation, Overall Sense of Control, and Intrinsic Motivation, bivariate Pearson correlation coefficients were first computed (see Table 4.10).

Table 4.10. Intercorrelations among gender, age, adaptive motivation, overall sense of control, and intrinsic motivation.

Variables	Gender	Age	Adaptive Motivation	Overall SoC
Age	.02			
Adaptive Motivation	-.02	-.14		
Overall SoC	-.11	-.06	.59**	
Intrinsic Motivation	-.02	-.02	.50**	.73**

Note. Overall SoC = Overall Sense of Control; $^{**}p < .01$.

As the table shows, Adaptive Motivation was positively correlated with both Overall Sense of Control and Intrinsic Motivation, and the latter two variables were strongly positively correlated with each other. Based on the guidelines described in Study Two (see Miles & Shevlin, 2001), to confirm that it met the assumptions of a normal joint distribution, including homoscedasticity, linearity, and lack of collinearity.

In the hierarchical regression model, post-test Adaptive Motivation was entered as the dependent variable. Of the independent variables, age and gender were entered in the first step; post-test Overall Sense of Control in the second step; and Intrinsic Motivation in the third step. Therefore, each step in the model allowed the variance contributed by the variables entered in that step to be estimated independently of the variables entered in the earlier steps. The results of the hierarchical regression analysis are shown in Table 4.11.

Table 4.11. Results of hierarchical regression analysis in which adaptive motivation was predicted from gender, age, overall sense of control, and intrinsic motivation.

Steps	Variables	B	SEB	ΔR^2	β
1	Gender	-.34	.20		-.15
	Age	-.02	.03	.02	-.05
2	Overall SoC	.02	.01	.27	.49*
3	Intrinsic Motivation	.56	.08	.32	.25*

Note. $^{*}p < .05$.

Results of the hierarchical regression analysis showed that in the first step gender and age were not significant predictors of Adaptive Motivation [$F_{(2, 141)} = 1.54$, $t = -.61$, $p = .22$]. The second step showed that post-test Overall Sense of Control explained 27% of the variance in Adaptive Motivation [$F_{(3, 140)} = 16.90$, $t = 6.83$, $p < .0001$], after the effects of gender and age had been controlled in Step One. The third step showed that

adding Intrinsic Motivation to the model accounted for an additional 5% of the variance in participants' Adaptive Motivation [$F_{(4, 139)} = 14.55$, $t = 2.40$, $p < .0001$]. In summary, the results showed that both Sense of Control and Intrinsic Motivation predicted adaptive motivation independently of age and gender.

To summarize, the first part of the study aimed to determine which of the techniques utilised in the previous study (i.e., information enhancement, goal setting, or a combination of them) was most effective in inducing sense of control, intrinsic motivation, and adaptive motivation. The results showed that each of the experimental techniques had a different effect on sense of control and intrinsic motivation. The combined intervention led to the greatest increase in overall sense of control, intrinsic motivation, and adaptive motivation. Information enhancement and goal setting increases sense of control and intrinsic motivation and, in turn, participants' adaptive motivational structure.

Discussion

The present study used two types of manipulation (i.e., information enhancement and goal setting) both individually and in combination to test their impact on increasing sense of control and intrinsic motivation, and, thereby, on adaptive motivation. The results showed that the combined manipulation led to the greatest increase in sense of control, intrinsic motivation, and adaptive motivation. The results mainly replicated those of the previous study (see Chapter Three). Information-enhancement technique for the Information Group and goal-setting technique for the Goal-Setting Group were equally effective in improving sense of control and intrinsic motivation; however, the Information Group was higher on adaptive motivation than the Goal-Setting Group.

The results support those of several earlier studies (e.g., Austin & Vancouver, 1996; Botti, 2004; Buikema, 2003; Eads et al., 2000; Menon, 1996; Pegg el al., 2005), which showed that each of the four techniques (i.e., choice, knowledge, feedback, and goal setting) increased sense of control and intrinsic motivation. As predicted, the combination of information enhancement (including, choice, knowledge, feedback) and goal setting was more effective in producing desired motivational changes than using each technique alone.

The information-enhancement technique comprises several components, including choice, information, and feedback. The use of multiple components could account for the group's higher scores on TSPCI than the No-Intervention and Goal-

Setting Groups, and it could explain why some studies failed to observe desired motivational improvements when utilising each technique alone—i.e., either choice, knowledge, feedback or goal-setting. For example, Tankoonsombut (2004) reported no impact of goal setting on work performance.

Recall that participants in the Combination Group completed their tasks more successfully than those in the other groups. They also obtained the highest scores on Positive and Overall Sense of Control, Choice, Interest, feelings of Competence and Intrinsic Motivation, but scored lowest on Negative Sense of Control and Pressure compared to the other groups. Intrinsic motivation is expected to increase when people have an opportunity to choose their tasks, and when they enjoy completing them (Haasen & Gordon, 1997). Contingent and supportive feedback are important for increasing sense of control and intrinsic motivation because they increase the person's degree of success (Fauss, 2003) and feelings of task involvement and progress (Koka & Hein, 2005; Ratell, Baldwin, & Vallerand, 2005). The goal setting also fuelled the positive motivational changes in the Combination Group; it, presumably, served to challenge this group and brought them greater success while completing the tasks than the other groups achieved.

These results support those of Ryan and Deci (2000a), who suggested that intrinsic motivation is related to feelings of choice, competence, low perceived pressure, and feelings of being effective. In addition, several studies (e.g., Deci & Ryan, 2000; Henkel et al., 2002; Logan et al., 1993) have shown that when people achieve their goals successfully, their intrinsic motivation and sense of control are more likely to increase than when they fail. As Double (2004) indicated, sense of control increases with increased probability of success and reduced feelings of pressure.

To conclude, the results of the current study support those of previous studies (Gauggel et al., 2002; Harmon, Hedrick, & Wood, 2005; Miller & Iris, 2002; Tsigilis & Theodosiou, 2003; Young, 2005), which found that people are more likely to achieve their goals, if the following conditions are present:

- The goals are clearly defined.
- People are able to choose the tasks to complete.
- They acquire new skills while trying to achieve their goals.
- They are able set challenging goals, and they receive clear and relevant feedback.
- They are able to control the level of pressure that they feel while pursuing their goals.

Follow-Up Session

The results reported thus far showed that the Combination Group (receiving both information enhancement and goal setting) and Information Group were higher on post-test sense of control and intrinsic motivation than any of the other groups were. In addition, the results showed that increases from the pre- to the post-test in participants' sense of control and intrinsic motivation were associated with an increase from the pre- to the post-test in their adaptive motivation. However, it was unclear whether the motivational changes were temporary or more enduring. Therefore, a follow-up study was conducted to test the stability of the motivational changes in the three experimental groups. It was hypothesised that the induction of sense of control, intrinsic motivation, and adaptive motivation differentially across the groups would be sustained over time and that at the follow-up the groups would still be ordered from highest to lowest in overall sense of control, intrinsic motivation, and adaptive motivation as follows: Combination Group > Information Group > Goal-Setting Group > No-Intervention Group.

Participants

As described earlier, participants were invited to attend a follow-up session. Appointments were scheduled such that each participant attended his/her follow-up session about 45 days after the first assessment. A letter was sent to each participant who attended the first session to remind him or her to attend the follow-up session (as each had agreed to do on the consent form). The letters were sent to the participants via their email addresses two weeks before the 45 days had elapsed. After their initial response to the letter, appointments were made to conduct the follow-ups in small groups. The number of responses to the letter varied across the four groups (see Table 4.12; see page 158). A total of 94 participants were tested during the follow-up session (males = 30.5%, males' mean age = 20.50, SD = 3.51; females' mean age = 19.51, SD = 1.82). Participants received course and print credits for their participation in the follow-up.

Procedure

All participants were seen in groups of approximately five people each in a lecture room with normal illumination and minimum background noise. Prior to distributing the study pack, the experimenter briefly explained the goal of the session to the participants. The experimenter told them "As you remember, in the study 'Motivation, Cognition, and Problem-Solving' you received two tasks. The first one was Concept-Identification Cards and the second one was anagrams. You had some

experience with the brainteasers in the study, so before completing the following questionnaires for the follow-up, please let me know whether:

(a) After completing the experiment, have you practised anagrams or other kinds of brainteasers?

(b) Have you had a chance to think about the kinds of problems that you have done during the experimental session?

Participants were next asked to complete the TSPCI. The instructions were as follows: "Imagine that you are going to solve various types of 'brainteasers' such as scrambled letters, puzzles, arithmetic problems, and three-dimensional shapes—similar to those that did about 45 days ago. As in the experimental session, the brief questionnaire in the next section asks you about your current feelings and views about and familiarity with these types of problems. For example, you might like brainteasers and enjoy trying to solve them. On the other hand, you might dislike them and do not want to bother with them. You might have feelings about your performance on these types of problems—for example, how happy or sad you would be if you can or cannot solve them. For each of the ratings on the questionnaire, please write a number from zero to 10 to describe your feelings. For each problem, be sure to fill in all the boxes before continuing with your ratings for the next one."

After reading the definition of the three tasks, participants were first asked to rate their current familiarity with them. Before going on to the second answer sheet, they were told, "Think carefully about each of the tasks. On the next page, please rate each type of brainteaser. To do so, imagine that you are about to try to solve a series of problems in each category. For each of the ratings on the next page, please choose a number from zero to 10 to describe your feelings about eleven dimensions in each category. For each problem in each category (i.e., anagrams, maths, and Concept-Identification Cards), be sure to fill in all of the boxes before going on to the next category." Participants then rated the eleven dimensions on the TSPCI. Finally, they were required to complete the TSSCI and the TSIMI under similar instructions as for the TSPCI described above.

Results

Participants and their Demographic Characteristics

The distribution across the four groups of the 95 participants (31.6% male) who completed the follow-up session was as follows: No-Intervention Group ($N = 15$, 46.67% males), Goal-Setting Group ($N = 26$, 26.92% males), Information Group ($N = 24$, 25%

males) and Combination Group ($N = 30$, 30% males). In total, 66 % of the participants who completed the initial experiment also participated in the follow-up session. The proportion of males and females who participated in the first session did not differ from the proportion who participated in the follow-up. The number of males and females in the four groups who attended in the first and the follow-up portions of the study are shown in Table 4.12.

The means of male and female participants' age and education (year in university) in the four groups are shown in Table 4. 13. One-way ANOVAs showed that there was no significant difference among the groups age [$F_{(3, 90)} = .49, p = .69$]; or years of university education [$F_{(3, 90)} = .96, p = .42$].

Table 4.12. Sample size and gender composition in each of the groups.

Group	Third Study		Follow-up	
	Gender			
	Males	Females	Males	Females
No-Intervention	14	22	7	8
Goal-Setting	12	24	7	19
Information	11	25	6	18
Combination	11	25	10	21
Total	48	96	30	66

A Kruskal-Wallace non-parametric test was conducted to test whether the group differed from one another on gender. The results showed that the groups did not differ from one another on gender, X^2 (3) = 2.34, $p = .58$.

Table 4.13. Four groups' mean age and years of university education, separately for males and females.

Gender		Group							
		No-Intervention		Goal-Setting		Information		Combination	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Males	Age	20.71	4.15	21.43	5.71	19.33	1.03	20.44	1.94
	Education	1.57	0.53	1.71	0.76	1.67	0.82	1.67	0.87
Females	Age	20.00	2.27	18.68	1.87	19.83	1.79	19.76	2.07
	Education	1.50	0.76	1.63	0.68	2.00	0.91	1.86	0.65

Practising and Thinking about the Tasks

At the follow-up session, participants first asked to state whether or not they had practised or thought about the brainteaser tasks since they had completed the first part of

the study 45 days earlier. Table 4.14 shows the frequency with which each group of participants indicated that they had practiced or thought about the tasks. A Kruskal-Wallis test showed that the groups did not differ from one another in the frequency of practicing the brainteaser tasks, X^2 (3) = 4.41, p = .22; but they differed from one another on the frequency with which they though about the tasks, X^2 (3) = 26.10, p < .0001. As Table 4.14 shows, the Combination Group was highest of the groups in the frequency with which they thought about the task, and the No-Intervention Group was the lowest.

Table 4.14. Frequency and percentage of practising and thinking about the brainteasers in each group.

Group	Practising		Thinking	
	N	%	*N*	%
No-Intervention	2	2.08	4	4.17
Goal-Setting	5	5.21	5	5.21
Information	2	2.08	7	7.29
Combination	8	8.33	27	28.13

Calculating the TSPCI Summary Index

Based on the guidelines discussed in the previous chapter, a TSPCI summary index called Adaptive Motivation was calculated for post-test and follow-up to evaluate changes between the two time points. The index was based on the same formula used in the first part of the study (see Page 8). The applicability of the formula was confirmed by the results of a PCA, which included only the 95 participants who completed both the post-test and follow-up. The rationale for conducting the PCA was explained earlier in this chapter. The pattern of factor loadings at the follow-up was similar to the pattern of factor loadings at the pre-test, supporting the use of the same formula to calculate Adaptive Motivation for the post-test and follow-up assessments. The means and standard deviations of the post-test and the follow-up Adaptive Motivation indices are shown in Table 4.15. Comparisons between the post-test and follow-up Adaptive Motivation indices will be presented in a later section.

Table 4.15. Means and standard deviations of four groups on adaptive motivation at post-test and follow-up.

Group	Post-test		Follow-up	
	M	*SD*	*M*	*SD*
No-Intervention	4.02	0.89	3.95	0.91
Goal-Setting	4.37	0.86	4.33	0.88
Information	4.52	0.73	4.63	0.68
Combination	4.93	0.68	5.59	0.82

Changes in Sense of Control

It was hypothesised that the four groups' sense of control seen at the post-test would be sustained over time and that they would be ordered at the follow-up from highest to the lowest as follows: Combination Group > Information Group > Goal-Setting Group > No-Intervention Group. The means and standard deviations of the four groups on TSSCI subscales at the post-test and follow-up are shown in Table 4.16.

Table 4.16. Means and standard deviations of four groups on positive, negative, and overall sense of control at the post-test and follow-up.

		Group							
	Sense of Control	No-Intervention		Goal-Setting		Information		Combination	
		M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Post-test	Positive	54.27	9.50	62.19	5.08	60.88	8.24	65.67	5.18
	Negative	13.27	5.91	10.92	3.05	11.63	4.87	9.43	2.98
	Overall	81.03	13.51	91.27	7.42	89.25	10.68	96.23	7.28
Follow-up	Positive	51.27	9.38	60.92	7.83	62.18	7.34	68.73	4.10
	Negative	15.20	6.93	11.19	3.71	11.14	4.32	8.01	2.35
	Overall	76.07	14.95	89.73	10.26	91.54	10.04	102.73	5.73

To test whether the groups changed on sense of control from the post-test to the follow-up, a series of repeated measures analyses of variance was conducted. Positive, Negative, and Overall Sense of Control were entered in each of the models as the within-participants variable (dependent variable). In each model, time was the within-participants factor, and it had two levels (post-test and follow-up), and Group was the between-participants factor.

None of the analyses resulted in a significant Mauchly's *W* test, indicating that the sphericity assumption was met for each model. The results of the analyses showed that the main effect for Time was not significant (*p*s > .05): (a) on Positive Sense of Control [$F_{(1, 90)} = .04, p = .83, \eta^2 = .0001$, Wilks' Lambda = .92]; (b) on Negative Sense of Control [$F_{(1, 90)} = .020, p = .87, \eta^2 = .0001$, Wilks' Lambda = .90]; and (c) on Overall Sense of Control [$F_{(1, 90)} = .01, p = .92, \eta^2 = .0001$, Wilks' Lambda = .94]. However, the interaction of Time and Group achieved significance in all analyses: (a) on Positive Sense of Control [$F_{(3, 90)} = 5.16, p = .002, \eta^2 = .15$, Wilks' Lambda = .85]; (b) on Negative Sense of Control [$F_{(3, 90)} = 4.33, p = .007, \eta^2 = .13$, Wilks' Lambda = .88]; and (c) on Overall Sense of Control [$F_{(3, 90)} = 6.13, p = .001, \eta^2 = .17$, Wilks' Lambda = .83].

Because the Time x Group interaction in all three analyses was significant, a series of dependent samples *t*-tests was conducted to identify the source of the changes from the post-test to the follow-up. The Combination Group was the only group that showed significant changes on all subscales of sense of control from the post-test to the follow-up: (a) an increase on Positive Sense of Control [$t_{(29)} = -4.09, p < .0001, d = -.46$]; (b) a reduction on Negative Sense of Control [$t_{(29)} = 4.38, p < .0001, d = .36$]; and (c) an increase on Overall Sense of Control [$t_{(29)} = -4.87, p < .0001, d = -.47$].

To test the hypothesis about the order of groups on follow-up sense of control, a series of one-way ANOVAs was conducted. The results showed that the groups differed from one another on Positive [$F_{(3, 91)} = 21.07, p < .0001$]; Negative [$F_{(3, 91)} = 10.03, p < .0001$]; and Overall Sense of Control [$F_{(3, 91)} = 20.86, p < .0001$]. Post hoc pairwise comparisons showed that, on each of the subscales, the groups were ordered as follows ($p < .005$): (a) on Positive and Overall Sense of Control; Combination Group > the Information Group = the Goal-Setting Group > the No-Intervention Group; (b) on Negative Sense of Control; the Combination Group < the Information Group = the Goal-Setting Group < the No-Intervention Group.

To summarize, the Combination Group was the only group that changed from the post-test to the follow-up. This group showed an increase in Positive and Overall Sense of Control and a decrease in Negative Sense of Control. In addition, the Combination Group showed the greatest increase on Overall Sense of Control from the post-test to the follow-up than the other groups. These results are shown graphically in Figure 4.5.

Changes in Intrinsic Motivation

It was hypothesised that the four groups' intrinsic motivation seen at the post-test would be sustained over time and that they would be ordered at the follow-up from the highest to the lowest as follows: The Combination Group > Information Group > Goal-Setting Group > No-Intervention Group. The means and standard deviations of the four groups on four IMI subscales at the post-test and follow-up are shown in Table 4.17.

To test the hypothesis about the groups' changes in the IMI subscales from the post-test to the follow-up, a series of repeated measures analyses of variance was conducted.

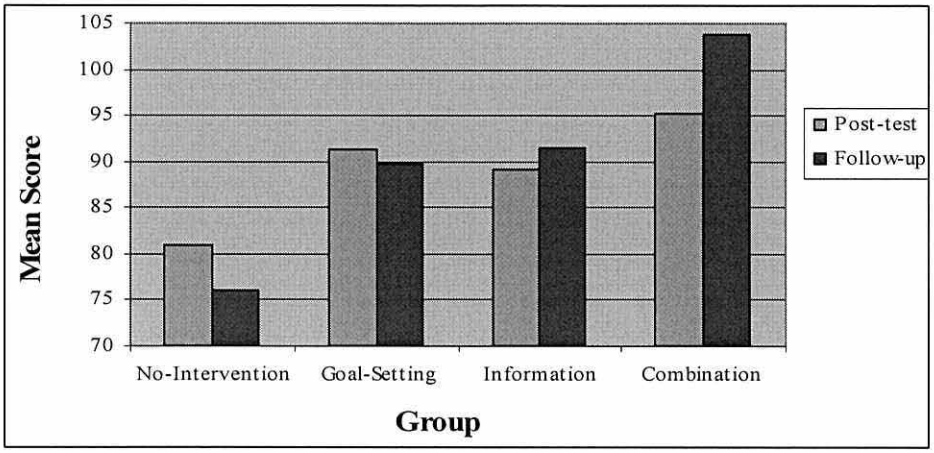

Figure 4.5. Mean Overall Sense of Control for the four groups at the post-test and follow-up.

Each analysis examined pairwise within- and between-participants comparisons in the same analysis. Interest, Pressure, Choice, Competence, and Intrinsic Motivation were entered in each of the analyses as the within- participants variable (dependent variable). In each analysis, time had two levels: post-test and follow-up. Group was entered as the between-participants factor.

Table 4.17. Means and standard deviations of four groups on interest, pressure, choice, and competence of Intrinsic Motivation Inventory at the post-test and follow-up.

		Group							
Time		No-Intervention		Goal-Setting		Information		Combination	
	IMI Subscales	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Post-test	Interest	4.27	1.49	5.23	0.71	5.33	0.69	5.93	1.11
	Pressure	3.33	1.09	3.23	1.07	3.09	1.46	2.70	1.15
	Choice	5.13	0.94	5.53	0.98	5.49	0.89	5.91	0.83
	Competence	3.61	1.12	4.59	0.71	4.88	1.00	5.77	0.65
Follow-up	Interest	3.97	1.27	4.87	1.47	5.07	1.37	6.21	0.56
	Pressure	4.00	1.25	3.71	1.73	2.96	1.46	2.11	1.11
	Choice	4.67	1.29	5.23	1.22	5.43	0.93	6.31	0.57
	Competence	3.53	1.06	4.38	1.24	4.96	1.00	6.17	0.83

None of the analyses resulted in a significant Mauchly's *W* test, indicating that the sphericity assumption was met for each analysis. The results of the analyses showed that the main effect for Time was significant only for Interest ($p > .05$), but not for the other IMI subscales or for Intrinsic Motivation: (a) Interest [$F_{(1, 90)} = 4.05, p = .047, \eta^2 = .07$, Wilks' Lambda = .96]; (b) Pressure [$F_{(1, 90)} = .061, p = .81, \eta^2 = .001$, Wilks' Lambda =

.98]; (c) the perceived Choice [$F_{(1, 90)} = 4.36, p = .40, \eta^2 = .005$, Wilks' Lambda = .98]; (d) Competence [$F_{(1, 90)} = .069, p = .79, \eta^2 = .001$, Wilks' Lambda = .97]; and (e) Intrinsic Motivation [$F_{(1, 90)} = .58, p = .50, \eta^2 = .006$, Wilks' Lambda = .97]. However, the Time x Group interaction achieved significance in all analyses: (a) on Interest [$F_{(3, 90)} = 3.59, p = .02, \eta^2 = .03$, Wilks' Lambda = .96]; (b) on Pressure [$F_{(3, 90)} = 4.43, p = .006, \eta^2 = .13$, Wilks' Lambda = .87]; (c) on Choice [$F_{(3, 90)} = 5.91, p = .001, \eta^2 = .16$, Wilks' Lambda = .87]; (d) on Competence [$F_{(3, 90)} = 4.70, p = .004, \eta^2 = .13$, Wilks' Lambda = .86]; and on (e) Intrinsic Motivation [$F_{(3, 90)} = 5.76, p < .001, \eta^2 = .16$, Wilks' Lambda = .82]. Because the Time x Group interaction in all five analyses was significant, a series of dependent-samples *t*-tests was conducted to identify which group showed changes from the post-test to the follow-up. The Combination Group was the only group that showed significant changes (i.e., improvements) from the post-test to the follow-up: (a) on Interest [$t_{(29)} = -3.20, p < .003, d = -.38$]; (b) on Pressure[$t_{(29)} = 3.20, p < .003, d = .42$]; (c) on Choice [$t_{(29)} = -2.99, p < .005, d = -.43$]; (d) on Competence [$t_{(29)} = -2.56, p < .001, d = -.33$]; and (e) on Intrinsic Motivation [$t_{(29)} = -3.83, p < .001, d = .43$] (Figure 4.6).

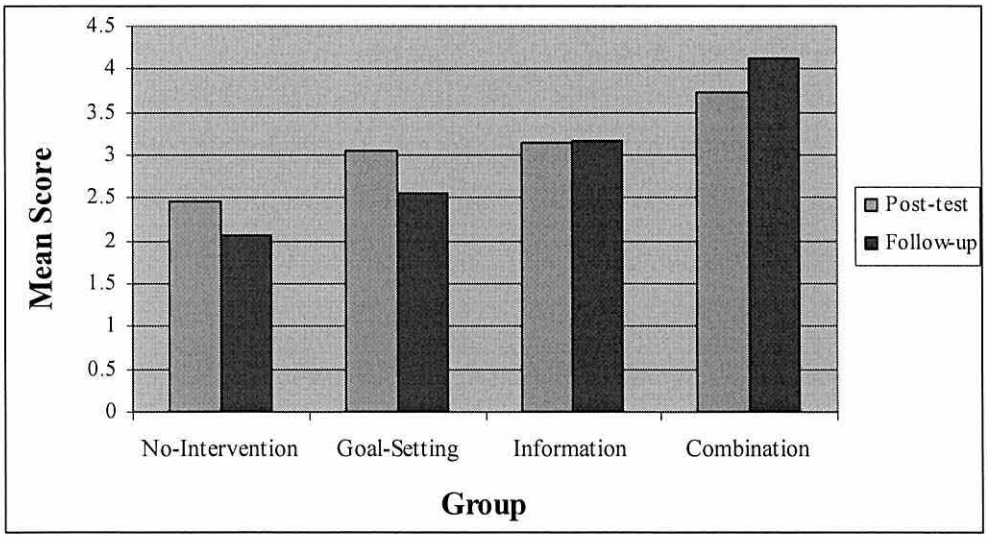

Figure 4.6. Mean intrinsic motivation for the four groups at post-test and follow-up.

To test the study hypothesis about the order of groups at the follow-up on the IMI subscales, a series of one-way ANOVAs was conducted. The results showed that the groups differed from one another on Interest [$F_{(3, 90)} = 15.38, p < .0001$]; Pressure [$F$ (3, 90) = 9.59, $p < .0001$]; Choice [$F_{(3, 90)} = 11.52, p < .0001$]; and Competence [$F_{(3, 90)} =$

30.22, $p < .0001$]. Post hoc comparisons showed that the groups were ordered as follows ($p < .05$) (a) on Interest and Competence: Combination Group > Information Group > Goal-Setting Group = No-Intervention Group; (b) on Pressure: Combination Group < Information Group = Goal-setting Group = No-Intervention Group; (c) on Choice: Combination Group > Information Group = Goal-Setting Group = No-Intervention Group; (d) on Intrinsic Motivation: Combination Group > Information Group > Goal-Setting Group = No-Intervention Group.

Changes in Adaptive Motivation

Based on guidelines described in Chapter 3, Adaptive Motivation was calculated for the TSPCI data on the post-test and follow-up for 95 participants. Table 4.18 shows the means and standard deviations of the four groups on Adaptive Motivation at post-test and follow-up.

To test whether the groups changed on adaptive motivation from the post-test to the follow-up, a repeated measures analyses of variance was conducted. Adaptive Motivation was entered as the within-participants variable (dependent variable). In this analysis, time had two levels: post-test and follow-up. Group was entered as the between-participants factor (fixed factor), and familiarities with the tasks (i.e., anagrams, maths, and Concept-Identification Cards) were entered as the covariates.

Table 4.18. Means and standard deviations of Adaptive Motivation on the post-test and follow-up, separately for each group.

	Post-test		Follow-up	
Group	*M*	*SD*	*M*	*SD*
No-Intervention	4.02	0.89	3.95	1.09
Goal-Setting	4.32	0.86	4.37	0.88
Information	4.51	0.73	4.63	0.68
Combination	4.93	0.68	5.65	0.82

The Mauchly's *W* test was not significant, indicating that the sphericity assumption was not a problem. There was no main effect for Time, [$F_{(1, 88)} = .36, p = .55$, $\eta^2 = .004$, Wilks' Lambda = .94]; however, the Time x Group interaction was significant, [$F_{(3, 88)} = 8.34, p < .0001, \eta^2 = .22$, Wilks' Lambda = .78]. Therefore, a series of dependent samples *t*-tests was conducted to determine which groups changed from the post-test to the follow-up. The Combination Group was the only group that showed significant change (i.e., improvements) on Adaptive Motivation from the post-test to the

follow-up [t (29) = -5.40, p <.0001, d = -.71] (see Figure 4.7). Other interactions were not significant: (a) Time x Familiarity with anagrams [$F_{(1, 88)}$ = .008, p = .55, η^2 = .004, Wilks' Lambda = .96]; Time x Familiarity with maths [$F_{(1, 88)}$ = .023, p = .63, η^2 = .003, Wilks' Lambda = .94]; and Time x Familiarity with Concept-Identification Cards [$F_{(1, 88)}$ = .79, p = .48, η^2 = .009, Wilks' Lambda = .98].

To test the study hypothesis about the order of groups on Adaptive Motivation at follow-up, a one-way ANOVA was conducted, which showed that the groups differed on Adaptive Motivation [$F_{(3, 91)}$ = 15.94, p < .005]. Post hoc comparisons revealed that the groups were ordered on Adaptive Motivation (p < .05) as follows: Combination Group > Information Group = Goal-Setting Group = No-Intervention Group.

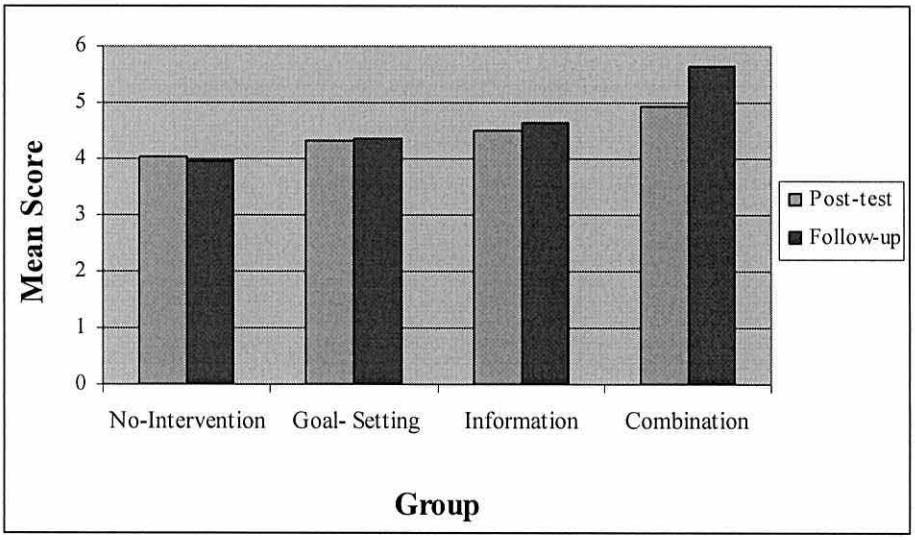

Figure 4.7. Mean Adaptive Motivation for the four groups in post-test and follow-up.

Discussion

It was hypothesized that the differences among the groups on sense of control, intrinsic motivation, and task-specific motivational structure that were seen at the post-test would be maintained at the follow-up, so that the groups would be ordered from highest to lowest as follows: Combined Group (i.e., information-enhancement and goal setting) > Information Group > Goal-Setting Group > No-Intervention Group. The Combination Group was the only group that increased from the post-test to the follow-up on Sense of Control, Intrinsic Motivation, and Adaptive Motivation. The groups were ordered as follows: (a) on Overall Sense of Control: Combination Group > Information Group = Goal-Setting Group > No-Intervention Group; (b) on Intrinsic Motivation: Combination Group > Information Group > Goal-Setting Group = No-Intervention

Group; and (c) on Adaptive Motivation: Combination Group > Information Group = Goal-Setting Group = No-Intervention Group.

