

***Weight Maintenance, the Relapse Prevention Model and Additional Cognitive and  
Behavioural Factors Affecting Percentage of  
Weight Loss Maintained***

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Thank you

Geri

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### **Abstract**

Weight loss maintenance is very difficult to achieve, with most individuals' weight stabilizing only slightly below their pre-loss baseline level within five years. The present study used Relapse Prevention Model (RPM) variables coping, self-efficacy and lapsing in addition to other variables previously found to influence maintenance rates, to predict percentage of weight loss maintained (PWLM). Fifty-six females and ten males, who had lost at least 5% of their body weight, completed the Hypothetical High Risk Situations Questionnaire (HHRS), the Weight Efficacy Lifestyle Questionnaire (WEL), a Self-monitoring Seven-day Lapse Diary (LD) and the Questionnaire on Eating and Weight Patterns (QEWP). Three variables significantly predicted PWLM: *perceived severity of lapses, vigilance for diet and exercise and maintenance time*. The results are discussed with respect to the applicability and influence of the RPM and additional variables on weight loss maintenance. Implications for the development of new maintenance treatments, based on the RPM are also considered.

## Introduction

Weight loss is difficult but not impossible to achieve, and has been facilitated by improved treatments in last 20 years (Jeffery, Epstein, Wilson, Drewnowski, Stunkard, Wing & Hill, 2000). However, maintaining weight loss in the long term is generally more problematic and less successful than the initial weight loss (Jeffery et al., 2000). Relapse, or weight regain, begins within approximately six months after the end of the diet phase. This regain continues until the individual almost reaches baseline weight within five years, indicating that current treatments for weight loss are ineffective in the long term (Kramer, Jeffery, Forster & Snell, 1989; Anderson, Konz, Frederich & Wood, 2001; Wilson, 1994).

Many studies assessing outcomes of long term weight maintenance have supported these claims. For example, French, Jeffrey, Folsom, McGovern and Williamson (1996) found that fewer than 2% of participants, who had lost weight when aged between 18 and 30 years, reported maintaining losses of 10% or greater of baseline body weight until the age of 50 years. In addition, a study conducted by Kramer et al. (1989) assessed long term weight outcomes of obese males and females, who had lost weight through a weight loss program, in which 100% maintenance was required for a participant to be considered successful by the researchers. This study found that out of 114 men and 38 women, only 0.9% of men and 5.3% of women had maintained the weight loss or decreased weight further in all 4 years of follow up. That is, post-treatment, weight was slowly regained stabilizing on average only 3% below baseline weight. Furthermore, French, Jeffery, Forster, McGovern, Kelder and Baxter (1994) reported that over two years, the act of dieting to lose weight actually predicted weight gain, not loss.

The process of losing, regaining, and losing weight again, known as *weight-cycling*, may have many adverse consequences for the individual as it is associated with mortality and morbidity (Garner & Wooley, 1991; Wilson, 1994). Therefore, lowering weight and maintaining the weight

loss has both physical health and psychological benefits for the individual. Positive physical health benefits include reducing blood pressure and decreasing the risk of diabetes mellitus, coronary heart disease, hypertension, stroke, some types of cancer, osteoarthritis, gallbladder disease and gout (Wilson, 1994; Jeffery et al., 2000). In addition to potential physical health problems, weight-cycling and obesity may also be associated with psychological problems (Byrne, 2002) such as lowered self-efficacy from reinforced failure (Jeffery et al., 2000), decreased self-esteem (Turner, Wang & Westerfield, 1995), depression (Wing & Jeffery, 1995) and discrimination in the areas of education, employment and healthcare (Teachman & Brownell, 2001).

Past research in the maintenance domain has generally focused on identifying cognitive and behavioural factors that are characteristic of successful maintainers and factors that differentiate between maintainers and regainers. This research has provided some useful insights into weight loss maintenance. However, in a review of strategies designed to enhance maintenance, Jeffery et al. (2000) recommended that future research focus on applying models, from other domains, to the problem of weight maintenance. The present research takes this approach, applying the Relapse Prevention Model (RPM), developed by Marlatt and Gordon (1985), to weight loss maintenance.

### ***Definitions of Maintenance***

Until recently, there was no consistent definition of successful maintenance, making previous research in the area very difficult to compare (Bartlett, Faith, Fontaine, Cheskin & Allison, 1999). This prompted Wing and Hill (2001) to suggest that studies should only require a minimum of 10% of initial body weight lost overall. They proposed that maintenance should be defined "...as achieving an intentional weight loss of at least 10% of initial body weight and maintaining this weight loss for at least a year" (p. 324).

The Wing and Hill (2001) definition allows for weight to be regained up to the threshold of 10% below initial weight during the maintenance phase to classify the individual as a maintainer.

This definition is based on the finding that a 10% weight loss is good for health and should be strived for, and achieved, rather than the almost impossible accomplishment of achieving 100% maintenance of a normal or desirable body weight (Wilson, 1994). Therefore, using the Wing and Hill (2001) criteria for example, a participant who loses 20% of their body weight and regains half, so the net reduction is 10% for at least a year, would be labelled a successful maintainer. It is important to note here that many researchers are beginning to lower the criteria for successful maintenance from 10%, as proposed by Wing and Hill (2001), to 5% below baseline weight because weight losses of as little as 4% have been shown to have positive health outcomes (Gregg & Williamson, 2002).

However, taking a dichotomous view of maintenance, as being either successful or unsuccessful, may be unhelpful to individuals for whom maintenance is a struggle. Maintenance and relapse are opposite outcomes of long term weight loss, representing extreme points of success or failure. Therefore, given the inconsistencies of previous studies' definitions of success, maintenance should possibly be looked at on a continuum, or *percentage of weight loss maintained (PWLM)* (Jeffery et al., 2000), in which the higher the PWLM the greater weight loss maintained. Any weight loss maintained should be considered a success because of the physical health and psychological benefits the lowered weight provides.

Using PWLM to assess level of maintenance will also minimise the risk of an individual, who regains some weight and narrowly misses the criteria for success, from becoming discouraged and giving up trying to maintain. Moreover, it is also possible for a participant to lose more weight during maintenance, and conversely, it is also possible for an individual to regain all the lost weight, plus additional weight. The continuous variable, PWLM, can take into consideration all weight outcomes and could form the basis of a goal-setting strategy to facilitate maintenance, therefore PWLM will be the measurement used in the present research.

An example of a study that used PWLM as the measure of maintenance was the meta-analysis conducted by Anderson et al. (2001) of results from 29 U.S. studies. These studies used



structured weight loss programs with a follow up at least two years from the end of treatment. The mean weight loss maintained across all the studies included in the meta-analysis was 3.2% below initial weight. However, the large attrition rates during follow-up that ranged from an overall 67% individuals remaining in the studies at one year, down to 21% of individuals at five years may reduce the generalizability of the results. Generalizability is reduced because it is unknown whether the remaining individuals were representative of the original population in the study.

### ***The National Weight Control Registry (NWCR)***

In 1994, the National Weight Control Registry (NWCR) was developed to help understand the characteristics of people who successfully maintain weight and the reason for the maintenance. This was due to a lack of available and reliable data on maintenance for longer time periods (Wing & Hill, 2001; Jeffery et al., 2000). The NWCR has approximately 3000 members who were eligible to join the registry after proving that they had lost at least 14kg and maintained the loss for at least one year. The minimum required weight loss of 14kg was described as a substantial weight loss; however, no reason was given for this particular amount of weight chosen. The mean amount of weight lost by the participants was approximately 22kg, and these losses were maintained for five years before joining the registry (Wing & Hill, 2001; Jeffrey et al., 2000). Unfortunately, the findings of NWCR individuals may only be generalized to the obese or formerly obese and not necessarily other weight losers. However, the NWCR enabled common behavioural features of these maintainers to be researched and may be an essential step in the process of developing effective treatments to increase PWLM.

### ***Common features and differentiation between maintainers and relapsers***

The following findings have been found in research regarding both behavioural and cognitive commonalities of maintainers. For example, some commonalities that differentiate from maintainers

include having realistic weight goals, achieving the weight goal, satisfaction with current body weight, not over-valuing weight and shape, low subjective hunger and perceiving the benefits as outweighing the costs of maintaining (Byrne, 2002; Byrne, Cooper & Fairburn, 2003). Conversely, some features of relapsers include higher levels of depression (McGuire et al., 1999) and stress (Sarlio-Lahteenkorva, Rissanen & Kaprio, 2000).

McGuire, Wing, Klem, Lang and Hill (1999) suggested that relapse was the result of failure to maintain the behaviour and cognitive changes that were required to lose the weight initially. Previous research has also uncovered the possibility that commitment to maintenance goals and vigilance regarding diet and exercise may be important to maintenance and are discussed below.

*Commitment.* Commitment to maintenance requires motivation and readiness to change enabling the achievement of a goal which is moderated by the relationship between the desirability of the goal and performance on the task (Locke, 1968). Commitment has been studied with regard to decreasing or discontinuing addictive behaviours such as alcoholism (Staines, Magura, Rosenblum, Fong, Kosanke, Foote & Deluca, 2003) and smoking (Hirschl, Francesconi, Chudik, Katzenschlager & Kundi, 2004). However, while over-eating and other eating disorders are not classified as addictions (Wilson, 1991) a study by Ferguson, Brink, Wood and Koop (1992) assessed successful maintainers (15% weight loss and maintenance for at least a year) and regainers using semi-structured interviews. Perceptions regarding food, including the assessment of cravings and attitudes to weight maintenance were also measured to provide a degree of reliability to the introspection method of semi-structured interviews as a research tool. Participants in this study were asked what they thought contributed to their maintenance success, or lack of success. Cognitive and psychological factors for success were described by 58% of female and 48% of male maintainers of determination, commitment and patience. Regainers did not mention level of commitment as a factor in their lack of success. Therefore commitment may also be a predictor of maintenance.

*Vigilance.* Vigilance is the state of being alert and attentive to cognitive and behavioural dietary control and/or exercise adherence. Vigilant behaviours and cognitions found to be important for maintenance include self-weighing, self-monitoring and exercise (Byrne, 2002; Klem, Wing, McGuire, Seagle & Hill, 1998).

Self-weighing (Klem, Wing, Lang, McGuire & Hill, 2000) and having a personal regain threshold (McGuire, Wing, Klem & Hill, 1999) was found to differentiate between maintainers and regainers. For example, a descriptive study by Klem, Wing, McGuire, Seagle and Hill (1997) found that 75% of maintainers weighed themselves at least weekly.

Other important behaviours common among maintainers were self-monitoring (Colvin & Olsen, 1983; Wing & Hill, 2001; Anderson et al., 2001) including counting calories (Byrne et al., 2003), having a higher percentage of calories from carbohydrate (Klem et al., 1997; Pasman, Westerterp-Plantenga, & Saris, 1997; Wing & Hill, 2001; DePue, Clark, Ruggiero, Medeiros & Pera, 1995), the use of very low calorie diets (VLCD), meal replacements (Wing & Hill, 2001; Anderson et al., 2001) and adherence to a low fat diet (McGuire, Wing, Klem & Hill, 1999).

Exercise was common among the participants of the NWCR with exercise rates amounting to approximately one hour of moderate intensity exercise per day (Anderson et al., 2001; Wing & Hill, 2001). Furthermore, Klem et al. (1997) found that only 9% of maintainers on the NWCR reported not participating in any physical activity or exercise. Therefore vigilance, or strict adherence to maintenance-related behaviours, may be an important predictor of maintenance.

### ***The effect of time on maintenance***

Commonalities of maintainers from previous research are consistent across studies, however, the findings of research on the effect of time on maintenance rates is conflicting. One view is that the effort required to maintain reduces, increasing the likelihood of long term success, while the second view is that weight regain increases over time.

With respect to the first view, Klem et al. (2000) found that over time, performing maintenance behaviours required less effort among successful maintainers. Participants for that study were recruited from the NWCR to discover the types and numbers of maintenance strategies used and found longer duration of maintenance was associated with fewer food related strategies, with individuals revealing less attention and effort was required to maintain.

It was thought that this phenomenon occurred because the necessary behaviours and cognitions such as record keeping, motivation using a photo in a crucial place, or using food related strategies may become habitual, and can be executed without the individual's conscious attention (Klem et al., 2000). This idea was supported by Smyth, Collins, Morris and Levy (1994) who suggested that practicing behaviours or cognitions increases skills and knowledge which over time may alter outcomes. That is, the behaviour becomes easier to execute, making the difficulty or hassle of maintaining less of a problem.

However, a second and widely supported view by researchers such as Jeffery et al. (2000) have found that maintenance decreases over time, consistently showing that almost all weight lost is regained within five years of finishing the weight loss phase. The reason proposed for this phenomenon was that during the weight loss phase the individual may experience lower numbers on the scales, smaller clothing sizes, looser clothing, compliments from others, feelings of achievement (Jeffery, Kelly, Rothman, Sherwood & Boutelle, 2004) and increased self-efficacy (Clark, Abrams, Niaura, Eaton & Rossi, 1991). However, once the dieting or weight loss phase has ceased, the individual does not receive this positive reinforcement, therefore, commitment to maintenance and dietary and exercise vigilance decreases possibly leading to relapse.

