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# **Helping Families Change Childhood Obesity**

A thesis

submitted in fulfillment

of the requirements of the degree

of

**Master of Social Sciences in Psychology**

at

**The University of Waikato**

by

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Te Whare Wānanga o Waikato

The University of Waikato

2008

## **Abstract**

The prevalence of childhood obesity is increasing at an alarming rate and is implicated in the onset of serious and life threatening health problems of both a physical and psychological nature. The current research comprised of three main components. Firstly, the reliability of a readiness to change questionnaire was examined, which had been completed by parents of obese children enrolled in the Bodywise childhood obesity programme. Secondly, an analysis of outcome data from 36 families who completed the above programme was also undertaken in order to determine if the data identified their stage of change, as defined by the questionnaire. Thirdly, four semi-structured interviews were conducted with families involved with the Bodywise programme. These parents provided information related to their experiences of lifestyle change, including what initiated change, what assisted change, and what barriers to change they had encountered. Findings revealed that in accordance with the transtheoretical model the readiness to change questionnaire was a reasonably reliable instrument for identifying parents' readiness to change their child's eating patterns and physical activity levels. Analysis of the outcome data from the 36 families revealed individuals in the action stage of change for both eating and physical activity made more rapid change at the outset of the programme than individuals in earlier stages of change. In addition, information derived from the interviews with families identified several promoters and barriers to change, many of which were similar across families. Until now no studies have examined the application of the transtheoretical model to an intervention for childhood obesity. Previous research has shown support for the model's use with other health problems. Overall this study lends support for the utility of the transtheoretical model in childhood obesity intervention.

## Acknowledgements

Special thanks must go firstly to the families who shared their experiences of change. Without their feedback this thesis would have been considerably less interesting and informative.

I would also like to thank my supervisors, Nicola Starkey and Karma Galyer for their advice, encouragement, and wisdom. In particular, I would like to acknowledge how grateful I am for your generosity of time.

Thanks must also go to my friends in the clinical programme who have been wonderfully empathic and a great source of encouragement.

I would also like to acknowledge my family and friends for all the support and encouragement I have received throughout this journey. I would especially like to thank my mother, Val Thomson, for her faith in me, her assistance on the domestic front, as well as being the most awesome proof reader. At least the errors gave us a few good laughs!

Furthermore, I owe a debt of gratitude to my late father Peter Thomson, who instilled in me a sound work ethic, a love and appreciation of life, and a pragmatism that has largely been responsible for my achievement in academic pursuits.

Finally, a special thanks to my husband, Denis for the countless hours of unofficial therapy he has provided. No woman could wish for a more loving and enthusiastic 'main supporter'!

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## CHAPTER ONE

### Introduction

#### *1.1 Obesity Prevalence*

Obesity has increased in western countries at an astonishing rate over the past 25 years (Ebbeling, Pawlak & Ludwig, 2002) affecting both adults and children alike. The World Health Organisation (1998) has gone so far as to call obesity a global epidemic. In New Zealand adult obesity prevalence rates vary depending upon ethnicity. New Zealand Europeans are the least adversely affected with prevalence rates of 4.7% and 6% for males and females respectively. A higher prevalence is found in Maori, with rates of 15.7% and 16.7% for males and females respectively. Prevalence is somewhat higher again for Pacific Islanders, with rates for males at 26.1% and peaking for females at 31% (Ministry of Health, 2003). Data from the Health and Independence Report revealed that, using international cut-off criteria, in 2002 21.3% of New Zealand children (aged between 5 – 14 years) were overweight and 9.8% were obese (Ministry of Health, 2005).

Given that the prevalence of childhood obesity is on the rise in many countries, including New Zealand, effective interventions to address this problem are necessary in order to safeguard the health and wellbeing of future generations.

#### *1.2 Factors Influencing Obesity*

The aetiology of obesity is multi-faceted with no single known cause; however, a combination of genetic and environmental factors has been implicated (Galvez, Frieden, & Landrigan, 2003). From a genetic standpoint, Kopelman (2000) suggests a predisposition to obesity exists. The onset of obesity may occur due to monogenic syndromes or genes that heighten a person's susceptibility. However, obesity is

more commonly due to an interaction of genes rather than a single gene defect (Ebbeling et al, 2002). The prevalence rates described earlier reveal that both the Maori and Pacific Island populations are at considerably higher risk of developing weight problems than their European counterparts.