One reason why the Combination Group may have increased on sense of control and intrinsic motivation from the post-test to the follow-up was that participants in this group reported spending more time thinking about the tasks than did participants in the other groups. Consistent with this result, there is evidence (e.g., Siekanska, 2004) that as the degree of success in solving difficult tasks increases, so does people's feelings of satisfaction and their tendency to think about the tasks they successfully completed. Another reason why the Combination Group reported greater competence and interest in the tasks than the other groups at the follow-up could have been that they paid more attention to the tasks while completing them than the other groups. The Combination Group's increase in intrinsic motivation is consistent with prior studies (e.g., Ryan & Deci, 2000b), which suggested that people's success in overcoming challenging situations increases their intrinsic motivation for engaging in the activity and their indulgence in it in the future. The Combination Group's increase in sense of control from the post-test to follow-up is consistent with Basoglu et al.'s (2005) results, which showed that increasing participants' sense of control over their PTSD symptoms improved over time even after two years.

The Combination Group's higher scores than other groups on all measures at the follow-up could be accounted for in terms of Csikszentmihalyi's theory of *sense of flow* (1990). The theory states that the sense of flow results from a perfect sense of accomplishment when people are able to choose their tasks, become highly involved with them, find the tasks challenging, and gain a feeling of control over them (Csikszentmihalyi, Abuhamdeh, & Nakamura, 2005; Jackson, 2004). In the study three, the Combination Group benefited from all of the conditions that are necessary for a sense of flow. However, the results of the follow-up session showed that for the sense of flow to *improve* over time, goal setting is also required. The goal setting that the Combination Group experienced perhaps challenged participants in this group, which in turn further enhanced their motivation to complete the tasks and improved their performance (Hwang et al., 2002; Young, 2005). Similarly, Payant (2005) found that structured goal setting had a positive effect on goal achievement.

As discussed earlier, when an individual decides to pursue a goal, a unique motivational state begins that is called a *current concern*. A current concern starts with a person becoming committed to achieving a goal, and it continues until the person achieves it or gives up the pursuit (e.g., Klinger, 1975, 1977, 1987, 1996). A person's

success or failure at achieving his/her goals depends on his/her motivational structure, which, as explained before, can be characterised in terms of its adaptivity or maladaptivity. The results of the follow-up session confirmed that the combination of information enhancement and goal setting had an additive impact on improving the participants' adaptive motivational structure than using either technique alone. Moreover, using the combined technique resulted in further improvements in adaptive motivation across time than using either information enhancement or goal setting alone. The combined technique included a variety of useful strategies: choice, information, immediate and contingent feedback, and goal setting. These strategies apparently helped the person to find his/her tasks more enjoyable and to become more involved in completing them. The combination of interest in, sense of control over, and success in pursuing a specific goal likely leads to an intentional or unintentional cognitive rehearsal of the good experience—a condition that further enhances components of the person's adaptive motivation, such as commitment and hope, while completing similar tasks in the future.

Conclusions

The follow-up session showed that the positive effects of an increase in sense of control and intrinsic motivation on adaptive motivational structure lasted across a 45-day period. The results also showed that, when both information enhancement and goal setting techniques were used, the positive motivational effects (i.e., on sense of control, intrinsic motivation, and motivational structure) developed even further across time.

One implication of these results is that increasing sense of control and intrinsic motivation would help people develop an adaptive motivational structure. The results suggested that when positive motivational changes are strong enough, it is possible for further positive changes to occur across time. Thus, the greatest improvement in and development of sense of control and intrinsic and adaptive motivation occurred when the combined technique (i.e., information enhancement and goal setting) were used. Nevertheless, from the current results, it was not clear whether the effects of the manipulation on motivational structure occurred because of sheer changes in participants' mood and affect or because of more fundamental changes in their motivation. In other words, could the experimental techniques have produced only changes in participants' mood, or did they actually lead to changes in components of participants' motivational structure? To help answer this question, the fourth study examined the effects of mood induction on motivational structure and the stability of the changes across time.

CHAPTER FIVE

Does Mood Induction Alter Motivational Structure?

In the previous study, the motivational manipulations resulted in significant differences in participants' adaptive motivational structure across the experimental groups. Participants in the Combination Group not only were higher on post-test adaptive motivation than the other groups but also showed significant motivational improvements across a 45-day follow-up period. However, it was unclear whether this group's improvements in adaptive motivation resulted from the experimental manipulations (targeting their sense of control and intrinsic motivation) or from their enhanced mood resulting from the experience of success. Therefore, the fourth study aimed to test whether positive and negative mood inductions could cause changes in participants' motivational structure. In other words, it would be valuable to know whether the mood inductions would influence participants' responses on the TSPCI after they completed the experimental tasks but in the absence of the motivational re-structuring techniques.

Research Hypotheses

The hypotheses were as follows:

1. The groups would differ from one another neither on pre-test positive or negative mood, scores on the TSPCI, nor on the number of anagrams or concept-identification tasks that solved.
2. On the post-test, compared to participants in the Neutral-Mood-Induction Group, participants in the Happy-Mood Group would have stronger positive mood and participants in the Sad-Mood Group would have stronger negative mood.
3. On the post-test, there would be no difference among the three groups in their scores on the TSPCI (i.e., Neutral-Mood-Induction Group = Happy-Mood Group = Sad-Mood Group).

Method

Power Analysis and Participants

A power analysis was conducted to determine the sample size needed. It was planned that ANCOVA and MANCOVA would be used to test the hypotheses. A medium effect size ($f = .30$) was calculated based on the results of Study Two, which was

deemed suitable to be used in the present power analysis. Using the G*Power programme (Erdfelder et al., 1996), with an expected effect size of $f = .30$, and three groups of participants, a sample size of 75 (i.e., 25 participants in each group) was calculated.

Seventy-five psychology students (male = 46.7 %, males' mean age = 19.60, *SD* = 1.44; females' mean age = 19.40, *SD* = 1.40) were recruited through the Student Participant Panel of the School of Psychology, University of Wales, Bangor. Each participant was randomly assigned to one of three groups until each group had 25 participants. Participants received course and print credits for their participation. The inclusion criteria were as follows: (a) being a native speaker of English or a true bilingual speaker of English, (b) having abstained from alcohol for at least six hours before the experimental session, and (c) not having participated in the two previous studies (i.e., Study Two and Study Three).

Instruments

Three types of instruments were used. The first type included the questionnaires that were administered to measure changes in participants' adaptive motivation, and changes in their positive and negative affect due to mood induction. These measurements were (a) the TSPCI and (b) the Positive Affect and Negative Affect Scale (PANAS); these tests were given at baseline (pre-test) and again post-experimentally (post-test). The second type of instruments included the same materials that the experimenter used in Study Two (i.e., anagrams and concept-identification tasks). The experimenter administered these materials under the no-intervention condition (see Chapter Three) to avoid experimental manipulation of the participants' success or failure rates. The third type of instruments were used in a musical mood induction and a progressive imaginary technique called *Bos's method* (2003); the experimenter used these two techniques to induce a happy or a sad mood in two of the experimental groups. The instruments are described in more detail in the next section.

Self-Report Measures

In the current study, two questionnaires were used: the TSPCI and the PANAS. The TSPCI was also used in the second and third studies (see Chapters Three and Four). As mentioned, the TSPCI measured participants' motivational structure related to all three tasks (i.e., anagrams, concept-identification cards, and maths) at the pre- and the

post-tests. The second questionnaire was the Positive and Negative Affect Scale.

Positive and Negative Affect Scale (PANAS)

The Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988) is a 20-item designed to assess participants' positive or negative affect. For example, it can be used to measure participants' affect about a target activity in laboratory experiments (e.g., Gadea, Gomez, Gonzalez-Bono, Espert, & Salvador, 2005; Jundt & Hinsz, 2002). It assesses positive affect with ten items and negative affect with ten items. Participants rate each item on a scale that ranges from one (*very slightly*) to five (*extremely*) (Appendix 18). The PANAS is designed to measure participants' mood within a specific period (i.e., now, today, past few days, past week, past few weeks, past year, or in general).

Positive and negative affect are calculated as the sum of a participant's responses on the positive and negative mood items, respectively. In the current study, the PANAS was used to measure changes in participants' momentary positive and negative affect from the pre- to the post-test resulting from the mood induction. There is evidence (e.g., Crawford & Henry, 2004; Ostir, Smith, Smith, & Ottenbacher, 2005) that the PANAS is both valid and reliable.

Mood Induction

People experience different degrees of positive and negative mood in their everyday lives. These affective states are thought to influence a large range of human behaviours and cognitions (e.g., Jundt & Hinsz, 2002; Schwartz, 2000). In the last few decades, several experimental procedures have been developed to induce certain types of mood in the laboratory. The mood induction procedures are very diverse (Martin, 1990; Westermann, Spies, Stahl, & Hesse, 1996). According to Garcia-Palacios and Banos (1999) mood inductions are "strategies whose aim is to provoke in an individual a transitory emotional state in a non-natural situation or in a controlled manner; the induced mood tries to be specific and pretends to be an experimental analogue of the mood that would happen in a certain natural situation" (p. 16). Mood induction procedures aim to be efficient in producing the target mood, and they are used extensively in experimental psychology (Gerrads-Hesse, Spies, & Hesse, 1994). This popularity is due to the growing interest in the interaction between emotions and cognitions (Lazarus, 1991) and to the new insights that mood induction studies have brought to psychopathology (Goodwin &

Sher, 1993). The main techniques for manipulating mood states in the laboratory are as follows:

Imagination techniques (e.g., Van den Bos, 2003; Taylor & Cooper, 1992; Velten, 1968) require the person to imagine a mood state or a situation that is associated with a given mood. For example, Van den Bos (2003) developed an imagination technique that is based on the participant's description of his/her affective imagination, emotional experiences, and related physical feelings associated with a given mood.

Autobiographical memory techniques (e.g., Abele, Gendolla, & Petzold, 1998; Otto & Schmitz, 1993), sometimes augmented by hypnosis (e.g., Weiss, Blum, & Gleberman, 1987), require the person remember an event from his/her own past that is associated with the target mood.

Memory for positive and negative life events (e.g., Abele, 1990; Seidlitz & Diener, 1993) is a technique that requires the person to recall events from his or her life that are associated with a given mood. This technique is similar to Autobiographical memory techniques but in the Autobiographical memory techniques, researcher use the technique of hypnosis to help person for remember an event from his/her own past but in this technique the hypnosis technique is not used.

Musical techniques (e.g., Kenealy, 1988; Phillips, Smith, & Gilhooly, 2002) require the person to listen to a selected piece of music, which, because of the characteristics of the music, help the person to achieve a target mood. These techniques usually require the person to try deliberately to feel a certain way.

The use of *film clips* (e.g., Abele et al., 1998; Ekman, Davidson, & Friesen, 1990) seeks to induce a target mood by showing short selections of films or videos to the participant.

Social interaction techniques (e.g., Josephson, Singer, & Salovey, 1996) usually require role-playing by a confederate, who aims to induce or produce a given emotional reaction in a participant through interacting with him/her in a social setting.

The *imitation of a facial expression* technique (e.g., Levenson, Ekman, & Friesin, 1990; Schiff & Lamon, 1989; 1994) usually requires relaxation or contraction of the facial muscles associated with a given emotion.

Positive and negative word lists, such as those included on the Affective Auditory Verbal Learning Test (Everhart & Demaree, 2003), require participants to read the words in order for a target mood state to be induced. The mood induces by a positive word list, for example, can vary from mildly happy to highly euphoric.

Mood induction slides (e.g., Schneidre, Gur, Gur, & Muenz, 1993) contain scenes

or facial expressions related to particular mood states.

The *Velten mood induction* technique (e.g., Finegan & Seligman, 1995; Gadea et al., 2005; Velten, 1968) uses a series of cards that are presented to the participant. With this technique, participants read a series of cards that either from mildly happy to highly euphoric or from mildly depressing to highly depressing. To produce a target mood state, a selective set of these stimuli are presented to the participant.

Musical Mood Induction and Bos's Technique

To induce a happy or a sad mood in the current study, a musical mood induction and a progressive imaginary technique termed Bos's method (2003) were used together. The following paragraphs describe these two techniques.

Mood inductions with music have been the focus of many studies for more than a century. Sutherland, Newman, and Rachman (1982) used music to create sad or happy moods in an experimental study. Several researchers (e.g., Bouhuys, Bloem, & Groothusic, 1995; Phillips et al., 2002) showed that different kinds of music could create different mood states. Other researchers (e.g., Sutherl et al., 1982) believe that music per se cannot automatically create a given mood state; rather, participants attain the instructed mood state through their own efforts (e.g., sad or happy). Martin (1990) reviewed 16 commonly used techniques for inducing temporary mood states and evaluated them on a range of factors, including their success rate, the intensity of the induced mood, and the range of moods that could be induced. He concluded that musical techniques could be reliably used in a wide range of experimental settings and in almost all cultures.

Whatever the underlying reason might be, music seems to have the ability to induce certain emotions. Emotions can be studied scientifically and thus the role of music in emotions can be understood in principle (Vastfjall, 2002). Several studies (i.e., Nguyen & Scharff, 2003; Krumhansl, 1997) have concentrated on four emotional states produced by music: sadness, happiness, anger, and fear. Clark (1983) concluded that music-based mood induction techniques were effective with 100% of participants. Barnes-Holmes, Barnes-Holmes, Smeets, and Luciano (2004) showed that happiness is created with louder music but sadness with softer music. Research has found (e.g., Blood, Zatorre, Bermudez, & Evans, 1999) high correlations between specific musical pieces and specific mood states. Gerrards-Hesse et al. (1994) reported a list of musical pieces that can be used to induce positive (happy), negative (sad), or neutral mood states.

In the current study, three 30-minute audio cassettes were used that contained various musical extracts. The extracts, obtained from Nilly Mor (October 2005; personal

communication), had been used in several earlier experimental studies (e.g., Barnes-Holmes, 2004; Nguyen & Scharff, 2003; Phillips et al., 2002). The extracts for each of the three different mood conditions (i.e., positive, negative, or neutral) were recorded as computerised sound files. Each musical selection took about five minutes to play, which was consistent with several other studies (e.g., de l'Etoile, 2002; Richell & Anderson, 2004).

Participants in the Happy-Mood Group listened to a tape that comprised the following two pieces: "Johnny's Mambo," by Michael Lloyd, from the album *Ultimate Dirty Dancing*; and "Russian Dance" from Tchaikovsky's *Nutcracker*. Participants in the Sad-Mood Group listened to a selection of pieces from Prokofiev's "Russia under the Mongolian Yoke," played at half speed. Finally, participants in the Neutral-Mood-Induction Group listened to audiotape that comprised two Chopin Waltzes (No. 11 in G Flat Major and No. 12 in F Minor), performed by Alexander Brialowsky.

Participants in the experimental groups received an additional manipulation. The experimenter used Bos's method (Bos, 2003) immediately after playing the musical selections. The method was administered in three steps: *First*, the experimenter instructed the participant "For one minute, imagine how you would feel if you were very *happy* [or *sad*]." *Then*, they were asked to complete two open-ended questions, as follows, (a) "Please write down, as specifically as you can, which emotions you experience when you feel very *happy* [or *sad*], and (b) "Please write down, as specifically as you can, which physical feelings you experience when you feel very *happy* [or *sad*]."

Pilot Study

Before the main study was run, a pilot study was conducted to determine how much time the experimenter would need to conduct the entire procedure and whether there were any potential problems.

The fourth study was initially designed to induce positive and negative feelings by using only Bos's technique. For the pilot study, nine participants (males = 55.6%) were randomly assigned to the Neutral-Mood-Induction Group, the Happy-Mood Group and the Sad-Mood Group. Each group included three participants. The results showed that participants in the Happy-Mood and Sad-Mood Groups differed from each other but neither of them differed from the Neutral-Mood-Induction Group. The results of the pilot study suggested that the manipulation was not effective enough to induce either a happy or a sad mood.

In the next pilot study, the experimenter decided to induce positive and negative

feelings by using a musical mood induction. Nine participants (males = 44.4 %) were randomly assigned to the Neutral-Mood-Induction Group or one of the two experimental groups. Again, the results showed that participants in the Happy-Mood and the Sad-Mood Groups differed from each other but neither of them differed from the Neutral-Mood-Induction Group. Therefore, the experimenter decided to use the musical induction and Bos's techniques together.

The decision to use a combined technique was consistent with the results of several studies suggesting that using multiple mood-induction increases the likelihood of inducing a target mood over using either of the techniques alone (e.g., Hernandez , Vander, & Spring, 2003; Lang, Bradley, & Cuthbert, 1995; Nguyen & Scharff, 2003; Phillips et al., 2002). Again, nine participants (males = 44.4%) were randomly assigned to the three groups. This time the results showed significant differences between the experimental groups and also between the experimental groups and the Neutral-Mood-Induction Group. Therefore, the researcher decided to use the two mood induction techniques in the main study.

Procedure

All participants were seen individually in one of the School of Psychology's experimental rooms, the background noise in which was minimal. The room was equipped with a PC. Prior to distributing the study pack, the experimenter briefly explained the goal of the study to the participants. Participants were then asked to study the Information Sheet and to sign the Consent Form, if they wanted to proceed with the experiment. Next, the participant began the baseline (pre-test) assessment by completing: (a) the Demographic Information Sheet, (b) PANAS, and (c) TSPCI. After completing the pre-tests, participants completed the two experimental tasks (i.e., anagrams and Concept-Identification Cards) under the no-intervention condition. The details of the procedures for completing the tasks under the no-intervention condition (researcher used this procedure in the Second study for the No-Intervention Group) are fully explained in the previous chapters. Upon completion of the experiment, the experimenter used the mood induction with the participants to induce the desired mood state, depending on their membership in one of the experimental groups (i.e., happy-mood or sad-mood groups). The researcher simultaneously applied two mood induction techniques (i.e., musical mood induction and Bos's technique). Then, on the post-test, participants first completed the PANAS. The reason for giving the PANAS was to determine whether the mood manipulation was effective in producing the expected changes in their mood. Next,

participants completed the TSPCI.

Participants' mood in the Sad-Mood Group was checked once again before they left the experimental session. This was done to ensure they did not leave the experimental room with a more negative mood than they had at baseline. If a negative mood due to the experimental manipulation persisted, the participant was given the positive-mood induction technique until there was no difference between his/her pre- and post-test PANAS scores. Seven participants from the Sad-Mood Group received the counter-mood induction technique as described above.

Results

Participants and their Demographic Characteristics

Seventy-five participants (46.1% male) were randomly assigned to the Neutral-Mood-Induction Group (48% male), the Sad-Mood Group (40% male), and the Happy-Mood Group (52% male). The number and percentage of males and females in the three groups is shown in Table 5.1.

Table 5.1. Sample size and gender composition of each group.

	Gender	
	Males	Females
Group	*N*	*N*
Neutral-Mood-Induction	12	13
Sad-Mood	10	15
Happy-Mood	13	12
Total	35	40

The nationality of the participants was as follows: There were 65 British (Neutral-Mood-Induction Group = 33.84 %, Sad-Mood Group = 33.84% and Happy-Mood Group = 32.32%) and 10 Welsh or Irish (Neutral-Mood-Induction Group = 30%, Sad-Mood Group = 40% and Happy-Mood Group = 30%) participants. On the Participant's Demographic Information Sheet, participants were asked to rate their proficiency in reading English on a continuum as follows: *weak* (1) , *medium* (2), *good* (3), *as native speaker* (4), and *native speaker* (5). Almost all participants rated their English reading proficiency as "a native speaker," except for three participants, who rated themselves "as a native speaker." Participants' mean age and years of university education completed are shown in Table 5.2.

Table 5.2. Means and standard deviations of age and years of university education for males and females in three groups.

		Group					
		Neutral-Mood-Induction		Sad-Mood		Happy-Mood	
Gender		*M*	*SD*	*M*	*SD*	*M*	*SD*
Males	Age	19.33	1.30	19.90	1.91	19.61	1.19
	Education	1.58	0.51	1.30	0.48	1.46	0.52
Females	Age	19.38	1.26	19.80	1.86	18.92	1.51
	Education	1.54	0.52	1.73	0.46	1.50	0.52

One-way ANOVAs showed that there were no differences among the groups on age [$F_{(2, 72)} = 1.16, p = .32$] or years of university education [$F_{(2, 72)} = .21, p = .81$]. A Kruskal-Wallace non-parametric test was conducted to test whether the groups differed from one another on gender. The results showed that the groups did not differ from one another on gender, X^2 (2) = .74, $p = .69$.

Pre-Test Results

Positive Affect and Negative Affect

It was hypothesised that the groups would not differ from one another at the pre-test on positive or negative mood. The means and standard deviations of the three groups on the PANAS at pre-test (baseline) are shown in Table 5.3. One-way ANOVAs showed that on the pre-test the groups differed from one another neither on Positive Affect [$F_{(2, 72)} = .58, p = .56$] nor on Negative Affect [$F_{(2, 72)} = .92, p = .40$].

Table 5.3. Means and standard deviations of three groups on PANAS positive and negative affect at the pre-test.

	Group					
	Neutral-Mood-Induction		Sad-Mood		Happy-Mood	
PANAS scale	*M*	*SD*	*M*	*SD*	*M*	*SD*
Positive Affect	26.56	6.78	27.20	6.08	26.48	6.28
Negative Affect	12.84	2.62	13.84	2.75	13.04	2.88

Responses on the TSPCI

The TSPCI was administered at the pre- and post-test assessments. Both the pre-

and post-test versions of the test required participants first to rate from zero to 10 their familiarity with three type of tasks: (a) Verbal Puzzles (i.e., anagrams); (b) Mathematical Puzzles (i.e., calculations); and (c) Concept Identification. Next, the test asked participants to rate their predicted performance on the three tasks (i.e., Anagrams, Concept Identification, and Maths) across eleven TSPCI dimensions (e.g., control, commitment, joy). Similar to the previous study, participants were not asked to complete any mathematical tasks, although the TSPCI still ask participants to provide ratings on all three of the tasks.

Familiarity with the tasks. In the first part of the TSPCI, participants were asked to rate their familiarity with the three types of tasks. Table 5.4 shows participants' mean ratings of their familiarity with the three tasks, separately for each of the groups.

Table 5.4. Means of participants' rating of their familiarity with the TSPCI tasks on the pre-test.

	Group		
Title of task	Neutral-Mood-Induction	Sad-Mood	Happy-Mood
Anagrams	6.69	6.19	6.80
Maths	6.60	6.56	6.20
Concept-Identification	4.64	4.88	4.60

One-way ANOVAs showed that on the pre-test TSPCI, there were no differences among the three groups on their familiarity with Anagrams [$F_{(2, 72)} = .23, p = .79$], Maths [$F_{(2, 72)} = .25, p = .72$], or Concept-Identification Cards [$F_{(2, 72)} = .28, p = .76$].

Factor analysis of the TSPCI. As noted in the second and third studies, a new formula was used to score the TSPCI. However, before using this formula in the current study, it was necessary to run Principal Component Analyses (PCAs) on the TSPCI pre- and post-test data to ensure that the patterns of factor loadings were similar to those from the pervious studies. Based on the guidelines discussed in Chapter Two, a mean for each of the TSPCI rating scales for the anagrams and Concept-Identification Cards was calculated and then these means were entered into two separate Principal Component Analyses (called "PCA-AC" for the PCA on the TSPCI data from the anagrams and the cards): one on the pre- and the other on the post-test results. Next, the TSPCI ratings for the Maths task were used in two separate PCAs (called "PCA-M" for the PCA on the TSPCI data from the maths tasks) —on the pre- and the post-test results (see Table 5.5). The patterns of the factor loadings were very similar to those reported in the previous chapters (see Chapter 2 and Chapter 3); hence, a detailed description of the loadings

distinguishing the two factors seems unnecessary here.

Table 5.5. Factor loadings for the mean TSPCI rating scales on the pre- and post-tests.

	Anagrams and Concept-Identification				Maths			
	Pre-test*		Post-test**		Pre-test#		Post-test##	
TSPCI rating scales	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2	Factor 1	Factor 2
Liking the tasks	.77	#	.81	-.31	.84	#	.82	#
Disliking the tasks	-.60	.40	-.54	.65	-.71	.38	-.67	.37
Control over success	.78	#	.70	#	.50	#	.52	#
Know what to do	.76	#	.81	#	.76	#	.81	#
How likely if I try my best	.87	#	.85	#	.73	#	.85	#
How likely if lucky	#	.61	#	.35	#	.31	#	.35
Joy if succeed	.38	#	.40	#	.43	#	.40	.42
Conflict (unhappiness)	#	.59	-.41	.70	#	.75	#	.78
Sorrow from failure	#	-.54	.55	-.79	#	-.63	.33	-.73
Commitment	.70	#	.72	#	.77	#	.71	#
Goal distance	#	.58	#	.49	#	.59	#	.40

Note. # = loadings < .30. * Factor 1 and Factor 2 explained 33.46% and 16.25% of the variance, respectively. ** Factor 1 and Factor 2 explained 32.93% and 19.07% of the variance, respectively. # Factor 1 and Factor 2 explained 33.37% and 14.95% of the variance, respectively. ## Factor 1 and Factor 2 explained 32.34% and 15.45% of the variance, respectively.

Finally, as in the previous chapters, the mean ratings from the TSPCI on the three tasks across both the pre- and the post-test were subjected to another PCA (see Table 5.6). The global PCA were conducted because pairwise comparisons showed that there were no differences between the factors extracted for the PCA-AC and the PCA-M—neither on the pre-test nor on the post-test. Before conducting each PCA, its suitability was tested using a correlation matrix (i.e., by inspecting the significant correlations among the TSPCI indices), Bartlett's test of sphericity (all p values < .05), and KMO (all values > .71)—i.e., a test of the factorability of the variables.

Table 5.6. Factor loading for the mean TSPCI rating scales on three tasks at pre- and post-tests.

	Three tasks			
	Pre-test*		Post-test#	
TSPCI rating scales	Factor 1	Factor 2	Factor 1	Factor 2
Liking the tasks	.75	#	.79	#
Disliking the tasks	-.52	.50	-.53	.63
Control over success	.78	#	.74	#
Know what to do	.78	#	.81	#
How likely if try best	.84	#	.85	#
How likely if lucky	#	.40	#	.50
Joy if succeed	.48	#	.47	.44
Unhappiness (conflict)	#	.72	#	.73
Sorrow from failure	.36	-.64	.39	-.71
Commitment	.70	#	.77	#
Goal distance	#	.54	#	.46

Note. # = loadings < .30. * Factor 1 and Factor 2 explained 33.31% and 15.87% of the variance, respectively. # Factor 1 and Factor 2 explained 32.93% and 19.07% of the variance, respectively.

Calculating the TSPCI Summary Index

As discussed in Chapter Three, it would not be appropriate to perform a factor analysis of variance on two separate sets of scores retrieved from the pre- and post-test administrations of a test. Therefore, an adaptive motivation summary score was calculated to make comparisons across the two administrations of the test feasible. The summary score was based on the TSPCI rating scales that loaded on Factor 1 from the pre-test (see Table 5.6). The one rating scale with negative a loading was subtracted from the sum of the rating scales with positive loadings.

The formula was: Adaptive Motivation = [[(like + control + what to do + try my best + happiness + frustration (sorrow) + commitment) – dislike] / 8]. This formula was used to calculate Adaptive Motivation for both the pre- and the post-test TSPCI. The means and standard deviations of the pre- and the post-test Adaptive Motivation summary scores are shown in Table 5.7.

Table 5.7. Means and standard deviations of three groups on the pre- and post-tests adaptive motivation summary score.

Group	Pre-test		Post-test	
	M	*SD*	*M*	*SD*
Neutral-Mood-Induction	4.83	1.01	4.67	.96
Sad–Mood	5.15	1.12	5.07	1.05
Happy-Mood	5.19	1.16	5.26	1.24

To determine whether the groups differed on pre-test Adaptive Motivation, a univariate analysis of covariance (ANCOVA) using GLM was conducted, in which Group was entered as the independent variable (fixed factor), and familiarity with the tasks (i.e., anagrams, concept-identification, and maths) were entered as the covariates, and pre-test Adaptive Motivation was entered as the dependent variable. There was no effect for Group on pre-test Adaptive Motivation (p =.38), indicating that the three groups did not differ from one another on adaptive motivation prior to the experimental induction.

Performance on Concept-Identification Cards and Anagrams

Table 5.8 shows the means and standard deviations of correct solutions of the Anagrams and Concept-Identification task of each group. One-way ANOVAs showed that the groups did not differ from one another on either the Concept-Identification task [$F_{(2, 72)} = .71, p = .50$] or the anagrams [$F_{(2, 72)} = .03, p = .97$].

Table 5.8. Means and standard deviations of anagrams and Concept-Identification Cards solved by each group.

	Group					
	Neutral-Mood-Induction		Sad-Mood		Happy-Mood	
Task	*M*	*SD*	*M*	*SD*	*M*	*SD*
Anagrams	7.96	2.39	7.80	2.84	7.80	2.36
Concept Identification	3.56	.92	3.80	1.00	3.44	1.22

To summarise, the pre-test results supported the first hypothesis that the groups would not differ from one another on pre-test PANAS Positive Affect, PANAS Negative Affect, or Task-Specific Adaptive Motivation nor on the number anagrams and Concept-Identification Cards that they correctly solved.

Post-Test Results

Changes in Positive Affect and Negative Affect

It was hypothesised that on the post-test, participants in the Happy-Mood Group would be higher on Positive Affect than the Neutral-Mood-Induction Group and that participants in the Sad-Mood Group would be higher Negative Affect than the Neutral-Mood-Induction Group. The means and standard deviations of the three groups on PANAS Positive Affect and Negative Affect at the post-test are shown in Table 5.9.

To determine whether the groups differed from one another on their post-test PANAS scores, a MANCOVA was conducted. In the model, Group (with three levels) was entered as the independent variable (fixed factor); pre-test PANAS Positive Affect and Negative Affect were entered as covariates; and post-test PANAS Positive and Negative Affect were entered as the dependent variables. Levene's test of equality of variances was not significant, indicating the adequacy of the MANCOVA model. The groups differed on the combined dependent variables [$F_{(4, 138)} = 55.63, p < .0001, \eta^2 = .62$, Wilk's Lambda = .15; Power = .94]. When the dependent variables were tested separately, there was also a main effect for Group on both subscales: post-test Positive Affect [$F_{(2, 70)} = 153.48, p < .0001, \eta^2 = .81$] and Negative Affect [$F_{(2, 70)} = 53.96, p < .0001, \eta^2 = .62$]. Post hoc pairwise comparisons revealed the sources of the difference among the groups on the post-test PANAS. On Positive Affect, the Happy-Mood Group was higher than the Neutral-Mood-Induction Group ($p < .0001$), and both groups were higher than the Sad-Mood Group ($p < .0001$). On Negative Affect, the Sad-Mood Group was higher than both the Neutral-Mood-Induction Group and the Happy-Mood Group ($ps < .0001$), but the latter two groups did not differ from each other ($p = .72$).