Another approach to studying maintenance, in addition to researching variables that are linked (or thought to be linked) to maintenance, is to incorporate research based on cognitive-behavioural models. The following section reviews the RPM and its application to the weight loss maintenance domain.

### ***The Relapse Prevention Model***

Relapse prevention research is a cognitive-behavioural approach to studying maintenance, differing from the maintenance studies previously mentioned. Relapse prevention is based on the model developed by Marlatt and Gordon (1985), and is both a conceptual framework and treatment of addiction. The purpose of the model is to change maladaptive behaviours using social-learning theory and to maintain that change so the maladaptive behaviour is reduced or eradicated permanently (Marlatt & Gordon, 1985).

*Definitions of lapse and relapse in the Relapse Prevention Model for maintenance.* The RPM begins with the high-risk situation and eventually leads to either the decreased likelihood of relapse or the increased likelihood of relapse. However, it is important to begin with a discussion of lapsing and relapse regarding maintenance. This is because it is a challenge to adapt the definition of lapse and relapse for maintenance. For example, the goal when treating a smoking addiction is complete abstinence and the criteria for measuring relapse are dichotomous: the individual has either smoked or has not smoked. However, regarding weight maintenance, the individual still needs to consume food in order to live; food becomes an allowed but restricted substance.

*Lapse.* A lapse in the maintenance domain is a single event (a slip or mistake) in which the individual breaks their own idiosyncratic rules for maintaining their weight. This can include the performance of undesired behaviours (such as overeating) and/or the non-performance of desired behaviours (such as exercising). It is important to note that because lapses are defined by the individual, severity and causes of lapses are subjective.

*Relapse.* A relapse was considered by Marlatt and Gordon (1985) to be the beginning of relapse if behaviour and cognitions failed to prevent more lapses. Jeffery et al. (2000) states that short term violations of the rules about behavioural adherence can often lead to negative psychological reactions that precipitate a return to pre-treatment patterns” (p.12). That is, if a lapse is the process, behaviour

or event, then relapse may be the outcome following the lapse (Brownell, Marlatt, Lichtenstein & Wilson, 1986).

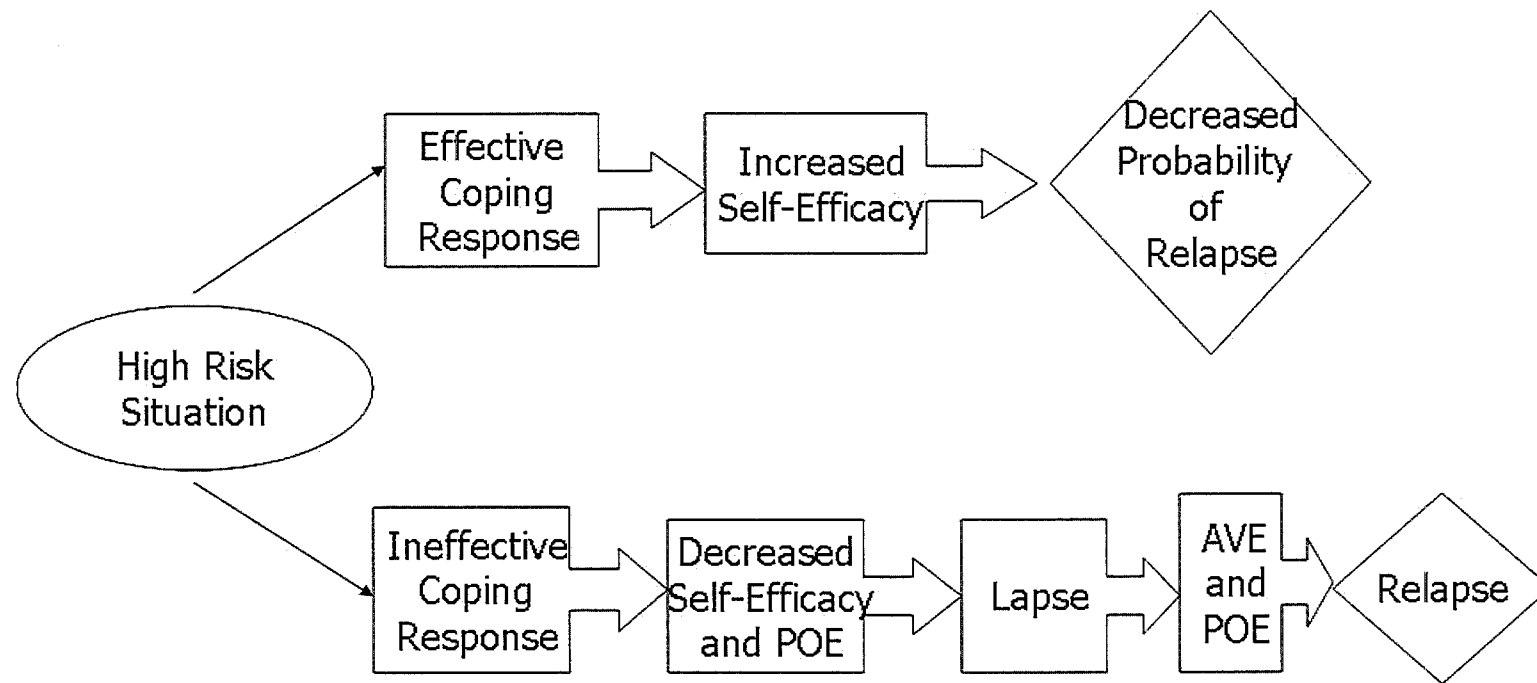
In the RPM, the term relapse regarding weight loss has previously been defined as weight loss that is subsequently regained in addition to the permanent abandonment of dietary control (Marlatt & Gordon, 1985) and/or possibly exercise adherence. However, in the maintenance domain, as previously stated, food is a required substance and therefore it is difficult to judge if maintenance behaviours necessary to be performed by the individual have been abandoned. Therefore maintenance or relapse can be measured as a net change in the individual's weight, from the lowest point at the end of the dieting phase to weight at a point in the future which can also be represented on a continuum as a PWLM as in the maintenance literature mentioned earlier.

*Overview of the Relapse Prevention Model.* The RPM, shown in Figure 1, illustrates the cognitions an individual may execute following an exposure to a high risk situation. High risk situations are circumstances in which the individual perceives they could lose control and behave in an undesired manner. However, it is not the actual situation that causes the lapse but the individual's response to the temptation with either an effective or ineffective coping strategy that is important regarding the RPM.

*Coping.* Following exposure to the high-risk situation, the model splits into two possible outcomes in which an individual generates either an effective or an ineffective coping response. Coping responses can include behavioural, cognitive and emotional strategies (Beutler & Moos, 2003), such as distraction, leaving the situation, or performing relaxation exercises (Carels, Douglass, Cacciapaglia & O'Brien, 2004). Individuals may display coping responses that range from ineffective to highly effective, depending on the situation encountered. Therefore, it may be important to study coping as a continuous variable, despite how the RPM is represented in Figure 1, because measuring coping as a dichotomous variable in a limited number of situations may limit the

generalizability of research. Previous studies (e.g., DePue, 1995; Carels et al., 2004; Patsis, 1991) have also measured coping in the RPM as a continuous variable.

Immediate determinants and covert antecedents during the high risk situation may also influence the degree of effectiveness of the coping response generated. Immediate determinants are few or no coping skills available to the individual and positive outcome expectancies are the anticipated positive affects of engaging in behaviour. In addition, covert antecedents of lifestyle imbalances and cravings are also important to consider. These factors either singularly, or in combination, may lead to an increased likelihood of lapse and subsequent relapse (Marlatt & Gordon, 1985).



**Figure 1. Relapse prevention model (Marlatt & Gordon, 1985). Note: AVE is Abstinence Violation Effect and POE is Positive Outcome Expectancies.**



*Coping, Self-efficacy and Lapsing.* The second stage of the RPM posits that self-efficacy will either increase or decrease within the individual depending on whether or not an appropriate or effective coping response occurred. If an effective coping response does occur, self-efficacy will increase, lessening the likelihood of lapse. However, if no coping response or an ineffective coping response occurs, self-efficacy is proposed to decrease leading to a lapse.

Self-efficacy essentially is about how capable and proficient the individual feels they are in their environment. Self-efficacy influences nearly all aspects of everyday life, from social competence, to academic performance and physical aptitude, along with ability to cope with stress, anxiety, pain and phobias. An individual may have different levels of self-efficacy for different tasks which are malleable depending on experience and previous performance (Bandura, 1977). The level of self-efficacy an individual has for a domain can have an enormous effect on the motivation and ability the individual has to perform the particular task. This is because self-efficacy is a future oriented concept meaning that beliefs will affect the outcome of a performance that may happen at a later stage in the individual's life (Graham & Weiner, 1996).

*Lapsing and the Abstinence Violation Effect.* Generally, individuals produce attributions for events that are concrete, important, unusual and surprising (Anderson & Arnoust, 1985). Regarding maintenance, a lapse is important to the individual and therefore an attribution may be made. An individual can make many different attributions for a lapse and it is not necessarily the situation that causes the lapse, but the individual's perception of, and reaction to (with both coping and attributions) the lapse that is important.

Attributions for lapses are classified along three dimensions: locus of control (internal vs. external), stability (stable vs. unstable) and pervasiveness (global vs. specific). Locus of control refers to whether the individual's perception of the cause of the lapse to have been due to themselves (an internal attribution) or other factors, such as the situation (an external attribution). The dimension, stability refers to the individual's perception of whether the behaviour could change over

time (unstable), and therefore, the individual is not bound to behave the same way again. In contrast, the individual's perception may be permanent (stable), and therefore, the individual feels that they will still act exactly the same way again. The third dimension refers to whether the behaviour is global, pervading all aspects of the person's life and part of the overall make up of the individual's traits and personality (e.g. skills), or if it is specific and not a significant aspect of the individual (e.g. luck) (Weary, Stanley & Harvey, 1989). Therefore, an individual who makes an attribution that is external, unstable and specific may conclude that the situation in which they lapsed, was unusual and they were not prepared, but still feels able to deal with other high risk situations. This does not mean the individual is unable to maintain, but coping needs reassessment in situations in which they are not prepared (Marlatt & Gordon, 1985).

Making this attribution for a lapse is not as likely to result in total relapse in contrast to an individual who has a lapse, generating an attribution that is internal, stable and global which is more likely to lead to relapse (Weary, Stanley & Harvey, 1989). For example, an individual who attributes their lapse to a lack of willpower in all situations, which will never change, can be at risk of relapse because maintenance efforts are likely to be abandoned. These negative attributions or explanations for lapses, as perceived by the individual, are known in the RPM as Abstinence Violation Effects (AVE) (Marlatt & Gordon, 1985). There are two major components of AVE as conceptualized by Marlatt and Gordon (1985); the attributions of the cause of the lapse and the affective reaction to the lapse.

#### *Application of the RPM to weight loss and maintenance*

The RPM is dynamic, evolving over time to incorporate new research as a strategy designed to enhance the durability of behaviour therapy and treatment (Perri, 1984). One of the strongest attributes of the model is the ability to generalize to various areas of addiction (Marlatt & Gordon, 1985), with advantages over other approaches, having been validated by previous

research. While eating is not considered to be an addiction (Wilson, 1991), the RPM has been applied to the maintenance domain because it has been applied successfully to addictions of alcoholism and smoking and other areas of behaviour change (Larimer, Palmer & Marlatt, 1999; Condiotte & Lichtenstein, 1981).

The RPM contains elements that appeal to both the theoretical and practical explanation and treatment of addition and behaviour change that appear to be able to be applied to various domains. Previous studies, have assessed RPM variables such as coping (Drapkin, Wing & Shiffman, 1995), self-efficacy (Clark et al., 1991) and lapsing (Carels et al., 2004) regarding eating behaviours, which found results similar to those expected from the RPM, implying that the RPM will be able to be applied to maintenance. Consequently, the following section will describe the application of RPM variables coping, self-efficacy and lapsing, to the domain of weight loss maintenance.

*Coping and maintenance.* Coping skills are cognitions and behaviours generated by an individual in an attempt to stop an unwanted outcome when confronted with a high risk situation (Marlatt & Gordon, 1985). For example, a dieter who knows that they tend to over-eat when home with nothing to do may decide to go for a walk or ring a friend when they have an urge to open the fridge.