Although it is clear that genetic factors are implicated to some degree in the onset of obesity, environmental variables tend to attenuate or exacerbate the final outcome.

The obesiogenic environment in which we live has been suggested as being partially responsible for the dramatic increase in childhood obesity. Western children are said to live in a “toxic food environment” (Brownell & Horgen, 2004) which is comprised of ready access to fast food outlets, processed foods, and foods high in sugar and fat. Dining away from home has also been linked to consumption of larger portions with greater energy intake (Ledikwe, Ello-Martin, & Rolls, 2005). The attitudes and beliefs parents hold regarding eating habits is also transmitted to their children though their own thoughts and actions (Johnson & Birch, 1994),

Modelling of food habits, as well as exercise practices, is common. Children are living more sedentary lives with decreases in physical activity due to patterns of transportation, such as car use increasingly becoming the norm, and more time is spent viewing television and playing computer games (Dietz, 2001). These activities have been shown to be related to childhood obesity (Gable & Lutz, 2000). Research has shown that the deleterious consequences of TV viewing are threefold. Firstly, the child is exposed to food commercials that commonly promote snacking and eating and, secondly, the TV becomes a conditioned stimulus for eating (Matheson, Killen, Wang, Varady, & Robinson, 2004). In addition, television viewing is also replacing other more active pastimes (De Mattia, Lemont, & Meurer, 2007).

Other environmental factors include socio-economic status and cultural context. The interaction between obesity and socio-economic status is dependent upon the development of the country. In developed countries there is a higher prevalence of overweight and obesity in individuals with lower incomes and education levels, compared to those with fewer fiscal constraints and higher qualifications.

(Deckelbaum & Williams, 2001). In developing countries affluence has been linked to problems with overweight (Kopelman, 2000); however, in some of these countries frequencies of malnutrition in the poor and obesity in the rich appear concurrently (Deckelbaum & Williams). Cultural context also appears to influence the perception of weight problems. Crandell, D'Anello, Sakalli, Wiczorkowski and Feather (2001) suggest that the degree to which obesity is devalued may be at least partially based on one's cultural milieu. These authors suggest that western, non-collective cultures attach more negative stereotypes to excessive weight than collective cultures. For instance, plumpness is a sign of affluence and health in Chinese culture (Marsh, Hau, Sung, & Yu, 2007) and, accordingly, is viewed favourably.

Furthermore, gender may also play an implicit role in the emergence of obesity.

Research suggests parental concern about weight status may differ depending upon the sex of one's child (Crouch, O'Dea, & Battisti, 2007) and that parents may also demonstrate gender biased feeding practices (Johannsen, Johannsen, & Specker, 2006). This topic will be reviewed in more depth later in this section.

An addition to the factors highlighted above, there is also a reported nexus between childhood neglect and the occurrence of obesity. Lissau and Sorensen (1994) suggest neglected children were nine times more likely to develop obesity in adulthood compared to children who were raised in supportive family environments.

Another change in the home environment is said to be implicated in the onset of childhood obesity, namely the rise in maternal employment. In the developed world this has been rapidly accelerating over the past decades. As a result of this phenomenon families spend less time together due to work and time constraints and research suggests this may promote overweight and obesity in the offspring of working couples (Hawkins, Cole, & Law, 2007).

Given the genetic and environmental factors implicated in the onset of childhood successful intervention has proven challenging. Changes in the home environment, time constraints, consumption of less nutritious food, and an increase in sedentary lifestyles have all been implicated in the rising numbers of obese children worldwide.