In addition, *t*-tests for paired-samples were conducted to test changes from the pre- to the post-test on the PANAS, separately for each of the three groups. The Happy-Mood Group increased from the pre- to the post-test on Positive Affect [$t_{(24)} = -7.98, p < .0001, d = -1.48$], but it showed a decrease in Negative Affect [$t_{(24)} = 2.65, p < .014, d = .72$].

Table 5.9. Means and standard deviations of three groups on PANAS positive affect and negative affect on the post-test.

	Group					
	Neutral-Mood-Induction		Sad-Mood		Happy-Mood	
PANAS scale	*M*	*SD*	*M*	*SD*	*M*	*SD*
Positive	27.00	6.81	14.24	5.92	36.44	7.13
Negative	12.80	2.05	28.20	1.59	11.24	1.98

On the other hand, the Sad-Mood Group showed an increase from the pre- to the post-test on Negative Affect [$t_{(24)} = -7.59, p < .0001, d = -1.71$] but a reduction in Positive Affect [$t_{(24)} = 12.53, p < .0001, d = 2.64$]. The Neutral-Mood-Induction Group did not change from the pre- to the post-test on Positive Affect [$t_{(24)} = -.66, p = .51, d = -.06$] or Negative Affect [$t_{(24)} = .94, p = .074, d = .01$]. These results are shown graphically in Figure 5.1.

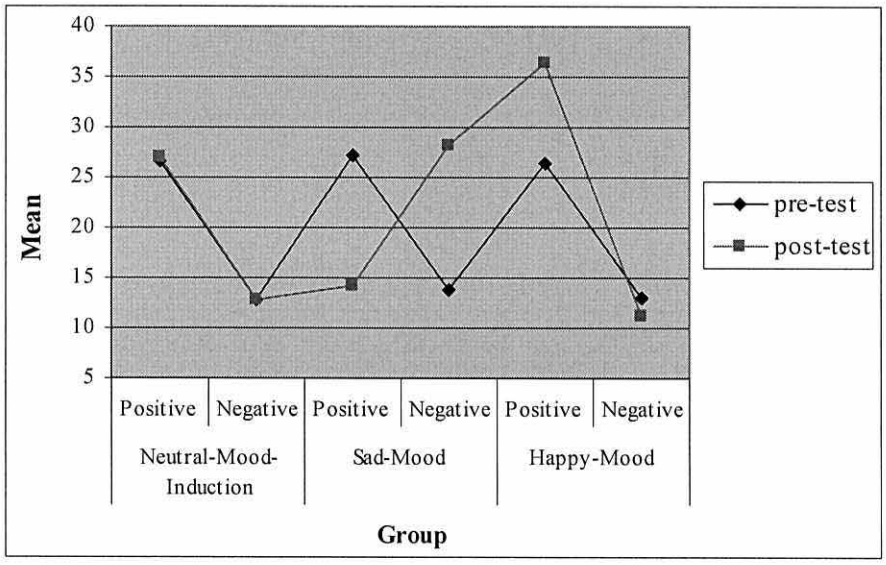

Figure 5.1. Mean PANAS Positive Affect and Negative Affect of the three groups on the pre- and post-tests.

To summarise, after the mood induction, the groups were ordered on Positive Affect from the highest to the lowest as follows: Happy-Mood Group > Neutral-Mood-Induction Group > Sad-Mood Group; on Negative Affect, they were ordered as: Sad-Mood Group > Neutral-Mood-Induction Group = Happy-Mood Group. Moreover, from the pre- to the post-test, the Happy-Mood Group's Positive Affect increased and its Negative Affect decreased. Conversely, from the pre- to the post-test, the Sad-Mood Group's Negative Affect increased and its Positive Affect decreased. The Neutral-Mood-

Induction Group's PANAS did not change from the pre- to the post-test. Accordingly, the results confirmed that the mood inductions were effective for inducing a happy and a sad mood.

Changes in Adaptive Motivation

The third hypothesis was that on post-test Adaptive Motivation, there would be no difference among the groups (i.e., Neutral-Mood-Induction Group = Happy-Mood Group = Sad-Mood Group). The means and standard deviations of the three groups on Adaptive Motivation at the pre- and post-test are shown in Table 5.7.

To determine whether the third hypothesis was supported, a univariate analysis of covariance (ANCOVA) was conducted, in which Group was entered as the independent variable (fixed factor); pre-test Adaptive Motivation and Familiarity with the tasks (i.e., anagrams, maths, and concept identification) were entered as the covariates; and post-test Adaptive Motivation was entered as the dependent variable. The results showed that there was no main effect for Group [$F_{(2, 68)} = 1.89$, $p = .16$, $\eta^2 = .05$], after controlling for the covariates—i.e., (a) pre-test Adaptive Motivation [$F_{(1, 68)} = 247.70$, $p < .005$, $\eta^2 = .79$]; (b) Familiarity with anagrams [$F_{(1, 68)} = .65$, $p = .43$, $\eta^2 = .009$]; (c) Maths [$F_{(1, 68)} = .76$, $p = .39$, $\eta^2 = .011$]; and (d) Concept-Identification Cards [$F_{(1, 68)} = .91$, $p = .34$, $\eta^2 = .013$].

To summarise, on the post-test, the groups did not differ from one another on Adaptive Motivation. Therefore, the third hypothesis was supported.

Summary of the Main Findings

The current study aimed to test (through the pre- and post-test measurements) the influence of induced happy or sad moods on participants' Adaptive Motivation, after they had performed a series of problem-solving tasks (i.e., anagrams and Concept-Identification tasks) in the absence of motivational re-structuring techniques. The main results of the study were as follows:

There was no difference among the three groups on pre-test PANAS or Adaptive Motivation. In addition, the groups did not differ from each other in the number of anagrams and Concept-Identification Cards that they successfully solved.

The musical technique and Bos's technique were effective in inducing positive and negative mood states. From the pre- to the post-test, the Happy-Mood Group's Positive Affect increased and their Negative Affect decreased; the Sad-Mood Group's

Negative Affect increased and their Positive Affect decreased; there was no change in the PANAS scores of the Neutral-Mood-Induction Group. Adaptive motivation did change as a result of the induced positive or the negative mood.

Subsidiary Results

The experimenter was also interested in determining whether participants' mere experience of success in completing the experimental tasks would influence their adaptive motivation. The criterion for judging a participant's "success" was whether or not he or she answered three or more (of five) card sets and 10 or more (of 20) anagrams. Thirty-five participants [Neutral-Mood-Induction Group = 14 (male = 56%); Happy-Mood Group = 10 (male = 40%); and Sad-Mood Group = 11 (male = 44%)] were identified as successful. A Kruskal-Wallace non-parametric test was conducted to test whether the groups differed from one another on the number of anagrams and Concept-Identification Cards that they successful solved. The results showed that the groups did not differ from one another on the number of anagrams and Concept-Identification Cards that they successful solved, X^2 (2) = 1.37, p = .59.

Next, a univariate analysis of covariance (ANCOVA) using GLM was conducted, in which Success (two levels) and Group (three levels) were entered as the independent variables (fixed factors), pre-test Adaptive Motivation was entered as the covariate, and post-test Adaptive Motivation was entered as the dependent variable. Levene's test of equality of variances was not significant, supporting the adequacy of the MANCOVA model. The results showed that there was a main effect for neither Success [$F_{(1,68)}$ = .048, p = .83, η^2 = .001], Group [$F_{(2, 68)}$ = 1.63, p = .20, η^2 = .046], nor the interaction between Success and Group [$F_{(2, 68)}$ = .20, p = .82, η^2 = .006], after controlling for pre-test Adaptive Motivation [$F_{(1, 68)}$ = 300.87, p < .0001, $\eta^2_{\cdot}$ = .82].

The results showed that the mere experience of success did not improve participants' Adaptive Motivation, regardless of their group membership. The finding supports Chandler, Seibel, and Spies's (1990) results, which showed that there was a difference between *actual success* and *perceived success* in their effect on individuals' self-referenced attributions. Perceived success was associated with greater satisfaction and stronger internal attributions than the experience of actual success per se. In addition, Freitas and Higgins (2002) showed that participants' perceptions of success in completing their tasks increased their satisfaction with the tasks and their willingness to repeat them; the observed effects were independent of participants' actual success on the experimental

tasks. Pinqurart and Sibereisen (2006) also reported that cancer patients who perceived that their treatment would be successful were more inclined to initiate new social contacts than those who did not expect success. Therefore, it seems that actual success has less effect than perceived success on goal pursuits and goal-related motivational consequences. Participants in the High-Sense-of-Control Group in Study Two (Chapter Three) and those in the Combination Group in Study Three (Chapter Four) chose the task they would complete, received key information about how to complete their tasks more successfully, received contingent and immediate feedback, and were encouraged to set goals in order to increase their motivation and improve their performance. All of these strategies were assumed to increase participants' perceived success in completing their tasks. Snyder, Cheavens, and Michael (2005) also reported that perceived success in goal pursuits increases people's positive emotions.

Discussion

In the current study, musical and Bos's methods were used successfully to induce happy or sad mood states. The effectiveness of using the two mood induction techniques together supported the results of prior studies (e.g., Hernandez et al., 2003; Lang, Bradley, & Cuthbert, 1995; Phillips et al., 2002) that showed that combining two techniques increases the likelihood that a mood induction will be successful.

As stated, no differences were found among the three groups (i.e., Neutral-Mood-Induction Group, Happy-Mood Group, and Sad-Mood Group) on pre-test positive affect or negative affect. However, on the post-test, the Happy-Mood Group was higher on positive affect and lower on negative affect than the other two groups. On the other hand, participants in the Sad-Mood Group were higher on negative affect and lower on positive affect than the other two groups. The observed differences between the groups on post-test positive affect and negative affect was attributed to the experimental mood manipulations.

As mentioned, the aim of the current study was to assess the effects of mood induction on adaptive motivational structure. Therefore, it was necessary to use specific manipulations to induce positive and negative moods without creating feelings of success or failure in the participants. This was because several studies have shown that the experience of success or failure also leads to feelings of happiness or sadness (Detweiler-Bedell, 2002; Henkel & Hinsz, 2004), as would be expected. Recall that Study Two and Study Three also showed that participants' experience of success was associated with

increases in both their sense of control and their intrinsic motivation.

The researcher utilized mood induction techniques *after* the participants' had had experience with the anagrams and Concept- Identification task. This was done in order to minimize any prior effects of the mood induction on participants' feelings of success or failure from completing the tasks. For example, Zarinpush (1996) showed that even a small change in a specific feeling (e.g., a happy or a sad mood) might have a significant influence on decision-making, judgment, and other cognitive processes. There is also evidence that inducing a happy mood before participants complete a task can increase their chances of success (e.g., Lyubomirsky, King, & Diener, 2005). An induced positive mood prior to task completion might facilitate the problem solving, reduce the number of errors made, and reduce the number of trials needed to solve a task successfully (e.g., Forgas, Burnham, & Trimboli, 1988; Nasby & Yando, 1982). Bryan and Bryan (1991) found that students who were induced with a positive mood completed a series of math tasks more accurately and with greater self-efficacy than students in a no-mood induction condition. Furthermore, Bless et al. (1996) found that when participants felt positive (e.g., in a happy mood), they showed greater confidence about their general knowledge than they otherwise did. Moreover, positive mood is associated with improvements in the brain's functions (e.g., Habel et al., 2005), cognitive performance, motivation, and well-being (e.g., George, 1989; 1991; Kelly, 2004; Sinclair & Mark, 2002).

Conversely, evidence (e.g., Conway & Giannopoulos, 1993; Dobson & Dobson, 1981; Ellis, Thomas, & Rodriguez, 1984) shows that negative mood impairs participants' problem solving, decision-making, and cognitive performance when they complete memory tasks. To conclude, the results of these various studies underscore the importance of the procedure followed in the current study of inducing the mood states *after* participants had completed the tasks. This was done in order to avoid the effects of prior mood induction on the participants' experience of success or failure in completing the tasks. The pre- and post-test PANAS results indicated that participants' mood had remained stable when they were given the mood induction.

In contrast to the results of Study Two and Study Three, participants in the different groups in the current study showed no difference in their performance on the anagrams and concept-identification cards. The finding supports the assumption that the High-Sense-of-Control Group's (Second Study) and the Combination Group's (Third study) success were due to the experimental techniques used in the studies. The components were (a) choosing the task (Sansone & Smith 2000; Thomas, 2000); (b) receiving relevant information (e.g., Harmon, 2002); (c) receiving contingent and

immediate feedback (e.g., West et al., 2001); and (d) goal setting because achieving pre-set goals increases people's pleasure from making progress and from achieving their goals (e.g., Gauggel & Hoop, 2004; Gauggel et al., 2002).

Participants' adaptive motivation did not change from the pre- to the post-test, regardless of whether they were induced with a happy or a sad mood. The failure of the mood induction to change adaptive motivation was expected because motivational structure is not a simple construct that is influenced only by one's current mood. Motivational structure includes a combination of factors (e.g., control, commitment, emotional involvement) that influence people's goal strivings. The results of the current study support those of other studies (e.g., Mackie & Worth, 1989; Petty, Wells, & Brock, 1976) that showed that a happy mood did not facilitate participants' performance on complex tasks such as message scrutiny. In addition, Schwarz (1990) found that an induced positive mood did not enhance participants' analytical processing. Similarly, Wegner, Erber, and Zanakos (1993) showed that inducing a happy mood did not help participants to better recall nine-digit numbers; surprisingly, their participants reported a stronger negative mood at the post-test than at the pre-test.

Conclusions

The present study used a novel combination of music and Bos's technique to test experimentally the influence of happy and sad moods on task-specific adaptive motivation. The results showed that the manipulations were effective in inducing happy or sad mood states, but that they did not affect participants' task-specific adaptive motivation. Although an induced positive mood might improve participants' performance and increase their perceived success on simple tasks, such as simple mathematical problems, it probably does not alter their more complex goal-pursuit patterns. It seems logical to assume that improvements in motivational structure require multi-dimensional interventions that address various aspects of the complex construct. Merely changing their mood state is unlikely either to improve or to impair participants' task-specific motivational structure.

CHAPTER SIX

General Discussion

Rationale for the Study

Goal strivings are an integral part of humans' lives. Having a purpose is also an integral part in all goal-seeking activities; hence, goal pursuits are a vehicle that gives meaning to humans' lives. Individuals' success in achieving their goals determines their emotional well-being. To achieve their goals, people need to be motivated. People's motivation to pursue their goals can manifest itself in various ways both explicitly (e.g., "all I want now is some food to eat") and implicitly (e.g., "the sight of that food made me feel hungry"). One's decisions can be influenced by various factors (e.g., both past and current factors and factors such as personality and culture). In addition, people are emotionally involved in the pursuit of their goals. They expect to experience certain affective changes if they achieve their goals or fail to achieve them. The ability to anticipate affective changes leads a person to make behavioural decisions to become committed to pursuing a goal or to disengage from it. Klinger and Cox (1988, 2004) suggested that the most proximal factor that underlies a person's goal-related decisions (such as the decision to drink alcohol or not) is the net expected affective gains from deciding to do one thing rather than the other. Not only people's decisions to pursue goals but also the pattern of their goal strivings are influenced by their emotional expectancies (e.g., happiness from achieving a goal or sadness from failing to achieve it).

Each goal pursuit corresponds to a motivational state termed *current concern* (see Chapter One). A current concern is a motivational state that begins when a person becomes committed to pursuing a goal, and it continues until the person achieves the goal or relinquishes it. A current concern, therefore, is the result of a decision-making process. It is a dynamic motivational process; it coordinates the explicit and implicit resources within an individual to facilitate achieving the goal (Cox et al., 2006). Therefore, a current concern does not exist in isolation; rather, it interacts with the person's outer and inner world. Although one's initial commitment to pursue a goal initiates a current concern, the degree to which this motivational state can successfully channel the person's resources toward achieving the goal is not predetermined; goal-seeking patterns are not inherited in people as a package.

As discussed in Chapter One, there are factors that influence people's *chances of success* in their goal-seeking activities, among which are their sense of control and

intrinsic motivation. It was also discussed how relationships among goal pursuit activities and sense of control and intrinsic motivation are reciprocal. For example, although a person's sense of control plays a crucial role in his/her attempts to achieve a goal, the experience of success, in turn, increases the person's sense of control. In fact, there are various cognitive and emotional factors (e.g., perceived control, knowledge, commitment, affective expectancies) that influence an individual's goal-seeking behaviours; they can gradually develop into a more-or-less stable pattern termed *motivational structure*. Cox and Klinger (2002; 2004a) have shown that the construct motivational structure is crucial for understanding people's goal-directed activities.

Motivational structure can vary in terms of its degree to which it is adaptive or maladaptive. Evidence (e.g., Cox et al., 2002; Cox & Klinger, 2002, 2004a) shows that, compared to maladaptive motivation, adaptive motivation is associated with the following characteristics: having (a) more appetitive goals; (b) greater personal control over achieving goals; (c) more hope for achieving goals; (c) greater emotional involvement in goal outcomes; (d) greater commitment to goal pursuits; and (e) less perceived distance from goal attainments. On the other hand, a maladaptive motivational structure often prevents the individual from achieving his or her goals. For example, chances of achieving a goal are reduced for a person who develops strong emotional expectancies about his/her success without having sufficient commitment to pursue his/her goals (Cox et al., 2002). In addition, goal pursuits may diminish in intensity because of misguided decision-making, such as by selecting aversive goals or having conflicting goals or by the manner in which the person pursues his/her goals; these characteristics of goal pursuits suggest a maladaptive motivational structure.

There is evidence to show that maladaptive motivation is associated with greater alcohol use than is adaptive motivation. Various researchers (e.g. McCusker, 2001; Robinson & Berridge, 2001, 2003; Tiffany & Conklin, 2000; West, 2001) agree that the inability of alcohol abusers to control their urges to drink is one of the key criteria in the definition of alcohol abuse. Differences in personality characteristics between alcohol abusers and non-abusers, including emotional reactions and temperament, have been also found to influence individuals' decisions to drink alcohol (Cox, 1983, 1987; Cox & Klinger, 1987). Alcohol abusers are reported to be higher on social non-conformity (Smith & Newman, 1990), risk taking (Soderstrom et al., 2001), and sensation seeking (Finn, Sharkansky, Brandt, & Turcotte, 2000) than non-abusers. Therefore, it seems reasonable to assume that alcohol abusers will be motivationally different than non-abusers. Cox and Klinger introduced the concept *motivational structure* to characterize

these differences. Some salient differences in the motivational structure of alcohol abusers and non-abusers could reasonably be expected.

Treatments for excessive drinkers try to help them gain control over their behaviour. Nevertheless, approximately 75% of excessive drinkers who enter treatment relapse within three months after completing it (Whitworth et al., 1996). These high failure rates are worrying. They occur despite the fact that problem drinkers are aware of the negative consequences of their drinking and frequently decide never to drink again. These excessive drinkers are viewed as having lost control over their drinking (Tiffany, 1990). The motivational model of alcohol use (e.g., Cox & Klinger, 1988, 2004b) proposes that to the extent that people lack motivation to attain alcohol-unrelated goals, they will have less control over making decisions not to drink. Conversely, to the extent that drinkers have adaptive motivation for setting and pursuing alcohol-unrelated goals, they will be more likely not to drink.

To conclude, an adaptive motivational structure increases people's chances of achieving their goals, and a maladaptive motivational structure reduces their chances of doing so. Greater success in achieving important goals is expected to be positively associated with emotional satisfaction and happiness; conversely, a low rate of success associated with maladaptive motivation is associated with emotional dissatisfaction. The motivational model of alcohol use (Cox & Klinger, 1988; 2004b) postulates that people with a maladaptive motivation are at greater risk of resorting to alcohol to enhance their undesirable emotional states. Clearly, a chemical, short-term remedy to escape feelings of failure leads to a malicious cycle of more failure and a greater need to drink alcohol. The motivational model asserts that people's motivation to drink increases as their satisfaction from other incentives decreases; conversely, the motivation to drink decreases as people's satisfaction from other incentives increases. In support of this prediction, Man et al. (1998) distinguished alcohol abusers from a demographically similar sample of non-abusers based on their motivational characteristics related to their goal pursuit activities.

Despite the importance of adaptive motivational structure in successful goal-pursuits, it was not clear prior to the thesis research whether motivational structure could be changed through experimental manipulation of the constituent factors. Accordingly, the current research first assessed relationships among sense of control, intrinsic motivation, and motivational structure, in an attempt to identify ways of improving people's motivational structure by manipulating the factors that affect it. Sense of control and intrinsic motivation were identified as two of the important factors.

As discussed in Chapter One, sense of control and intrinsic motivation have been the focus of much research. Evidence suggests that sense of control and intrinsic motivation play a vital role in people's success in goal pursuits. Evidence was summarised to indicate that people with a high sense of control feel more committed to pursuing their goals, feel more hopeful about goal attainments, have a greater sense of well-being, and they perform better cognitively than those with a low sense of control. Conversely, poor sense of control and helplessness are associated with lower success rates and a greater risk of making decisions to drink alcohol (in an explicit and an implicit way). Alcohol abusers with a high sense of control are more likely to recover from their addiction than those with low sense of control. Therefore, it was reasonable to try to find factors that increase people's sense of control.

Evidence was presented that intrinsic motivation also plays an important role in people's success in goals pursuits. Briefly, with respect to their goal pursuits, people who are motivated intrinsically report greater effort; more concern about future consequences of their actions; greater self-regulation; better cognitive functioning; more persistence and, consequently, more achievement, and greater initiative than those who are extrinsically motivated. Moreover, intrinsically motivated people attribute greater importance to their personal role in their goal pursuits, greater commitment to their goals; they find more meaning in their goal pursuits and enjoy them more, regardless of whether they achieve their goals and regardless of feedback from others, intrinsically motivated people are more likely to achieve their goals than are extrinsically motivated individuals (e.g., Murphy & Roopchand, 2003; Waterman, 2005). As far as health-related goals are concerned, including the goal of controlling one's drinking, intrinsically motivated people are better able to achieve their goal. Externally motivated drinkers pay less attention to their health and are more poorly motivated to change their excessive drinking, whereas intrinsically motivated people require less external support and external reinforcement to change their behaviour. Extrinsically motivated people are more likely to make little effort, avoid challenging tasks, fear failure, have a low self-concept (especially following failure), lack perseverance, and to feel helpless. When facing a difficult problem, people with extrinsic motivation are more likely to stop trying and to resort to their unhealthy behaviours than are people with intrinsic motivation.

To conclude, sense of control and intrinsic motivation play an important role in people's pursuit of goals. The aim of the current study, therefore, was to determine how these motivational variables are related to motivational structure. The researcher hypothesised that by increasing people's intrinsic motivation and sense of control their

motivational structure would become more adaptive, and this change would then reduce participants' motivation to drink alcohol.

Summary of the Results

The first study assessed relationships among participants' sense of control, helplessness, motivational orientation (i.e., intrinsic/extrinsic), habitual alcohol consumption, and motivational structure (i.e., adaptive/maladaptive).

The main findings of the first study were as follows:

First, the PCI data were subjected to a principal component analysis (PCA). The patterns of factor loadings of the PCI indices indicated two distinctive motivational structures: an adaptive and a maladaptive one (see Chapter Two). The maladaptive motivational structure was characterised by lack of knowledge about and little control over achieving goals. Participants with a maladaptive motivational structure also believed that luck played a more important role in attaining their goals than their own efforts. They did not report strong expectations of either happiness from achieving their goals or sadness from failing to achieve their goals. In contrast, the adaptive motivational structure was characterised by positive loadings on appetitive motivation and realistic feelings of control, commitment, emotional investment in goal pursuits, and being hopeful about and perceiving control over goal achievements. Adaptive motivational structure was also characterised by appetitive goal pursuits; that is, trying to reach attractive goals rather than avoiding or trying to get away from unpleasant things.

Second, it was found that the adaptive motivational structure was positively correlated with sense of control and intrinsic motivation. Although sense of control, intrinsic motivation, and adaptive motivation were all negatively correlated with alcohol consumption, motivational structure was a full mediator of the relationship between sense of control and intrinsic motivation with the amount of alcohol that participants habitually consumed. The results of the mediational analyses suggested that sense of control and intrinsic motivation are involved in the development of adaptive motivation—which, in turn, was negatively associated with alcohol consumption.

To test cause-and-effect relationships that the results of the questionnaire study suggested, it was necessary to conduct a series of experimental studies. There were many unanswered questions about the relationships between motivational structure, sense of control, intrinsic motivation, and urges to drink, which could not be answered by a questionnaire study. For example, do sense of control and intrinsic motivation affect people's urges to drink? Would participants who were *induced* with low or high sense of

control and intrinsic motivation show changes in the relationship between their motivational structure and urges to drink?

Another issue was whether an intervention to increase intrinsic motivation and sense of control would help increase participants' adaptive motivation. As mentioned in the literature review, the previous evidence showed that factors such as choice, knowledge, feedback, and goal-setting can determine people's intrinsic motivation and sense of control. Therefore, it was hypothesized that experimental techniques designed to change these motivational variables would lead to increases in participants' sense of control and intrinsic motivation and, in turn, their adaptive motivation. In summary, the main goal of the experimental studies was to determine the effects of induced changes in sense of control and intrinsic motivation on task-specific personal concern inventory, and to assess whether these changes affected participants' implicit and explicit urges to drink.

In the second study, participants were randomly assigned to a no-intervention group or to one of the two experimental groups: low- or high- sense of control. The aims of this study were to assess (a) the effectiveness of a new experimental technique (that used choice, knowledge, feedback, and goal-setting) for manipulating individuals' sense of control and intrinsic motivation; (b) whether the changes would affect participants' success or failure in completing the experimental tasks (i.e., Anagrams and Concept-Training Cards); (c) whether these changes would affect participants' task-specific motivational structure; (d) whether the induced changes in participants' sense of control and intrinsic motivation would affect their performance on cognitive tasks (i.e., memory tasks and verbal quizzes); and (e) whether the induced changes in the participants' motivational structure would affect their explicit and implicit urges to drink.

The main results of the second study are as follows: It showed that high or low sense of control was successfully induced in the experimental groups. In addition, compared with the other groups, the High-Sense-of-Control Group (a) was more successful in completing the experimental tasks; (b) completed the cognitive tests quicker and more accurately; (b) were higher on adaptive motivation; and (c) reported weaker urges to drink and less attentional bias for alcohol-related stimuli on the alcohol-Stroop test. To conclude, the results demonstrated a significant correlation between sense of control, motivational structure, and implicit and explicit measures of urges to drink.

The High-Sense-of-Control Group's better performance than the No-Intervention and the Low-Sense-of-Control Groups on the verbal and memory tasks is consistent with similar findings indicating that having a strong sense of control improves a person's cognitive performance (e.g., Miller & Gagne, 2006). People with lower sense of control

are more vulnerable to memory and health problems in later life, in part because they are less likely to use compensatory strategies or adopt preventative behaviours (Lachman & Firth, 2004). Implications of these results for interventions are discussed later in this chapter.

The observed relationship between motivational structure and sense of control can be conceptualised as follows. In creases in sense of control and intrinsic motivation increase were associated with increases in adaptive motivation. This relationship supports Buikema's (2003) results indicating that students' learning improves if they can choose which task to do, feel control over completing them, think critically, and collaborate in the learning process. In addition, Armbruster, Lehr, and Osborn (2001) showed that teaching specific skills helps students to improve their performance on cognitive tasks, such as reading comprehension.

The Low-Sense-of-Control Group showed both greater self-reported urges to drink and alcohol attentional bias than the No-Intervention Group. The reason for this difference could be that the Low-Sense-of-Control Group experienced stronger negative emotions— because of their experience of failure—than the No-Intervention Group. This result supports the theory of current concerns, which explains that having a current concern for drinking alcohol leads to the development of attentional bias for alcohol-related stimuli (Cox et al., 2006).

The second study used two different sets of techniques to induce high or low sense of control; however, it was not clear which component of the technique was most effective in increasing sense of control and intrinsic motivation. Therefore, in the third study, the researcher evaluated the relative or combined effects of enhancement-information and goal setting on increasing sense of control and task-specific motivational structure in a 2 x 2 factorial design. In other words, there were four groups in the study: (a) No-Intervention Group; (b) Goal-Setting Group; (c) Information Group; and (d) Combination Group. The results showed that the different combinations of the techniques resulted in different levels of sense of control among the four groups. Although enhancement information or goal setting, when used separately, both increased participants' sense of control and intrinsic motivation, the combination of the two techniques was most effective. Compared to the Goal-Setting Group, the Combination and Information groups showed (a) greater increases in positive and overall sense of control and intrinsic motivation and (b) greater reductions in negative sense of control and perceived pressure. The results also showed that the greatest increase in adaptive motivation resulted from the combined techniques (i.e., goal setting plus enhancement

information). In addition, the durability of the induced sense of control and intrinsic motivation was tested over a 45-day period. Only the combination group showed stability in their positive and overall sense of control and intrinsic motivation. The increases in sense of control and intrinsic motivation led to increases in adaptive motivation at the post-test, which were maintained at the follow-up. These results support Csikszentmihalyi's et al. (2005) argument that when goals and objectives are clear, the feedback is specific, distractions are limited, and the task seems relatively easy, the person's intrinsic motivation and sense of control quickly develop. Csikszentmihalyi (1998, 2005) introduced sense of flow as a subjective state that people report when they are completely involved in something to the point of forgetting time, fatigue, and everything else but the activity itself. The results of the follow-up in Study Two suggested that for the *sense of flow* to improve across time, goal setting is also required. The lack of goal setting could be the reason why the information group's adaptive motivation had decreased at the 45-day follow up. As mentioned, the combination group received both enhancement-information and goal setting, the effects of which were additive. The two together strategies used together provided an extra challenge for the participants that further enhanced the combination group's motivation and actual performance (Young, 2005).

It was not clear, however, whether the manipulation techniques improved task-specific motivational structure because it increased participants' sense of control and intrinsic motivation or simply because it enhanced their positive mood following the experience of success. This is an important issue because there is evidence suggesting that people show more optimism about achieving their goals when they are in a positive mood than when they are in a negative mood (Wright & Bower, 1992; Salovey & Birnbaum, 1989).

For this reason, the fourth study was conducted to determine whether the observed changes in participants' TSPCI indices from the pre- to post-tests resulted from changes in their mood. The experimental techniques (i.e., music and Bos's technique) were effective in inducing neutral, happy, or sad mood states in the participants. Nevertheless, the induced happy or sad mood did not alter participants' adaptive motivation from the pre- to post-test. Thus, the motivational changes that were observed in the second and third studies could not be attributed solely to changes in the participants' mood.

Implications for Future Research

As discussed earlier, several studies have shown that adaptive motivation is associated with positive goal-related characteristics, such as optimism, commitment, and emotional involvement. Adaptive motivation is associated with greater satisfaction with life and fewer problematic compensatory behaviours, such as excessive drinking. The current research showed that increasing participants' sense of control and intrinsic motivation were associated with increases in their adaptive motivational structure. The combination of enhancement information and goal setting led to greater improvements in adaptive motivation than using either technique alone.