A study conducted by DePue et al. (1995) assessed maintenance rates among 178 participants after completion of a very low calorie diet (VLCD) and behaviour modification weight loss program between 10 and 38 months prior to the study. The participants were assessed, following the treatment, with a questionnaire on difficulties encountered during maintenance, including eating in restaurants, low motivation and stress. Coping among the 29% of maintainers (weighing within 5kgs of their end of treatment weight) was more direct with the use of active problem-solving strategies, while, in contrast the 71% regainers (follow-up weight was on average 65% higher than end of treatment weight) reported using escape-avoidance or emotion focused strategies. Regainers also

perceived life stress to be higher despite objective assessment of life stress between the groups being approximately equal. DePue et al. (1995) proposed that these results supported the RPM, regardless of the model not being fully applied and assessed. In this study coping skills were associated with maintainers, suggesting that regainers may be at risk of being overwhelmed due to lack of appropriate coping strategies during times of stress, consequently decreasing self-efficacy and motivation to adhere to maintenance activities (DePue et al., 1995).

*Self-efficacy and maintenance.* Much emphasis has been placed on the role of self-efficacy (Bandura, 1977), or the belief that an individual has of his or her own effectiveness at completing a task or developing a skill, in relation to eating and exercise behaviours. Generally, self-efficacy increases or is higher in motivated individuals and in those who have made positive changes in their lives such as quitting smoking, undertaking exercise programs and weight loss (Norcross, Mrykalo, & Blagys, 2002; Clark et al., 1991). For example, Martin, Dutton and Brantley (2004) studied self-efficacy measured by the Weight Efficacy Lifestyle Questionnaire (WEL) and weight change in over-weight and obese African American women. This study found that individuals whose self-efficacy score increased during the study also experienced greater weight loss.

*Lapsing and maintenance.* In the RPM, the goal has always been abstinence from the target behaviour and avoidance of relapse. However, lapses appear to be an inevitable part of behaviour change (Larimer et al., 1999) and because food is not considered a drug, lapses should possibly be viewed more positively (Marlatt & Gordon, 1985). Lapses may lead to the practice of coping skills, and the individual will eventually have fewer lapses, making relapse less likely to occur.

Turner et al. (1995) proposed that treatment to prevent relapse should include creating hypothetical situations where the individual is most likely to lapse, so that he or she can anticipate and plan for these high risk situations by practicing and increasing coping skills. Consequently, negative behaviours that lead to lapses may be caught before becoming a relapse by adapting

behaviour through "...positive mental processes and responsive decision making" (Turner et al., 1995, p.652), that is, high self-efficacy and coping skills may decrease the likelihood of lapsing.

This idea of practising lapses and incremental learning was supported by Schachter (1982) in a study comparing weight loss and cessation of smoking in two populations, blue-collar workers and university personnel. The results from that study implied that lapses increased the skills to overcome future lapses eventually leading to success. The argument states, that if for example, 100 individuals are trying to lose weight and 10% are successful in the initial attempt to stop the unwanted behaviour, and in time another 10% of the initial 100 individuals may overcome the behaviour, followed by another 10%, a cumulative result of approximately 27% of successful individuals will occur. This figure of 27% was considered to lend support to the idea that addictions are able to be overcome despite lapses occurring.

Conversely, Brownell et al. (1986) did not support this notion of practice improving maintenance, arguing that incremental learning from past lapses will not increase the likelihood of maintenance. This question remains unanswered as there appears to be no research correlating frequency of lapses experienced by participants with relapse following weight loss.

It is possible that the assessment by the individual of the lapse and attributions generated may be the most important aspect of maintenance research (Marlatt & Gordon, 1985). Evidence was found by Condiotte and Lichtenstein, (1981) in a study of 78 smokers in a treatment program aimed at the cessation of smoking. Participants were assessed pre-treatment, post-treatment and at follow-up regarding self-efficacy. Self-efficacy was found to predict relapse and low self-efficacy scores for situations corresponded to the smoking situations in which the participants lapsed.

*Abstinence Violation Effect (AVE)*. Condiotte and Lichtenstein, (1981) also found that the cognitive or emotional reactions of the individuals, who lapsed by smoking, experienced guilt or decreased confidence in treatment success, which was mirrored in the description of AVE by Marlatt and Gordon (1985).

A study by Dohm, Beattie, Aibel and Striegel-Moore (2001) compared maintainers and regainers on questions regarding importance of aspects such as lack of willpower, stress and cognitive attributions for why participants gained weight. It was concluded that how the individual responds to a lapse may be one of the most important variables to study regarding maintenance, as it appears to differentiate between successful and unsuccessful maintainers.

In the maintenance domain, the occurrence of an AVE following a lapse may also depend on the presence of self-blame (Carels et al, 2004). Self-blame, or the individual blaming themselves by taking responsibility for the lapse, may contribute to a higher likelihood of relapse, which may be an important component of AVE, as it is an internal attribution of having been personally responsible for the cause of the lapse.

In addition, individuals that perceive lapses as generally more severe, when compared to other individuals with similar frequency and types of lapses, are also expected to have a higher likelihood of relapse. This is because individuals with higher perceived severity ratings following a lapse may be less confident in their ability to maintain weight due to feelings of probable failure to adhere to necessary maintenance behaviours. However, perceived severity ratings while not necessarily attributions, but affective reactions that may initiate an AVE to be made due to the cognitive distortions of the individual. Therefore, these reactions will also increase likelihood of relapse (Carels et al., 2004).

### ***Previous studies of maintenance using the Relapse Prevention Model***

Two studies have assessed the RPM as a treatment to improve maintenance by assessing the effect of relapse prevention training on problem solving during high risk situations for lapsing, and cognitive strategies designed to prevent an AVE from occurring. Unfortunately, the results of the practical applications of the RPM to maintenance were inconclusive. In the first study Perri, Shapiro, Ludwig, Twentyman, and McAdoo (1984) found a group treatment for obesity involving behaviour

therapy, relapse prevention training and post treatment contact by mail and telephone resulted in greater maintenance after one year compared to groups receiving behaviour therapy, and behaviour therapy with relapse prevention training.

According to the researchers, it was the post treatment contact that seemed to have been the key reason for the group's success. All the groups lost a similar amount of weight (8.5kgs) in the initial behaviour therapy. However, at 12 months the only group successful at maintenance had received all treatments (behaviour therapy, relapse prevention training and post-treatment contact) had lost a total of 10.3kgs over the entire study, compared to 2.9kgs for the equivalent group who did not receive post-treatment contact. The unsuccessful maintenance groups regained most of the weight within a 12 month period.

The second study by Perri, Nezu, McKelvey, Shermer, Renjilan and Viegner (2001) conducted a comparison of relapse prevention training and problem-solving training in obese females. No significant difference was found in maintenance after one year between the two programs. However, the authors considered that it was likely that this was a result of the relapse prevention training group not having time to master the skills taught and were, therefore, not as successful at maintenance as possible. During the study, the relapse prevention training group was exposed to additional skills that the problem-solving training group was not. Moreover, during the training phase of the programs, no measures of skills acquired by the participants were taken and there was a high attrition rate from both groups, with nearly 30% of participants withdrawing from the study over the year. Therefore, it was unclear what influenced the different groups, since an accurate comparison of the two was not possible.

Previous research has been unsuccessful in improving maintenance rates in the long term, therefore using the RPM to assess the relationships between the variables and the relative importance of each in contributing to PWLM is necessary. This is because it is possible that weight maintenance may require a combination of coping skills, self-efficacy and minimization of lapses for both eating

and exercise behaviours. Some variables may be more critical for maintenance than others and important variables will not necessarily be the same as those for other domains in which the RPM has been applied. The following two studies concentrated on evaluating the contribution some variables from the RPM make to the PWLM. However, neither study assessed all the variables in the RPM.

The first study by Patsis (1991), using RPM variables, was conducted after participants lost weight on a very low calorie diet (VLCD) and filled in questionnaires on coping and self-efficacy. Proportion of weight loss maintained after the three month period was compared to number of post treatment contact sessions attended. In general, the RPM was supported by this study; however, lapsing and AVE were not measured. Another limitation of this study was that the coping measure the Ways of Coping Questionnaire (WAYS) (Folkman & Lazarus, 1985) used by Patsis (1991) is a measure of coping in stressful and negative situations only. This measure may be insufficient because research has indicated that overeating also occurs in positive situations (Schlundt, Sbrocco & Bell, 1989).

The two most common coping measures in previous research were the WAYS and the COPE (Carver, Scheier & Weintraub, 1989). Hypothetical scenarios are a different type of measure of coping from those used in previous studies on maintenance and the RPM. Drobes, Meier and Tiffany (1994) found that smokers' relapse can be predicted by measuring coping responses from hypothetical scenarios and may be a more valid measure of coping regarding maintenance.

The second study, conducted by Carels et al. (2004), compared dietary temptation and lapsing of 37 obese women in the final week of a weight loss intervention in which regain was not assessed. Temptation and lapses were measured using a pencil and paper ecological momentary assessment (EMA) diary technique. Diaries to assess lapsing are a more valid technique than retrospective recall because diaries are less likely to suffer from inaccuracies that may be influenced by current lapsing and eating behaviour. In a study by Shiffman, Hufford, Hickcox, Paty, Gnys and Kassel, (1997), estimates from participants of past smoking behaviour overestimated the number of



cigarettes smoked and the negative effect the lapses caused. Current smoking behaviour was also found to influence the recall of participants.

Carels et al. (2004) evaluated coping during actual lapses and temptations by requiring participants to rate on Likert scales the degree to which they behaved or thought for example “removed myself from the situation” or “thought about the negatives associated with not dieting”. A total coping score was calculated for both temptations and lapses rather than using a separate measure. Measures of AVE were conducted in a similar way by using Likert scales to assess the individual’s reaction to the lapse such as “I know my diet will be successful” or “I feel guilty because of my temptation or lapse. The results found that temptations were associated with coping attempts rather than actual lapse behaviour while lapses were associated with AVE and mood.

The application of the RPM to maintenance has been an initiative undertaken in only a small number of studies. While this approach has added to the knowledge from previous maintenance research, which dealt with success rates of maintenance and the identification of characteristics of successful maintainers, the RPM variables have not been examined collectively. In addition, these studies have not necessarily used measures that are valid measures of the variable of interest (e.g. the WAYS used to measure coping in Patsis, 1991) and have problems with procedures, measures, limited sample sizes, and the populations tested. Therefore, previous research into the effectiveness of relapse prevention techniques and treatments is inconclusive for the maintenance domain, although the literature suggests that the RPM can effectively predict maintenance.

### ***Limitations of applying the RPM to the maintenance domain***

As previously stated the RPM was originally developed to decrease the likelihood of relapse in alcoholism. However, the model has been applied to a variety of domains sometimes with unsuccessful or inconclusive results (Perri et al., 1984; Perri et al., 2001). Therefore, there are some

important considerations to make when applying the model to new domains other than the one the RPM was originally developed for.

The dichotomous classification of effective versus ineffective coping responses in the RPM may be redundant in the weight maintenance domain, as assessment of coping as a continuous variable may yield more informative results. A study by Drapkin et al. (1995), using hypothetical scenarios in high risk situations for eating lapses, concluded that the generation of any coping response is more important than the type of coping response generated when predicting weight loss. *Perceived risk of lapsing* was measured by Drapkin et al. (1995) using questions covering likelihood to overeat, level of temptation to overeat and confidence to avoid overeating, all measured using continuous scales to assess total coping scores for each participants. These investigators found a substantial range of responses in among participants, in their coping levels and types of responses across scenarios as well as in the level of perceived risk of lapsing. Therefore, the assessment of coping style as either effective or ineffective may not be the key to eventually predicting maintenance. Instead, the quantity of coping responses generated and perceived risk of lapsing across individual scenarios may be more sensitive to individual variation and therefore be a better measure.

In the context of addictions, the RPM implies that the occurrence of a lapse (e.g., a person maintaining abstinence from alcohol, taking a drink) can increase risk for relapse when it is accompanied by a corresponding AVE. In the maintenance of weight loss, abstinence is not a feasible goal, and individuals have their own idiosyncratic ideas about what constitutes a lapse. In light of the fact that lapses are individually defined, they may need to be captured by using EMA tools assessing lapsing and the perceived severity of lapses as they occur. This may also be useful because in weight maintenance, relapse may have a slower progression, as an individual is not able to regain all weight lost in a single lapse; lapses may instead have a cumulative effect on weight regain. In addition, previous research on lapsing among weight losers and maintainers has only included the

assessment of eating lapses, despite the importance of exercise as a predictor of weight loss and maintenance (Jeffery et al., 2000).

In addition, dichotomous classification of individuals as either maintainers or regainers also loses a great deal of information. The model also states that output is increased likelihood to relapse" and "decreased likelihood to relapse". This implies that maintenance in the RPM can be viewed as a continuous variable, as even the model has avoided concrete outcome predictions.

Therefore, it may be more informative to use continuous variables, such as PWLM, as other studies have done.