### ***1.3 Health Issues Related to Childhood Obesity***

Childhood obesity leads to a heightened risk of morbidity whether or not excess weight is carried into adulthood (Kiess et al., 2001). Dietz (1998) suggests that from early to late teens obesity persistence increases for both genders, that is, the longer a child is obese the greater the likelihood that the child will remain so into adulthood. This is cause for considerable concern given that a host of sequelae are known to exist, both of a psychological and physiological nature (Germann, Kirschenbaum, & Rich, 2006; Kiess, et al., 2001). A correlation exists between obesity and psychopathology in children with an increased prevalence of major depression, oppositional defiant disorder (Mustillo et al., 2003) and bulimia nervosa (Fairburn, Welch, Doll, Davies, & O'Connor, 1997). While numerous physical complications may arise, such as disorders of the cardiovascular system (hypertension, hypercholesterolemia, dyslipidaemia), endocrine system (Type 2 diabetes, hyperinsulinism, precocious puberty), and pulmonary system (sleep apnoea, asthma, exercise intolerance). Furthermore, obesity has the potential to negatively impact

upon a child's gastrointestinal, renal, and musculoskeletal systems (Ebbeling et al., 2002).

As well as contending with these physical and psychological challenges, a child is also in jeopardy of critical social evaluation. Some of the negative stereotypes that surround overweight people suggest the individual is lazy, socially inadequate, and less intelligent than their more slender counterparts (Germann et al., 2006).

In the long-term obesity will become an increasing economic burden for society with the mounting costs of health care and medical expenses (Ebbeling et al., 2002).

Research suggests that in developed countries the costs associated with obesity equate to between approximately 2% to 7% of the annual health budget. This being the case, the cost to the New Zealand economy would amount to \$303 million (Ministry of Health). As such, there is an urgency to develop and implement successful strategies to manage obesity before this problem, quite literally, becomes too big!

#### ***1.4 Prevention and Early Intervention***

Given that there are over 350 million obese people world-wide (World Health Organisation, 1998) and that obesity is known to have long-term risks that impact on quality of life and longevity, research suggests prevention is the most desirable approach. Prevention strategies have been devised at a micro-level through to a macro level (Kumanyika, Jeffery, Morabia, Ritenbaugh, & Antipatis, 2002).

Possible settings where these types of prevention approaches are found include homes, schools, and the community through to governmental level where policies are developed to promote change. Daniels, et al. (2005) suggest that the success of an intervention depends on the designer's knowledge about the target audience and how to effectively implement change for that audience. In addition, Daniels, et al. suggest

that all prevention programmes should be theory-based if they are to be successful, as is the precedent from other health-based psychological interventions.

It is possible to transform individually-oriented prevention strategies into early interventions that can be developed, for instance, by the parents in the home.

Examples may include making small changes to family routine, such as dining together as a family, turning the television off at meal times or ensuring the family eat regular daily meals (Speiser, et al., 2005). Similarly, school-based prevention/early intervention strategies may include encouraging students to prepare their own healthy lunches, or a review of what foods are on offer at the school tuck shop (Kumanyika, et al., 2002). Two components that are ubiquitous in the area of prevention and/or intervention with obesity are the facilitation of a more nutritious diet and the promotion of physical activity.

### ***1.5 Diet and Eating Patterns***

Dietary preferences may be formed as early on as infancy. Drawing on inferences from animal research, Birch (1998) suggests that a child's food preferences may develop as early as infancy. It is posited that the flavours of the food ingested by the mother are transmitted to her child through the breast milk. Although evidence of this is inconclusive, what is known is that food aversions are a genuine phenomenon, which occur in both humans and animals alike (Carlson & Buskist, 1997). Food and flavour aversions are said to emerge due to the classical conditioning process (Birch, 1998). This process has been valuable from an evolutionary perspective whereby infants have learned to prefer sweet flavours over sour and bitter ones. The rationale being that the former flavour is indicative of an energy source, while the latter two may signal the presence of noxious compounds (Birch). Furthermore, the predilection for certain foods may arise due to the environmental context in which

the foods are found. If the emotional environment is positive then a child is likely to be more receptive to the food offered than if the reverse is true (Birch).

Understandably, a child's parents play a critical role in mediating the nature and quality of that environment.

If, as Golan and Weizman (2001) suggest, the home is the centre of the belief system regarding food, then a child's parents will, undoubtedly, have a significant influence on dietary intake. The attitudes and beliefs of parents regarding food and the rituals that surround it will alter a child's relationship with it (Dietz & Gortmaker, 2001).