The manipulative techniques used in this study could be applied in various situations, in which it is important to increase individuals' intrinsic motivation, sense of control, adaptive motivation, and consequently their personal progress and experiences of success. Examples include educational settings and clinical practices and other places where psychological interventions are used, such as in centres for the treatment of addictive behaviours. Potential applications of these techniques in two of these settings are now described.

Educational settings. To have a class that is actively involved, teachers are recommended to organize and maintain an environment in which students feel secure, happy, and challenged. Above everything else, a teacher needs to know how to reduce students' problems, increase their satisfaction, and improve their organizational efficiency and effectiveness. Two of the problems that teachers consistently need to address in the classroom are (a) student's inattention (e.g., Shore, 1998) and (b) the lack of discipline (e.g., Levin & Nolan, 2006).

Attention is an important requirement in a successful classroom. Most students, especially younger ones, are naturally active, and they might find it difficult to concentrate a task for very long time. Zanni (2006) indicated that attention problems affect both behaviour and cognitive processes related to language, memory, and perceptual abilities.

To improve students' attentional span, teachers need to create enjoyable lessons. Students pay more attention to their tasks when they find them enjoyable and interesting. Renninger (2000) suggested that teachers should aim to increase students' interests in new subjects because being interested in a task enhances the motivation to do it and the attention that is paid; interest, therefore, facilitates new learning. Moreover, interest and motivation increase persistence and perseverance, and they led to better task performance.

In addition, students are more likely to pay more attention to new tasks if they feel

that they have selected the new tasks and they want to learn them. Several studies (e.g., d'Agincourt-Canning, 2006; Langer & Rodin, 2004) have shown that giving participants a chance to choose their own goal and pursue it increases their sense of responsibility about reaching it. Creating such a situation in a classroom can be very simple. For example, a teacher could instil a sense of choice when the students are acquiring a new mathematical skill by providing when with two alternative problems from which to choose. Students could be told, "You have Sheets A and B to complete. It is up to you whether you complete Sheet A or Sheet B first" or "You are going to answer a few questions now as a competition. Would you like to do give our answers alone or as part of the group?"

Trying to learn a new concept or to complete a new task (i.e., learning new information or acquiring a new skill) when the person does not understand the necessary basic concepts involved renders the new learning a boring process and quickly diminishes the learners' ability to sustain their attention to the new materials. In addition, before teaching a new lesson, it would be useful for the teacher to give some basic information about the new material to help students to move in the right direction and to better understand the new materials or to better perform the new tasks. Therefore, a teacher needs to evaluate students' knowledge about the subject before starting to teach the new material. This process can be facilitated if the teacher attempts to link previous and new information while also giving the students a chance to select what they want to learn, providing them with relevant clues that will increase their chances of success, and setting a progression of steps to complete in order to reach the goal of learning the new materials.

Practice is also essential for effective learning to occur. Usually, teachers provide students with time to practice newly acquired skills. Practice is a valuable way to reinforce academic skills, and it helps beginners to master new material. Practice can be given to students as warm-up exercises to help them to familiarise themselves with new material or skills before they are actually required to use them. Recall from Study Two that the High-Sense-of-Control Group was provided with additional practice prior to the experimental tasks. Additionally, as explained, teachers should look for ways to make new activities more enjoyable. Enjoying a task increases learners' interest in doing it and increases their intrinsic motivation, persistence, and chances of completing the task.

Teachers can increase their students' performance by providing contingent and immediate feedback to their students while they are trying to learn new materials and complete new tasks. For example, Dihoff, Brosvic, Epstein, and Cook (2005) found that primary school students who received immediate and contingent feedback learned

mathematical skills more quickly, and they maintain them longer than their peers who did not receive feedback. Epstein and Brosvic (2002) found that one reason for students' preference for immediate and contingent feedback was that it helped them understand the requirements more easily and get become more involved with their tasks. In addition, Koka and Hien (2005) indicated that contingent and immediate feedback was the strongest predictor of students' intrinsic motivation. Therefore, teachers should provide students with immediate and contingent feedback, but they should also highlight their students' success and encourage them when they are doing well. If a student makes mistakes, the teacher can provide him/her with an emotional control technique to help him/her to relax and better concentrate on the job at hand—for example, by saying supporting sentences, such as, "Don't worry, you have time to improve." When the teacher concludes that the students have sufficiently understood the new lessons, goal-setting techniques could then be used.

Goal setting is necessary because it produces a challenge that enhances motivation and performance while completing a task (Young, 2005). There are many personal, social, and academic benefits to students who routinely use goal setting. Goal setting helps students become more persistent, productive, and motivated. Consequently, they show greater self-confidence and self-esteem and are more comfortable doing difficult tasks (Sands & Wehmeyer, 2005). There are many examples of goal-setting techniques that might help students improve their academic performance (e.g., in reading, writing, and math). Goal setting can be used with students from the first year of schooling. For example, Baron, Kalsher, and Henry's (2005) review showed that goal setting improves primary school students' acquisition of mathematical skills and knowledge.

Discipline is an important requirement in a successful classroom. Some teachers believe that if they can increase their own level of control and lower the level of their students' autonomy, they can control their class better (Psunder, 2005). This kind of discipline is not in accordance with democratic principles. In fact, good teachers spend very little time dealing with student misbehaviour. One way to improve discipline in the classroom is by using motivational techniques. The teacher can (a) set criteria for acceptable behaviours and clearly explain the limits and logical consequences of violating them, (b) increase students' sense of responsibility, (c) give them choice in their activities, (d) increase the attractiveness of classroom activities, (e) find opportunities for providing contingency and immediate feedback, and (f) encourage goal setting to increase students' motivation for and concentration on their goal pursuits.

Behavioural goals could be used to help change problem behaviours. An example is changing aggressive students' undisciplined behaviour in the classroom. Shore (1998) argued that an aggressive child causes a climate of fear in the classroom, creating anxiety among other students and distracting them from their schoolwork. In such situations, giving the aggressive student relevant information and then using contingent and immediate feedback with him or her could be useful. A teacher who needs to deal with a problem child should first explain to the child the basic rules governing the teacher's relationship with the pupil and the pupil's relationship with the other children. For example, the child should know that he/she is not allowed to hit or push other children under any circumstances, and he/she should be clearly advised of the consequences of aggressive behaviour. Children may resort to aggression because they lack the words or other skills to solve problems non-physically. The teacher should teach aggressive children how to solve their conflicts without acting aggressively. In addition, emotional management can be encouraged by teaching children to calm down when they feel angry and leting others explain their actions without being interrupted or blamed. When aggressive incidents occur, the teacher should take immediate action to show that the classroom is a safe place for everyone. When the teacher explains his/her behaviour to a student, it is important to stay calm and to be realistic because the teachers' behaviour is a guide for students. The teacher should also pay enough attention to the aggressive student by listening to him/her carefully and showing respect for his/her thoughts and concerns; this would the student feel supported and accepted by his/her teacher, thereby helpful the child to develop healthier behaviours.

In summary, fostering positive feelings in the classroom requires a learning context in which students enjoy their learning and become actively involved in the classroom activities. Learning is enhanced when the materials to be learned are meaningful to the students, they want to learn them, and they decide to engage actively in doing them (Caine, Caine, McClintic, & Klimek, 2005). People often judge an activity to be meaningful when it satisfies deep-rooted human emotional needs. Students will achieve their valued goals in their classroom, if the teacher can enhance their motivation to learn and to maintain discipline.

Excessive drinking. Excessive drinkers might drink alcohol for many different reasons. For example, they might like the taste or are feeding their habit, or they might drink to feel relaxed, cope with problems, reduce stress, or socialize with others. All of these reasons can be summarised as "to feel better" or "to feel less bad." McClelland et al. (1972) concluded that some people drink to enhance their feelings of power or

personal control over situations. Altered states of consciousness become valued effects of alcohol, especially when the individual encounters stress, depression, and anxiety induced by the loss of control. These effects of consuming alcohol might help the person to reduce tension to think that he or she is functioning more adequately, especially in social situations (Jung, 1978).

Therefore, to help alcohol abusers control their drinking, it is important to recognize the reasons underlying their decisions to drink. For example, Labouvie (1986) investigated the role of alcohol in relation to emotional regulation. He suggested that the experience of stress in social relationships (e.g., a sense of helplessness in social relations) might persuade adolescents to rely more heavily on alcohol use as a means of emotional self-regulation. Drinking requires little effort and ability; it promises instant effects; and provides a temporary increase in one's sense of control. These positive, short-term consequences of drinking might encourage further (or excessive) drinking, despite the harmful consequences. For example, a driver who perceives more competence and a greater sense of control after drinking a few pints of beer would endanger his life and that of others by taking excessive risks, such as driving recklessly.

Factors that affect personal responsibility for excessive drinking include awareness of the problem, knowledge of a genetic predisposition, understanding of addictive processes or the associated medical problems, adequacy of the support network, nature of the early environment, the degree to which the substance use is tolerated in sociocultural context, the availability of competent psychiatric, medical, and psychological treatments for the dependency, and the individuals' tendency to use substance abuse treatments. Factors that affect societal responsibility for abusive drinking behaviours include degree of access to alcohol, societal norms about alcohol consumption, legal approaches to deterring alcohol abuse, availability of education, early assessment, and prevention, and degree of access to outpatient and community treatment (Boyarsky et al., 2002).

All of these factors contribute to individuals' sense of control over and responsibility in their substance use and their decision to take action to quit if their use is excessive or otherwise inappropriate. It is noteworthy that beliefs about control can be specific to a certain domain. For instance, individuals with a greater sense of control over their health are more likely to behave in healthy ways because they believe what they do make a difference, (e.g., Lachman et al., 1994). They are more likely to take action, to engage in health-promoting behaviours, and to avoid health-damaging behaviours (Rodin, 1986; Strickland, 1978). Individuals with internal beliefs about having control over their

health would avoid drinking alcohol excessively or actively seek help if they are drinking too much. On the other hand, with a low sense of control might attribute the cause of their excessive drinking to external factors. Their attributional style would cause them to pay less attention to their health and to be poorly motivated to find a way to change their problematic behaviour. These people would be more likely to give up trying to change and would be at greater risk of relapse to their old drinking habits.

Although most people, including problem drinkers, know that excessive drinking causes health problem and many other negative consequences, many of them do not succeed in controlling their behaviour. Clearly, many abusers who enter treatment programmes fail to achieve their goal of controlling their drinking. Although there are many factors that determine the effectiveness of an intervention, some of them are related to the intervention programme itself. Based on the results of the current study, it would seem reasonable to suggest that an intervention for substance abuse should contain the following:

(a) Provide abusers with *information* about the acute and long-term effects of the abusive behaviour on their mind and body. For example, a psychologist might explain with the use of slides the effects of drinking on the brain. These detrimental effects are clear. For example, Regard, Knoch, Gutling, and Landis (2003) showed that drinkers were more impaired in concentration, memory, and executive functions than non-drinkers were. Electroencephalogram (EEG) revealed dysfunctional activity in 65% of the heavy drinkers compared to 26% of the control participants. In addition, explaining the beneficial effects of cutting down or stopping and teaching coping strategies should help abusive drinkers better understand their problem and how to change it.

(b) Provide the abusers with an *opportunity to choose* certain aspects of their treatment, such as the time and date of their treatment entry or the particular group sessions that they will attend (e.g., recreational or art therapy).

(c) Provide the abusers with *feedback* about their treatment goal (e.g., abstinence vs. controlled drinking) and their progress during the treatment. Proper use of feedback can motivate excessive drinkers to change their behaviour. For instance, the Drinker's Check-Up (DCU; Emmen & Bleijenberg, 2004; Miller, 1988) uses feedback to motivate excessive drinkers to change their drinking. The DCU consists two sessions. During the first session, an extensive test assessment battery is administered (including measures of alcohol consumption and problems, blood tests, neuropsychological tests, various questionnaires, and an interview). The drinker

returns for the second session, usually one week later. It consists of personalized feedback from the assessment results. This brief assessment-feedback intervention provides clients who are in the precontemplation stage with information that increases their awareness of their drinking problem and the importance of changing. The method helps clients who are in the contemplation stage to reduce their ambivalence about change. Miller (1988) concluded that the DCU motivates excessive drinkers to want to change and help them actually do so.

(d) Encourage abusers to *set goals* and stick with them. Setting goals can be based on individualised decisions to reduce the amount of substance/alcohol use to an agreed (e.g., 10% per week for the four consecutive weeks). The client should record the amount of alcohol consumed between the two consecutive sessions. Goal ladders can be used to facilitate achieving each step within a complex goal. Goal setting can be used for various reasons; for example, the goal of avoiding high-risk situations for a given period.

To conclude, the techniques advanced in this study were found to be effective in increasing participants' experience of success, sense of control, intrinsic motivation, and adaptive motivation. The results indicated that sense of control and intrinsic motivation were important components of an adaptive motivational structure, which, in turn, is associated with how well people successfully reach their goals. It was also shown that experimental techniques could be used to enhance adaptive motivation and reduce participants' explicit and implicit urges to drink alcohol. The changes in adaptive motivation were shown not to be a result simply of changes in the participants' emotional states resulting from their experience of success with the experimental tasks. It would appear that for adaptive motivation to develop, a sense of control and intrinsic motivation are essential.

REFERENCES

Abele, A. E., Gendolla, G. H. E., & Petzold, P. (1998). Positive mood and ingroup-outgroup differentiation in a minimal group setting. *Personality and Social Psychology Bulletin, 24*, 1343-1357.

Abeles, R. P. (1990). Schemas, sense of control, and aging. In R. Judith, S. Carmi, & S. K. Warner (Eds.), *Self-directedness: Cause and effects throughout the life course* (pp. 85-94). Hillsdale, Lawrence Erlbaum Associates.

Abramson, L. Y., Garber, J., & Seligman, M. E. (1980). Expectancy changes in depression and schizophrenia. *Journal of Abnormal Psychology, 87*, 165-179.

Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87* (2) 49-74.

Abrmason, L. Y., Alloy, L. B., Hogan, M. E., Whitehouse, W. G., Gibb, B. E., Hankin, B. L., et al. (2000). The hopelessness theory of suicidality. In J. E. Thomas & M. D. J. E. Rudd (Eds.), *Suicide science: Expanding the boundaries* (pp. 17-32). New York, Kluwer Academic, Plenum Publishers.

Adler, N. E., Boyce, T., Chesney, M. A., Cohen, S., et al., (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist, 49* (1), 15-24.

Ames, C. (1984). Achievement attributions and self-instructions under competitive and individualistic goal structures. *Journal of Educational Psychology, 76*(3), 478-487.

Ames, C. (1992a). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84*(3), 261-271.

Ames, C. (1992b). Achievement goals and the classroom motivational climate. In J. Meece & D. Schunck (Eds.), *Student perception in the classroom* (pp. 327- 348). Hillsdale, NJ.Erlbaum.D.

Archer, J. (1994). Achievement goals as a measure of motivation in university students. *Contemporary Educational Psychology, 19*(4), 430-446.

Armbruster, B. B., Lehr, F., & Osborn, J. (2001). *Put reading first: The research building blocks for teaching children to read.* Washington, DC: ED Publishers.

Astin, J. A. (1997). Stress reduction through mindfulness meditation. Effects on psychological symptomatology, sense of control, and spiritual experiences. *PsychotherapyPsychosomaticPsychother Psychosom, 66*(2), 97-106.

Astin, J. A., Anton-Culver, H., Schwartz, C. E., Shapiro, D. H., Jr., McQuade, J., Breuer, A. M., & et al. (1999). Sense of control and adjustment to breast cancer: the importance of balancing control coping styles. *Behaviour Medicin, 25*(3), 101-109.

Astin, J. A., Shapiro, S. L., Lee, R. A., & Shapiro, D. H., Jr. (1999). The construct of control in mind-body medicine: implications for healthcare. *Alternative Therapies in Health and Medicine, 5*(2), 42-47.

Austin, J. T., & Vancouver, J. B. (1996). Goal constructs in psychology: Structure, process, and content. *Psychological Bulletin, 120* (3), 338-375.

Aydin, G. (1993). Is helpless explanatory style related to illness? *Psychology: A Journal of Human Behaviour, 30* (3-4), 27-31.

Baayen, H. R., Piepenbrock, R., & van Rijn, H. (1993). *The CELEX Lexical Database*

[CD-ROM]. Philadelphia, PA: Linguistic Data Consortium, University of Pennsylvania.

Bailey, K. G., & Sowder, W. T. (1970). Audiotape and videotape self-confrontation in psychotherapy. *Psychological Bulletin, 74*(2), 127-137.

Baker, T. B., Udin, H., & Vogler, R. E. (1975). The effects of videotaped modeling and self-confrontation on the drinking behaviour of alcoholics. *The International Journal of the Addictions, 10*(5), 779-793.

Baldwin, M. W. (1992). Relational schemas and the processing of social information. *Psychological Bulletin, 112*(3), 461-484.

Baltes, M. M., Wahl, H. W., & Schmid-Furstoss, U. (1990). The daily life of elderly Germans: Activity patterns, personal control and functional health. *Journal of Gerontology: Psychological Sciences, 45,* 173–179.

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychology Revie, 84*(2), 191-215.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist, 37*(2), 122-147.

Bandura, A. (1983). Temporal dynamics and decomposition of reciprocal determinism: A reply to Phillips and Orton. *Psychological Review, 90,* 166-170.

Bandura, A. (1990). Selective activation and disengagement of moral control. *Journal of Social Issues, 46*(1), 27-46

Bandura, A. (1994). Regulative function of perceived self-efficacy. In M. G. Ramsey & C. B. Walker (Eds.), *Personnel selection and classification* (pp. 261-271). Hillsdale, NJ: Lawrence Erlbaum Associates.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York, Freeman, Times Books.

Bandura, A. & Schunk, D. H. (1981). Cultivating competence, self-efficacy, and intrinsic interest through proximal self-motivation. *Journal of Personality and Social Psychology, 41*(3), 586-598.

Barnes-Holmes, Y., Barnes-Holmes, D., Smeets, P. M., & Luciano, C. (2004). A Derived Transfer of Mood Functions Through Equivalence Relations. *Psychological Record, 54*(1), 95-113.

Baron, R. M., Kalsher, M. j., & Henry, R. A. (2005). *Psychology from science to practice* (312-345). Auckland, New Zealand: Pearson Education New Zealand.

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.

Basoglu, M., Salcioglu, E., Livanou, M., Kalender, D., & Acar, G. (2005). Single-Session Behavioral Treatment of Earthquake-Related Posttraumatic Stress Disorder: A Randomized Waiting List Controlled Trial. *Journal of Traumatic Stress, 18*(1), 1-11.

Bauer, D., & Cox, W. M. (1998). Alcohol related words are distracting to both alcohol abusers and non-abusers in the Stroop colour-naming task. *Addiction, 93*(10), 1539-1542.

Bauman, A. E., Craig, A. R., Dunsmore, J., & Browne, C. (1989). Removing barriers to effective self-management of asthma. *Patient Education and Counseling, 14*(3), 217-226.

Beck, A. T., Weissman, A., Lester, D., & Trexler, L. (1974). The measurement of pessimism: the hopelessness scale. *Journal of Consulting and Clinical Psychology, 42*(6), 861-865.

Beck, P. J. (1979). Locus of control and task instruction effects upon creative problem solving. *Dissertation Abstracts International, 40*(3-A), 13-51

Becker, E. S., Rinck, M., Margraf, J., & Roth, W. T. (2001). The emotional Stroop effect in anxiety disorders: general emotional or disorder specificity? *Journal of Anxiety Disorders, 15*(3), 147-159.

Beckman, L. J. (1980). An attributional analysis of alcoholics anonymous. *Journal of Studies on Alcohol, 41*, 714–726.

Berger, A. (1983). Unlearning learned helplessness with the elderly through expressive interventions of poetry and song. *Dissertation Abstracts International, 44*(2-A), 54-58.

Bigelow, G. E., Brooner, R. K., & Silverman, K. (1998). Competing motivations: drug reinforcement vs. non-drug reinforcement. *Journal of Psychopharmacology, 12*(1), 8-18.

Blaney, P. H. (1986). Affect and memory: A review. *Psychological Bulletin, 99*(2), 229-246.

Bless, H., Schwarz, N., Clore, G. L., Golisano, V., Rabe, C., & Wolk, M. (1996). Mood and the use of scripts: does a happy mood really lead to mindlessness? *Journal Personality and Social Psychology, 71*(4), 665-679.

Blood, A. J., Zatorre, R. J., Bermudez, P., & Evans, A. C. (1999).Emotional responses to pleasant and unpleasant music correlate with activity in paralimbic brain regions. *Nature Neuroscience, 2*(4), 382-387.

Bogenschutz, M. P., Tonigan, J. S., & Miller, W. R. (2006). Examining the effects of alcoholism typology and AA attendance on self-efficacy as a mechanism of change. *Journal of Studies on Alcohol, 67*(4), pp. 562-567.

Boggiano, A. K. (1998). Maladaptive achievement patterns: a test of a diathesis-stress analysis of helplessness. *Journal of Personality and Social Psychology, 74*(6), 1681-1695.

Bohn, M. J., Krahn, D. D., & Staehler, B. A. (1995). Development and initial validation of a measure of drinking urges in abstinent alcoholics. *Alcoholism: Clinical and Experimental Research, 19*(3), 600-606.

Botti, S. (2004). Freedom of choice and perceived control: an investigation of the relationship between preference for choosing and customer satisfaction. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 65*(6-A) 22-81.

Bouffard, T., Bouchard, M., Goulet, G., Denoncourt, I., & Couture, N. (2005). Influence of achievement goals and self-efficacy on students'self-regulation and performance. *International Journal of Psychology, 40*(6), 373-384.

Bouhuys, A. L., Bloem, G. M., & Groothuis, T. G. (1995). Induction of depressed and elated mood by music influences the perception of facial emotional expressions in healthy subjects. *Journal of Affective Disorders, 33*(4), 215-226.

Boyarsky, B. K., Dilts, S., Frances, R. J., Frosch, W. A., Galanter, M., Levin, F., & et al. (2002). Responsibility and choice in addiction. *Psychiatric Services, 53*(6) 707-713.

Bradley, B. P., Mogg, K., Millar, N., & White, J. (1995). Selective processing of negative

information: effects of clinical anxiety, concurrent depression, and awareness. *Journal of Abnormal Psychology, 104*(3), 532-536.

Bradley, S. J. (1990). Affect regulation and psychopathology: bridging the mind-body gap. *Canadian Journal of Psychiatry, 35*(6), 540-547.

Brown, J. M., & Miller, W. R. (1993). Impact of motivational interviewing on participation and outcome in residential alcoholism treatment. *Psychology of Addictive Behaviors, 7*(1), 211-218.

Brown, S. A., Goldman, M. S., Inn, A., & Anderson, L. R. (1980). Expectations of reinforcement from alcohol: Their domain and relation to drinking patterns. *Journal of Consulting and Clinical Psychology, 48*(4):419-426,

Bruch, M. A., & Belkin, D. K. (2001). Attributional style in shyness and depression: Shared and specific maladaptive patterns. *Cognitive Therapy and Research, 25,* 247–259.

Bryan, T., & Bryan, J. (1991). Positive mood and math performance. *Journal of Learning Disabilities, 24*, 490-494.

Bryman, A., & Cramer, D. (1995). *Quantitative data analysis for social scientists.* London: Routledge.

Bryman, A., & Cramer, D. (2001). *Quantitative data analysis with SPSS release 10 for windows: a guide for social scientists.* London, Routledge.

Buchanan, G. M., & Seligman, M. E. P. (1995). *Explanatory style*. Hillsdale, NJ, England: Lawrence Erlbaum Associates.

Buikema, A. L. Jr. (2003). *Lessons learned from blended biology classes.* In J. A. Chambers, (Ed.), Selected papers from the 14th International Conference on College Teaching and Learning. (pp. 35-41). Jacksonville, FL, US: Florida Community College at Jacksonville. ix, 203 pp.

Burger, J. M. (1992). Desire for control and academic performance. *The psychology of control, 24*(2), 147-155.

Cai- Hong, Z., & He-An, C. (2006). Interpersonal attribution style of female students of nursing school and medical school. *Chinese Mental Health Journal, 20*(7), 447-450.

Caine, R. N., Caine, G., McClintic, C., & Klimek, K. (2005). *12 brain/mind learning principles in action: The fieldbook for making connections, teaching, and the human brain.* Thousand Oaks, CA, US: Corwin Press. xvi, 263 pp.

Calbraith, D., Ford, S., Walker, G., & Ford, J. (2005). The contribution of different components of working memory to knowledge transformation during writing. *Educational Studies in Language and Literature, 5*(2), 113-145.

Carrillo, L. S. (2001). Self-concept and learned helplessness in a group of teachers from metropolitan Lima. *Revista de Psicologia, 19* (1), 117-149

Catherine, R. E., & Mirowsky, J. (2003). *Social structure and psychological functioning: Distress, perceived control, and trust.* In J. Delamater (Ed). Handbook of social psychology. Handbooks of sociology and social research. (pp. 411-447). New York, NY, US: Kluwer Academic/Plenum Publishers.

Cattell, R. B. (1978). The scientific use of factor analysis in behavioural and life sciences. *Experimentation in Psychology and Education, 1,* 10-25.

Cavanagh, M. E. (1991). Myths and facts about alcoholism: Pastoral implications. *Pastoral Psychology, 40*(2), 73-81

Cedrus-Corporation .(1999). *SuperLab Pro Experimental Laboratory Software.* Version 2.1. San Pedro, USA.

Chance, S. S. (2001). How we use sensory information to keep oriented as we locomote. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 61*(12-B), 28-67.

Chandler, T. A., Seibel, C. A., & Spies, C. J. (1990). Attributions and affects related to actual vs perceived success in an actual achievement context. *Psychological Reports, 66*(3, Pt 1), 971-976.

Chaney, J. M., Mullins, L. L., Uretsky, D. L., Pace, T. M., Werden, D., & Hartman, V. L. (1999). An experimental examination of learned helplessness in older adolescents and young adults with long-standing asthma. *Journal of Paediatric Psychology, 4*(3), 259-270.

Chapline, J. P., & Krawiec, T. S. (1974). *Systems and theories of psychology.* Oxford, England: Holt, Rinehart & Winston.

Charles, R. I., & Lester, F. K. (1984). An evaluation of a process-oriented instructional program in mathematical problem solving in Grades 5 and 7. *Journal for Research in Mathematics Education, 15*(1), 15-34.

Chou, K. L. (2005). Everyday competence and depressive symptoms: Social support and sense of control as mediators or moderators? *Aging and Mental Health, 9*(2), 177-183.

Chou, K. L., & Chi, I. (2001). Social comparison in Chinese older adults. *Aging and Mental Health, 5*(3), 242-252.

Clark, D. M. (1983). On the induction of depressed mood in the laboratory: evaluation and comparison of the Velten and musical procedures. *Advances in Behaviour Research and Therapy, 5*, 27–49.

Cocks, R. J. & Watt, H. M. G. (2001). *Self-perceptions of academic competence: how they develop and how they relate to the intrinsic motivation for learning in English and Mathematics in Year 6 students*. AARE Annual Conference Papers.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112* (1), 155-159.

Conway, M. & Giannopoulos, C. (1993). Dysphoria and decision making: Limited information use for evaluations of multiattribute targets. *Journal of Personality and Social Psychology, 64*, 613-623.

Cook, W. (1993). Interdependence and the interpersonal sense of control: An analysis of family relationships. *Journal of Personality and Social Psychology. 64*(4), 587-601.

Cooney, N. L., Litt, M. D., Morse, P. A., Bauer, L. O., & Gaupp, L. (1997). Alcohol cue reactivity, negative-mood reactivity, and relapse in treated alcoholic men. *Journal of Abnormal Psychology, 106*(2), 243-250.

Cooper, M. L., Frone, M. R., Russell, M., & Mudar, P. (1995). Drinking to regulate positive and negative emotions: a motivational model of alcohol use. *Journal of Personality and Social Psychology, 69* (5), 990-1005.

Corah, N. & Boffa, J. (1970). Perceived control, self-observation, and response to aversive stimulation. *Journal of Personality and Social Psychology, 16* (1), 1-4.

Correia, C. J. (2004). Behavioral economics: basic concepts and clinical applications. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling: Concepts, approaches, and assessment*. Chichester, United Kingdom: Wiley.

Courtney, P. P. (2005). Sense of control and psychological well-being during the transition to parenthood. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 66*(6-B), 2005, 23-34.

Cox, W. M. (1983). *Identifying and measuring alcoholic personality characteristics.* San Francisco, CA: Jossey-Bass.

Cox, W. M. (1987). Personality theory and research. In H. T. Blane, & K. E. Leonard (Eds.), *Psychological theories of drinking and alcoholism* (pp.55-89), New York: Guilford.

Cox, W. M. (1998). Motivational variables for addiction research. *Addiction Research, 6,* 289-293.

Cox, W. M. (2000). *Alcohol Use Questionnaire.* Unpublished manuscript, University of Wales, Bangor.

Cox, W. M., Blount, J. P., & Rozak, A. M. (2000). Alcohol abusers' and non-abusers' distraction by alcohol and concern-related stimuli. *American Journal of Drug and Alcohol Abuse, 26*(3), 485-489.

Cox, W. M., Blount, J. P., Bair, K. D., & Hosier, S. G. (2000). Motivational predictors of readiness of change chronic substance abuse. *Addiction Research, 8*(2), 121-128.

Cox, W. M., Fadardi, S. J., & Pothos, E. (2006). The Addiction-Stroop Test: Theoretical Considerations and Procedural Recommendations. *Psychological Bulletin, 132,* 443-476.

Cox, W. M., Hogan, L. M., Kristian, M. R., & Race, J. H. (2002). Alcohol attentional bias as a predictor of alcohol abusers' treatment outcome. *Drug Alcohol Depend, 68*(3), 237-243.

Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. Special Issue: Models of addiction. *Journal of Abnormal Psychology, 97*(2), 168-180.

Cox, W. M., & Klinger, E. (1990). Incentive motivation, affective change, and alcohol use: A model. In W. M. Cox (Ed.). *Why people drink: Parameters of alcohol as a reinforcer* (pp. 291-314). New York: Gardner Press.

Cox, W. M., & Klinger, E. (2002). Motivational structure: Relationships with substance use and processes of change. *Addictive Behaviours, 27,* 925-940.

Cox, W. M., & Klinger, E. (2004a). Measuring motivation: The Motivational Structure Questionnaire and Personal Concerns Inventory. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counselling: Concepts, approaches, and assessment* (pp. 141-176). Chichester, United Kingdom: Wiley.

Cox, W. M., & Klinger, E. (2004b). A motivational model of alcohol use: Determinants of use and change. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling: Concepts, approaches, and assessment* (pp.121-140). Chichester, United Kingdom: Wiley.