### ***The present study***

The current study aimed to identify predictors of weight maintenance among individuals who had successfully lost weight. Identifying predictors of maintenance may allow the development of research aimed at preventing weight regain and enabling maintenance by specifically targeting individuals' needs. This is important because the improvement of maintenance rates in weight loss is assumed to lead to better psychological and physiological health outcomes for the individual (Gregg & Williamson, 2002).

To date, no study has addressed the prediction of maintenance using all aspects of the RPM (coping, self-efficacy, AVE and lapsing). Self-blame and perceived severity of lapses has been included as measures of the AVE in the maintenance domain. The current study examined PWLM using the RPM and assessment of eating and weight patterns among individuals who have lost at least 5% of their body-weight and had stopped losing weight, either voluntarily or because weight loss had ceased despite continued efforts to lose more.

The present study does not aim to test the RPM but to predict PWLM using relevant concepts from the RPM in addition to other variables. The relationships between other cognitive and behavioural variables known to effect maintenance such as commitment to maintenance, vigilance

regarding diet and exercise and time from the end of the weight loss, also need to be studied to assess the application of the RPM to the prediction of maintenance. There is evidence that maintenance can differ between males and females, across different age groups and individuals using different weight loss methods (Colvin & Olsen, 1983; Anderson et al., 2001), therefore, age, sex, and weight loss method will be assessed, along with self-reported health status and ethnicity.

### *Hypotheses*

The hypotheses of the study were that PWLM will be influenced by cognitive and behavioural factors coping skills, self-efficacy, lapsing, AVE (conceptualized as self-blame and perceived severity of lapses), commitment and vigilance.

Coping, self-efficacy commitment and vigilance are predicted to be positively correlated with PWLM, while frequency, self-blame and severity of lapses were predicted to be negatively correlated with PWLM.

The present study will also assess the effect frequency of lapses had on PWLM. Length of time since maintenance began (hereafter referred to as *maintenance time*) was predicted to be negatively correlated with PWLM based on previous maintenance research (Wilson, 1994; Jeffery 2000) despite evidence that length of maintenance time is related to less maintenance effort and greater pleasure derived from the lower weight (Klem et al., 2000).

Additionally, this study hypothesized that the RPM can be used to predict PWLM with the relative contribution each variable makes to the model identified. Therefore, the present study may lead to the development of better understanding of how the RPM functions and may improve strategies and treatments for maintenance.

## **Method**

### ***Participants***

Sixty-eight individuals (10 males; 58 females) ranging in age from 18 to 79 ( $M=42.2$ ,  $SD=15.1$ ) volunteered to participate in a study on Weight Maintenance and the Relapse Prevention Model, having been recruited through advertisements in local newspapers and magazines, advertising posters on the University campus and local gyms and e-mail recruitment within the Psychology Department. An inducement of entering the draw to win \$200 of petrol vouchers was offered to facilitate recruitment and return of questionnaires.

To be eligible to participate, individuals had to have lost at least 5% of their body weight and had to have stopped losing weight, either voluntarily or because weight loss had ceased despite their continued efforts to lose more. All participants were informed that the study had been reviewed and approved by the University of Canterbury Human Ethics Committee. Table 1 depicts the demographic characteristics of the participants in this study. Two female participants were excluded, leaving a total sample size of 66. The rationale for excluding these participants is included in the results section on page 40.

Table 1  
*Demographic Characteristics*

Demographics		<i>n</i>	%
Sex	male	10	15.1
	female	56	84.8
Ethnicity	Pakeha/ New Zealand European	62	93.9
	New Zealand Maori	4	6.0
Self reported health	excellent	39	59.0
	moderate	24	36.3
	poor	3	4.5

*Note.* *N*= 66

**Materials**

Questionnaires were counterbalanced in the order of presentation except for the Self-monitoring Seven-day Lapse Diary (LD) which was always presented last. However, all measures will be referred to in the same order for clarity, beginning with the Hypothetical High-Risk Situation (HHRS), Weight Efficacy Lifestyle Questionnaire (WEL), Self-monitoring Seven-day Lapse Diary (LD) and the Questionnaire on Eating and Weight Patterns (QEWP). All questionnaires are presented in Appendix A (HHRS), Appendix B (WEL), Appendix C (QEWP) and Appendix D (LD).

*Assessment of coping in high risk situations using the Hypothetical High-Risk Situation (HHRS).* Domains such as addiction have used hypothetical scenarios to assess coping responses and strategies of individuals' during high risk situations (Drapkin et al., 1995). In the present study, coping was measured using a modified Hypothetical High-Risk Task (HHRT) developed by Drapkin et al. (1995). The HHRT consisted of four scenarios that were considered high-risk situations for individuals attempting to control eating behaviour. The four scenarios reflect a range of situations

and emotions in which an individual could be tempted into lapsing. Therefore, the four hypothetical scenarios depicted included *family mealtime celebration*, *watching TV*, *tension at work*, based on previous research by Grilo et al. (1989) and *argument*, included by Drapkin et al. (1995).

The scenarios are as follows: “Family mealtime celebration: You are having a family celebration. You are enjoying the company and the festive atmosphere. Everyone has prepared their specialty dishes from the appetizers through to the desserts and you really love these foods.”

“Argument: You are sitting down for a relaxed evening at home. A family member picks this time to continue an unresolved argument. Tempers flare and they stomp out of the house, slamming the door behind them. You escape to the kitchen and find yourself looking for something to eat.”

“Watching television: You are watching TV, feeling okay, pretty relaxed. A commercial comes on and you find yourself wandering into the kitchen to see what there is good to eat. You see your favourite food lying on the kitchen bench. It looks pretty good.”

“Work: If you are currently not working, please imagine yourself in this situation. You are behind on a project at work and the boss has been looking in on you every 10 minutes with impatient glares. You feel pressure and very tense. You go to get yourself a cup of coffee and eye the delicious snacks that someone brought in that morning.”

The original HHRT was developed to assess the relationship between coping skills and weight loss. . In the original study by Drapkin et al. (1995), participants were required to listen to the recorded scenarios. Following each scenario, participants responded verbally regarding their plan to limit or stop overeating in the situation and record answers to questions of likelihood, level of temptation and self-efficacy on Likert scales. The Cronbach alphas for the HHRT questions: level of likelihood, level of temptation, and confidence to avoid overeating in the study by Drapkin et al. (1995) ranged from .78 to .86 for each question across the four scenarios and were therefore combined to form one measure across scenarios of perceived risk of lapsing.

The modified HHRT used the same scenarios as Drapkin et al. (1995) but was renamed the Hypothetical High Risk Scenarios (HHRS) to reflect the changes made to the original questionnaire. Each scenario was presented in a printed format, followed by a series of questions about each scenario. The HHRS used three of the same questions as the original HHRT; assessing the coping strategy for dealing with the hypothetical situation, expected outcome of the situation, and degree of temptation to overeat. Drapkin et al. (1995) had also included a question on self-efficacy; which was removed for the present study as a separate measure of self-efficacy was used (the WEL, described below).

The HHRS presented four scenarios followed by five questions. The first question required a “yes” or “no” answer to discover if a coping response would have been generated by the participant in that situation. The second question was short answer which required the participant to state what specific plan or strategy they would implement to cope with the scenario if they were concerned about overeating. “If you were concerned about overeating, what would your plan or strategy be? That is, what would you think or do to keep from overeating in this situation? (Please be specific).” This was to validate question 1, that a coping response was actually generated by the participant.

The following three questions were answered on 5-point Likert scales (1 = not at all to 5 = extremely). Participants were instructed to answer these questions even if they did not think of a plan in which to cope with the hypothetical scenario. Question 3 assessed participants’ perceptions of their *likelihood* of using a plan, or the plan stated in question 2. “If you did think of a plan, how *likely* would you be to use it? (Even if you answered NO to question 1, imagine that you did think of a plan).” The fourth question asked “How *likely* would you be to overeat in this situation?”, and the fifth question asked “In this scenario, how close would the amount you ate be to what you think you should eat (your ideal amount)?”

*Assessment of self-efficacy using the Weight Efficacy Lifestyle Questionnaire (WEL).* The WEL, created by Clark et al. (1991), was based on the Smoking Confidence Questionnaire developed



by Condiotte and Lichtenstein (1981). The WEL assesses an individual's own judgments regarding their ability to control eating behaviours in various situations and consists of 20 items on 10-point Likert scales (0 = not at all to 9 = extremely) from five factors: *negative emotions* (nervous, depressed, irritable, experienced failure), *availability* (weekends, different kinds of foods, party, high calorie foods available), *social pressure* (have to say "no", impolite, pressure from others, upset others), *physical discomfort* (run down, headache, pain, uncomfortable) and *positive activities* (watching TV, reading, before going to bed, happy).

The five factors were found by Clark et al. (1991) by using a Principle Components Analysis of 40 original items leaving 20 items with four per factor. The internal consistency of the subscales (Cronbach alpha coefficients) ranged from .70 (positive activities) to .90 (social pressure).

*Assessment of Lapsing using the Self-monitoring Seven-day Lapse Diary (LD).* The LD was an EMA pencil and paper task using monitoring sheets based on the Marlatt and Gordon (1985) Daily Drinking Diary and from Fairburn, Marcus and Wilson (1993) regarding the assessment of actual food intake using self-monitoring diaries or EMA techniques. A lapse was defined in the lapse diary instructions as "...a single slip or mistake and can be anything that you feel will hinder your efforts to maintain or reduce your body-weight. A lapse is not necessarily something that you *have* done such as overeating, but can also be things that you *have not* done such as exercising." An information and instruction sheet for the LD was included preceding the monitoring sheets. The LD instructions explained the purpose of completing the LD, the number of recording days (that is, one monitoring sheet per day for seven days), the definition of a lapse (including things that the participant had, and had not done, which the participant feels will hinder their weight maintenance efforts), and a detailed description of how to fill in each column. An example monitoring sheet was included from a hypothetical LD the researcher created based on possible common lapses that may occur such as feeling lonely, social pressure and not exercising. Participants were required to record

information including time and date, type of lapse, situation and context of the lapse, cause of lapse (self or other blame) and perceived severity of lapse.

*Self-blame.* Participants could either indicate that the lapse was caused by themselves, another person or the situation or context in the free-response question “Who or what caused your lapse?” Lapses were coded as either *self-blame* or *other blame* and were used as one measure of AVE. Self-blame was measured as a continuous variable as percentage of lapses in which self-blame occurred.

*Perceived severity of the lapse.* Perceived severity of lapses was included to check if lapses were actual episodes of objective overeating. In addition, to assess actual (as opposed to perceived) severity of lapses, the content of all eating-related lapses was checked to assess whether they were actual episodes of objective overeating. The perceived severity of the lapse was assessed using a Likert scale (1 = not at all severe, to 7 = extremely severe lapse).

*The Questionnaire on Eating and Weight Patterns (QEWP).* The QEWP was developed by Spitzer et al. (1992) to evaluate the eating behaviours and consequent weight outcomes of those behaviours on the individual. Features of the QEWP included in the current study were the assessment of demographic characteristics sex, age, health status, ethnicity and weight loss history.

Modifications were made to the QEWP to make the questionnaire suitable for use on a New Zealand sample. The modifications included changing the question on ethnic background in which *Black*, *Hispanic* and *Asian* ethnic descriptions were exchanged for *Maori* and *Pasifika* to represent the indigenous people of New Zealand, and those of Pacific Island descent. *Caucasian* was exchanged for *Pakeha*, the commonly used word for individuals of New Zealand Caucasian descent.

Questions were also included regarding the most recent weight loss including when the weight loss started and finished (month/year) starting weight, finishing weight and current weight. Body weight before the weight loss, at the end of the weight loss phase, and current weight, was assessed by self-report. The questions on height and weight had a space to write an answer but no

unit of measurement because, in New Zealand, although the metric system is the officially adopted one, some individuals also use the imperial system. Therefore, answers using the imperial system were converted by the researcher into the metric system.

Questions regarding method of weight loss were also modified because some of the weight loss programs' stated on the original QEWP are unavailable in New Zealand. This question was reworded to include other methods of weight loss such as doctor prescribed, on own, with support and commercial program. "How did you lose the weight? (Please circle)" (1= commercial weight loss program/support group (e.g. Jenny Craig, Weight Watchers, Overeaters Anonymous); 2= On my own with friends and family for support; 3= On my own without support; 4= Doctor prescribed drugs or program; 5= Other).

The original QEWP did not assess current health status. In the current study, participants were given the scale (1=excellent, 2=moderate, 3=poor (please specify health difficulties)) of self-reported health. The education level question was removed because this variable was not going to be included in the analysis.

Two additional questions were included to assess commitment to maintaining the current weight and vigilance regarding eating and exercise behaviours (1=not at all to 5=extremely).

### ***Procedure***

Potential participants contacted the researcher by email or by leaving their contact details on the University of Canterbury's voice messaging service. The researcher contacted respondents by telephone and assessed eligibility to participate in the study with a short telephone interview in which participants were asked how much weight they had lost and if they were currently trying to maintain weight or were unsuccessfully trying to lose further weight.