Parents may employ tacit or explicit strategies to modify dietary intake. For instance, parents may use food as a punisher or a reinforcer, that is, they may withhold certain foods if other foods are not eaten or they may use food as a reward (Fisher & Birch, 1999). Food restriction is one method by which parents control their child's energy intake (Fisher & Birch) and thereby moderate their weight.

Parents may seek to curb their child's ingestion of high-density foods, which they may have dichotomised as either all "good" or all "bad" (Birch, 1998). Research has shown; however, that food restriction in children has some negative effects. Firstly, this strategy has the unintended consequence of making the withheld foods more desirable (Dietz & Gortmaker, 2001; Epstein, Gordy, Raynor, et al., 2001). A study by Birch, Fisher, and Davison (2003) endorses this outcome and directs us to the impact restriction has on over-consumption. Their research with 5 to 9 year-old children showed that when access to previously restricted foods was granted, children ate substantial amounts in the absence of self-reported hunger.

Secondly, another unfortunate consequence found in the literature is the nexus between parental restrictive practices and the ability of a child to self-regulate energy intake. Evidence shows that parental food restriction may have a deleterious impact

on a child's capacity to self-regulate energy intake. Studies have shown youngsters are able to self-regulate dietary consumption from infancy (Fox, Devaney, Reidy, Razafindrakoto, & Ziegler, 2006). Birch (1998) also highlighted research that demonstrated newborns' ability to moderate energy intake by determining the strength of the formula they were fed. The caveat; however, is that self-regulation is not uniformly precise among individuals, with some children being more efficient at it than others. For instance, children with greater adiposity were found less able to regulate dietary intake (Johnson & Birch, 1994) than their leaner counterparts. Research has also shown differences in regulation between the sexes, with boys better able to self-regulate than girls (Johnson & Birch). Two primary reasons are foundational to the ability to successfully self-regulate. The first is the erroneous parental belief that a child is unable to self-regulate energy intake (Johnson & Birch). Secondly, parents with their own issues with food regulation have a tendency to be excessively vigilant about their children's eating patterns (Fisher & Birch, 1999). A more preferable strategy is to offer children healthy food and a variety of choices, rather than utilising restrictive practices (Birch).

Just as dietary restriction has an effect, so does disinhibited eating. Hood et al (2000) describe disinhibition as "the degree to which an individual abandons control of dietary intake in the presence of certain external food cues (p. 1323)". It is somewhat ironic that parents with a disinhibited eating style also have the potential to unfavourably restrict their child's food consumption. As Saelens, Ernst, and Epstein (2000) note, an overweight child living in an environment characterised by maternal disinhibition is frequently the target for dietary over-control and in families where both parents demonstrate disinhibition children are at a particularly high risk of obesity (Hood et al.).

Furthermore, a child's weight may not only be compromised by parental intervention, but also through modelling unhealthy parental eating patterns (Hood, et al., 2000). Birch (1998) concurs and suggests children tend to partake of at least some of the foods consumed by their parents. Therefore, those parents whose diet is comprised of a large proportion of high-density foods will unwittingly model these foods as acceptable and, possibly, desirable for their child.

A child's interaction with food will be variable. Research has shown some intriguing variations in the experience of feeding practices among different children. Birch and Fisher (2000) suggest a child's weight, gender, and age may all influence their experience with food. This finding is endorsed by a number of studies. Waxman and Stunkard (1980) provided evidence that mothers of children with differing weight status fed their obese child greater amounts of food than their normal weight child. There also appears to be marked differences in girls' experience of food in childhood than boys. A potential reason for this is society's obsession with feminine beauty equating to slimness (Johnson & Birch, 1994) and therefore the added pressure faced by girls in relation to their dietary intake and weight.

As the incidence of obesity has increased, so too has the likelihood of having an overweight parent. Studies have frequently shown that a child with at least one obese parent is at greater risk of obesity themselves (Deckelbaum, & Williams, 2001; Epstein et al, 2001; Hood et al, 2000). A possible reason for this is the parental threat perceived for their child and subsequent implementation of the restrictive dietary measures discussed previously. An authoritarian parenting style has also been shown to negatively influence a child's level of self-control (Johnson & Birch, 1994). Birch, Marlin, Kramer, and Reyer (1981) found that obese parents' and children's food intake was higher than normal weight peers. Furthermore, Epstein,

Wing, Koeske, and Valoski (1986) found that, in comparison to children with obese parents, children with normal weight parents were more likely to conform to dietary, physical activity, and self-regulation aspects of treatment.