Cox, W. M., & Klinger, E. (2004c). Systematic Motivational Counseling: The Motivational Structure Questionnaire in action. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counselling: Concepts, approaches, and assessment* (pp. 217-238). Chichester, United Kingdom: Wiley.

Cox, W. M., Klinger, E., & Blount, J. P. (1995). The Motivational Structure Questionnaire. In J. P. Allen (Ed.), *Assessing alcohol problems: A guide for clinicians and researchers* (pp. 399-411). NIAAA Treatment Handbook Series 4. NIH Publication N. 95-3745. Bethesda, MD: National Institute on Alcohol Abuse and Alcoholism.

Cox, W. M., Pothos, E. M., & Fadardi, J. S. (2002). *Stroop task in alcohol studies.* Unpublished manuscript, Bangor.

Cox, W. M., Schippers, G. M., Klinger, E., Skutle, A., Stuchlikova, I., Man, F., & et al. (2002). Motivational structure and alcohol use of university students across four nations. *Journal of Studies on Alcohol, 63*(3), 280-285.

Cox, W. M., Yeates, G. N., & Regan, C. M. (1999). Effects of alcohol cue on cognitive processing in heavy and light drinkers. *Drug and Alcohol Dependence, 55*(1-2), 85-89.

Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology, 43*(3), 245-265.

Crum, R. M., Storr, C. L., & Chan, Y. F. (2005). Depression syndromes with risk of alcohol dependence in adulthood: a latent class analysis. *Drug and Alcohol Dependence, 79*, 71-81.

Csikszentmihalyi, M. (1990). *Flow: The Psychology of Optimal Experience*. New York: Harper and Row.

Csikszentmihalyi, M. (1998). *Finding Flow: the psychology of engagement with everyday life*. New York: Basic Books.

Csikszentmihalyi, M., Abuhamdeh, S., & Nakamura, J. (2005). In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of competence and motivation.* New York, NY, US: Guilford Publications. xvi, 704 pp.

Culler, R. E. & Holahan, C. J. (1980). Test anxiety and academic performance: The effects of study-related behaviors. *Journal of Educational Psychology, 72*(2), 16-20.

Curry, S., Wagner, E. H., & Grothaus, L. C. (1990). Intrinsic and extrinsic motivation for smoking cessation. *Journal of Consulting and Clinical Psychology, 58*(3), 310-316.

d'Agincourt-Canning, L. (2006). Genetic testing for hereditary breast and ovarian cancer: responsibility and choic. *Qualitative Health Research. 16*(1), 97-118

Davis, M. C., & Matthews, K. A. (1996). Do gender-relevant characteristics determine cardiovascular reactivity? Match versus mismatch of traits and situation. *Journal of personality and social psychology, 71*(3), 527-535.

Davis, M. C., Matthews, K. A., Meilahn, E. N., & Kiss, J. E. (1995). Are job characteristics related to fibrinogen levels in middle-aged women? *Health Psychology, 14*(4), 310-318.

Dawn, M. S. (1998). The role of person, outcome, environmental, and learning variables. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 59*(1-A), 2-38.

de l'Etoile, S. K. (2002). The effect of musical mood induction procedure on mood state-dependent word retrieval. *Journal of Music Therapy, 39*(2), 145-160.

Dean, S. I. (1958). Treatment of the reluctant client. *American Psychologist, 13*, 627–630.

Deaton, A. S. (1975). The measurement of income and price elasticities. *European Economic Review 19*, 261-273.

Deci, E. L. & Ryan, R. M. (1985b). *Intrinsic motivation and self-determination in human behaviour*. New York: Plenum.

Deci, E. L. (1975). *Intrinsic motivation.* New York: Plenum Publishing Co. Japanese

Edition, Tokyo.

Deci, E. L. (1980). *The psychology of self-determination.* Lexington, MA: D. C. Heath (Lexington Books). Japanese Edition, Tokyo.

Deci, E. L. (1981). *The psychology of self-determination.* Lexington, MA: Heath.

Deci, E. L., & Ryan, R. M. (1985a). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality, 19*, 109-134.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska symposium on motivation: Perspectives on motivation, 38*, 237-288. Lincoln, NE: University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (2000). The what and why of goal pursuits: Human needs and the self-determination of behaviuor. *Psychological Inquiry, 11*, 227-268.

Deci, E. L., & Ryan, R. M. (2002). *Handbook of self-determination research.* Rochester, NY: University of Rochester Press.

Deci, E. L., Eghrari, H., Patrick, B. C., & Leone, D. (1994). Facilitating internalization: The self-determination theory perspective. *Journal of Personality, 62,* 119-142.

Deneve, K. M. & Cooper, H. (1998). The happy personality: A meta-analysis of 137 personality traits and subjective well-being. *Psychological Bulletin, 124*(2), 197-229.

Denning, S. (2000). *The Springboard: How Storytelling Ignites Action In Knowledge-Era Organizations.* Boston, Butterworth Heinemann.

Detweiler-Bedell, B. T. (2002). Mood and perceived success: Self-focused attention moderates the influence of mood on perceived success. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 63*(3-B), 1607.

Dev, P. C. (1997). Intrinsic motivation and academic achievement: What does their relationship imply for the classroom teacher? *Remedial and Special Education, 18*(1), 12-19.

Dihoff, R. E., Brosvic, G. M., Epstein, M. L., & Cook, M. J. (2005). Adjunctive Role for Immediate Feedback in the Acquisition and Retention of Mathematical Fact Series by Elementary School Students Classified with Mild Mental Retardation. *Psychological Record, 55* (1), 39-66.

Dobson, D. J. G. & Dobson, K. S. (1981). Problem-solving strategies in depressed and nondepressed college students. *Cognitive Therapy and Research, 5,* 237-249.

Doherty, W. J. (1983). Impact of divorce on locus of control orientation in adult women: A longitudinal study. *Journal of Personality and Social Psychology, 44*(4), 834-840.

Double, R. (2004). Three kinds of control. *Behavioral Ecology and Sociobiology, 48*(6), 438-446.

Drummond, D. C., & Phillips, T. S. (2002). Alcohol urges in alcohol-dependent drinkers: further validation of the Alcohol Urge Questionnaire in an untreated community clinical population. *Addiction, 97*(11), 1465-1472.

Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist, Special Issue: Psychological science and education, 41*(10), 1040-1048.

Dweck, C. S., Davidson, W., Nelson, S., & Enna, B. (1978). Sex differences in learned helplessness: II. The contingencies of evaluative feedback in the classroom. An experimental analysis. *Developmental Psychology, 14*, 268-276.

Dweck, C. S. & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review, 95*(2), 256-273.

Dykema, J., Bergbower, K., & Peterson, C. (1995). Pessimistic explanatory style, stress, and illness. *Journal of Social and Clinical Psychology, 14*(4), 357-371.

Eads, A. S., Perlmuter, L. C., & Lawrence, C. (2000). Age and education moderate the effects of choice on performance. *International Journal of Cognitive Technology, 5*(2), 27-36.

Earley, P. C., & Kanfer, R. (1985). The influence of component participation and role models on goal acceptance, goal satisfaction, and performance. *Organizational Behaviour and Human Decision Processes, 36*(3), 378-390.

Edwards, C., Dunham, D. N., Ries, A., & Barnett, J. (2006). Symptoms of traumatic stress and substance use in a non-clinical sample of young adults. *Addictive Behaviors, 31*(11), 2094-2104.

Eisenberger, R., & Cameron, J. (1996). Detrimental effects of reward: Reality or myth? *American Psychologist, 51*(11), 1153-1166.

Ekman, P., Davidson, R. J., & Friesen, W. V. (1990). Duchenne's smile: Emotional expression and brain physiology II. *Journal of Personality and Social Psychology, 58*, 342-353.

Ellenbecker, T. K. (2003). Effect of content choice freedom on drawer's creative engagement. *Art Therapy, 20*(1), 22-27.

Elliot, A. J., & Dweck, C. S. (1998). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*(1), 5-12.

Elliot, A. J., & Harackiewicz, J. M. (1994). Goal setting, achievement orientation, and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 66*, 968-980.

Elliot, A. J., & Harackiewicz, J. M. (1996). Approach and avoidance achievement goals and intrinsic motivation: A mediational analysis. *Journal of Personality and Social Psychology, 70*, 461-475.

Elliot, A. J., Faler, J., McGregor, H. A., Campbell, W. K., Sedikides, C., & Harackiewicz, J. M. (2000). Competence valuation as a strategic intrinsic motivation process. *Personality and Social Psychology Bulletin, 26*(7), 780-794.

Elliott, E. S., & Dweck, C. S. (1988). Goals: an approach to motivation and achievement. *Journal of Personality and Social Psychology, 54*(1), 5-12.

Elliott, R., Sahakian, B. J., McKay, A. P., Herrod, J. J., Robbins, T. W., & Paykel, E. (1996). Neuropsychological impairments in unipolar depression: The influence of perceived failure on subsequent performance. *Psychological Medicine, 26,* 975-989.

Ellis, H. C., Thomas, R. L., & Rodriguez, I. A. (1984). Emotional mood states and memory: Elaborative encoding, semantic processing, and cognitive effort. *Journal of Experimental Psychology: Learning, Memory and Cognition, 10*, 470-482.

Emmen, M. J., & Bleijenberg, G. (2004). The Motivational Drinker's Check-Up: a brief intervention for early-stage problem drinkers. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling: Concepts, approaches, and assessment.*

Emmons, R. A., & King, L. A. (1988). Conflict among personal strivings: Immediate and long-term implications for psychological and physical well-being. *Journal of Personality and Social Psychology, 54*(6), 1040-1048.

Epstein, M., & Brosvic, G. M. (2002). Students prefer the immediate feedback assessment technique. *Psychological Reports, 90*(3), 1136-1138.

Erdfelder, E., Faul, F., & Buchner, A. (1996). G*Power: a general power analysis program. *Behaviour Research Methods, Instruments, and Computers, 28*(1), 1-11.

Eva, K. W., Cummington, J. P. W., Reiter, H., Keane, D. R., & Norman, G. R. (2004). How Can I Know What I Do not Know? Poor Self Assessment in a Well-defined domain. *Advances in Health Sciences Education, 9*(3), 211-224.

Everhart, D. E., & Demaree, H. A. (2003). Low alpha power (7.5-9.5Hz) changes during positive and negative emotional processing. *Cognitive, Affective, and Behavioral Neuroscience, 3 (1)*, 39-45.

Fadardi, J. S. (2003). *Cognitive-Motivational Determinants of Attentional Bias for Alcohol-Related Stimuli: Development of an Attentional-Control Training Programme.* Unpublished Ph.D. Thesis, University of Wales, Bangor.

Fadardi, J. S., & Cox, W. M. (2002). *Two predictors make a more robust prediction: motivational structure and attentional bias as predictors of alcohol use among university students.* Paper presented at the Addiction 2002, Eindhovin, Netherlands.

Fauss, R. L. (2003). A study to determine the relationship between middle school students' motivation and feedback from graphed assessment data. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 63*(12-A), 42-49.

Field, S., & Hoffman, A. (1994). Development of a model for self-determination. *Career Development for Exceptional Individuals, 17*(2), 159-169.

Fincham, D. S., Hokoda, A., & Sanders, F. (1989). Learned helplessness, test anxiety, and academic achievement: A longitudinal analysis. *Child Development, 60,* 138-145.

Fincham, F. D., & Cain, K. M (1986). Learned helplessness in humans: A developmental analysis. *Developmental Review, 6*(4), 301-333.

Finegan, J. E., & Seligman, C. (1995). In defense of the Velten mood induction procedure. *Canadian Journal of Behavioural Science 27*, 405-419.

Finn, P. R., Sharkansky, E. J., Brandt, K. M., & Turcotte, N. (2000). The effects of familial risk, personality, and expectancies on alcohol use and abuse. *Journal of Abnormal Psychology, 109*(1), 122-133.

Fiske, S., & Taylor. S. (1984). *Social Cognition.* Reading, MA: Addison-Wesley.

Forgas, J., Burnham, D. K., & Trimboli, L. (1988). Mood, memory and social judgements in children. *Journal of Personality and Social Psychology, 54*, 697-703.

Fouquereau, E., Fernandez, A., Mullet, E., & Sorum, P. C. (2003). Stress and the urge to drink. *Addictive Behaviors, 28*(4), 669-685.

Foy, S. S., & Mitchell, M. M. (1990). Factors contributing to learned helplessness in the institutionalized aged: A literature review. *Physical and Occupational Therapy in Geriatrics, 9*(2), 1-23.

Gadea, M., Gomez, C., Gonzalez-Bono, E., Espert, R., & Salvador, A. (2005). Increased cortisol and decreased right ear advantage (REA) in dichotic listening following a negative mood induction. *Psychoneuroendocrinology, 30*(2), 129-138.

Garcia, T., & Pintrich, P. R. (1996). The effects of autonomy on motivation and performance in the college classroom. *Contemporary Educational Psychology, 21*(4), 477-486.

Garcia-Palacios, A., & Banos, R. M. (1999). Effectiveness of two procedures of induction of the mood and influence of moduladoras variables. *Journal of Psychopathology and Clinical Psychology, 4*(1), 15-26.

Gauggel, S., & Fischer, S. (2001). The effect of goal setting on motor performance and motor learning in brain-damaged patients. *Neuropsychological Rehabilitation, 11,* 33–44.

Gauggel, S., Hoop, M. (2004). Goal-Setting as a Motivational Technique for Neurorehabilitation. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling: Concepts, approaches, and assessment*. Chichester, United Kingdom: Wiley.

Gauggel, S., Hoop, M., & Werner, K. (2002). Assigned versus self-set goals and their impact on the performance of brain-damaged patients. *Journal of Clinical and Experimental Neuropsychology, 24*(8), 1070-1080.

Geer, J. H., Davison, G. C., & Gatchel, R. I. (1970). Reduction of stress in humans through nonveridical perceived control of aversive simulation. *Journal of Personality and Social Psychology, 16,* 731-738.

George, J. M. (1989). Mood and absence. *Journal of Applied Psychology, 74*, 317-24.

George, J. M. (1991). State or trait: effects of positive mood on prosocial behaviors at work. *Journal of Applied Psychology,* 76, 299-307.

Gernigon, C., Thill, E., & Fleurance, P. (1999). Learned helplessness: A Survey for Cognitive, Motivational and Perceptual-Motor Consequences in Motor Tasks. *Journal of sports sciences, 17*(5), 403-412.

Gerrads-Hesse, A., Spies, K., & Hesse. F. W. (1994). Experimental inductions of emotional states and their effectiveness: A review. *British Journal of Psychology, 85* (1), 55-78.

Gibbons, A. S., Roberston, D. J., Duffin, J. R., & Thomson, B. (2001). Effects of administering feedback following extended problem solving. *Journal of Educational Computing Research, 25*(4), 417-426.

Giglio, J. J., & Kaufman, E. (1990). The relationship between child and adult psychopathology in children of alcoholics. *The International Journal of the Addictions, 25*(3), 263-290.

Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition: Foundations of social behaviour,* (53-92). New York: Guilford.

Goodie, A. S. (2003). The effects of control on betting: Paradoxical betting on items of high confidence with low value. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 29*(4), 598-610.

Goodie, A. S. (2004). *The role of perceived control and overconfidence in pathological gambling.* Unpublished manuscript, University of Georgia, GA.

Goodwin, A. H., & Sher, K. (1993). Effects of induced mood on diagnostic interviewing: Evidence for a mood and memory effect. *Psychological Assessment, 5*(2), 197-202.

Gorsuch, R. L. (1983). *Factor analysis.* Hillsdale, NJ: Lawrence Erlbaum Associates.

Gotlib, I. H. (1984). Depression and general psychopathology in university students. *Journal of Abnormal Psychology, 93(*1), 19-30.

Goudas, M., Minardou, K., & Kotis, I. (2000). The effect of feedback regarding goal

achievement on intrinsic motivation. *Perceptual and Motor Skills, 90,* 810-812.

Greeley, J., Swift, W., & Heather, N. (1992). Depressed affect as a predictor of increased desire for alcohol in current drinkers of alcohol. *British Journal of Addiction, 87,* 1005-1012.

Green, L. R. (2000). Learned helpless to mastery orientation transition process. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 60*(7-A), 23-42.

Greet, S., Morris, T., Pettingale, K.W. (1979). *Psychological Response to Beast Cancer: Effect on Outcome.* Lancet. 785-787.

Grisart, J. M., & Plaghki, L. H. (1999). Impaired selective attention in chronic pain patients. *European Journal of Pain, 3*(4), 325-333.

Grob, A., Little, T. D., Wanner, B., Wearing, A. J., & Euronet, S. (1996). Adolescencts? Well-being and perceived control across fourteen sociocultural contexts. *Journal of Personality and Social Psychology, 71,* 785-795.

Gundogdu, M. & Aydin, G. (1994). Relations of helpless explanatory style and test anxiety with academic achievement in Turkish children: an investigation of gender differences. *Current Psychology: Developmental, Learning, Personality, Social, 24*(2), 123-133.

Haasen, A., & Gordon F. S. (1997). *A Better Place to Work: A New Sense of Motivation Leading to High Productivity.* AMA Management Briefing, American Management Association, New York.

Habel, U., Klein, M., Kellermann, T., Shah, N. J., & Schneider, F. (2005). Same or different? Neural correlates of happy and sad mood in healthy males. *Neuroimage, 26*(1), 206-214.

Harackiewicz, J. M., & Sansone, C. (1991). Goals and intrinsic motivation: You can get there from here. *Advances in Motivation and Achievement, 7,* 21-49.

Harackiewicz, J. M., Barron, K. E., Tauer, J. M., & Elliot, A. J. (2002). Predicting success in college: A longitudinal study of achievement goals and ability measures as predictors of interest and performance from freshman year through graduation. *Journal of Educational Psychology, 94,* 562-575.

Harmon, J. M. (2002). Teaching independent word learning strategies to struggling readers. *Journal of Adolescent and Adult Literacy, 45*(7), 606-615.

Harmon, J. M., Hedrick, W. B., & Wood, K. D. (2005). Research on Vocabulary Instruction in the Content Areas: Implications for Struggling Readers. *Reading and Writing Quarterly: Overcoming Learning Difficulties, 21*(3), 261-280.

Hasson-Ohayon, I., Walsh, S., Roe, D., Kravetz, S., & Weiser, M. (2006). Personal and interpersonal perceived control and the quality of life of persons with severe mental illness. *The Journal of Nervous and Mental Disease, 194*(7), 538-542.

Heather, N., Rollnick, S., & Bell, A. (1993). Predictive validity of the Readiness to Change Questionnaire. *Addiction 88*(12),1667-1677.

Heckhausen, H. (1991). *Motivation and action.* Berlin: Springer-Verlag.

Helzer, J. E., Robins, L. N., Taylor, J. R., Carey, K., Miller, R.H., Combs-Orme, T., & et al. (1985). The extent of long-term moderate drinking among alcoholics discharged from medical and psychiatric treatment facilities. *New England Journal of Medicine. 312*(26), 1678-1682.

Hemmingsson, T., & Lunberg, I. (2001). Development of alcoholism: interaction between

heavy adolescent drinking and later low sense of control over work. *Alcohol and Alcoholism, 36* (3), 207-212.

Henkel, J. M., & Hinsz, V. B. (2004). Success and failure in goal attainment as a mood induction procedure. *Social Behavior and Personality, 32*, 715-722.

Henkel, V., Bussfeld, P., Moller, H. J., & Hegerl, U. (2002). Cognitive-behavioural theories of helplessness/hopelessness: valid models of depression? *European Archives of Psychiatry and Clinical Neuroscience, 252*(5), 240-249.

Hernandez, S., Vander Wal, J., & Spring, B. (2003). Efficacy of a negative mood induction procedure across repeated administrations. *Journal of Psychopathology and Behavioral Assessment, 25*, 49-55.

Heyman, G. D., & Dweck, C. S. (1992). Achievement goals and intrinsic motivation: Their relation and their role in adaptive motivation. Motivation and Emotion. *Special Issue: Perspectives on Intrinsic Motivation, 16(*3), 231-247.

Heyman, G. D., & Dweck, C. S., Cain, K. M. (1992). Young children's vulnerability to self-blame and helplessness: Relationship to beliefs about goodness. *Child Development, 63*(2), 401-415.

Hilgards, E. R., & Russell, D. H. (1950). Motivation in school learning. In N. B. Henry (Ed.), *The forty-ninth yearbook of the national society for the study of education. Learning and instruction* (pp. 36-68). Chicago, IL, US: University of Chicago Press.

Hiroto, D. S. & Seligman, M. E. (1975). Generality of learned helplessness in man. *Journal of Personality and Social Psychology, 31,* 311-327.

Holland, P. W. (1988). Causal inference, path analysis, and recursive structural equation model. *Sociological Methodology, 18*, 449-484.

Horn, J. L., Wanberg, K. W., & Foster, F. M. (1990) *Guide to the Alcohol Use Inventory (AUI)*. National Computer Systems, Inc., Minneapolis.

Hunt, W. A. & General, W. R. (1973). Relapse rates after treatment for alcoholism. *Journal of Community Psychology, 1*(1), 66-68

Hussong, A. M., Hicks, R. E., Levy, S. A., & Curran, P. J. (2001). Specifying the relations between affect and heavy alcohol use among young adults. *Journal of Abnormal Psychology, 110*(3), 449-461.

Hwang, Y. S., Echols, C., & Vrongistinos, K. (2002) Multidimensional academic motivation of high achieving African American students. *College Student Journal, 36*(4), 544-554.

Igonor, A. (2000). Success factors for development of knowledge management in e-learning in gulf region institutions. *Journal of Knowledge Management Practice,3* (7), 216-233.

Igonor, A. (2002). Success factors for development of knowledge management. *Journal of Knowledge Management Practice, 3,* 13-27.

Iyengar, S. S. & Lepper, M. R. (2002). Choice and its consequences: On the costs and benefits of self-determination. In A. Tesser (Ed.), *Self and motivation: Emerging psychological perspectives* (pp.71-96). Washington, DC: American Psychological Association.

Jackson, B. H. (2004). In search of peak experiences through life: Understanding the arenas and strategies for replicating the flow experience. a developmental perspective. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 64*(9-B), 46-54.

Jackson, B. H., Sellers, R. M., & Peterson, C. (2002). Pessimistic explanatory style moderates the effect of stress on physical illness. *Personality and Individual Differences, 32*(3), 567-573.

Jagacinski, C. M. & Nicholls, J. G. (1987). Competence and affect in task involvement and ego involvement: The impact of social comparison information. *Journal of Educational Psychology, 79*(2), 107-114.

James, L. R., & Brett, J. M. (1984). Mediators, moderators and tests for mediation. *Journal of Applied Psychology, 69*, 307-321.

Jose, P. E. (2003). MedGraph. Victoria University of Wellington. http://www.vuw.ac.nz/psyc/staff/paul-jose/files/medgraph/medgraph.php

Josephson, B. R., Singer, J. A., & Salovey, P. (1996). Mood regulation and memory: Repairing sad moods with happy memories. *Cognition and Emotion, 10*, 437-444.

Judd, C. M., & Kenny, D. A. (1981). Process Analysis: Estimating Mediation in Treatment Evaluations. *Evaluation Review,5*(5): 602-619.

Jundt, D., & Hinsz, V. B. (2002). Influences of positive and negative affect on decisions involving judgmental biases. *Social Behavior and Personality, 30*(1), 45-52.

Jung, J. (1978). The feeling of powerlessness. In Jung, J (Ed). *Understanding human motivation* (pp. 105-130). New York: Macmillan Publishing.

Kaiser, H. (1974). An index of factorial simplicity. *Psychometrika, 39*, 31-36.

Kandel, D. B., Kessler, R. C., & Margulies, R. Z. (1978.). Antecedents of adolescent initiation into stages of drug use: A developmental analysis. In Kandel, D. B (Ed.), *Longitudinal Research on Drug Use: Empirical Findings and Methodological Issues*. New York: Wiley.

Kanfer, R., Ackerman, P. L., Murtha, T. C., & Dugdale, B. (1994). Goal setting, conditions of practice, and task performance: A resource allocation perspective. *Journal of Applied Psychology, 79*(6), 826-835.

Kasser, T. (2002). Sketches for a self-determination theory of values. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (123-140). Rochester, NY: University of Rochester Press.

Kasser, T., & Ryan, R. M. (1993). A dark side of the American dream: correlates of financial success as a central life aspiration. *Journal of Personality and Social Psychology, 65,* 410-422.

Kasser, T., & Ryan, R. M. (1996). Further examining the American dream: differential correlates of intrinsic and extrinsic goals. *Personality and Social Psychology Bulletin, 22,* 280-287.

Kasser, T., & Ryan, R. M. (2001). Be careful what you wish for: optimal functioning and the relative attainment of intrinsic and extrinsic goals. In P. Schmuck & K. Sheldon (Eds.), *Life goals and well-being.* Gottingen: Hogrefe.

Kasser, T., Ryan, R. M., Zax, M., & Sameroff, A. J. (1995). The relations of maternal and social environments to late adolescents' materialistic and prosocial values. *Developmental Psychology, 31,* 907-914.

Katz, E., & Lazarsfeld, P. F. (1955*). Personal influence: the part played by people in the flow of mass communications.* New York, NY, US. 400-408.

Kelly, J. R. (2004). Mood and emotion in groups. In M. B. Brewer & M. Hewstone (Eds.), *Emotion and motivation: Perspectives on Social Psychology*. Oxford, UK: Blackwell Publishing.

Kenealy, P. (1988). Validation of a music mood induction procedure: Some preliminary findings. *Cognition and Emotion, 2*(1), 41-48.

Kennelly, K. J., Hayslip, B., & Richardson, S.K. (1985). Depression and helplessness-induced cognitive deficits in the aged. *Experimental Aging Research, 11*,169-173.

Kenny, D. A. (2006). *Dyadic analysis.* Retrieved from http://www.davidakenny.net/cm/mediate.htm

Kenny, D. A., Kashy, D. A., & Bolger, N. (1998). Data analysis in social psychology. In D. Gilbert., S. Fiske., & G. Lindzey (Eds.), *The handbook of Social Psychology* (pp. 233–265). Boston, MA: McGraw-Hill.

Kenny, D. A., Korchmaros, J. D., & Bolger, N. (2003). Lower level mediation in multilevel models. *Psychological Methods, 8*, 115-128.

Kim-Goh, M., Suh, C., Blake, D. D., & Hiley-Young, B. (1995). Psychological impact of the Los Angeles riots on Korean-American victims: implications for treatment. *The American Journal of Orthopsychiatry, 65*(1), 138-146.

King, A. C., Bernardy, N. C., & Hauner, K. (2003). Stressful events, personality, and mood disturbance: Gender differences in alcoholics and problem drinkers. *Addictive Behaviours, 28*(1), 171-187.

King, L. A., & Emmons, R. A. (1990). Conflict over emotional expression: Psychological and physical correlates. *Journal of Personality and Social Psychology, 58*(5), 864-877.

King, L. A., & Emmons, R. A. (1991). Psychological, physical, and interpersonal correlates of emotional expressiveness, conflict, and control. Special Issue: Personality and physical health. *European Journal of Personality, 5,* 131-150.

Kline, P. (1994). *An Easy Guide to Factor Analysis.* London: Routledge.

Klinger, E. (1975). Consequences of commitment to and disengagement from incentives. *Psychological Review, 82,* 1-25.

Klinger, E. (1977). *Meaning and Void: Inner Experience and the Incentives in People's Lives.* Minneapolis: University of Minnesota Press.

Klinger, E. (1987). Current concerns and disengagement from incentives. In F. Halisch & J. Kuhl (Eds.), *Motivation, intention and volition* (pp. 337-347). Berlin: Springer-Verlag.

Klinger, E. (1996a). The contents of thoughts: Interference as the downside of adaptive normal mechanisms in thought flow. In I. G. Sarason., B. R. Sarason., & G. R. Pierce (Eds.), *Cognitive interference: Theories, methods, and findings* (pp. 3-23). Hillsdale, NJ: Lawrence Erlbaum Associates.

Klinger, E. (1996b). Emotional influences on cognitive processing, with implications for theories of both. In P. Gollwitzer & J. A. Bargh (Eds.), *The Psychology of Action: Linking Cognition and Motivation to Behavior* (pp. 168-189). New York: Guilford.

Klinger, E. (2007, February). *Goal Pursuit as Organizational Core for Cognitive Processing, Emotion, and Action; and Differences with Age*. Colloquium Talk at the Max Planck Institute for Human Development.

Klinger, E., & Cox, W. M. (1986). Motivational predictors of alcoholics' responses to inpatient treatment. *Advance in Alcohol and Substance Abuse, 6*(1), 35-44.

Klinger, E. & Cox, W. M. (2004a). Motivation and the theory of current concerns. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling: Concepts,*

approaches, and assessment (pp. 3-29). Chichester, United Kingdom: Wiley.

Klinger, E. & Cox, W. M. (2004b). The Motivational Structure Questionnaire and Personal Concerns Inventory: Psychometric Properties. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling: Concepts, approaches, and assessment* (pp. 177-197). Chichester, United Kingdom: Wiley.

Kofta, M., & Sedek, G. (1989). Repeated failure: a source of helplessness or a factor irrelevant to its emergence? *Journal of Experimental Psychology,118* (1), 3-12.

Koka, A., & Hein. V. (2005). The effect of perceived teacher feedback on intrinsic motivation in physical education. *International Journal of Sport Psychology, 36*(2), 91-106.

Kong, C., & Hau, K. (1996). Student's achievement goals and approaches to learning: The relationship between emphasis on self-improvement and thorough understanding. *Research in Education, 55*, 74-85

Korolenko, C. P., & Kensin, D. V. (2001). The quality world change as a cause of addiction development in conditions of the north. *Journal of Circumpolar Health, 60*(2), 294-299.

Krumhansl, C. (1997). An exploratory study of musical emotions and psychophysiology. *Canadian Journal of Experience, 51*, 336-352.

Kucera-Francis, W.N. (1967). *Computational analysis of present-day American English. Providence*. Brown University Press.

Kushner, M. G., Sher, K. J., Wood, M. D., & Wood, P. K. (1994). Anxiety and drinking behavior: moderating effects of tension-reduction alcohol outcome expectancies. *Alcoholism, Clinical and Experimental Research, 18*(4), 852-860.

Labouvie, E. W. (1986). Alcohol and marijuana use in relation to adolescent stress. *International Journal of the Addictions, 21*(3), 333-345.

Lachman, M. E. (1986). Locus of control and aging research: A case for multi-dimensional and domain-specific assessment. *Psychology and Aging, 1*,34-40.

Lachman, M. E. (2005). Aging under control? *Psychological Science Agenda, 19*(1), 327-338.

Lachman, M. E., & Andreoletti, C. (2004) *Strategy use mediates the relationship between control beliefs and memory performance for middle-aged and older adults.* Manuscript submitted for publication.

Lachman, M. E., & Firth, K. M. (2004). The adaptive value of feeling in control during midlife. In O. G. Brim, C. D. Ryff, & R. Kessler (Eds.), *How healthy are we?: A national study of well-being at midlife,* (320-349). Chicago: University of Chicago Press.