Eligible respondents were informed that the study consisted of an anonymous questionnaire to be completed in their own time. Each respondent was also told about the questionnaire and that it

would take approximately 30 to 45 minutes to complete and the seven-day diary would take approximately three minutes per day. If the participant agreed to proceed a packet of questionnaires was posted to them.

The packet consisted of an information sheet shown in Appendix E, consent form (which was also the entry for the prize draw) in Appendix F, questionnaires (WEL, HHRS and QEWP), LD (including instructions, sample diary and seven monitoring sheets in) and a self-addressed reply-paid envelope. The instructions for the lapse diary and sample diary are shown in Appendix G.

The first form was the information sheet, which also contained a checklist to confirm that the participant was eligible to be involved in the study. There were two checks in which the participant was asked to read and tick the box if they met the criteria. These were: "I have lost at least 5% of my body weight during my last weight loss" and "I have either finished losing weight at least 6 months ago or have stopped losing weight at least 6 months ago but am still attempting." A table was provided listing various weights and what a 5% reduction from each would be.

The participants filled in the consent form and questionnaires, and were then instructed to fill in one sheet of the LD for seven consecutive days. At the end of the seven days, the instructions informed participants to place all forms in the self-addressed envelope provided except the information sheet, which the participant could keep. The pack was then returned by post to the researcher.

Following the return of the questionnaire pack to the researcher, the consent form was separated from the questionnaire pack to ensure anonymity of respondents. The consent form was used to enter the participant into the draw to win the \$200 petrol vouchers. Participants were provided with the researchers contact details if they wanted to discuss any aspects of the research further.

## *Design*

The aim of the current study was to predict PWLM which was achieved using multiple regression followed by stepwise regression analysis (Cohen, Cohen, West & Aiken, 2003). The statistical package Statistica® (version 6.1; StatSoft, Inc, Tulsa, OK) was used for all analyses.

## *Variables*

*Percentage of Weight Loss Maintained (PWLM).* The dependant variable PWLM was calculated using the following formula from Anderson et al. (2001) which was:  $PWLM = \text{weight loss maintained (kg)} / \text{weight lost (kg)}$ . A PWLM score of zero indicated that the participant's weight remained unchanged from the end of the weight loss phase until testing. A negative score indicated regain, and a positive score indicated maintenance or further weight reduction. For example, if a participant lost 10kg and regained 5kg, their PWLM would equal -50%.

*Coping.* Question 1 was coded as 0 = No (no coping response generated) and 1=Yes (a coping response was generated by the participant). The remaining questions were Likert scales (Q3, Q4 and Q5) which were summed, in addition to Question 1 (that is, Question 1 was included) yielding a total coping score for each scenario and across all four scenarios. Reverse coding of Q4 (How likely would you be to overeat in this situation? 1=not at all likely to 5= extremely likely) was conducted to keep the direction of the scale consistent.

Coping scores across all scenarios could range from 32 to 68 and separate subscale scores were summed for each scenario assessed (family mealtime celebration, argument, watching TV, and tension at work) which could range from 4 to 17. A high score on the HHRS indicated high coping skills for the individual.

*Self-efficacy.* Self-efficacy scores on the WEL were obtained by summing the scores of the twenty Likert scales and for each of the five subscales. High scores indicated the participant had high

self-efficacy for resisting eating in various situations. The range of possible scores for the entire scale was 0 to 180 and the range of scores for each subscale was 0 to 36.

*Self-monitoring Seven-day Lapse Diary (LD).* The following three variables lapse frequency, self-blame and perceived severity were calculated from the LD.

*Lapse Frequency.* The lapses frequency was calculated for each participant by summing number of lapses over the seven days.

*Self-blame.* Self-blame was calculated as a percentage score for the number of times the participant indicated that they blamed themselves for the lapse rather than other people or circumstances, divided by the total number of lapses for which blame was assigned. A low self-blame percentage indicated that the individual tended to blame external factors for their lapses, such as the situation or another person. An individual with a high self-blame percentage score indicated that the individual tended to blame themselves for the lapse.

*Perceived Severity of Lapses.* The perceived severity of lapse was calculated by obtaining the mean severity rating across all lapses per participant. This was a continuous measure with low scores indicating that on average the individual did not perceive their overall lapses as severe and high scores indicating the individual perceived their lapses as extremely severe.

*Questionnaire on Eating and Weight Patterns.* The following three variables, commitment, vigilance and maintenance time were assessed by the QEWP:

*Commitment.* This variable measured the dedication the participant had for maintaining their current weight or to lose more weight. Commitment was reverse coded to ensure that the direction of the scale was consistent with other measures. High commitment to maintaining weight was indicated by a high score chosen by the participant on the Likert scale.

*Vigilance.* This variable measured how vigilant the participant was regarding eating and exercise. High vigilance was indicated by a high score chosen by the participant on the Likert scale.

*Maintenance time.* Maintenance time was calculated from time in months from the end of the weight loss phase until the time the questionnaire was completed by the participant.

## Results

Weight loss characteristics of the participants were evaluated and are depicted in Table 2. The questionnaire pack response rate was 62%, of those who were mailed a questionnaire, leaving a sample of 68 individuals (10 males; 58 females). Two female participants were excluded from the data analysis because the first participant's PWLM could not be calculated due to insufficient completion of the questionnaire. The second participant was excluded because the individual was an extreme outlier (Cooks  $D = 2500$ ) accounting for a large proportion of the variance in PWLM possibly due to the extreme length of maintenance time (216 months versus the mean of 20.4 months). Cooks  $D$  is a measure of influence, a combination of distance in the dependant variable and leverage in the independent variables, in which assists in the identification of potential outliers. Any point on the regression line with a Cooks  $D$  greater than 1 should be considered for exclusion due the large effect that point may have on the regression results (Howell, 2002).



Table 2  
*Weight Loss Characteristics*

Characteristic	<i>n</i>	%	<i>M</i>	<i>SD</i>	minimum	maximum
Baseline BMI			30.6	4.9	20.0	40.3
Baseline weight (kg)			83.8	14.9	45.0	123.0
Highest weight (kg)			86.4	14.9	47.0	123.0
Amount of weight lost (kg)			13.9	7.4	3.4	36.4
Percentage of body weight lost (%)			16.0	7.3	5.3	43.3
Time taken to lose weight (month)			9.8	6.9	2.0	39.0
Time from completion of weight loss (month)			20.4	31.0	1.0	149.0
Weight loss maintained (kg)			11.1	9.4		
PWLM (%)			75.9	43.7		
Weight loss method						
Commercial (e.g. Weight Watchers)	18	27.2				
Family/friend support	16	24.2				
On own	22	33.3				
Pharmacological intervention	1	1.5				
Other	9	13.6				

*Note.*     *N* = 66  
          BMI = body mass index  
          PWLM = percentage of weight loss maintained

The demographic variables of sex, self-reported health status, ethnicity and weight loss method were assessed to ensure that the participants were a relatively homogeneous group. No significant differences in PWLM were found as a function of sex, ethnicity, and self-reported health status or between weight loss methods using independent *t*-tests and ANOVA at alpha level = .05. Following this, correlations between PWLM and the following variables were assessed: participant age, baseline BMI, time taken to lose weight and amount of weight lost. No correlations were significant and ranged from  $r = .04$ , n.s to  $r = .14$ , n.s. As no significant differences were found, all participants were analysed as one group.

The means and standard deviations for each scenario, and all other variables are reported in Table 3. The Cronbach alpha coefficients, to show reliability of the scales, for the variables HHRS Scenario 1: Family mealtime celebration and the WEL Positive activities were unexpectedly lower than previous studies using the same measures (Drapkin et al., 1995). In addition, as another check of

the validity of the HHRS scale, all participants that indicated they would generate a coping response in the scenario, actually did complete Question 2 with a coping response.

Cronbach alpha coefficients were not conducted on the LD as each variable was independent of the other and there was no total lapse score. In addition, lapses are measured as lapse frequency and self-blame is measured as the percentage of lapses in which the individual blames themselves for the lapse.

Table 3  
*Descriptive Statistics*

Variable	<i>M</i>	Minimum	Maximum	<i>SD</i>	$\alpha$
Coping					
Coping score	43.92	27	68	9.38	
Scenario 1: Family mealtime celebration	10.38	5	17	2.84	.67
Scenario 2: Argument	11.04	4	17	4.01	.83
Scenario 3: Watching television	10.71	4	17	2.98	.75
Scenario 4: Work	11.80	4	17	3.29	.70
Self-efficacy					
Self-efficacy score	124.24	57	180	29.66	
Negative emotions	23.56	1	36	8.60	.82
Availability	21.00	2	36	8.03	.84
Social pressure	26.07	6	36	6.92	.86
Physical discomfort	27.16	7	36	6.35	.73
Positive activities	27.02	10	36	6.31	.65
Lapsing					
Lapse frequency	5.71	0	16	3.46	
Self-blame (%)	63.00	0	100	30.00	
Perceived severity of lapse	3.14	0	7	1.83	
Commitment to maintenance	3.68	1	5	0.92	
Vigilance regarding diet and exercise	3.34	1	5	0.95	

*Note.*     *N*=66

***Predicting maintenance***

*Correlations between PWLM and predictor variables.* Correlations were calculated between PWLM and the predictor variables and are shown in Table 4. As hypothesised, coping, self-efficacy, commitment and vigilance were positively correlated with PWLM. This indicates that higher levels of coping, self-efficacy, commitment and vigilance corresponded to higher PWLM.

Only the overall coping score in the HHRS was significantly correlated with PWLM while none of the four scenarios were significantly correlated as shown in Table 4. Therefore, only the overall coping score was used in the analysis. The correlation between the self-efficacy score and the sub-scales of the WEL and PWLM showed that only the sub-scale of social pressure was significantly correlated.

In addition, self-blame, perceived severity of lapses, and maintenance time were negatively correlated with PWLM. Lapse frequency was also negatively correlated as predicted, but was not significant. Self-blame was not significantly correlated with PWLM or any other variable except perceived severity of lapse  $r=.35$ ,  $p<.01$ .

*Perceived Severity of Lapses.* Severity of lapse ratings in the diaries were assessed by the researcher for any cases of objective overeating based on the definition of Fairburn and Cooper (1993). Based on this definition, less than 2% of all lapses constituted objective overeating. This suggests that participants classified eating events as lapses because they perceived them as being harmful to their maintenance, rather than because these events were episodes of objective overeating. Indeed, many recorded lapses in the diaries were very minor (e.g., “eating vegetables while cooking the evening meal”). In addition, assessment of the LD found that 12.7% of lapses referred to not exercising when scheduled or reduced intensity of exercise as a lapse.

Table 4  
*Correlations Between PWLM and Predictor Variables*

Predictor Variables	<i>r</i>
Coping	
Coping score	0.24 *
Scenario 1: Family mealtime celebration	0.21
Scenario 2: Argument	0.19
Scenario 3: Television	0.08
Scenario 4: Work	0.16
Self-efficacy	
Self-efficacy score	0.19
Negative emotions	0.13
Availability	0.10
Social pressure	0.30 *
Physical discomfort	0.10
Positive activities	0.08
Lapsing	
Lapse frequency	-0.09
Self-blame (%)	-0.01
Perceived severity of lapse	-0.25 *
Maintenance time	-0.53 **
Commitment to maintenance	0.34 **
Vigilance	0.49 ***

Note. N=66

\* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$

*Correlations between predictor variables.* Correlations between the predictor variables coping score, self-efficacy under social pressure, perceived severity of the lapse, commitment, vigilance and maintenance time, were significantly correlated with PWLM, and are shown in Table 5. It is important to be aware of variables that are highly correlated with each other as regression analysis can be affected. Coping, self-efficacy, vigilance and commitment are positively and significantly correlated with each other. However, maintenance time and perceived severity of lapse were not significantly correlated to any of the other predictor variables, with the exception of a negative correlation between perceived severity of lapse and the overall coping score.

Table 5  
*Correlations Between Significant Predictor Variables*

		1	2	3	4	5	6
1	Coping score	—	0.43 ***	-0.39 **	0.35 **	0.45 ***	0.10
2	Self-efficacy -social pressure		—	-0.21	0.28 *	0.31 *	0.08
3	Perceived severity of lapse			—	-0.17	-0.11	-0.06
4	Commitment				—	0.61 ***	0.13
5	Vigilance					—	0.01
6	Maintenance time						—

Note. N=66  
\* $p<.05$ , \*\* $p<.01$ , \*\*\* $p<.001$

**Regression Analyses**

Variables that were significantly correlated with PWLM were entered into the regression model. The variables coping score, self-efficacy under social pressure, perceived severity of lapse, commitment, vigilance and maintenance time explained 47% ( $R^2=.47$ ) of the variance in PWLM,  $F(6,58)=8.72$ ,  $p<.001$  as shown in Table 6, which indicated that the regression variables significantly predicted PWLM.