In addition to environmental change, alterations in food consumption have also occurred over the last few decades that have influenced paediatric adiposity (Ledikwe, et al., 2005). Nicklas, Baranowski, Cullen, and Berenson (2001) suggest some of the more pertinent changes include the exclusion of breakfast, changes in the size of meals eaten, the wide variety of foods and beverages now consumed, and the impact of dining together as a family. In recent times, research has highlighted the negative impact that skipping breakfast can have on children and adults alike (Newby, 2007). For a school-age child with ready access to the school tuck shop, the omission of breakfast may have the unfortunate impact of increasing hunger later in the day and increase the likelihood of consumption of high density foods that are low in nutrition. It should be noted; however, that studies linking the failure to consume breakfast with an increase in obesity have shown inconsistent results (Nicklas, Bao, Webber, & Berenson, 1993).

Diliberti, Bordi, Conklin, Roe, and Rolls (2004) suggest that over the past several decades meal portion sizes have also changed. It is suggested that the increased frequency of dining out may be partially responsible for weight gain due to the quantities of food ingested while eating out. Ledikwe, et al. (2005) note that restaurant dining and obesity rates have been rising at comparative rates and research has shown that children consume more fat while dining out than when eating at home (Zoumas-Morse, Rock, Sobo, & Neuhausser, 2001).

Along with where children eat, how children eat has also altered. Children's dietary intake now comprises of greater amounts of proteins and carbohydrates with a small

decrease in the consumption of fat (Nickas et al., 2001). The variety of beverages on the market has increased over the past few decades and along with this increase heightened soft drink consumption has been witnessed (Harnack, Stang, & Story, 1999). Consumption of sugary beverages has also been highlighted as a possible factor in the onset of childhood weight difficulties (Nickas et al).

As has been demonstrated, dietary intake has altered substantially in the past several decades, together with the traditional ritual of family dining (Jabs & Devine, 2006). This is unfortunate due to the link between healthier dietary intake and meals eaten together as a family (Gillman, et al., 2000). Research indicates that dining as a family results in a higher consumption of fruits, grains and vegetables, together with increased intake of calcium, iron and a number of vitamins (Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003). Alterations to family meal patterns have arisen for several reasons, including perceived time scarcity and the more common incidence of maternal employment (Jabs, & Devine, 2006; Neumark-Sztainer et al., 2003).

Overall, a child's parents have considerable influence on their child's food intake. The attitudes and beliefs that parents hold regarding food consumption and the quality of food eaten indirectly impact on their child. Children have been shown to model the behaviour of their parents and, accordingly, the eating patterns they develop often reflect those of their parents. In addition, alterations to diet including an increase in portion sizes and density of food, together with a decrease in family dining have all been shown to play a part in the rising incidence of childhood obesity. Therefore they are significant targets for any intervention designed to address obesity in a paediatric population.

### ***1.6 Physical Activity***

Along with dietary intake, another key determinant of childhood obesity is physical activity. Evidence suggests that regular exercise moderates the risk attached to carrying extreme weight and that active overweight individuals are at lower risk of illness or death than their normal weight inactive peers (Blair & Brodney, 1999). In a study of adults and children conducted by Allender, Cowburn, and Foster (2006) findings showed that motivation to remain healthy was not the primary reason for exercising, rather the ability to socialise with others and the sheer enjoyment of sports participation ranked highly. Also, provided that the children received the necessary parental encouragement, they were more likely to engage in a variety of new and diverse sporting activities provided the atmosphere was friendly and non-competitive. The latter factor highlights the importance of parental attitude in the instigation and participation of new activities by their children. Furthermore, involvement in physical activity has been reported to be beneficial as it also increases children's self-esteem, wellbeing, and sense of achievement, together with alleviating boredom (Biddle, Gorely, & Stensel, 2004; Rees, et al., 2006). Eleven to 16-year old girls highlighted weight management as an additional benefit.