Lachman, M. E., & Prenda, K. M. (2004). The adaptive value of feeling in control during midlife. In O. G. Brim, C. D. Ryff, & R. Kessler (Eds.), *How healthy are we?: A national study of well-being at midlife*, (pp. 320-349). Chicago: University of Chicago Press.

Lachman, M. E., & Weaver, S. L. (1998). The Sense of Control as a Moderator of Social Class Differences in Health and Well-Being. *Journal of Personality and Social Psychology, 74*(3), 763-773.

Lachman, M. E., Jette, A., Tennstedt, S., Howland, J., Harris, B. A., & Peterson, E. (1997). A cognitive-behavioural model for promoting regular physical activity in older adults. *Psychology, Health & Medicine, 2*(3), 251-261.

Lachman, M. E., Ziff, M. A., & Spiro, A. I. (1994). Maintaining a sense of control in later life. In Abeles, R. P. & Gift, H. C. (Eds.), *Aging and quality of life. Springer series on life styles and issues in aging*,(pp. 216-232). New York, NY: Springer Publishing.

Lang, A. J., & McNiel, D. E. (2006). Use of the anxiety control questionnaire in psychiatric inpatients. *Depression and Anxiety, 23* (2), 107-112.

Lang, P. J., Bradley, M. M., & Cuthbert, B. N. (1995). *The international affective picture system (IAPS): Technical manual and affective ratings*. Gainesville, FL, Center for Research in Psychophysiology, University of Florida.

Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology, 34,* 191-198.

Langer, E. J., & Rodin, J. (2004). The Effects of Choice and Enhanced Personal Responsibility for the Aged: A Field Experiment in an Institutional Setting. Kowalski, R. M. & Leary, M. R. (Eds.), *The interface of social and clinical psychology: Key readings. Key readings in social psychology*, (339-348). New York, NY, US: Psychology Press.

Lavelle, T. L., Metalsky, G. I. & Coyne, J. C. (1979). Learned helplessness, test anxiety, and acknowledgment of contingencies. *Journal of Abnormal Psychology, 88*(4), 381-387.

Lawton-Craddock, A., Nixon, S. J., & Tivis, R. (2003). Cognitive efficiency in stimulant abusers with and without alcohol dependence. *Alcoholism, Clinical and Experimenatl Research, 27*(3), 457-464.

Lazarus, R. S. (1991). *Emotion and Adaptation.* Oxford Univeristy Press, New York.

Leake, G. J., & King, A. S. (1977). Effect of counselor expectations on alcoholic recovery. *Alcohol Health and Research World, 1*(3), 16-22.

Lee, F. K., Sheldon, K. M., & Turban, D. B. (2003). Personality and the goal-striving process: the influence of achievement goal patterns, goal level, and mental focus on performance and enjoyment. *Journal of Applied Psychology, 88*(2): 256-65.

Lefcourt, H. M. (1992). Durability and impact of the locus of control construct. *Psychological Bulletin, 112*(3), 411-414.

Lefcourt, H. M. (1993). The function of the illusions of control and freedom. *American Psychologist, 28*(5), 417-425.

Leggett, E. L. (1986) Individual differences in effort/ability inference rules and goals: Implications for causal judgments. *Dissertation Abstracts International, 47*(6-B), 26-62.

Lester, D. (2001). An inventory to measure helplessness, hopelessness, and haplessness. *Psychology Report, 89*(3), 495-498.

Levenson, R. W., Ekman, P., & Friesen, W. V. (1990). Voluntary facial action generates emotion-specific autonomic nervous system activity. *Psychophysiology, 27*, 363-384.

Levin, J. L., Nolan, J. F. (2006). *Principles of Classroom Management: A Professional Decision-Making Model.* Boston, MA: Allyn & Bacon.

Levy, S. M., Herberman, R. B., Maluish, A. M., Schlien, B., & Lippman, M. (1985). Prognostic risk assessments in primary breast cancer by behavior and immunological parameters. *Health Psychology, 4*(2), 99-113.

Lewin, K. (1928). Will, intention, and need. *Psychologische Forschung, 7,* 330-385.

Lewin, K. (1938). *The conceptual representation and the measurement of psychological forces.* Durham, North Carolina: Duke University Press.

Li, F., & Harmer, P. (1996). Testing the simplex assumption underlying the Sport Motivation Scale: A structural equation modeling analysis. *Research Quarterly for Exercise & Sport, 67,* 396-405.

Litman, G. K., Stapleton, J., Oppenheim, A. N., Peleg, M., & Jackson, P. (1983). Situations related to alcoholism relapse. *British Journal of Addiction, 78,* 381–389.

Litten, K. G (1999). Prevention program design for inner-city, high school adolescents to combat learned helplessness and depression. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 60*(3-B), 13-60.

Little, B. R. (1983). Personal projects analysis: Trivial pursuits, magnificent obsessions, and the search for coherence. In N. Cantor (Ed.), *Personality Psychology: Recent trends and emerging directions*, (15-31). New York: Springer-Verlag.

Livanou, M., Basoglu, M., Marks, I. M., De Silva, P., Noshirvani, H., & Lovell, K., et al. (2002). Beliefs, sense of control and treatment outcome in post-traumatic stress disorder. *Psychological Medicine, 32*(1), 157-165.

Locke, E. A. (1982). Relation of goal level to performance with a short work period and multiple goal levels. *Journal of Applied Psychology, 67*(4), 512-514.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance.* Englewood.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory of goal setting and task motivation. A 35-year odyssey. *American Journal of Community Psychology, 57*(9), 705-717.

Logan, J. W., Olson, M. W. & Lindsey, T. P. (1993). Lessons from champion spellers. *Journal for the Education for the Gifted, 13*(1), 89-96.

Lyvers, M. (2000a). Cognition, emotion, and the alcohol—aggression relationship. *Experimental and Clinical psychopharmacology, 8*(4), 607- 612.

Lyvers, M. (2000b). Loss of control in alcoholism and drug addiction: A neuroscientific interpretation. *Experimental and Clinical Psychopharmacology, 8*(2), 225-249.

MacAndrew, C. (1983). Alcoholic personality or personalities: scale and profile data from the MMPI. In W. M. Cox., & Blount, J. P. (Eds.), Are punishment-avoiding college students protected from excessive alcohol consumption? Psychology of Addictive Behaviors, 12(4), 227-232.

MacCallum, R. C., Widaman, K. F., Zhang, S., & Hong, S. (1999). Sample Size in Factor Analysis. *Psychological Methods, 4*(1), 84-99.

Maccoby, E. E. (1980). *Social development: Psychological growth and the parent–child relationship.* San Diego, CA: Harcourt Brace Jovanovich.

Mackie, D. M. & Worth, L. T. (1989). Processing deficits and the mediation of positive affect in persuasion. *Journal of Personality and Social Psychology, 57*, 27-40.

MacKinnon, D. P. (1994). Analysis of mediating variables in prevention and intervention research. In A. Cazares & L. A. Beatty (Eds.), *Scientific methods in prevention research.* Washington, Govt. Print.

MacKinnon, D. P. (2000). Contrasts in multiple mediator models. In J. S. Rose, L. Chassin, C. C. Presson, & S. J. Sherman (Eds.), *Multivariate applications in*

substance use research: New methods for new questions (141– 160). Mahwah, NJ: Erlbaum.

MacKinnon, D. P., & Dwyer, J. H. (1993). Estimating mediating effects in prevention studies. *Evaluation Review, 17,* 144–158.

MacLeod, C. M. (1991). Half a century of research on the Stroop effect: An integrative review. *Psychological Bulletin, 109*(2), 163-203.

Maddox, G., & Clark, D. (1992). Trajectories of functional impairment in later life. *Journal of Health and Social Behavior, 33,*114-125.

Maier, S. F., Peterson, C., & Schwartz, B. (2000). From helplessness to hope: The seminal career of Martin Seligman. In Gillham, J. E. (Ed.), *The science of optimism and hope*. Philadelphia, PA: Templeton Foundation Press.

Man, F., Stuchlikova, I., & Klinger, E. (1998). Motivational structure of alcoholic and nonalcoholic Czech men. *Psychological Reports, 82,* 1091-11-6.

Markowe, H. L. J., Marmot, M. G., Shipley, M. J., Bulpitt, C. J., Meade, T. W., Stirling, Y., & et al. (1985). Fibrinogen: a possible link between social class and coronary heart disease. *British Journal of Medical Education, 291*, 1312-1314.

Marlatt, G. A. & Gordon, J. R. (1980). Determinants of relapse: implications for the maintenance of behavior change. In Davidson, P., & Davidson, S. (Eds.), *Behavioural Medicine: changing health lifestyles,* (410–452), New York, Brunner/Mazel.

Marlatt. G. A., Curry. S., & Gordon. J. R. (1988). A longitudinal analysis of unaided smoking cessation. *Journal of Consulting and Clinical Psychology, 56*(5), 715-720.

Marlatt. G. A. (1985). Controlled drinking: The controversy rages on. *American Psychologist, 40*(3), 374-375.

Martin, M. (1990). On the induction of mood. *Clinical Psychology Review, 10*(6), 669-697.

Martinez, R., & Sewell, K.W. (2000). Explanatory style in college students: Gender differences and disability status. *College Student Journal, Special Issue: Social Studies Instruction, 34*(1), 72-78

Martin-Krumm, C. P., Sarrazin, p. G., Pererson, C., & Famose, J-P. (2003). Explanatory style and resilience after sports failure. *Personality and Individual Differences, 35*(7), 1685-1695.

Matusov, E. (1997). The types of students'communication for ideal school. In G. A. Zukerman (Ed.), The type of communication in education. *Mind, Culture, and Activity, 4*(2), 132-136.

May, J., Cooper, C. & Kline, P. (1986). The reliability of reaction times in some elementary cognitive tasks. *Personality and Individual Differences, 7*, 893-895.

McAuley, E., Duncan, T., & Tammen, V. V. (1987). Psychometric properties of the Intrinsic Motivation Inventory in a competitive sport setting: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport, 60,* 48-58.

McClelland, D. C., Davis, W. N., Kalin, R., & Wanner, E. (1972). *The drinking man: Alcohol and human motivation*. New York, Free Press.

McCusker, C. G. (2001). Cognitive biases and addiction: an evolution in theory and method. *Addiction, 96*(1), 47-56.

McMurran, M. (2003). Assessing and Changing Motivation to Offend. In Cox, W. M. &

Klinger, E. (Eds.), *Handbook of motivational counseling: Concepts, approaches, and assessment.* (pp. 319-334). Chichester, United Kingdom: Wiley.

McNeil, D. W., Tucker, P., Miranda, R. Jr., Lewin, M. R., & Nordgren, J. C. (1999). Response to depression and anxiety Stroop stimuli in posttraumatic stress disorder, obsessive-compulsive disorder, and major depressive disorder. *The Journal of Nervous and Mental Disease, 187*(8), 512-516.

McQuillan, C. T., & Rodriguez, J. (2000). Adolescent suicide: a review of the literature. *Boletin Asociaion Medica de Puerto Rico, 92*(1-3), 30-38.

Menon, S. T. (1996). Employee empowerment: Definition, measurement and construct validation. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 57*(4-A), 1732.

Merriam-Webster Online Dictionary. (2004). from http://www.merriam-webster.com.

Milam, J. R. (1992). *The alcoholism revolution. Professional Counsellor.* Retrieved 5 March 2002 from: http://www.unhooked.com/sep/alcorevo.htm

Miles, A., Sawyer, M., & Kennedy, D. (1995). A preliminary study of factors that influence children's sense of competence to manage their asthma. *Journal of Asthma, 32*(6), 437-444.

Miles, J., & Shevlin, M. (2001). Applying Regression & Correlation: A Guide for Students and Researchers. London: Sage Publications.

Milkulincer, M. (1994). Human learned helplessness: A coping perception. New York: PB PLenum Press.

Miller, A. M. & Iris, M. (2002). Health promotion attitudes and strategies in older adults. *Health Education and Behaviour, 29*(2), 249-267.

Miller, L. M. S., & Gagne, D. D. (2006). *Adult age differences in reading to problem solve*. A paper to be presented at the Cognitive Aging Conference, Atlanta, GA.

Miller, L. S., & Lachman, M. E. (2000). The sense of control and cognitive aging: Toward a model of mediational processes. In T. Hess & Blanchard-Fields (Eds.), *Social Cognition* (17-41). NY: Academic Press.

Miller, N. S. (1995). Pharmacotherapy in alcoholism. *Journal of Addictive Diseases, 14*(1), 23-46.

Miller, P. C., Lefcourt, H. M., Holmes, J. G., Ware, E. E., & Saleh, W. E. (1986). Marital locus of control and marital problem solving. *Journal of Personality and Social Psychology, 51,* 161-169.

Miller, R. B., Greene, B. A., Montalvo, G. P., Ravindran, B., & Nichols, J. D. (1996). Engagement in academic work: The role of learning goals, future consequences, pleasing others, and perceived ability. *Contemporary Educational Psychology, 21*(4), 388-422.

Miller, W. R. & Tonigan, J. S. (1996). Assessing drinkers' motivation for change: The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES). *Psychology of Addictive Behaviors, 10,* 81-89.

Miller, W. R., & Marlatt, G. A. (1984). *Manual for the Comprehensive Drinker Profile.* Odessa, FL: Psychological Assessment Resources.

Mintzer, M. Z., & Stitzer, M. L. (2002). Cognitive impairment in methadone maintenance patients. *Drug Alcohol Depend, 67*(1), 41-51.

Mirowsky, J. & Ross, C. E. (1990). Control or defence? Depression and the sense of control over good and bad outcomes. *Journal of Health and Social Behaviour,*

31(1), 71-86.

Mirowsky, J. (1995). Age and the sense of control. *Social Psychology Quarterly, 58*(1), 31-43

Mirowsky, J. (1997). Age, subjective life expectancy, and the sense of control: The horizon hypothesis. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences, 52B* (3), S125-S134.

Mitchell, S. A. (1997). Relationships between perceived learning environment and intrinsic motivation in middle school physical education. *The Journal of Teaching in Physical Education, 15*(3), 369-383

Monti, P. M., Roshsenow, D. J., & Hutchison, K. E. (2000). Toward bridging the gap between biological, psychological and psychosocial models of alcohol craving. *Addiction, 95*(8), 229-237.

Moos, R. H., Brennan, P. L., Fondacaro, M. R., & Moos, B. S. (1990). Approach and avoidance coping responses among older problem and nonproblem drinkers. *Psychology and Aging, 5*(1), 31-40.

Morris, P. L., Stewart, S. H., & Ham, L. S. (2005). The relationship between social anxiety disorder and alcohol use disorders: A critical review. *Clinical Psychology Review. Special Issue: Anxiety and Stress Vulnerability and Substance Problems: Theory, Empirical Evidence, and Directions for Future Research, 25*(6), 734-760.

Muldoon, O. T., & Wilson, K. (2001). Ideological commitment, experience of conflict and adjustment in Northern Irish adolescents. *Medicine, Conflict, and Survival, 17*(2), 112-124.

Murphy, H., & Roopchand, N. (2003). Intrinsic Motivation and Self-esteem in Traditional and Mature Students at a Post-1992 University in the North-east of England. *Educational Studies, 29*(2-3), 243-259.

Nasby, W., & Yando, R. (1982). Selective encoding and retrieval of affectively valent information: Two cognitive consequences of children's mood states. *Journal of Personality and Social Psychology, 43*, 1244-1253.

Nathan, P. A. (1986). Some implications of recent biological findings for the behavioural treatment of alcoholism. *Behaviour Therapist, 9*(8), 159-161.

Newcomb, M. D & Bentler, P. M. (1988). Behavioral and psychological assessment of sexual dysfunction: An overview. In B. R. Atkins., & F.J. Roberts (Eds.), *Treatment of sexual problems in individual and couples therapy* (127-166). Costa Mesa, CA, US: PMA Publishing Corp.

Newcomb, M. D., & Harlow, L. L. (1986). Life events and substance use among adolescents: mediating effects of perceived loss of control and meaninglessness in life. *Journal of Personality and Social Psychology, 51*(3), 564-577.

Nicassio, P. M., Schuman, C., Radajevic, V., & Weisman, M. H. (1999). Helplessness as a mediator of health status in fibromyalgia. Cognitive Therapy and Research. *Special Issue: Cognitive factors in Chronic Illness: Empirical Approaches, 23*(2), 181-196.

Nicassio, P. M., Schuman, C., Radojevic, V., & Weisman, M. H. (1999). Helplessness as a mediator of health status in fibromyalgia. *Cognitive Therapy and Research, 23*(2), 181-196

Nikles, C., Brecht, D., Klinger, E., & Bursell, A. (1998). The effects of current-concern and nonconcern-related waking suggestions on noctural dream content. *Journal of Personality and Social Psychology, 75*, 242-255.

Nikula, R., Klinger, E., & Larson-Gutman, M. K. (1993). Current concerns and electrodermal activity; responses to words and thoughts. *Journal of Personality, 61*, 63-84.

Noel, X., Paternot, J., Van der Linden, M., Sferrazza, R., Verhas, M., Hanak, C., & et al. (2001). Correlation between inhibition, working memory and delimited frontal area blood flow measure by 99mTc-Bicisate SPECT in alcohol-dependent patients. *Alcohol, 36*, 556–563.

Noel, X., Van der Linden, M., Schmidt, N., Sferrazza, R., Hanak, C., Le Bon, O., & et al. (2002). Supervisory attentional system in nonamnesic alcoholic men. *Archives of General Psychiatry, 58*(12), 1152-1158.

Ochse, R. (1989). Toward the prediction and stimulation of creativity. *South African Journal of Psychology, 19*(3), 113-121.

Ostir, G. V., Smith, P. M., Smith, D., & Ottenbacher, K. J. (2005). Reliability of the Positive and Negative Affect Schedule (PANAS) in medical rehabilitation. *Clinical Rehabilitation, 19*(7), 767-769.

Otto, J. H., & Schmitz, B. (1993). Changes in positive mood states induced by analytical and creative information processing. *Zeitschrift fur Experimentelle und Angewandte Psychologie, 40*(2), 235-266.

Pandina, R. J., Johnson, V., & Labouvie, E. W. (1992). Affectivity: A central mechanism in the development of drug dependence. In M. Giant & R. Pickens (Eds.), *Vulnerability to Drug Abuse* (179-209). Washington, DC: American Psychological Association.

Parrish, S. (2003). *Mastery Oriented vs. Learned Helplessness in Children.* http//129.49.7L236/psy104/presentations/shawn.htm

Paul, M. R. (1991). *Handbook of behavior therapy and psychological science : an integrative approach.* New York ; Oxford: Pergamon.

Payant, S.C. (2005). An analysis of the relationship among structured goal setting, goal achievement, motivation, and academic performance of novice adult learners at the Schools of Banking. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 66* (5-A), 16-41.

Pearlin, L.I., Menaghan, E.G., Lieberman, M.A., Mullan, J.T. (1981). The stress process. *Journal of Health and Social Behavior, 22*(4), 337-356.

Pearman, A. M., & Lachman, M. E. (2004). *Cognitive concerns: The role of personality and control beliefs.* In C. Hertzog (Chair), Social cognition, beliefs, and aging. Symposium presented at the 112th Meetings of the American Psychological Association, Honolulu, HI.

Pegg, P. O. J., Auerbach, S. M., Seel, R. T., Buenaver, L. F., Kiesler, D. J., & Plybon, L. E. (2005). The Impact of Patient-Centered Information on Patients' Treatment Satisfaction and Outcomes in Traumatic Brain Injury Rehabilitation. Rehabilitation. *Psychology, 50* (4), 366-374.

Perri, M. G. (1985). Self-changes strategies for the control of smoking, obesity, and problem drinking. In S. Shiffman & T. A. Wills (Eds.), *Coping and substance use* (295-317). Orlando, FL: Academic Press.

Peterson, C., & Barrett, L. C. (1987). Explanatory style and academic performance among university freshmen. *Journal of Personality and Social Psychology, 53*, 603-607.

Peterson, C., & Bossio, L. M. (1991). *Health and optimism.* New York: Free Press.

Peterson, C., & Seligman, M. E. P. (1984). Causal explanations as a risk factor for depression: Theory and evidence. *Psychological Review, 91,* 347-374.

Peterson, C., & Seligman, M. E. P. (1987). Explanatory style and illness. *Journal of Personality. Special Issue: Personality and physical health, 55*(2), 237-265.

Peterson, C., & Seligman, M. E. P. (1994). Pessimistic explanatory style is a risk factor for physical illness: A thirty-five-year longitudinal study. In S. Andrew, & W. Jane (Eds.), *Processes and health*, (pp. 235-246). New York: Cambridge University Press.

Peterson, C., & Stunkard, A. (1989). Personal control and health promotion. *Social Science and Medicine, 28*(8), 819-828

Peterson, C., Maire, S. F., & Seligman, M. E. P. (1993) *Learned helplessness.* Oxford University press: New York.

Peterson, C., Seligman, M. E. P., & Vaillant, G. E. (1994). Pessimistic explanatory style is a risk factor for physical illness: A thirty-five-year longitudinal study. *Journal of Personality and Social Psychology, 55*, 23-27.

Peterson, C., Seligman, M. E. P., Yurko, K. H., Martin, L. R., & Fridman, H. S. (1998) Catastrophizing and untimely death. *Psychological Science, 9* (2), 127-130.

Petri, H. L., & Govern, J. M. (2004). Motivation: Theory, Research and Applications (5 th Ed.) Belmont, CA: Wadsworth.

Pettingale, K. W., Morris, T., Greer, S., & Haybittle, J. L. (1985). Mental attitudes to cancer: An additional prognostic factor. *Lancet 2:* 750.

Petty, R. E., Wells, G. L., & Brock, T. C. (1976). Distraction can enhance or reduce yielding to propaganda: Thought disruption versus effort justification. *Journal of Personality and Social Psychology, 34*, 874-884.

Phelps, L., & Waskel, S. A. (1993). Work reinforcer and explanatory style for women age 40 to 75 years. *Journal of Psychology, 128*(4), 403-407.

Phillips, L. H., Smith, L. & Gilhooly, K. J. (2002). The effects of age and induced positive and negative mood on planning. *Emotion, 2,* 263-272.

Pickens, R. W., Hatsukami, D. K., Spicer, J. W., & Svikis, D. S. (1985). Relapse by alcohol abusers. *Alcoholism: Clinical and Experimental Research, 9*, 244–247.

Pierce, C. P. (2005).Sense of control and psychological well-being during the transition to parenthood. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 66*(6-B), 3423.

Pinqurart, M., & Sibereisen, R. K. (2006). Socioemotional Selectivity in Cancer Patients. *Psychology and Aging, 21*(2), 419-423.

Pintrich, P. R. & Schunk, D. H. (2002). *Motivation in education: Theory, research, and applications.* (2nd Ed.). Englewood Cliffs, NJ: Prentice Hall.

Polich, J. M., Armor, D. J., & Braiker, H. B. (1981). *The course of alcoholism: Four years after treatment.* New York: Wiley.

Poole, J. H., Tobias, F. C., & Vinogradov, S. (2000). The functional relevance of affect recognition errors in schizophrenia. *Journal of International Neuropsychological Society, 6*(6), 649-658.

Power, M. J., & Dalgleish, T. (1999). *Handbook of cognition and emotion.* New York: Wiley.

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effect in simple mediation models. *Behavior Research Methods, Instruments, and*

Computers, 36(4), 717-731.

Preacher, K. J., & MacCallum, R. C. (2002). Exploratory Factor Analysis in Behavior Genetics Research: Factor Recovery with Small Sample Sizes. *Behavior Genetics, 32*(2), 153-161.

Psunder, M. (2005). How effective is school discipline in preparing students to become responsible citizens? Slovenian teachers' and students' views. *Teaching and Teacher Education, 21*(3), 273-286.

Pugh, K. J., Bergin, D. A. & Rocks, J. (2003). *Motivation and Transfer: A Critical Review.* American Educational Research Association Annual Conference, Chicago.

Ramirez, E., Maldonado, A., & Martos, R. (1992). Attribution modulate immunization against learned helplessness in humans. *Journal of Personality and Social Psychology, 62*, 139-146. Rosenbaum, 2000

Ratell, C. F., Baldwin, M. W., & Vallerand, R. J. (2005). On the cued activation of situational motivation. *Journal of Experimental Social Psychology, 41*(5), 482-487.

Reeve, J. (2002). Self-determination theory applied to educational settings. In E. L. Deci, & R. M. Ryan (Eds.), *Handbook of self-determination research* (183–203). Rochester, NY: University of Rochester.

Reeve, J., Nix, G., & Hamm, D. (2003). Testing Models of the Experience of Self-Determination in Intrinsic Motivation and the Conundrum of Choice. *Journal of Educational psychology, 95*, 375-392.

Regard, M., Knoch D., Gutling, E., & T. Landis. (2003). Brain Damage and Addictive Behavior: A Neuropsychological and Electroencephalogram Investigation with Pathologic Gamblers. *Cognitive and Behavioral Neurology, 16*(4) 47-53.

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin, 26*, 419-435.

Reivich, K. J., Gillham, J. E., Chaplin, T. M., & Seligman, M. E. P. (2005). From helplessness to optimism: The role of resilience in treating and preventing depression in youth. In S. Goldstein & R.B. Brooks (Eds.), *Handbook of Resilience in Children,* (223-237). New York: Kluwer Academic/Plenum Publishers.

Renninger, K. A. (2000). Individual interest and its implications for understanding intrinsic motivation. In C. Sansone., & J. M. Harackiewicz (Eds.), *Intrinsic and extrinsic motivation: The search for optimal motivation and performance*. (373-404). San Diego, CA: Academic Press.

Richards, A., Richards, L. C., & McGeeney, A. (2000). Anxiety-related Stroop interference in adolescents. *Journal of General Psychology, 127*(3), 327-333.

Richell, R. A., & Anderson, I. M. (2004). Reproducibility of negative mood induction: a self-referent plus musical mood induction procedure and a controllable/uncontrollable stress paradigm. *Journal of Psychopharmacology, 18*, 94-101.

Roberts, A. J., & Koob, G. F. (1997). The Neurobiology of Addiction: An Overview. *Alcohol Health and Research World, 21*(2), 101-106.

Robinson, T. E., & Berridge, K. C. (1993). The neural basis of drug craving: an incentive-sensitization theory of addiction. *Brain Research Reviews, 18*(3), 247-291.

Robinson, T. E., & Berridge, K. C. (2000). The psychology and neurobiology of addiction: an incentive- sensitization view. *Addiction, 95,* 91-117.

Robinson, T. E., & Berridge, K. C. (2001). Incentive-sensitization and addiction. *Addiction, 96*(1), 103-114.

Robinson, T. E., & Berridge, K. C. (2003). Addiction. *Annual Review of Psychology, 54*(1), 25-53.

Rodin, J. (1986). Aging and health: Effects of the sense of control. *Science, 233,* 1271-1276.

Rodin, J., & Langer, E. J. (1977). Long-term effects of a control-relevant intervention with the institutionalized aged. *Journal of Personal Social Psychology, 35,* 897-902.

Rodin. J., Timko, C., & Harris, S. (1985). The construct of control: biological and psychosocial correlates. *Annual Review of Gerontology and Geriatrics, 5,* 3-55.

Rohsenow, D. J., & Monti, P. M. (1999). Does urge to drink predict relapse after treatment? *Alcohol Research & Health, 23*(3), 225-232.

Rollnick, S., Heather, N., Gold, R., & Hall, W. (1992). Development of a short readiness to change questionnaire for use in brief, opportunistic interventions among excessive drinkers. *British Journal of Addiction, 87* (5), 743-754

Rosenbaum, G. (2000). Verbal puzzles and remembering sentences/. Retrieved 5 August, 2004, from http://www.pbs.org/wgbh/nova/everest/exposure/testyourself.html

Ross, C. E., & Drentea, P. (1998). Consequences of retirement activities for distress and the sense of personal control. *Journal of health and social behaviour, 39*(4),317-334.

Rothman, A. J., Salovey, P., Antone, C., Keough, K., & Martin, C. D. (1993). The influence of message framing on intentions to perform health behaviors. *Journal of Experimental Psychology, 29,* 408-433.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs, 80* (1), 609-619.

Ryan, A. M., & Shim, S. O. (2006). Social achievement goals: The nature and consequences of different orientations toward social competence. *Personality and Social Psychology Bulletin, 32,* 1246-1263.

Ryan, R. M. (2005). (Personal communication by email).

Ryan, R. M., & Deci, E. L. (2000a). Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions. *Contemporary Educational Psychology, 25*(1), 54-67.

Ryan, R. M., & Deci, E. L. (2000b). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68-78.

Ryan, R. M., Chirkov, V. I., Little, T. D., Sheldon, K. M., Timoshina, E., & Deci, E. L. (1999). The American Dream in Russia: Extrinsic aspirations and well-being in two cultures. *Personality and Social Psychology Bulletin, 25,* 1509-1524.

Ryan, R. M., Deci, E. L., Grolnick, W. S., & La Guardia, J. G. (2006). The significance of autonomy and autonomy support in psychological development and psychopathology. In D. Cicchetti., & D. J. Cohen (Eds.), *Developmental psychopathology*, Vol 1: Theory and method (2nd ed.), (795-849). New Jersey:

John Wiley & Sons, Inc.

Ryan, R. M., Koestner, R., & Deci, E. L. (1991). Varied forms of persistence: When free-choice behavior is not intrinsically motivated. *Motivation and Emotion, 15,* 185-205.

Sadava, S., & Thompson, M. (1986). Loneliness, social drinking, and vulnerability to alcohol problems. *Canadian Journal of Behavioral Science, 18*, 133-139.

Salovey, P., & Birnbaum, D. (1989). Influence of mood on health-relevant cognitions. *Journal of Personality and Social Psychology, 57*(3), 539-551.

Samaras, T. T., & Elrick, H. (2002). Less is better. *Journal National Medical Association, 94*(2), 88-99.

Sands, D., & Wehmeyer, M. (2005).Teaching Goal Setting and Decision Making to Students with Developmental Disabilities. In M. L. Wehmeyer & M. Agran (Eds.), *Mental retardation and intellectual disabilities: Teaching students using innovative and research-based strategies.* (273-296). Auckland, New Zealand: Pearson Education Limited.

Sansone, C., & Smith, J. L. (2000). Interest and self-regulation: The relation between having to and wanting to. In C. Sansone & J. M. Harackiewicz (Eds.), *Intrinsic and Extrinsic Motivation: The Search for Optimal Motivation and Performance*. San Diego, CA: Academic Press.

Sansone, C., Sachau, D. A., & Weir, C. (1989). Effects of instruction on intrinsic interest: The importance of context. *Journal of Personality and Social Psychology, 57*, 819-829.

Sarason, I. G., & Sarason, B. R. (1990). Test anxiety. In L. Harold (Ed.), *Handbook of social and evaluation anxiety*, (475-495). New York, Plenum Press.