Table 6  
*Beta Table for Full Regression Model*

Variable	Beta	Semipartial $r^2$ (%)
Coping score	-0.06	0.21
Self-efficacy: social pressure	0.16	2.18
Perceived severity of lapse	-0.25	5.11 *
Commitment	0.05	0.16
Vigilance	0.41	9.12 **
Maintenance time	-0.41	16.2 ***

Note. N=55  
\* $p<.05$ , \*\* $p<.01$ , \*\*\* $p<.001$

Stepwise regression was conducted on the full model and found perceived severity of lapse mean, vigilance and maintenance time had an  $R^2= .45$  which was significant  $F(3,61)=16.63$ ,  $p<.001$ .

Table 7 shows the Beta values and squared semipartial correlations. The latter indicates the percentage of variance in PWLM uniquely accounted for by each variable. Therefore, the difference between the sum of the squared semipartial correlations and R2 is the amount of variance that could be explained by any of the variables, that is, the variance is not unique to any one predictor. Therefore, the unstandardized regression equation was: PWLM= 0.35-0.06(perceived severity of lapse) + 0.21(vigilance)-0.005(maintenance time). The sample size was reduced in the regression analyses, from N =66 to N =55, because not all participants had scores for each variable, and therefore, were excluded.

Table 7  
*Beta Table for Reduced Regression Model*

Variable	Beta	Semipartial $r^2$ (%)	
Perceived severity of lapse	-0.26	6.76	**
Vigilance	0.46	21.34	***
Maintenance time	-0.39	15.65	***

Note. N=55  
\*\* $p<.01$ , \*\*\* $p<.001$

## Discussion

The current study proposed that coping skills, self-efficacy and lapsing, encompassed in the RPM, and additional variables from previous research (e.g. Kramer et al., 1989; Brownell, et al., 1986; Byrne et al., 2003) including maintenance time, commitment and vigilance would predict PWLM.

The results demonstrated significant positive correlations between coping, commitment, vigilance and PWLM and significant negative correlations between perceived severity of lapses, maintenance time and PWLM. The regression model significantly predicted PWLM, including the variables perceived severity of lapses, vigilance and maintenance time.

These results partially supported the hypotheses that RPM variables, in addition to other variables, would significantly predict PWLM. Contrary to the hypothesis, the RPM variables of coping, self-efficacy, lapse frequency and self-blame were not significant predictors of PWLM in the stepwise regression model.

### *Prediction of Maintenance*

*Coping.* The results support the RPM theory that coping score on hypothetical scenarios using the HHRS, based on the HHRT developed by Drapkin et al. (1995), was positively correlated with PWLM. That is, the higher the coping skill of the individual, the greater the PWLM. Patsis (1991) also concluded that the results supported the RPM because coping was significantly positively correlated with PWLM. In addition, the results supported Patsis (1991) findings using different measures than the one used in the current study. Patsis (1991) correlated The Ways of Coping Questionnaire (WAYS) (Folkman & Lazarus, 1988) with PWLM while the current study correlated the HHRS with PWLM, producing very similar positive significant correlations. The Patsis (1991)

finding provides strength for the results of the present study, because similar results were found from two different samples with two different measures that purport to evaluate the same construct of coping.

However, contrary to the hypothesis and RPM theory, coping was not a significant predictor of PWLM in the regression model. This is possibly because other predictor variables (self-efficacy under social pressure, perceived severity of lapse, commitment, vigilance) were significantly correlated with the coping score; therefore, coping did not contribute additional variance to PWLM and subsequently was not included in the model.

Maintenance time was the only variable that was not significantly correlated with coping. This result indicates that it is not coping but other variables that may need to be concentrated on because other variables in combination seem to have a greater effect on PWLM.

*Self-efficacy.* The second stage of the RPM relates to self-efficacy, or the confidence the individual has to resist eating in various situations, as measured by the WEL. The results of the current study indicated self-efficacy was significantly positively correlated with coping. That is, higher coping responses indicated higher confidence to resist eating. This supports the RPM in which coping responses, measured in the current study as higher coping scores, were related to higher self-efficacy scores.

However, the current study also found that only self-efficacy under social pressure was significantly positively correlated with PWLM, that is, the greater the self-efficacy in social pressure situations, the greater the PWLM. Self-efficacy under social pressure refers to an individual's confidence that he or she can resist eating while under pressure by others to violate their diet. Pressure can include either verbal and non-verbal persuasion, or indirect pressure such as being around people who are eating (Larimer et al., 1999) or anxiety to resist eating (Marlatt & Gordon, 1985). For example, questions on the WEL included confidence to resist eating when the individual has to say "no", or feels that it would be impolite, or would upset others by refusing to eat.



There are two possible reasons for the finding that self-efficacy under social pressure may be a more important variable to consider than the overall self-efficacy score. Firstly, Bandura (1977) states that higher self-efficacy leads to perseverance, because the individual has an *efficacy expectation*, or a belief, that they can perform the necessary behaviour and consequently, an *outcome expectancy* that the behaviour will have the desired result. The level of self-efficacy an individual has for a domain can have an enormous effect on the motivation and ability the individual has to perform the particular task. This is because self-efficacy is future oriented concept which means that beliefs will affect the outcome of a performance that will happen at a later stage in the individual's life (Graham & Weiner, 1996). That is, the individual may persevere and resist eating under social pressure because they believe they can achieve this goal of not eating and ultimately maintain weight. Secondly, eating is usually a socially acceptable behaviour and individuals may be encouraged to eat by others (Clark et al., 1991). Moreover, an individual low in self-efficacy under social pressure may fail to resist this pressure to eat due to a conformity predisposition (a wish to be positively evaluated in front of others), or to decrease stress (Bandura, 1986). For example, maladaptive behaviours elicited during the stress of social pressure have been implicated as a reason for lapsing in alcoholism (Larimer et al., 1999). If this is the case, then positive outcome expectancies (Marlatt & Gordon, 1985) may need to be assessed, as individuals may perceive that lapsing will have the positive effect of alleviating the stress of social pressure. Furthermore, avoidant coping behaviours that may be used in social situations may need to be prevented (Beutler & Moos, 2003). While this study did not find self-efficacy under social pressure to be a significant variable in the prediction of PWLM, its unexpected correlation with PWLM indicates that self-efficacy under social pressure should possibly become a skill for individuals to develop, as it may be one of the keys to successful maintenance.

*Lapsing.* The current study assessed the lapse frequency, perceived severity of lapses and allocation of blame for the lapses using a LD. It is important to note that lapses in the LD were

recorded regarding both eating and non-eating lapses, while the other measures (e.g., WEL) were specific to eating only.

*Lapse frequency.* The total self-efficacy score and social pressure sub-scale were significantly negatively correlated with lapse frequency, meaning that low self-efficacy is correlated with high lapse frequency, supporting RPM theory.

In the treatment of addiction, lapses are considered to be inevitable and are expected to occur over time (Marlatt & Gordon, 1985). The RPM, proposed that, at a higher number of lapses, self-efficacy will reduce, decreasing PWLM. However, lapse frequency was not significantly correlated to PWLM. This is contrary to Turner et al. (1995) who suggested that practice effects (Smyth et al., 1994) and incremental learning (Schachter, 1982) would lead to higher maintenance rates.

*Self-blame.* Self-blame was not significantly correlated with PWLM or any other variable except perceived severity of lapse. The relationship between perceived severity of the lapse and self-blame may be explained because severity and self-blame were conceptually similar to each other. In the RPM, AVE's are the cognitive and emotional reactions the individual has to the lapse (Marlatt & Gordon, 1985). The type of attributions (internal/external, stable/unstable and global/specific) influences whether the participant decides if they are able to achieve their goal.

*Perceived severity of lapses.* PWLM was significantly negatively correlated with perceived severity of lapses and was also included as a significant predictor in the regression models. This was predicted and lends support for the RPM that the generation of an AVE is detrimental to maintenance. Therefore, it may be important to emphasise to maintainers that it is the perception of lapse severity and not the number of lapses that seems to affect PWLM. This may be due to the evaluation of the performance by the individual (either consciously or non-consciously) being an important factor in actual performance (Brownell, Marlatt, Lichtenstein & Wilson, 1986).

*Additional variables of commitment, vigilance and maintenance time*

While the variables in the RPM were generally significantly correlated with PWLM, other variables were also studied for their predictive power:

*Commitment.* Commitment to maintenance was significantly correlated with PWLM as hypothesised but did not feature significantly in regression model. In previous research, commitment was found to be an important factor in the accomplishment of treatment goals in a study by Mussell, Mitchell, Crosby, Fulkerson, Hoberman and Romano (2000), which assessed commitment to treatment goals and prediction of outcome. This study aimed to predict treatment outcomes in women with bulimia nervosa which found desire or commitment to discontinue bulimic behaviour and a successful treatment outcome expectancy predicted symptom remission.

However, its lack of significance in the regression model may be explained because commitment was highly correlated with vigilance for diet and exercise which was a significant variable in the regression model. Commitment was also significantly correlated with coping and self-efficacy under social pressure.

*Vigilance.* Vigilance regarding diet and exercise was significantly positively correlated with coping, self-efficacy under social pressure and commitment, but not with perceived severity of lapse, which was significantly negatively correlated as predicted. Vigilance also featured significantly as a predictor in both regression models.

Previous research has supported the finding that vigilance regarding self-monitoring (Brownell et al., 1986) and weight control, usually through dietary intake, was indicated by more maintainers compared to regainers (Byrne, 2002).

*Maintenance time.* Maintenance time was significantly negatively correlated with PWLM, as hypothesised, indicating that individuals appear to regain lost weight over time. This finding has been supported by numerous studies such as Anderson et al. (2001), who conducted a meta-analysis

by examining maintenance rates between 2 and 5 years, and found that individuals, having completed a structured weight loss program, regain most of the lost weight.

It is possible that maintenance time could be related to discontent, irritation and annoyance of the costs or perceived costs of maintaining over time, despite the finding that maintenance effort becomes less (Klem et al., 2000) and aversive outcomes of relapse are lessened or avoided (Cooper & Fairburn, 2001).

### ***Theoretical Importance and Implications for the use of the RPM regarding maintenance***

While the correlations between the variables of coping and self-efficacy and PWLM indicated support for the RPM, ultimately this study has provided evidence that the RPM is not in itself sufficient for predicting maintenance of weight lost. It appears that perceived severity of lapses, may be the only relapse prevention variable to consider when researching maintenance.

Perceived severity of lapses was a more important variable in the prediction of PWLM than initially predicted. Individuals may need to be trained to assess lapses more objectively, to lessen the likelihood of unhelpful attributions leading to more intense AVE and consequently relapse. Lapses should be viewed as mistakes, not as an indication of lack of motivation or willpower, and therefore, individuals may need to reframe cognitive distortions associated with lapsing (Larimer et al., 1999). That is, participants who rate lapses as more severe than they actually were could benefit from cognitive restructuring. Cognitive restructuring may enable an individual to continue with maintenance behaviour rather than believing that maintenance is not worth the effort, leading to relapsing.

This study has provided evidence that another variable, vigilance regarding diet and exercise, which is not currently included in the RPM may also be important to consider. Perhaps, in addition to cognitive restructuring, individuals should also be aware that performing vigilant behaviours such as

self-monitoring may reduce frequency of lapses, and consequently negative perceptions of lapses, earlier in maintenance.

This research, and in particular the regression model, may enable a more cost-effective approach to developing treatment programs for weight maintenance. The reduced (stepwise) regression model may be especially useful in predicting weight maintenance in clinical settings. When maintenance can be predicted from fewer measures, participants are more likely to complete the assessments given. In addition, costs involved such as recruitment of participants and reproduction of questionnaires will be less. This regression model would be particularly suited for identifying and addressing individuals' needs, based on their strengths and weaknesses regarding maintenance behaviours to facilitate the development of programs, enabling maintenance to be achieved by more people.

This approach could allow treatment to be flexible, based on an individuals strengths and weaknesses and was recommended by Brownell et al. (1986). Participants may be made aware of weakness in maintenance behaviours or cognitions and given training to prepare or overcome them. For example, participants who display low vigilance to maintenance behaviours such as self-monitoring, self-weighing and exercise, may benefit from behaviour modification techniques to increase vigilance.

### ***Strengths***

Strengths of the current study were the use of the LD, so lapsing was not based on retrospective recall. Lapses were also defined as what the participant did (e.g. overeating) and did not do (e.g. not exercising). Previous research such as Marlatt and Gordon (1985) and Carels et al. (2004) have only used eating behaviours as the criteria for lapsing and including exercise lapses may give more information regarding lapsing and maintenance especially when exercise has been shown in previous research to be a very important activity for maintainers.