Scanlan, T. K., & Passer, M. W. (1980). Self-serving biases in the competitive sport setting: An attributional dilemma. *Journal of Sport Psychology, 2*(2), 124-136.

Schiff, B. B., & Lamon, M. (1989). Inducing emotion by unilateral contraction of facial muscles: A new look at hemispheric specialization and the experience of emotion. *Neuropsychologia, 27*, 923–935.

Schiff, B. B., & Lamon, M. (1994). Inducing emotion by unilateral contraction of hand muscles. *Cortex, 30*, 247–254.

Schmuck, P. (2006). *Education Occurs in Organizations.* Eugen, OR: University of Oregon.

Schneidre, F., Gur, R. C., Gur, R. E., & Muenz, L. R. (1993). Standardized mood induction with happy and sad facial expressions. *Psychiatry Research, 51*(1), 19-31.

Schunk, D. H. (1991). *Title Learning theories: An educational perspective.* New York, Macmillan Publishing.

Schunk, D. H. (1996). Title Goal and self-evaluative influences during children's cognitive skill learning. *American Educational Research Journal, 33*(2), 359-382.

Schwartz, N. (1990). Feelings as information: Informational and motivational functions of affective states. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of Motivation and Cognition: Foundations of Social Behavior* (527-561), New York, NY: Guilford Press.

Schwartz, N. (2000). Emotion, cognition, and decision making. *Cognition and Emotion. special Issue: emotion, cognition, and decision making, 14*(4), 433-440.

Secrest, J. A., & Thomas, S. P. (1999). Continuity and discontinuity: the quality of life following stroke. Rehabilitation nursing. *The official journal of the Association of Rehabilitation Nurses, 24(*6), 240-246.

Seeman, M. & Lewis, S. (1995). Powerlessness, health and mortality: A longitudinal study of older men and mature women. *Social Science & Medicine, 41*(4), 517-525

Seeman, M. & Seeman, T. E. (1983). Health behaviour and personal autonomy: A longitudinal study of the sense of control in illness. *Journal of Health and Social Behavior, 24*(2), 144-160.

Seeman, T. E., Berkman, L. F., Gulanski, B. I., & Robbins, R. J. (1995). Self-esteem and neuroendocrine response to challenge: MacArthur studies of successful aging. *Journal of Psychosomatic Research, 39*(1), 69-84.

Seidlitz, L., & Diener, E. (1993). Memory for positive versus negative life events: Theories for the differences between happy and unhappy persons. *Journal of Personality and Social Psychology, 64*(4), 654-663.

Seligman, M. E. P. (1991). *Learned optimism.* New York: Alfred A. Knopf.

Seligman, M. E. P. (1992). Power and powerlessness: Comments on Cognates of personal control. *Applied and Preventive Psychology, 1*(2), 119-120.

Seligman, M. E. P. (1996). Science as an ally of practice. *American Psychologist. Special Issue: Outcome assessment of psychotherapy, 51*(10), 1072-1079.

Seligman, M. E. P. & Maier, S. F. (1967). Failure to escape traumatic shock. *Journal of Experimental Psychology, 74,* 1-9.

Seligman, M. E. P. (1960). For helplessness: Can we immunize the weak? *Psychology Today, 3*(1), 42-44.

Seligman, M. E. P. (1974). Submissive death: Giving up on life. *Psychology Today, 7*(12), 80-85.

Seligman, M. E. P. (1975). *Helplessness. On depression, development, and death.* San Francisco: Freeman.

Seligman, M. E. P. (1990). Why is there so much depression today? The waxing of the individual and the waning of the commons. In R. E. Ingram (Ed.), *Contemporary psychological approaches to depression: Theory, research, and treatment*, (1-9). New York, Plenum Press.

Seligman, M. E. P. (1994). *What you can change and what you cannot.* New York: Knopf.

Seligman, M. E. P., & Beagley, G. (1975). Learned helplessness in the rat. *Journal of Comparative and Physiological Psychology, 88*(2), 534-541.

Seligman, M. E. P., & Schulman, P. (1986). Explanatory style as a predictor of productivity and quitting among life insurance sales agents. *Journal of Personality and Social Psychology, 50*(4), 832-838.

Seligman, M. E. P., Nolen-Hoeksema, S., Thornton, N., & Thornton, C.M. (1990). Explanatory style as a mechanism of disappointing athletic performance. *Psychological Science, 1,* 143-146.

Shapiro, D. H. (1994). *Manual of the Shapiro control inventory (SCI).* Palo Alto, CA: Behaviordata, Inc.

Shapiro, D. H., & Zifferblatt, S.M. (1976). Zen meditation and behaviour self-control: Similarities, differences, and clinical applications. *American Psychologist. 31*(7),

519-532.

Shapiro, D. H., & Astin, J. A. (1998). *Control therapy: An integrated approach to psychotherapy, health, and healing.* Wiley series on personality processes. New York, NY, US: John Wiley & Sons.

Shapiro, D. H., & Bates, D. E. (1990). The measurement of control and self-control: Background, rationale, and description of a control content analysis scale. *Psychologia--An International Journal of Psychology in the Orient, 33*(3), 147-162.

Shapiro, D. H., Bates, D., Grennsang, T., & Carrere, S. (1991). A control content analysis scale applied to verbal samples of psychiatric outpatients: Correlation with anxiety and hostility scales. *Psychologia, 34* (3), 86-97.

Shapiro, D. H., Potkin, S. G., Jin, Y., Brown, B., Carreon, D., & Wu, J. (1993). Measuring the psychological construct of control. Discriminant, divergent, and incremental validity of the Shapiro Control Inventory and Rotter's and Wallstons' Locus of Control Scales. *International journal of psychosomatics: official publication of the International Psychosomatics Institute, 40*(4), 35-46.

Shapiro, D. H., Schwartz, S. C. E., & Astin, J. A. (1996). Controlling ourselves, controlling our world: Psychology's role in understanding positive and negative consequences of seeking and gaining control. *American Psychologist, 51*(12), 1213-1230.

Sharpe, K., & Bryant, R. (1998). Living with Pessimism and Optimism. *Science a nd Spirit. 9*(4), 8-9.

Sheeran, P., Webb, T. L., & Gollwitzer, P. M. (2005). The interplay between goal intentions and

Sheldon, K. M. (1995). Creativity and self-determination in personality. *Creativity Research Journal, 8*, 61-72.

Sheldon, K. M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress but not all progress is beneficial. *Personality and Social Psychology Bulletin, 24*, 1319-1331.

Sheldon, K. M., Ryan, R. M., & Reis, H. (1996). What makes for a good day? Competence and autonomy in the day and in the person. *Personality and Social Psychology Bulletin, 22*, 1270-1279.

Shields, K. (1997). *The conflicts of Learned Helplessness in Motivation.* Retrieved from http://ematusov.soe.udel.edu/final.paper.pub/_pwfsfp/00000062.htm

Shiomi, K. (1995). Correlations of hopelessness with motivation and personality traits among Japanese school children. *Perceptual and Motor Skills, 80*(3, Pt 1), 717-718.

Shore, K. (1998). *Special Kids Problem Solver.* Paramus, NJ: Prentice Hall.

Siegrist, M. (1995a). Effects of taboo words on colour-naming performance on a Stroop test. *Perception and Motor Skills, 81*(11), 19-22.

Siegrist, M. (1995b). Reliability of the Stroop test with single-stimulus presentation. *Perceptual and Motor Skills, 81*(3 Pt 2), 1295-1298.

Siegrist, M. (1997). Test-retest reliability of different versions of the Stroop test. *Journal of Psychology, 131*, 299-306.

Siekanska, M. (2004). Psychological determinants of job success. *Przeglad Psychologiczny, 47*(3), 275-290.

Simons, J., Dewitte, S., & Lens, W. (2000). Wanting to have vs. wanting to be: The effect of perceived instrumentality on goal orientation. *British Journal of Psychology, 91*(3), 335-351.

Simons, J., Dewitte, S., & Lens, W. (2004).The role of different types of instrumentality in motivation, study strategies, and performance: Know why you learn, so you will know what you learn. *British Journal of Educational Psychology, 74*(3), 343-360.

Simons, R. J., Van der Linden, J., & Duffy, T. (2000). *New learning. Dordrecht/Boston: Kluwer Academic Publishers.*

Sinclair, R. C., & Mark, M. M. (1995). The effects of mood state on judgmental accuracy: Processing strategy as a mechanism. *Cognition and Emotion, 9*, 417-438.

Skinner, B. F. (1953). *Science and Human Behavior.* New York: Macmillan.

Skinner, E. A. (1995). *Perceived control, motivation, and coping.* Sage series on individual differences and development, 8, Thousand Oaks, CA: Sage Publications.

Skinner, E. A. (1996). A guide to constructs of control. *Journal of Personality and Social Psychology, 71*(3), 549-570.

Skutle, A., & Berg, G. (1987). Training in controlled drinking for early-stage problem drinkers. *British Journal of Addiction, 82*(5), 493-501.

Slavin, R. E. (1991). *Student team learning: A practical guide to cooperative learning.* Washington, D.C. National Education Association.

Smith, S. S., & Newman, J. P. (1990). Alcohol and drug abuse-dependence disorders in psychopathic and nonpsychopathic criminal offenders. *Journal of Abnormal Psychology, 99*(4), 430-9.

Snider, B. S., Asmundson, G. J., & Wiese, K. C. (2000). Automatic and strategic processing of threat cues in patients with chronic pain: a modified Stroop evaluation. *Clinical Journal of Pain, 16*(2), 144-154.

Snyder, C. R., Cheavens, J. S., & Michael, S. T. (2005). Hope Theory: History and Elaborated Model. In J. A. Eliott (Ed.), *Interdisciplinary perspectives on hope.* (101-118). Hauppauge, NY: Nova Science Publishers.

Sobell, L. C., & Sobell, M. B. (1995). Alcohol consumption measures. In J. P. Allen & M. Columbus (Eds.), *Assessing alcohol problems: A guide for clinician and researchers*, (55-73). Rockville, MD: National Institute on Alcohol Abuse and Alcoholism.

Soderstrom, C. A., Ballesteros, M. F., Dischinger, P. C., Kerns, T. J., Flint, R. D., & Smith, G. S. (2001). Alcohol/drug abuse, driving convictions, and risk-taking dispositions among trauma center patients. *Accident; Analysis and Prevention, 33*(6), 771-82.

Spruijt-Metz, D. (1995). Personal incentives as determinants of adolescent health behavior: The meaning of behaviour. *Health Education Research, 10*(3), 355-364.

Stauber, R. J. (1995). Learned helplessness and excessive self-reliance in people. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 55*(9-B), 41-60.

Stein, R. F. (1987).Comparison of self-concept of non-obese and obese university junior female nursing students. *Adolescence 22,* 77–99.

Sterne, M. W., & Pittman, D. (1965). The concept of motivation: A source of institutional

and professional blockage in the treatment of alcoholics. *Quarterly Journal of Studies on Alcohol. 26*(1), 41-57

Stevens, J. (1996). Applied Multivariate Statistics for the Social Sciences (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Steward, S. H., Hall, E., Wilkie, H., & Birch, C. (2002). Affective priming of alcohol schema in coping and enhancement motivated drinkers. *Cognitive Behaviour Therapy, 31*(2), 68-80.

Stipek, D. (1988). *Motivation to learn: from theory to practice.* Englewood Cliffs, New Jersey: Prentice Hall.

Stormark, K. M., Laberg, J. C., Nordby, H., & Hugdahl, K. (2000). Alcoholics' selective attention to alcohol stimuli: Automated processing? *Journal of Studies on Alcohol, 61*(1), 18-23.

Strecher, V. J., Kobrin, S. C., Kreuter, M. W., Roodhouse, K., & Farrell, D. (1994). Opportunities for alcohol screening and counseling in primary care. *The Journal of Family Practice, 39*(1), 26-32.

Strecher, V. J., Seijts, G. H., Kok, G. J., & Latham,G. P. (1995). Goal setting as a strategy for health behavior change. *Health Education Quarterly, 22*(2), 190-200.

Strickland, B. R. (1978). Internal-external expectancies and health-related behaviors. *Journal of Consulting and Clinical Psychology, 46*(6), 1192-1211.

Stroop, J. R. (1935). Studies of interference in serial verbal reaction. *Journal of Experimental Psychology, 18*, 643-662.

SuperLab. (2001). *SuperLab Pro input options*. SuperLab. from the World Wide Web: http://www.SuperLab.com/pro/input-options.htm.

Surgenor, L. J., Horn, J., Hudson, S. M., Adamson, S., & Robertson, P. (2006). Alcohol Dependence and Psychological Sense of Control: Refining the Links. *New Zealand Journal of Psychology, 35*(3), 146-152.

Surgenor, L. J., Horn, J., Hudson, S. M., Lunt, H., & Tennent, J. (2000). Metabolic control and psychological sense of control in women with diabetes mellitus. Alternative considerations of the relationship. *Journal of Psychosomatic Research, 49*(4), 267-273.

Surgenor, L. J., Horn, J., & Hudson, S.M. (2003). Empirical Scrutiny of a Familiar Narrative: Sense of Control in Anorexia Nervosa. *European Eating Disorders Review, 11*(4), 291-305.

Surgenor, L. J., & Snell, D. L. (1998). Nasogastric tube as a means of attempted suicide: A case report. *European Eating Disorders Review*; 6, 212–215.

Surrette, M. A., & Harlow, L. L. (1992). Level of satisfaction and commitment to a decisional choice as mediated by locus of control. *Applied H. R.M. Research, 3*(2), 92-113.

Sutherl, G., Newman, B., & Rachman, S. (1982). Experimental investigations of the relations between mood and intrusive unwanted cognitions. *The British Journal of Medical Psychology, 55*(Pt 2), 127-138.

Tankoonsombut, K. (2004). Investigation of the effects of feedback and goal-setting on knowledge work performance in the distributed work environment. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 65*(1-B), 387.

Taylor, M. J., & Cooper, P. J. (1992). An experimental study of the effect of mood on body size perception. *Behaviour Research and Therapy, 30*(1), 53-58.

Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin. 103*(2), 193-210.

Tennen, H., & Affleck, G. (1998). Three compulsions of stress and coping research: A systems framework cure? *Psychological Inquiry, 9*(2), 164-168.

Tennen, H., & Eller, S. J. (1977). Attributional components of learned helplessness and facilitation. *Journal of Personality and Social Psychology, 35* (4), 263-171.

Thomas, D. A. (2000). Adult achievement goal orientations and perceived ability: Impact on task choice, persistence and strategy use. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 60*(12-A), 21-43.

Thompson, S. C., Cheek, P. R., & Graham, M. A. (1988). The other side of perceived control: Disadvantages and negative effects. In S. Spacapan., & S. Oskamp (Eds.), *The social psychology of health.* The Claremont Symposium on Applied Social Psychology (69-93). Thousand Oaks, CA: Sage Publications.

Tiffany, S. T. (1990). A cognitive model of drug urges and drug-use behaviour: Role of automatic and nonautomatic processes. *Psychological Review, 97*(2), 147-168.

Tiffany, S. T., & Conklin, C. A. (2000). A cognitive processing model of alcohol craving and compulsive alcohol use. *Addiction, 95*(l 2), S145-S153.

Timmer, S. G., Verhoff, J., & Colten, M. E. (1985). Life stress, helplessness, and the use of alcohol and drugs to cope: an analysis of national survey data. In S. Shiffman & T. A. Wills (Eds.), *Coping and Substance Use* (171- 198). Orlando, FL: Academic Press.

Tsigilis, N., & Theodosiou, A. (2003). Temporal stability of the Intrinsic Motivation Inventory. *Perceptual and Motor Skills, 97,* 271-280.

Tyssen, R., Vaglum, P., Aasland, O. G., Gronvold, N. T., & Ekeberg, O. (1998). Use of alcohol to cope with tension, and its relation to gender, years in medical school and hazardous drinking: A study of two nation-wide Norwegian samples of medical students. *Addiction, 93*(9), 1341-1349.

Uznadze, D. N. (1966). *The psychology of set.* New York: Consultants Bureau.

Vallerand, R. J., & Reid, G. (1988). On the relative effects of positive and negative verbal feedback on males' and females' intrinsic motivation. *Canadian Journal of Behavioural Science, 20*(3), 239-250

Van den Bos, K. (2003). On the subjective quality of social justice: the role of affect as information in the psychology of justice judgments. *Journal of Personality and Social Psychology, 85*(3), 482-498.

Vastfjall, D. (2002). Emotion induction through music: A review of the musical mood induction procedure. *Musicae Scientiae, 11,* 171-211.

Velten, E., Jr. (1968). A laboratory task for induction of mood states. *Behaviour Research and Therapy, 6*(4), 473-482.

Vincent, R. D., Goldberg, Y, K., & Titone, D. A. (2006). Anagram software for cognitive research that enables specification of psycholinguistic variables. *Behavior Research Methods, 38* (2), 196-201.

Vroom, V. H. (1964). *Work and motivation.* New York: Wiley.

Vuchinich, R. E., & Tucker, J. A. (1996). Alcoholic relapse, life events, and behavioral theories of choice: a prospective analysis. *Experimental and Clinical Psychopharmacology, 4*(6), 1-10.

Warner, J. E. (1992). Involvement of families in pain control of terminally ill patients.

Hospice Journal Special Issue: Noninvasive approaches to pain management in the terminally ill, 8(1-2), 155-170.

Waschbusch, D. A., Sellers, D. P., LeBlanc, M., & Kelle, M. L. (2003). Helpless attributions and depression in adolescents: The roles of anxiety, event valence and demographics. *Journal of Adolescence, 26*(2), 169-183

Waterman, A. S. (2005). When effort is enjoyed: Two studies of intrinsic motivation for personally salient activities. *Motivation and Emotion, 29*(3), 165-188.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54*(6), 1063-1070.

Waxman, H. C., & Huang, S. L. (1998). Classroom learning environments in urban elementary, middle, and high schools. *Learning Environments Research: An International Journal, 1*(1), 95-113.

Wegner, D. M., Erber, R. & Zanakos, S. (1993). Ironic processes in the mental control of mood and mood-related thought. *Journal of Personality and Social Psychology, 65*, 1093-1104.

Weigand, D. A., & Broadhurst, C. J. (1998). The relationship among perceived competence, intrinsic motivation, and control perceptions in youth soccer. *International Journal of Sport Psychology, 29(*4), 324-338.

Weinberg, R. S., Harmison, R. J., Rosenkranz, R., Hookom, S. (2005). Goal Setting. In J. Taylor & G. Wilson (Eds.), *Applying sport psychology: Four perspectives.* (101-116). Champaign, IL, US: Human Kinetics. ix, 310 pp.

Weinberg, R., Burton, D., Yukelson, D. & Weigand, D. (2000). Perceived goal-setting practices of Olympic athletes: An exploratory investigation. *The Sport Psychologist, 111*, 426-439.

Weiner, B. (1972). Attribution theory, achievement motivation, and the educational process. *Review of Educational Research, 42*(2), 203-215.

Weiner, B. (2006). *Social motivation, justice, and the moral emotions: An attributional approach.* Mahwah, NJ: Lawrence Erlbaum Associates Publishers.

Weinstein, S. E. (2000). The influence of control and effort on cardiovascular reactivity. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 60*(8-B), 42-94.

Weinstein, S. E., Quigley, K. S., & Mordkoff, J. T. (2002). Influence of control and physical effort on cardiovascular reactivity to a video game task. *Psychophysiology, 39,* 591-598.

Weiss, F., Blum, G. S., & Gleberman, L. (1987). Anatomically based measurement of facial expression in simulated versus hypnotically induced affect. *Motivation and Emotion, 11*, 67-81.

Wentzel, K. R. (1994). Relations of social goal purist to social acceptance, classroom behaviour, and perceived social support. *Journal of Educational Psychology, 86*(2), 173-182.

Wertz, J. M., & Sayette, M. A. (2001). Effects of smoking opportunity on attentional bias in smokers. *Psychology of Addictive Behaviors, 15*(3), 268-271.

West, R. L. (2001). Theories of addiction. *Addiction, 96*(1), 3-13.

West, R. L., & Thorn, R. M. (2001). Goal-setting, self-efficacy, and memory performance in older and younger adults. *Experimental Aging Research, 27*(1), 41-65.

West, R. L., Thorn, R. M., & Bagwell, D. K. (2003). Memory performance and beliefs as a function of goal setting and aging. *Psychology and Aging, 18*(1), 111-125.

West, R. L., Welch, D. C., & Thorn, R. M. (2001). Effects of goal setting and feedback on memory performance and beliefs among older and younger adults. *Psychology and Aging, 16*(2), 240-250.

Westermann, R., Spies, K., Stahl, G., & Hesse, F. W. (1996). Relative effectiveness and validity of mood induction procedures: A meta-analysis. *European Journal of Social Psychology, 26*(4), 557-580.

Whitworth, A. B., Fischer, F., Lesch, O. M., Nimmerrichter, A., Oberbauer, H., Platz, T., Potgieter, A., & et al. (1996). Comparison of acamprosate and placebo in long-term treatment of alcohol dependence. *Lancet, 347*(9013), 1438-1442.

Wiers, R. W., Stacy, A. W., Ames, S. L., Noll, J. A., Sayette, M. A., Zack, M., & et al. (2002). Implicit and explicit alcohol-related cognitions. *Alcoholism: Clinical and Experimental Research, 26*(1), 129-137.

Williams, G. C., Cox, E. M., Hedberg, V., & Deci, E. L. (2000). Extrinsic life goals and health risk behaviors in adolescents. *Journal of Applied Social Psychology, 30,* 1756-1771.

Williams, J. M., Mathews, A., & MacLeod, C. (1996). The emotional Stroop task and psychopathology. *Psychological Bulletin, 120*(1), 3-24.

Williams, L. (1994). A tool for training supervisors: Using the Supervision Feedback Form. *Journal of Marital & Family Therapy, 20*(3), 311-315.

Williams, M. R., Burden, S., & Al-Baharna, H. (2001). Making sense of success and failure: the role of individual in language learning. In Z. Dornyei & R. Schmidt (Eds.), *Motivation and second language acquisition* (169–182). Honolulu: The University of Hawaii Second Language Teaching and Curric.

Willinger, U., Lenzinger, E., Hornik, K., Fischer, G., Schonbek, G., Aschauer, H. N., & et al. (2002). Anxiety as a predictor of relapse in detoxified alcohol-dependent patients. *Alcohol and alcoholism, 37*(6), 609-612.

Winer, R.S. (1986). A reference price model of brand choice for frequently purchased products. *Journal of Consumer Research,13*(2), 250-256.

Wise, D., & Rosqvist, J. (2006). Explanatory Style and Well-Being. In J. C. Thomas., D. L. Segal., & M. Hersen (Eds.), *Comprehensive Handbook of Personality and Psychopathology, 1, Personality and Everyday Functioning* (285-305). Hoboken, NJ, US: John Wiley & Sons, Inc.

Witkowski, T., Stiensmeier-Pelster, J., Kulbat, J., & Paszkiewicz, K. (1997). Motivational Orientation Scales (MOS-P). *Przeglad Psychologiczny, 40*(1-2), 199-211.

Witte, K. L., Freund, J. S., & Csiki, I. (2002). Case-mixing effects on anagram solution. *Journal of General Psychology, 129*(2), 117-126.

Wong, C. J., Jones, H. E., & Stitzer, M.L. (2004). Community reinforcement approach and contingency management intervention for substance abuse. In W. M. Cox & E. Klinger (Eds.), *Handbook of motivational counseling Concepts, approaches, and assessment*. Chichester, United Kingdom: Wiley.

Wood, R.E. & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision-making. *Journal of Personality and Social Psychology, 56*, 407-415.

Wortman, C. B., Sheedy, C., Gluhoski, V., & Kessler, R. C. (1992). Stress, coping, and health: Conceptual issues and directions for future research. In H.S. Friedman

(Ed.), *Hostility, Coping, and Health* (pp. 227-256). Washington, DC: APA.

Wright, W. F., & Bower, G. H. (1992). Mood effects on subjective probability assessment. *Organizational Behavior and Human Decision Processes, 52*(2), 276-291.

Yates, S. M., Keeves, J. P & Tiggemann, M. (2000). Explanatory style in children. *Australian Journal of Social Research, 3*(1), 109-111.

Young, D. S. (2005). Today's Lesson by Roosevelt? The Use of Character Portrayal in classroom Guidance. *Professional School Counseling, 8*(4), 366-371.

Zanni, C. A. A. (2006). Attention and music: Understanding young children's attention and the potential of music to increase attention. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 66*(9-B), 51-68.

Zarinpush, F. (1996). The role of affect on moral judgements: An interface between the cognitive developmental approach to moral judgements and the affect-cognition approach to social judgements. *Dissertation Abstracts International: Section B: The Sciences and Engineering, 57*(2-B), 14-23.

Zatz, S. & Chassin, L. (1983). Cognitions of test-anxious children. *Journal of Consulting and Clinical Psychology, 51*(4), 526-534.

Zeldow, P. B., & Makoul, G. (2006). Communicating with Patients. In D. Wedding., & M. L. Stuber (Eds.), *Behavior and medicine* (4th ed.). (201-218). Ashland, OH, US: Hogrefe & Huber Publishers.

Ziff, M. A., Lachman, M. E., & Lewkowicz, C. (1996). *The relationship between sense of control and health in middle-aged and older adults: Lifestyle as mediator.* Manuscript submitted for publication.

Zimmerman, R. S., Sprecher, S., Langer, L. M., & Holloway, C. D. (1995). Adolescents' perceived ability to say no to unwanted sex. *Journal of Adolescent Research, 10*(3), 383-399.

Zumdahl, S. S. (1993). *Chemistry, Third Edition.* Lexington: D.C. Heath and company, (279-431).

APPENDIX 1

Study Information Sheet for the First Study

Information Sheet for Cognition and Motivation Study

Information for Participants

The information below should help you decide whether you wish to take part in the above study or not. Please take your time in reading this sheet and feel free to ask questions at any time. Thank you for your time.

The aims of the study

We are trying to determine how people view themselves on different dimensions, and how these different dimensions are related to each other. For example, we will determine if the goals that people are trying to achieve in their life are related to their perceptions of themselves.

What happens if I take part in the study?

This study is very simple. The study will be conducted in a group setting. Therefore, it is very important to remain quiet and to turn off your mobile phone. Zohreh Shamloo will distribute to the group envelopes containing a variety of questionnaires, and each person will be asked to complete each one in a predetermined order. This will last about 75 minutes. Before signing the consent form, during, and after the study, we will happy to try to answer any questions that you might have.

Additional notes

If at any time you find you no longer wish to complete the study, you are perfectly free to withdraw, with no penalty. Furthermore, if you wish to find out about the results of the study once it has been completed, we will be happy to provide you with this information.

APPENDIX 2

Consent Form

Consent Form

I..... hereby agree to participate in a scientific investigation of Ph.D. student Mrs. **Zohreh Shamloo**, under the supervision of Professor Miles Cox. The investigation and my part in the investigation have been fully explained to me and I understand this explanation. I will participate in an experiment that involves completing some questionnaire and solving some problems, and I might be given feedback about my performance. The procedures of this investigation have been answered to my satisfaction.

I understand that all data will remain confidential with regard to my identity.

I understand that I am free to withdraw my consent and terminate my participation at any time without penalty.

I understand that I may request a summary of the results of this study.

My responsibility is to participate actively and willingly and if I choose not to do so, I will exercise my right to withdraw. If I choose not to withdraw, I understand that I am expected to *participate actively*.

In the case of any complaints concerning the conduct of research, these should be addressed to Professor C. F. Lowe, Head of School, School of Psychology, University of Wales, Bangor, Gwynedd, LL57 2AS.

Date..... . Participant's Signature.....

I, the undersigned, have fully explained the investigation to the above individual.

Date ..... Experimenter's signature.....

APPENDIX 3

Participant's Information Sheet for Studies Two, Three, and Four

Participant's Information Sheet

Your email address:
Gender:
Age:
Date:
Starting Time: ...:...am or ...:... pm
Year of Education: 1st year, 2nd year, 3rd year
Study Subject: (e.g., Psychology)

Proficiency in English (Reading):
O Weak **O** Medium **O** Good **O** as Native Speaker **O** Native Speaker

Proficiency in English (Listening):
O Weak **O** Medium **O** Good **O** as Native Speaker **O** Native Speaker

My Nationality (optional):

I am a Dyslexic: No **O** Yes **O**

Reminder: Please turn your mobile phone off.

Thank you very much for your time and your interest in this study.

APPENDIX 4

Abridged Research Version of the Personal Concern Inventory (PCI)

Cox and Klinger, 2004

Personal Concerns Inventory

(Short Research Version)

Instructions (Page 1)

Undoubtedly, you have concerns and aspirations about different areas of your life. You might have concerns about unpleasant things that you want to *get rid of*, *prevent*, or *avoid*. Or you might have aspirations about pleasant things that you want to *get*, *obtain*, or *accomplish*. You may also have in mind things that you would like to change, in order to resolve these concerns or realise your aspirations (i.e., GOALS that you want to reach).

The following are examples of Life Areas in which many people have important concerns, aspirations, and goals:

- Home and Household Matters **- Finances and Employment**

- Relationships (with Partner, Family, Relatives, Friends, Acquaintances)

- Leisure and Recreation **- Smoking, Drinking, etc.**

- Love, Intimacy, and Sexual Matters **- Health and Medical Matters**

- Self-changes **- Education**

Before going to the ANSWER SHEET, think carefully about each of these areas. **What are the things that concern you most in each area? What would you like to do about these concerns? That is, how would you like things to turn out?** Your answers to this question would indicate your GOALS for each Life Area. You might have more than one goal in a particular area; however, for the purposes of this questionnaire, you are asked to think about only YOUR MOST IMPORTANT GOAL in each Life Area.

(Continue on the next page)

Instructions (Page 2)

On the next page, please provide ratings for your most important goal in each Life Area. For each of the ratings, you should write a number from 0 to 10 to describe your views about each goal; these are Rating Dimensions for each concern, aspiration or goal as described below. 0 is for the least amount of the thing; 10 is for the greatest amount of the thing. For each Life Area in which you have a goal, be sure to fill in all the boxes before going on to the next Life Area.

Rating Dimensions for Each Concern / Aspiration / Goal

To Get: How much it is something that I want **to get?**

To Avoid: How much is it something that I want **to avoid**?

Control: How much **control** do I have in achieving it?

What To Do: How much do I know what steps to take to achieve it?

Chances if I Try My Best: If I try my best, how **likely** am I to achieve it?

Chances If I Do Nothing: If I do nothing, how **likely** am I to achieve it**?**

Happiness: How **happy** will I be if I achieve it?

Conflict: How **unhappy** will I be if I achieve it? (Achieving some goals can bring us difficulties.)

Sadness: How **sad** will I be if I **canNOT** achieve it?

Commitment: How **committed** do I feel to achieving it?

How Long: How long will it take to achieve it?