### *Limitations*

Several limitations need to be considered when evaluating the results of the current study as these factors may reduce the generalizability of the results. The participants were male and female volunteers who self-selected themselves into the study if they met the criteria of at least a 5% reduction in body-weight. All participants resided in the South Island of New Zealand and mainly consisted of a Caucasian ethnic background. These findings may have limited generalizability to Maori and Pasifika People, who have higher rates of obesity and obesity-related diseases (Ministry of Health, 2002).

This study found that relapse increased with maintenance time, rather than number of lapses. Therefore, the LD may not have been a long enough time period to assess either the number of lapses or capture a relationship between lapse frequency and maintenance.

The Cronbach alpha scores for the HHRS and WEL were low in the current sample, with no Chronbach alpha score higher than .90, demonstrating the scales were not very reliable. This indicates the questions in each scale were probably not measuring the same construct, suggesting that summing the scales to achieve overall coping and self-efficacy scores may have been a problem. However, overall coping score was correlated significantly with PWLM and the self-efficacy under social pressure subscale has a relatively high Chronbach alpha (.86) compared to the other self-efficacy subscales.

Compliance for filling in the diary was not assessed. Neither was reactivity or the diary's effect on behaviour during the recording week. Comments were made on the diary by some participants regarding the effect the recording had on their eating and exercising behaviours. Carels et al. (2004) indicated that participants were influenced by keeping the diary, with 77% believing that they were more aware of their behaviour and 21% agreeing that the diary influenced their eating behaviours. Therefore, it is possible that this study did not achieve the expected results due to biased reporting by participants in the lapse diary.

### ***Future research***

The current research shows that it is possible and important to assess variables in terms of their relationship to maintenance, rather than only evaluating commonalities and differences between groups of maintainers, regainers and occasionally of weight stable individuals. However, there was no control group in this study. In general, all adults gain weight over time (Perri et al., 2001) therefore, in addition to assessing variables of coping, self-efficacy and lapsing over time, maintenance variables should be compared across individuals maintaining weight losses as well as a weight stable control group.

Other known behavioural and cognitive factors may need to be included in future studies to enable better predictions of PWLM and understanding of these relationships. One factor to consider is exercise as it has been shown by Klem et al. (1997) to be a common factor among maintainers. Future research could incorporate a measure of exercise frequency and intensity in the QEWP and an exercise scenario in the HHRS. That is, a scenario could be developed as a high-risk for lapsing (not participating) in exercise. This idea is based on the findings of the lapse diary, which found that 12.7% of lapses referred to not exercising when scheduled or reduced intensity of exercise as a lapse.

The current study also highlights the need to apply research to other ethnic groups and age groups as they were not represented in the current study and would increase the generalizability of the results. In New Zealand in particular there is a need for maintenance research to be applied to the ethnic groups of the New Zealand Maori and Pasifika ethnic groups. Adult obesity increased by 55% between the years 1989 and 1997, up to a current level of 17%. The prevalence of overweight and obesity in New Zealand may be as high as 52% and these figures are substantially higher among New Zealand Maori and Pasifika ethnic groups. By 2011, it is estimated that 29% of New Zealand's adults may be obese (Ministry of Health, 2002; Ministry of Health, 2003).

### *Summary and Conclusion*

It appears that no study has attempted to use the RPM to predict maintenance with previous studies using the RPM as a treatment with little success. Previous research has also focused on assessment of weight maintenance rates obtained by individuals, or the factors (usually behavioural) that are common to either maintainers or regainers. Jeffery et al. (2000) suggested that cognitive-behavioural models from other domains may be important for helping to understand maintenance and may become a basis to develop a treatment for maintenance.

The RPM implies the use of dichotomous variables; however, previous research has used continuous variables as has been done in the current study. Therefore, this study used RPM variables (coping, self-efficacy and lapsing) and other known important variables (commitment, vigilance and maintenance time), to examine maintenance and in particular PWLM in individuals who had lost at least 5% of their body-weight.

This study found that not all of the RPM's variables significantly predicted PWLM as originally hypothesized. Cognitive and behavioural factors such as perceived severity of lapses and vigilance are important and should not be ignored. In addition, previous findings in this area have been supported including the importance of time regarding maintenance. That is, the longer the individual is maintaining, the lower the PWLM, confirming that time is detrimental to maintenance. However, the present study suggests that it is not the number of lapses that is harmful to PWLM, but how negatively the individual perceives the severity of the lapse.

Finally, the current study may form the basis of research aimed at developing relapse prevention treatments for the effective maintenance of lost weight that specifically target individuals' needs. However, variables other than those in the RPM may have greater predictive power of PWLM, therefore the RPM should be used cautiously or in conjunction with additional variables shown to have predictive power in this domain.



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**Appendix A**

Hypothetical Scenarios

Instructions: Please read each scenario and answer the following questions. Please circle the number that best applies to you.

Scenario 1: Family mealtime celebration:

You are having a family celebration. You are enjoying the company and the festive atmosphere. Everyone has prepared their specialty dishes from the appetizers through to the desserts, and you really love these foods.

1. If you were actually in this situation would you think of a *plan or strategy* (for example drink a large amount of water to make you feel full) and use this to attempt to control your eating.

- a. No (If NO go to question 3)
- b. Yes

2. If you were concerned about overeating, what would your *plan or strategy* be? That is what would you think or do to keep from overeating in this situation? (Please be specific)

3. If you did think of a plan, how *likely* would you be to use it? (Even if you answered NO to question 1, imagine that you did think of a plan).

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

4. How *likely* would you be to overeat in this situation?

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

5. In this scenario, how close would the amount you ate be to what you think you should eat (your *ideal* amount)?

1	2	3	4	5
Not at all ideal	Somewhat Ideal	Moderately Ideal	Very ideal	Extremely ideal

6. If you were to overeat in this situation, how *distressed* would this make you feel?

1	2	3	4	5
Not at all distressed	Somewhat distressed	Moderately distressed	Very distressed	Extremely distressed



Scenario 2: Argument

You are sitting down for a relaxed evening at home. A family member picks this time to continue an unresolved argument. Tempers flare and they stomp out of the house, slamming the door behind them. You escape to the kitchen and find yourself looking for something to eat.

1. If you were actually in this situation would you think of a *plan or strategy* (for example drink a large amount of water to make you feel full) and use this to attempt to control your eating.

- a. No (If NO go to question 3)
- b. Yes

2. If you were concerned about overeating, what would your *plan or strategy* be? That is what would you think or do to keep from overeating in this situation? (Please be specific)

3. If you did think of a plan, how *likely* would you be to use it? (Even if you answered NO to question 1, imagine that you did think of a plan).

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

4. How *likely* would you be to overeat in this situation?

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

5. In this scenario, how close would the amount you ate be to what you think you should eat (your *ideal* amount)?

1	2	3	4	5
Not at all close to ideal	Somewhat close to ideal	Moderately close to ideal	Very close to ideal	Extremely close to ideal

6. If you were to overeat in this situation, how *distressed* would this make you feel?

1	2	3	4	5
Not at all distressed	Somewhat distressed	Moderately distressed	Very distressed	Extremely distressed

## **Appendix B**

Instructions

Please read the following questions and use the scale provided to indicate the extent that you feel you could resist eating or control *your* eating in each situation.

For example if you answered 0 or *not at all*, this would mean that you would not be able to resist eating or control your eating at all and you would have no confidence at all in this situation.

For example, if you answered 9 or *extremely*, this would mean that you would definitely be able to resist eating or control your eating and you would be the most confident you have ever felt about this situation.

1. I can resist eating when I am anxious or nervous.

0

1

2

3

4

5

6

7

8

9

Not at all

Extremely

2. I can control my eating on the weekends.

0

1

2

3

4

5

6

7

8

9

Not at all

Extremely

3. I can resist eating even when I have to say “no” to others.

0

1

2

3

4

5

6

7

8

9

Not at all

Extremely

4. I can resist eating when I feel physically run-down.

0

1

2

3

4

5

6

7

8

9

Not at all

Extremely

5. I can resist eating when I am watching TV.

0

1

2

3

4

5

6

7

8

9

Not at all

Extremely

6. I can resist eating when I am depressed or down.

0

1

2

3

4

5

6

7

8

9

Not at all

Extremely

7. I can resist eating when there are many different kinds of foods available.

0

1

2

3

4

5

6

7

8

9

Not at all

Extremely

8. I can resist eating even when I feel it is impolite to refuse a second helping.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

9. I can resist eating even when I have a headache.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

10. I can resist eating when I am reading.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

11. I can resist eating when I am angry or irritable.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

12. I can resist eating even when I am at a party.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

13. I can resist eating when others are pressuring me to eat.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

14. I can resist eating when I am in pain.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

15. I can resist eating just before going to bed.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

16. I can resist eating when I have experienced failure.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

17. I can resist eating even when high-calorie foods are available.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

18. I can resist eating even when I think others will be upset if I do not eat.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

19. I can resist eating when I feel uncomfortable.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

20. I can resist eating when I am happy.

0	1	2	3	4	5	6	7	8	9
Not at all					Extremely				

Scenario 3: Television

You are at home watching TV, feeling okay, pretty relaxed. A commercial comes on and you find yourself wandering into the kitchen to see what there is good to eat. You see your favourite food lying on the kitchen bench. It looks pretty good.

1. If you were actually in this situation would you think of a *plan or strategy* (for example drink a large amount of water to make you feel full) and use this to attempt to control your eating.

- a. No (If NO go to question 3)
- b. Yes

2. If you were concerned about overeating, what would your *plan or strategy* be? That is what would you think or do to keep from overeating in this situation? (Please be specific)

3. If you did think of a plan, how *likely* would you be to use it? (Even if you answered NO to question 1, imagine that you did think of a plan).

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

4. How *likely* would you be to overeat in this situation?

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

5. In this scenario, how close would the amount you ate be to what you think you should eat (your *ideal* amount)?

1	2	3	4	5
Not at all close to ideal	Somewhat close to ideal	Moderately close to ideal	Very close to ideal	Extremely close to ideal

6. If you were to overeat in this situation, how *distressed* would this make you feel?

1	2	3	4	5
Not at all distressed	Somewhat distressed	Moderately distressed	Very distressed	Extremely distressed

Scenario 4: Work

If you are currently not working, please imagine yourself in this situation.

You are behind on a project at work and the boss had been looking in on you every 10 minutes with impatient glares. You feel pressured and very tense. You go to get yourself a cup of coffee and eye the delicious snacks that someone brought in that morning.

1. If you were actually in this situation would you think of a *plan or strategy* (for example drink a large amount of water to make you feel full) and use this to attempt to control your eating.

- a. No (If NO go to question 3)
- b. Yes

2. If you were concerned about overeating, what would your *plan or strategy* be? That is what would you think or do to keep from overeating in this situation? (Please be specific)

3. If you did think of a plan, how *likely* would you be to use it? (Even if you answered NO to question 1, imagine that you did think of a plan).

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

4. How *likely* would you be to overeat in this situation?

1	2	3	4	5
Not at all likely	Somewhat likely	Moderately likely	Very likely	Extremely likely

5. In this scenario, how close would the amount you ate be to what you think you should eat (your *ideal* amount)?

1	2	3	4	5
Not at all close to ideal	Somewhat close to ideal	Moderately close to ideal	Very close to ideal	Extremely close to ideal

6. If you were to overeat in this situation, how *distressed* would this make you feel?

1	2	3	4	5
Not at all distressed	Somewhat distressed	Moderately distressed	Very distressed	Extremely distressed

**Please indicate (with a circle) which of these four scenarios you would find the most difficult to cope with regarding regulating your food intake.**

1. Family mealtime celebration
2. Argument
3. Television
4. Work



**Appendix C**

**Instructions:**

**Please complete the following questions to the best of your knowledge.**

1. Age \_\_\_\_\_ years
2. Sex:            1. Male                            2. Female
3. What is your ethnic background? (Please circle)
  1. European/Pakeha                            3. Pasifika
  2. Maori    4. Other (please state) \_\_\_\_\_
4. Health Status (Please circle)
  1. Excellent
  2. Moderate
  3. Poor (Please specify health difficulties) \_\_\_\_\_
5. How tall are you?  
\_\_\_\_\_

**The following 5 questions relate to your most recent weight loss.**

6. Have you *either* (Please circle)
  1. Finished losing weight

*or*

  2. Stopped losing weight but are still attempting.
7. How committed are you to losing or maintaining weight currently? (Please circle)
  1. Extremely committed
  2. Very committed
  3. Moderately committed
  4. Slightly committed
  5. Not committed

**8.** How did you lose the weight? (Please circle)

1. Commercial weight loss program/support group (e.g. Jenny Craig, Weight Watchers, Overeaters Anonymous).
2. On my own with friends and family for support
3. On my own without support
4. Doctor prescribed drugs or program
5. Other

**9.** When did the weight loss begin?

Date (or month/year): \_\_\_\_\_

**10.** What was your weight at the point when you started losing weight?

\_\_\_\_\_

**11.** When did your weight loss stop? (Or at what point did your weight seem to actually stop decreasing, whether or not you were still trying to lose weight?)