Please feel free to refer to these dimensions as frequently as you like

(Continue on the next page)

Answer Sheet

After each Life Area, rate your views about achieving your important goal in that area. For each dimension, write a number from **0** (the *least amount* of the thing) to **10** (the *greatest* amount of the thing). If you have a concern, aspiration, or goal in a Life Area, be sure to *fill in all the boxes for that area* before going on to the next Life Area.

Dimensions / **Life Areas**	**To Get**	**To Avoid**	**Control**	**What To DO**	**Chances if I Try My Best**	**Chances If I Do Nothing**	**Happiness if achieve it**	**Conflict**	**Sadness if NOT achieve it**	**Commitment**	**How Long**
Home and Household Matters											
Finances											
Career and Employment											
Relationships (Partner, Family, Friends)											
Leisure and Recreation											
Love, Intimacy, and Sexual Matters											
Health and Medical Matters											
Self Changes											
Education and Training											
Religion and Spiritual Matters											
Smoking, Drinking, Drugs, etc.											
Any Other Life Area not Listed Above											

Continue with the next questionnaire

APPENDIX 5

Shapiro Control Inventory

Shapiro, 1994

Note: Shapiro Control Inventory and Manual is copyrighted and can be purchased from the publisher at: http://www.behaviordat.com/mmpireport.htm#SCI

APPENDIX 6

Self-Determination Scale

Sheldon, Ryan, and Reis (1996)

SD Scale

Instructions: Please read the pairs of statements, one pair at a time, and think about which statement within the pair seems more true to you at this point in your life. Indicate the degree to which statement A feels true, relative to the degree that Statement B feels true, on the 5-point scale shown after each pair of statements. For example, if statement A feels completely true and statement B feels completely UNtrue, the appropriate response would be 1. If the two statements are equally true, the appropriate response would be a 3.

Only A feels true 1 2 3 4 5 **Only B feels true**
Both

	Choices	A 1	2	3	4	B 5
1	A. I always feel like I choose the things I do. B. I sometimes feel that it's not really me choosing the things I do.					
2	A. My emotions sometimes seem alien to me. B. My emotions always seem to belong to me.					
3	A. I choose to do what I have to do. B. I do what I have to, but I don't feel like it is really my choice.					
4	A. I feel that I am rarely myself. B. I feel like I am always completely myself.					
5	A. I do what I do because it interests me. B. I do what I do because I have to.					
6	A. When I accomplish something, I often feel it wasn't really me who did it. B. When I accomplish something, I always feel it's me who did it.					
7	A. I am free to do whatever I decide to do. B. What I do is often not what I'd choose to do.					
8	A. My body sometimes feels like a stranger to me. B. My body always feels like me.					
9	A. I feel pretty free to do whatever I choose to. B. I often do things that I don't choose to do.					
10	A. Sometimes I look into the mirror and see a stranger. B. When I look into the mirror I see myself.					

APPENDIX 7

Aspiration Index

Kasser and Ryan (1996)

Aspirations Index

Everyone has long-term Goals or Aspirations. These are the things that individuals hope to accomplish over the course of their lives. In this section, you will find a number of life goals, presented one at a time, and we ask you three questions (dimensions) about each goal. (a) How important is this goal to you? **[Importance]** (b) How likely is it that you will attain this goal in your future? **[Likelihood]** and (c) How much have you already achieved this goal thus far? **[Current Progress]** Please use the following scale in answering each of the three questions about each life goal.

Scale:

Not at all					Moderately					Very
0	1	2	3	4	5	6	7	8	9	10

Write your ratings (0–10) in the table on the next page under each of the three dimensions (i.e., Importance, Likelihood, Current Progress). Please leave **no** slot blank.

CONTINUE ON THE NEXT PAGE

Scale:

Not at all					Moderately					Very
0	1	2	3	4	5	6	7	8	9	10

	Life-goals	*Importance*	*Likelihood*	*Current progress*
1	To be a very wealthy person.			
2	To be grow and learn new things.			
3	To have my name known by many people.			
4	To have good friends that I can count on.			
5	To successfully hide the signs of aging.			
6	To work for the betterment of society.			
7	To be physically healthy.			
8	To have many expensive possessions.			
9	To be able to look back on my life as meaningful and complete.			
10	To be admired by many people.			
11	To share my life with someone I love.			
12	To have people comment often about how attractive I look.			
13	To assist people who need it, asking nothing in return.			
14	To feel good about my level of physical fitness.			
15	To be financially successful.			
16	To choose what I do, instead of being pushed along by life.			
17	To be famous.			
18	To have committed, intimate relationships.			
19	To keep up with fashions in hair and clothing.			
20	To work to make the world a better place.			
21	To keep myself healthy and well.			
22	To be rich.			
23	To know and accept who I really am.			
24	To have my name appear frequently in the media.			
25	To feel that there are people who really love me, and whom I love.			
25	To achieve the "look" I've been after.			
27	To help others improve their lives.			
28	To be relatively free from sickness.			
29	To have enough money to buy everything I want.			
30	To gain increasing insight into why I do the things I do.			
31	To be admired by lots of different people.			
32	To have deep enduring relationships.			
33	To have an image that others find appealing.			
34	To help people in need.			
35	To have a physically healthy life style.			

Continue with the next questionnaire.

APPENDIX 8

Lester's Questionnaire

Lester (2001)

Lester's Questionnaire

For each of the following items, indicate your agreement or disagreement by putting a tick in the appropriate box. Do not spend too much on each item. We are interested in your first impressions. Please answer every item.

	Items	Strongly Agree	Agree	Mildly Agree	Mildly Disagree	Disagree	Strongly Disagree
1	I can do just about anything I set my mind to.						
2	I am confident that I will complete college.						
3	Many of the unhappy things in my life are partly due to bad luck.						
4	I certainly feel useless at times.						
5	I look forward to the future with hope and enthusiasm.						
6	Trusting to fate has usually turned out well for me.						
7	I don't seem to be able to cope with crises without the help of others.						
8	I don't expect to get what I really want.						
9	Many times, I might just as well decide what to do by flipping a coin.						
10	I can hardly ever find ways around the problems that I face.						
11	I have enough time to accomplish the things I most want to do.						
12	I have often found that what is going to happen will happen.						
13	When I find myself in a jam, I can never think of ways of getting out of it.						
14	In the future I expect to succeed in what concerns me most.						
15	When I get what I want, it's usually because I'm lucky.						
16	I have difficulty starting to do things.						
17	All I can see ahead of me is unpleasantness rather than pleasantness.						
18	It's mainly a matter of fate whether or not I have a few friends or many friends.						
19	I rarely feel in control of my life.						
20	When I look ahead to the future I expect I will be happier than I am now.						
21	To a great extent, my life is controlled by accidental happenings.						
22	Sometimes I think I may as well give up because there's nothing I can do about making things better for myself.						
23	It is very unlikely that I will get any real satisfaction in the future.						
24	Often there's no chance of protecting my personal interest from bad happenings.						
25	There are few ways around the problems that I am						

	facing now						
26	I can look forward to more good times than bad times.						
27	It's not always wise for me to plan too far ahead because many things turn out to be a matter of good or bad fortune.						
28	I can't think of reasonable ways to reach my current goal.						
29	I never get what I want, so it's foolish to want anything.						
30	When I fail at things, I find it's useless to try again because my luck never changes.						

APPENDIX 9

Alcohol Use Questionnaire

Cox (2000)

Drinking Questionnaire

1. How often do you usually have a drink containing alcohol (e.g., beer, cider, stout, alcopop, wine, spirits)?

____ daily
____ 3 or 4 times a week
____ twice a week
____ once a week
____ 3 or 4 times a month
____ twice a month
____ once a month
____ 3 or 4 times a year
____ twice a year
____ once a year
____ never

Units of Alcohol

There is one unit of pure alcohol in:

-- 1/2 pint of ordinary strength beer, cider, or lager (containing 3.5 or 4% alcohol)

-- A small (4 oz.) glass of wine (containing 11 or 12% alcohol)

-- One pub measure of spirits (containing 40% alcohol)

There are two units of alcohol in:

-- One pint of ordinary strength beer, cider, or lager (containing 3.5 or 4% alcohol)

-- 1/2 pint or half a can of high strength beer or lager (containing 8 or 9% alcohol)

-- A large (8 oz.) glass of wine (containing 11 or 12% alcohol)

-- A large glass (double pub measure) of spirits (containing 40% alcohol)

-- A bottle (330 ml.) of lager or alcopop

2. Think of the days when you have had an alcoholic beverage recently. On days when you drank, how much (in units of alcohol) did you usually drink in a day)?
Total Units You Usually Drank Per Day:

____ 1 ____ 5 ____ 9 ____ 13
____ 2 ____ 6 ____ 10 ____ 14
____ 3 ____ 7 ____ 11 ____ 15
____ 4 ____ 8 ____ 12 More? _____

___ I never drink alcoholic beverages

3. Think of days when you drank more alcohol than usual. On such days, how many units did you typically drink in a day?
Most Units Drunk Per Day

____ 1 ____ 5 ____ 9 ____ 13
____ 2 ____ 6 ____ 10 ____ 14
____ 3 ____ 7 ____ 11 ____ 15
____ 4 ____ 8 ____ 12 ____ More? _____

____ I always drink the same amount

____ I don't drink

4. About HOW OFTEN do you drink this larger-than-usual amount?

____ Daily
____ 3 or 4 times a week
____ Twice a week
____ Once a week
____ 3 or 4 times a month
____ Twice a month
____ Once a month
____ 3 or 4 times a year
____ Twice a year
____ Once a year

____ I always drink the same amount
____ I don't drink

5. How many days has it been since you last had an alcoholic drink?

6. On the last day that you drank, how many units did you have that day?

Units on Last Day I Drank

____ 1	____ 5	____ 9	____ 13
____ 2	____ 6	____ 10	____ 14
____ 3	____ 7	____ 11	____ 15
____ 4	____ 8	____ 12	More? _____

____ I always drink the same amount
____ I don't drink

7. At what age did you start drinking alcohol on a regular basis?

APPENDIX 10

Information Sheet for Studies Two, Three, and Four

Information Sheet for Problem Solving Study

Information for Participants

The information below should help you decide whether you wish to take part in the above study or not. Please take your time in reading this sheet and feel free to ask questions at any time. Thank you for your time.

The aims of the study
People show different levels of skills for doing different tasks. We are trying to determine how people perform on different tasks that involve verbal and concept formation skills, and how these skills are related to people's performance on a series of other measures.

What happens if I take part in the study?
This study includes a series of measures, some of which are computerised. After the completing the measures, the experimenter will give you a few tasks involving anagrams and cards. You need to unscramble the anagrams and find the relationship between the cards. You may receive feedback about your performance on these tasks. Next, you will be asked to complete some additional measures. The experiment will last about one and one-half hours. Before and after the study, we will be happy to answer any questions that you might have.

Additional notes
If at any time you find you no longer wish to complete the study, you are perfectly free to withdraw, with no penalty. Furthermore, if you wish to find out about the results of the study once it has been completed, we will be happy to provide you with this information.

APPENDIX 11

Urges to Drink Questionnaire

Bohn, Krahn, and Steahler (1995)

Participant code:

Urges to Drink Questionnaire

Instructions: After each item, tick the appropriate box to indicate your feeling about having an alcoholic drink at the moment.

	Items	Strongly Agree	Agree	Mildly Agree	Indecisive	Mildly Disagree	Disagree	Strongly Disagree
1	All I want to do now is have a drink.							
2	I do not need to have a drink now.							
3	It would be difficult to turn down a drink this minute.							
4	Having a drink now would make things seem just perfect.							
5	I want a drink so bad I can almost taste it.							
6	If I had the chance to have a drink, I do not think I would drink it.							
7	I crave a drink right now.							

APPENDIX 12

Task-Specific Personal Concern Inventory (TSPCI)

Cox and Klinger (2004)

Task-specific PCI

Solving Brain-Teasers:

Self-Appraisal Questionnaire

Instructions

Undoubtedly, you have come across various types of "brain-teasers," such as scrambled letters, puzzles, arithmetic problems, and three dimensional shapes.
This brief questionnaire asks about your *previous experience* and *familiarity* with these types of problems. It also asks about your views and feelings about such problems. For example, you might *like* brain-teasers and *enjoy* trying to solve them. Or you might *dislike* them and try to *avoid* them. You may have views and feelings about your performance on these types of problems—for example, how happy or sad will you be if you can or cannot solve them.

Please continue with the next page, on which you are asked to rate your familiarity with three main types of brain-teasers.

ANSWER SHEET (1)

The following are major types and sub-types of brain-teasers:

Verbal puzzles:
Anagrams: one needs to unscramble the scrambled letters to make a word.
Math puzzles:
Calculations: one should use arithmetic functions to solve a problem.

Concept formation puzzles (e.g., in a series of shapes):
Components: one needs to find the salient feature in a series.

Feel free to refer to these definitions as often as you like.

After each Problem Type, rate your familiarity with it. For each type, write a number from 0 (the *least amount* of the thing) to 10 (the *greatest* amount of the thing). Be sure to *fill in all the boxes for each category* before going to the next category.

Table (A)

Category	My familiarity with:
Verbal puzzles: Anagrams	
Math puzzles: Calculations	
Concept formation: Components	

Before going to the SECOND ANSWER SHEET, think carefully about each of these types of brain-teasers. How much experience have you had with these types of brain-teasers? What are the things that bother you or interest you most in trying to solve these problems? How do you feel when you try to solve these types of problems?

Your answers to these questions would indicate your views about each type of brain-teaser.

On the next page, please provide ratings for each type of brain-teaser. To do so, imagine that you are about to solve a series of problems in each category. For each of the ratings on the next page, please choose a number from 0 to 10 to describe your views and feelings about each category. For example, 0 is for the least amount of the thing; 10 is for the greatest amount of the thing. For each problem in each category, be sure to fill in all the boxes before going on to the next category.

ANSWER SHEET (2)

Rating Dimensions

Liking: How much do I like trying to solve the problem?
Disliking: How much do I dislike trying to solve the problem?
Control: How much control do I have over finding the solution to the problem?
What To Do: To what extent do I know what steps to take to solve the problem?
If I Try My Best: If I try my best, how likely am I to solve it?
My Luck: How likely would I be to solve the problem through trial and error?
Joy: How happy would I be if I solved this type of problem?
Conflict: How unhappy would I be if I spent time and energy trying to solve it?
Frustration: How frustrated would I feel if I could NOT solve the problem?
Commitment: How committed do I be to finding the solution?
How Long: Compared to other people, how long would it take for me to find the solution?

Feel free to refer to these dimensions as frequently as you like.

Table (B)

Dimensions / Type of The Problems		**Liking**	**Disliking**	**Control**	**What To DO**	**If I Try My Best**	**My Luck**	**Joy**	**Conflict**	**Frustration**	**Commitment**	**How Long**
Verbal puzzles	*Anagrams*											
Math puzzles	*Calculations*											
Concept formation	*Components*											

APPENDIX 13

Task-Specific Shapiro Control Inventory (TSSCI)

Amended from Shapiro (1994)

SOC Inventory

Instructions: You are going to do a few tasks in this study which are related to people's decoding ability and concept formation. You need to unscramble 20 anagrams and also find the relationship between a series of cards. The cards contain five dimensions, with two values each. You will become more familiar with these tasks later. You will also be asked to complete a few paper-and-pencil questionnaires and a few computerised tasks, on which you should respond to a series of questions or stimuli as quickly and accurately as possible. The following questions are designed to measure your feelings of control in completing the tasks and tests in this study.

We know that it is difficult to give exact responses to the following questions before doing the real tasks and tests, but we are interested in knowing your estimation of your reactions. Please For each question, write *a number from 0 (Not at All) to 7 (Completely).*

1. I will have enough control over doing tasks in this experiment.
   Not at All *1 2 3 4 5 6 7* **Completely**

2. I believe in my ability to gain enough control over doing tasks in this experiment.
   Not at All *1 2 3 4 5 6 7* **Completely**

3. I think I will lose my sense of control while doing the tasks.
   Not at All *1 2 3 4 5 6 7* **Completely**

4. I lack control of this experimental situation.
   Not at All *1 2 3 4 5 6 7* **Completely**

5. At the moment, I feel too passive and helpless.
   Not at All *1 2 3 4 5 6 7* **Completely**

6. I will be able to calmly accept what I will not be able to improve in this experiment.
   Not at All *1 2 3 4 5 6 7* **Completely**

7. I will be able to act assertively and decisively to try to change or alter what I want to.
   Not at All *1 2 3 4 5 6 7* **Completely**

8. I will be able to choose and make decisions about important things that may arise in this experiment.
   Not at All *1 2 3 4 5 6 7* **Completely**

9. I will be able to set clear, realistic, and meaningful goals during this experiment.

Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

10. I will be aware of my own feeling and motivations and recognize how they affect me.
Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

11. I will take appropriate responsibility for that over which I have control.
Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

12. I will make the appropriate amount of effort and have sufficient discipline to do the tasks.
Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

13. I have the skills and ability to succeed in doing the tasks.
Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

14. I think that in this experiment, the experimenter will have too much control over me.
Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

15. I feel that I will lose control in areas where I once had control.
Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

16. I have the right degree of self-control for doing tasks in this experiment.
Not at All *1* *2* *3* *4* *5* *6* *7* **Completely**

APPENDIX 14

Task-Specific Intrinsic Motivational Inventory (TSIMI)

TASK EVALUATION QUESTIONNAIRE

For each of the following statements, please indicate how true it is for you, using the following scale:

	Items	Strongly Agree	Agree	Mildly Agree	Indecisive	Mildly Disagree	Disagree	Strongly Disagree
1	While working on the same tasks, I will think how much they are enjoyable.							
2	I do not feel at all nervous about doing the same tasks.							
3	I feel that I will have some choice in doing the tasks.							
4	I think I will be pretty good at these tasks.							
5	I will find the tasks very interesting.							
6	I will feel tense while doing the tasks.							
7	I think I will do pretty well at this activity, compared to other students.							
8	Doing the tasks would be fun.							
9	I will feel relaxed while doing the tasks.							
10	I will enjoy doing the tasks very much.							
11	I will not really have a choice about doing the tasks.							
12	I will be satisfied with my performance at these tasks.							
13	I will feel anxious while doing the task.							
14	I still think that the tasks are very boring.							
15	I feel like I will be doing what I want to do while I work on the tasks.							
16	I feel very skilful at this task.							
17	I think the tasks are very interesting.							
18	I will feel pressured while doing the tasks.							
19	I feel like I will have to do the task.							
20	I will describe the task as very enjoyable.							
21	I will do the task because I have no choice.							
22	After working at these tasks for awhile, I will feel pretty competent.							

APPENDIX 15

Concept-Identification Cards

Hiroto and Seligman (1975)

Concept-Identification Cards Presented to Three Groups with Solutions

A. Solutions to warm-up sets and goal setting sets.

Group	Sets	Common Values					Most frequent
		Pair 1	Pair 2	Pair 3	Pair 4	Pair 5	
All Groups	Warm up 1	Big *r*/ plain	Big *r*/ line below	Circle/ line above	Small *r*/ big shape	Big *r*/ shaded	Big *r*
High-Sense-of-Control Group	Warm up 2	Shaded/ big shape	Shaded/ small shape	Triangle/ small *r*	Big *r*/ plain	Shaded/ line above	Shaded
High-Sense-of-Control Group	Goal setting 1	Big *r*/ plain	Circle/ line above	Small *r*/ big shape	Big *r*/ line below	Big *r*/ shaded	Big *r*
	Goal setting 2	Shaded/ big shape	Shaded/ small shape	Small *r*/ triangle	Big *r*/ plain	Shaded/ line above	Shaded

B. Solutions to five Sets of cards given to control, low, and high-sense-of-control group.

Sets	Common Values					Most frequent
	Pair 1	Pair 2	Pair 3	Pair 4	Pair 5	
Set 1	Line above/ big shape	Big *r*/ plain	Line above/ circle	Small *r*/ triangle	Line above/ shaded	Line above
Set 2	Small shape/ shaded	Small *r*/ big shape	Small *r*/ line below	Circle/ plain	Small *r*/ triangle	Small *r*
Set 3	Triangle/ big *r*	Small *r*/ line above	Triangle/ plain	Shaded/ small shape	Triangle/ line below	Triangle
Set 4	Circle/ plain	Small shape/ shaded	Small shape/ line below	Big shape/ triangle	Small shape/ small *r*	Small shape
Set 5	Plain/ small *r*	Line above/ circle	Plain/ line below	Triangle/ big shape	Plain/ big *r*	Plain

APPENDIX 16

Anagrams

Easy, Moderately Difficult, and Difficult Words Extracted from Kucera-Francis Word Frequency Norm.

A. 20 easy words extracted from Kucera-Francis (1967) word frequency norms.

Word	K-F Word Frequency	Imagery	Concreteness	Meaningfulness	Number of syllables	Number of letters
Advice	50	3.13	2.08	5.39	2	6
Charm	50	4.7	2.17	6.13	1	5
Colony	50	5.1	5.84	5.00	3	6
Crime	50	4.43	3.81	6.34	1	5
Custom	50	3.43	2.99	5.33	2	6
Devil	50	5.63	2.13	5.94	2	5
Event	50	2.90	3.72	5.04	2	5
Excuse	50	2.77	3.05	4.04	2	6
Fault	50	2.83	2.87	4.80	1	5
Humour	41	4.57	2.31	5.72	2	6
Murder	50	5.40	2.60	6.80	2	6
Origin	48	3.30	3.25	5.32	3	6
Owner	50	4.23	5.90	5.71	2	5
Safety	50	4.27	2.25	5.76	2	6
Salary	50	4.70	5.23	5.38	3	6
Shadow	50	5.33	4.94	5.28	2	6
Shock	50	4.67	3.97	6.20	1	5
Volume	50	4.53	5.14	5.16	2	6
Style	50	3.83	3.18	5.84	1	5
Series	50	4.47	3.88	5.36	2	6
Mean	**49.38**	**4.21**	**3.68**	**5.51**	**1.94**	**5.61**

Note. K-F word frequency= Kucera-Francis word frequency.

B. 20 moderately difficult words extracted from Kucera-Francis (1967) word frequency norms.

Word	K-F Word Frequency	Imagery	Concreteness	Meaningfulness	Number of syllables	Number of letters
Array	20	3.30	3.60	4.17	2	5
Baron	27	5.10	5.77	5.72	2	5
Bloom	35	5.63	5.82	5.12	1	5
Crisis	19	3.43	2.81	5.44	2	6
Decree	20	3.30	4.58	5.16	2	6
Drama	23	4.90	3.66	5.94	2	5
Folly	29	2.93	2.63	4.40	2	5
Ghost	32	5.27	2.97	6.00	1	5
Maker	27	3.57	4.46	5.00	2	5
Menace	21	3.73	3.70	5.04	2	6
Misery	26	4.37	2.28	5.84	3	6
Nymph	13	5.63	4.40	5.36	1	5
Odour	27	5.13	5.83	5.76	2	5
Patent	27	3.43	4.05	4.96	2	6
Pledge	27	3.63	2.93	5.92	1	6
Quest	20	4.53	2.76	5.2	1	5
Revolt	22	5.07	4.05	5.6	2	6
Vapour	27	4.80	5.93	5.76	2	6
Vigour	19	4.43	2.60	5.72	2	6
Victim	36	5.07	5.49	5.36	2	6
Mean	**23.63**	**4.14**	**3.69**	**5.18**	**1.72**	**5.45**

Note. K-F word frequency= Kucera-Francis word frequency.

C. Nine difficult words extracted from Kucera-Francis (1967) word frequency norms.

Word	K-F Word Frequency	Imagery	Concreteness	Meaningfulness	Number of syllables	Number of letters
Abyss	5	4.17	4.20	5.08	2	5
Chaos	9	4.57	2.50	5.88	2	5
Chasm	6	4.47	4.25	5.04	1	5
Demon	8	4.70	2.56	5.04	2	5
Equity	5	2.23	2.57	4.20	3	6
Malady	6	3.37	3.72	5.00	3	6
Satire	7	3.37	2.33	5.64	2	6
Vacuum	5	4.70	3.87	4.94	2	6
Venom	5	4.23	5.62	5.04	2	5
Mean	**5.71**	**3.98**	**3.82**	**4.90**	**2.14**	**5.42**

Note. K-F word frequency= Kucera-Francis word frequency.

Details of Anagrams Used with Three Groups.

A. Warm-up set(s) and goal setting sets.

Sets	Words	Scrambled order	Mean frequency	Mean imagery	Mean concreteness	Mean meaningfulness	Mean syllables	Mean letters
Warm-up	drama, event, fault, shock	15243	43.25	3.83	3.56	5.50	1.50	5.00
Warm-up (HSCG)	angle, charm, quest, nymph	32514	16.50	5.08	3.58	5.28	1.00	5.00
Goal setting1	crime, style, bloom, odour	42135	40.50	4.76	4.66	5.77	1.25	5.00
Goal setting 2	origin, misery colony, decree	241635	36.00	4.02	4.00	5.33	2.75	6.00

B. Five sets of anagram for control and low and high-sense-of-control groups.

Sets	Words	Scrambled order	Mean frequency	Mean imagery	Mean concreteness	Mean meaningfulness	Mean syllables	Mean letters
1	owner, folly, baron, demon	35142	28.50	4.24	4.22	5.22	2.00	5.00
2	devil, maker, odour, chaos	23514	28.25	4.42	3.93	5.24	2.00	5.00
3	custom, misery, shadow, menace	463152	36.75	4.21	3.48	5.37	2.25	6.00
4	advice, vapour, volume, crisis	316425	36.50	3.97	3.69	5.44	2.00	6.00
5	safety, victim, humour, vigour	635124	36.50	4.58	3.16	5.64	2.00	6.00

APPENDIX 17

Verbal Puzzles and Memory Quizzes

Rosenbaum (2000)

Participant's Code: .....

Order (Circle): A/B, B/A, A/B (reversed),B/A (reversed)

Warm up (Verbal Puzzles)

	Question	Answer	Correct?		Sec?
			yes	no	
1	If I say Jack stole Ann's ball who is the thief?	Jack			
2	Which girl is taller if Jane is shorter than Sara?	Sara			
3	A man who was an engineer came to the store, where Alice worked to buy pastries.				
a	Where was Alice?	At the store			
b	Who bought pastries?	The engineer/ the man			
4	If one candy bar costs 24 pence. How much will 3 candy bars cost?	72			
5	If you see a picture with a circle to the left of a square but on top of a cross, is the cross:				
a	Above the square?	No			
b	To the left of the circle?	No			
c.	Below the circle?	Yes			

Warm up (Memory Quizzes)

	Sentence	Time taken before response	Time elapsed to repeat	Errors
1	James by an angry cat, the mouse burrowed deeply into the woodpile.			
2	Due to foresight and planning the family were able to realize their dream vacation.			
3	The car was clearly out of control as it careened across the median and into ongoing traffic.			
4	The old house had cedar shingles and the floor sagged from five generations of scrambling children.			
5	Several times in the past four years, I have had the opportunity to visit countries in Central America.			

Pre-test (Verbal Puzzles)

	Question	Answer	Correct? yes	Correct? no	Sec?
1	If I say Jane is wearing Alison's coat, who does the coat belong to?	Alison			
2	If Charles beats David in a sprint, which man is the faster runner?	Charles			
3	Janice, the head librarian, walked to the seventh floor, where John was shelving books.				
a	Where was John?	the seventh floor			
b	What did Janice do?	walked to the seventh floor			
4	How many hours will it take to run 21 miles at a rate of three miles per hour?	seven hours			
5	If you see a picture with a diamond to the right of a circle and a square below the circle, where is the circle				
a	Above the square?	Yes			
b	Below the diamond?	No			
c	To the left of the square?	No			

Pre-test (Memory Quizzes)

	Sentence	Time taken before response	Time elapsed to repeat	Errors
1	It was raining this morning so the children wore their boots to school.			
2	The team were playing well until the third quarter, when snow made visibility poor.			
3	The car lost power trying to accelerate on the slippery hill during a storm in March			
4	Jane started dancing at age eight, but didn't give her first recital until she was 23.			
5	The students were asked to do all the questions in chapter 20 as well as review chapter nine.			

Post-test (Verbal Puzzles)

	Question	Answer	Correct? yes	Correct? no	Sec?
1	Felix's hair is darker than Antoine's. Who is the lighter of the two?	Antoine			
2	If Daphne walks twice as fast as Margaret and they are the only two people in a race, who is most likely to finish last?	Margaret			
3	In the backyard of Joe's house, Alice and Frank's dog played Frisbee				
	Who did the dog belong to?	Frank			
	Where were they playing?	Joe's Backyard			
4	If a car drove 360 miles in six hours, how fast was the car going in miles per hour?	60			
5	If you see a picture with a cross beneath a rectangle, but to the right of a circle, is the rectangle:				
	Above the circle?	Yes			
	To the left of the circle?	No			
	Right of the cross?	No			

Post-test (Memory Quizzes)

	Sentence	Time taken before response	Time elapsed to repeat	Errors
1	Undetected by the sleeping dog, the thief broke into Jane's apartment.			
2	The train left Manchester an hour early, leaving Carl stranded at the station			
3	The warm humid weather that occurs in the tropics makes people sleepy by midday.			
4	The students needed to complete chapters nine and 11 and answer the question on page 20			
5	I lived by the river for 20 years and only twice during in all those years was it ever this high.			

APPENDIX 18

Positive and Negative Affect Scale

Watson, Clark, and Tellegen (1988)

Participant's Code:_____ **Date:**____/_____/_____

Session: pre / post

This scale comprises a number of words that describe different feelings and emotions. Read each word, and decide the extent to which it describes your feeling now.

Use the following scale to answer these questions. Put a check-mark after each item.

1 = Not at all
2 = A little
3 = Moderately
4 = Quite a bit
5 = Extremely

	Items	Not at all	A little	Moderately	Quite a bit	Extremely
1	Interested					
2	Distressed					
3	Excited					
4	Upset					
5	Strong					
6	Guilty					
7	Scared					
8	Hostile					
9	Enthusiastic					
10	Proud					
11	Irritable					
12	Alert					
13	Ashamed					
14	Inspired					
15	Nervous					
16	Determined					
17	Attentive					
18	Jittery					
19	Active					
20	Afraid					

PLEASE MAKE SURE YOU HAVE ANSWERED ALL THE QUESTIONS OF QUESTIONNAIRE.

APPENDIX 19

Thanks and Debriefing Sheet

Debriefing Sheet

"How are you feeling after the experiment? I hope you enjoyed it. You probably know that many studies require experimental manipulation. Some of the tasks in this study were designed to be difficult for many people. In addition, you might have received some false feedback, which was included in the experiment to make the tasks seem either more difficult or easier. Therefore, if you feel that you did not do well on some of the tasks, you should realise that this is NOT due to your actual ability. In this experiment, we are testing the effect of failure or success during problem solving on people's sense of control and motivation. The results of this study will be used to develop procedures to help people with low motivation.

We believe that you appreciate the importance of not revealing this information to anybody else, as others may be potential participants for this study. Again, thank you very much. Do you have any questions about the experiment?"