Approximate date (or month and year): \_\_\_\_\_

**12.** What was your weight at that point?

\_\_\_\_\_

**13.** How much do you weigh now?

\_\_\_\_\_

**14.** What has been your highest weight ever (when not pregnant)?

\_\_\_\_\_

**15.** Have you ever been overweight by at least 5kgs as a child or 7kgs as an adult (when not pregnant)?

1. Yes                      2. No or not sure

**IF YES:** How old were you when you were first overweight (at least 5 kgs as a child or 7 kgs as an adult?) If you are not sure, what is your best guess?

\_\_\_\_\_ years

**16.** How many times (approximately) have you lost 10kgs or more (when you were not sick) and then gained it back?

1. Never                      3. Three or four times  
2. Once or twice          4. Five times or more

17. During the past **six** months did you often eat an unusually large amount of food within a two hour period? (That is an amount of food that most other people would agree is unusually large).

1. Yes                      2. No

**IF NO:** Skip to question 25

**18.** During times when you ate an unusually large amount of food, did you often feel you could not stop eating or control what or how much you were eating? (even if this episode was planned).

1. Yes                      2. No

**IF NO:** Skip to question 25

**19.** During that past **six** months, how often, on average, did you have times when you ate this way? (That is large amounts of food plus the feeling that your eating was out of control? (There may have been some weeks when it was not present, just average those in)

1. Less than one day a week
2. One day a week
3. Two or three days a week
4. Four or five days a week
5. Nearly every day

**20.** Did you **usually** have any of the following experiences during these occasions?  
Circle all those that apply.

- |  |     |    |
|--|-----|----|
| a. Eating much more rapidly than usual?  | Yes | No |
| b. Eating until you felt uncomfortably full?   | Yes | No |
| c. Eating large amounts of food when you did not feel physically hungry?               | Yes | No |
| d. Eating alone because you were embarrassed by how much you were eating?              | Yes | No |
| e. Feeling disgusted with yourself, depressed or feeling very guilty after overeating? | Yes | No |

**21.** Think about a typical time when you ate this way, that is large amounts of food plus the feeling that your eating was out of control.

a. What time of day did the episode start?

1. Morning (8am to 12 noon)
2. Early afternoon (12 noon to 4 pm)
3. Late afternoon (4pm to 7pm)
4. Evening (7pm to 10pm)
5. Night (after 10pm)

b. Approximately how long did this episode of eating last, from the time you started to eat to when you stopped and did not eat again for at least two hours?

\_\_\_\_\_hours \_\_\_\_\_minutes

c. As best you can remember, please list everything you might have eaten or drunk during that episode. If you ate for more than two hours, describe the foods eaten and the liquids drunk during the two hours that you ate the most. Be specific; include brand names and amounts as best as you can estimate. For example: 1 ½ ham and cheese sandwiches with mustard, 50gms Eat potato chips, 1 cup Tip Top Hokey Pokey icecream, 1 Cadbury's Kingsize block of energy chocolate. (please write your answer on the follow lined page).

\_\_\_\_\_hours \_\_\_\_\_minutes

Please Turn Over

**22.** In general, during the past **six** months, how upset were you by overeating episodes in which you ate unusually large amounts of food?

- a. Not at all
- b. Slightly
- c. Moderately
- d. Greatly
- e. Extremely

**23.** In general, during the past **six** months, how upset were you by the feeling that you could not stop eating or control what or how much you were eating?

- a. Not at all
- b. Slightly
- c. Moderately
- d. Greatly
- e. Extremely

**24.** During the past **six** months, how important has your weight or shape been in how you feel about or evaluate yourself as a person compared to other aspects of your life, such as how you do at work, as a parent, or how you get along with other people?

- a. Weight and shape were not very important
- b. Weight and shape played a part in how you felt about yourself
- c. Weight and shape were among the main things that affected how you felt about yourself
- d. Weight and shape were the most important things that affected how you felt about yourself

**25.** During that past **three** months, did you ever make yourself vomit in order to avoid gaining weight after binge eating?

1 Yes

2 No

**IF YES:** *How often on average was that?*

- a. Less than once a week
- b. Once a week
- c. Two or three times a week
- d. Four or five times a week
- e. More than five times a week

**26.** During the past **three** months did you ever take more than twice the recommended dose of laxatives in order to avoid gaining weight after binge eating?

- 1. Yes
- 2. No

**IF YES:** *How often on average was that?*

- a. Less than once a week
- b. Once a week
- c. Two or three times a week
- d. Four or five times a week
- e. More than five times a week

**27.** During the past **three** months did you ever take more than twice the recommended dose of diuretics (water pills) in order to avoid gaining weight after binge eating?

- 1. Yes
- 2. No

**IF YES:** *How often on average was that?*

- a. Less than once a week
- b. Once a week
- c. Two or three times a week
- d. Four or five times a week
- e. More than five times a week



**28.** During the past **three** months did you ever fast (not eat anything at all for at least 24 hours) in order to avoid gaining weight after binge eating?

1. Yes                      2. No

**IF YES:** How often on average was that?

- a. Less than once a week
- b. Once a week
- c. Two or three times a week
- d. Four or five times a week
- e. More than five times a week

**29.** During the past **three** months did you ever exercise for more than an hour specifically in order to avoid gaining weight after binge eating?

1. Yes                      2. No

**IF YES:** How often on average was that?

- a. Less than once a week
- b. Once a week
- c. Two or three times a week
- d. Four or five times a week
- e. More than five times a week

**30.** During the past **three** months did you ever take more than twice the recommended dosage of diet pills in order to avoid gaining weight after binge eating?

1. Yes                      2. No

***IF YES: How often on average was that?***

- a. Less than once a week
- b. Once a week
- c. Two or three times a week
- d. Four or five times a week
- e. More than five times a week

**31. How controlled or vigilant are you regarding what and how much you eat and exercise?**

- a. Not at all
- b. Slightly
- c. Moderately
- d. Greatly
- e. Extremely

**32. Since you have been an adult (over 18 years old) how much of the time have you been on a diet, been trying to follow a diet, or in some way have been limiting how much you were eating in order to lose weight or to keep from regaining weight?**

- a. None or hardly any of the time
- b. about a quarter of the time
- c. about half of the time
- d. about three-quarters of the time
- e. Nearly all of the time

## **Appendix D**

## Date:

Time	What was your lapse?	What was the situation/context?	Did you try and use thoughts and behaviours to try and limit/stop the lapse? (If yes what)	Who or what caused your lapse?	Severity of the lapse.

## **Appendix E**

Information Sheet

PLEASE READ THIS FIRST BEFORE STARTING

Study on Weight Maintenance and the Relapse Prevention Model

Dear Participant

Thank you for participating in this study. The aim of this project is predict weight maintenance using the Relapse Prevention Model developed for behaviours such as smoking. This is to study the possible links between coping skills, self-efficacy (confidence), lapsing and eating and weight patterns.

It is important that you read the criteria for participating in this study and can answer *yes* to both questions.

Please tick

- ☐ YES. I have lost at least 5% of my body weight during my last weight loss. (If you are not sure how much 5% is, please refer to the following table).
- ☐ YES. I have either finished losing weight at least 6 months ago or have stopped losing weight at least 6 months ago but am still attempting.

Table of 5% weight loss

Starting weight (in kilograms)	5%	Starting weight (in kilograms)	5%
120	6	85	4.25
115	5.75	80	4
110	5.5	75	3.75
105	5.25	70	3.5
100	5	65	3.25
95	4.75	60	3
90	4.5	55	2.75

Please note that pounds can be approximately converted into kilograms by dividing by 2.2. For example: 150lbs is 68kg

When you have read this Information Sheet, please sign the attached Consent Form. The Consent Form will be separated from all other information provided when it is received by the researcher, and will be used to draw the prize of \$200 in petrol vouchers.

Please fill in the questionnaire which will take approximately 30 minutes. Please try to ensure that you have this amount of time free with as few interruptions as possible.

**It is very important to be as honest as possible regarding reporting your actual body weights.**

When the questionnaire is completed, please read the instructions for the Lapse diary. This diary needs to be completed everyday for seven days and should only take a few minutes of your time. **It is very important to be as honest as possible regarding reporting your actual lapses.**

When the diary has been completed, please return all forms in the self-addressed envelope provided. All information is confidential and anonymous and no identifying information will be connected to your data. Only the researcher and supervisor of this project will have access to the information provided by participants in this study. You have the right to withdraw from the project at any time, including withdrawal of any information provided. The results of the project may be published, but you may be assured of the complete confidentiality of data gathered in this investigation

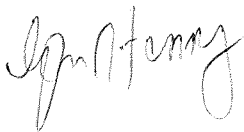
This project is being carried out as a requirement for the degree of Master of Science in Psychology by Geri Henry under the supervision of Dr. Janet Latner and Dr. Lucy Johnston. Geri Henry can be contacted at (03) 364 3152 ext 3152 or email [gfh18@student.canterbury.ac.nz](mailto:gfh18@student.canterbury.ac.nz). She will be pleased to discuss any information you may require about participation in the project. There are no expected risks of participating, however if you do become concerned please contact Geri Henry or counselling services listed below:

Lifeline  
Student Health Counselling Service

(03) 366 6743 or 0800 353 353  
(03) 364 2402

The project has been reviewed *and approved* by the University of Canterbury Human Ethics Committee. Again, thank you very much for your participation in this study.

Regards



Geri Henry  
Researcher

**Appendix F**



**Consent Form**

*Geri Henry  
Psychology Department  
University of Canterbury  
CHRISTCHURCH*

**CONSENT FORM**

*Weight Maintenance and the Relapse Prevention Model*

I have read and understood the description of the above-named project. On this basis, I agree to participate as a subject in the project, and I consent to publication of the results of the project with the understanding that anonymity will be preserved.

I understand also that I may at any time withdraw from the project, including withdrawal of any information I have provided.

NAME (please print): .....

Signature:

Date:

As a follow up to this study, are you willing to be contacted again by the researcher regarding this project or similar projects in the future?

*Please tick*

☐ **Yes**

Address:

Telephone number:

☐ **No**

## **Appendix G**

# Self-monitoring and Lapses

## Instructions

The following is a “Lapse Diary” to record any slips or mistakes that you make over the next 7 days. This is specifically regarding your eating and exercise plan that you use to maintain your weight at its current level.

A ***lapse*** is a single slip or mistake and can be anything that you feel will hinder your efforts to maintain or reduce your bodyweight. A lapse is not necessarily something that you ***have*** done such as overeating but can also be things that you ***have not*** done such as exercising.

A sample-monitoring sheet is included to help you fill in your entries. Please record ***all*** lapses that occur during this ***7 day*** period.

Please fill in the date on each sheet. Please use one sheet per day.

***Column 1 Time***

Record the time of your lapse.

***Column 2 What was your lapse?***

Record what the lapse was as clearly and precisely as you can. Remember a lapse is not necessarily something that you have done, but can also be something that you have not done.

***Column 3 What was the situation/context?***

Record the setting/events and feelings/moods that started the lapse.

***Column 4 Did you try to use thoughts and behaviours to limit/stop the lapse?***

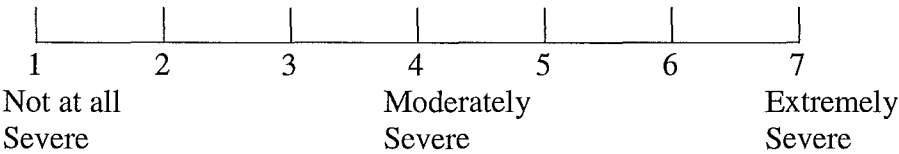
Record any thoughts or behaviours that you used to help you cope with or overcome the situation.

***Column 5 Who do you blame or what do you think caused your lapse.***

Record whether there is a **person** (either yourself or another individual) you feel is responsible for your lapse, or **what** you think was the cause of your lapse.

***Column 6 Severity of the lapse***

Circle a number between 1 and 7 to indicate how severe you feel your lapse was.



# SAMPLE Self-monitoring Lapse Diary

Date:

Time	What was your lapse?	What was the situation/context?	Did you try and use thoughts and behaviours to try and limit/stop the lapse? (If yes what)	Who or what caused your lapse?	Severity of the lapse.
10am	<i>Did not go to the gym</i>	<i>Cold rainy day, did not want to go out. Felt lonely and miserable.</i>	<i>Thought about calling a friend to come with me but they were not home</i>	<i>Myself because I did not force myself to go. I have no willpower.</i>	3
7 pm	<i>Ate ½ a choc cake</i>	<i>Friend visited with a cake and I was really happy to see her</i>	<i>I tried to take only 1 small piece and kept picking at it and taking more helpings</i>	<i>My friend is to blame, she brought a cake and I was not prepared for this situation. I won't let it happen again.</i>	6