Although the advantages of increasing physical activity are well documented, one of the challenges to assisting obese children to become more active is the reinforcement gained from sedentary behaviours. Epstein, Paluch, Gordy, and Dorn (2000) confirm that when efforts are made to alter certain sedentary behaviours, obese children often substitute one sedentary behaviour for another. Television viewing is one of the foremost static activities that has been linked to childhood obesity (Gortmaker, Must, Sobol, Peterson, Colditz, et al., 1996; Robinson, 1999). A study by Gortmaker et al.

(1996) found the risk of obesity was 5.3 times greater in children who watched 5 hours or more of television per day than children who watched less than 2 hours.

Psychological barriers to participation in exercise also appear to be prevalent. Biddle et al. (2004) suggest that the more inactive children are, the more they believe difficulties exist with participation in physical activity. Crocker, Eklund, and Kowalski (2000) concur and suggest that the greater a child's perceived competence in physical activity, the more likely he or she is to engage in that behaviour.

Unfortunately, perceived skill deficits in the physical arena sometimes translate into actual underperformance. As has been mentioned earlier, obese children often bear the brunt of scorn and ridicule because of their appearance. These children are aware of the negative stereotypes surrounding overweight and the victimization that can occur and, as such, it is unsurprising that if their athletic abilities are a source of jest that they would choose to avoid participation in these types of activities. Faith, Leone, Ayers, Heo, and Pietrobelli (2002) investigated the concept of weight criticism during physical activity, which lent support to this theory.

Research also shows that gender appears to have an influence on activity levels. A number of studies have found that boys as early as their preschool years are more active than girls (Biddle, et al., 2004; Buxton, Wyse, & Mercer, 1996; McManus, 2000).

Regardless of gender, with the understanding that obesity tends to track from childhood to adulthood (Steinbeck, 2001) an effort is required to intervene to counteract its establishment. Alterations to dietary intake and increasing physical activity levels have been reported as being of assistance in the battle against paediatric obesity (Barlow, Trowbridge, Klish, & Dietz, 2002). These factors together with parental involvement appear to be worthwhile intervention targets

(Epstein, Valoski, Wing, & McCurley, 1990). If childhood obesity is to be successfully addressed the implementation of effective interventions is paramount.

### ***1.7 Obesity Interventions***

Numerous interventions have been utilised in an effort to conquer childhood obesity.

To date family-based behavioural treatments have shown the greatest success

(Epstein, McCurley, Wing, Koeske, & Valoski, 1990) with superior results being

found in the short as well as the long-term (Faith et al., 2001). Unfortunately,

attrition from adult and child weight-loss programmes is high (Germann et al., 2006).

Although weight-loss programmes initially tend to be of assistance, the majority of

participants regain a substantial amount of weight one-year post treatment and many

have been found to regain almost all weight lost within a few years of treatment

(Riebe et al., 2005).

Research has also shown improvement in childhood weight loss when there is

parental involvement (Epstein, Valoski, Wing, et al, 1990). Furthermore, parents

utilised as the exclusive agents of change in situations where their child has pediatric

obesity are usually more successful than recruiting the children themselves as the

agent of change (Golan, Weizman, Apter, & Fainaru, 1998). A focus on a family-

based approach has been demonstrated to have numerous benefits. Firstly, a lower

drop-out rate is evidenced. Secondly, increased weight loss is witnessed with more

superior maintenance of children's weight loss. In addition, parental weight

reduction is also a possible corollary. Finally, the family-based treatment approach

has been shown to be cost effective (Golan, et al., 1998).

Given that some families respond better than others to various interventions

motivational theory may be one way to explain the individual difference that occurs.

Prochaska and DiClemente's (1983) transtheoretical model (TTM) or stages of

change model has been shown to be valid in a variety of settings for a diverse number of health behaviours (Anthis & La Voie, 2006). Some examples include effectiveness in smoking cessation (Velicer, Prochaska, Fava, Norman & Redding) and HIV prevention (Prochaska, Redding, Harlow, Rossi, & Velicer, 1994), along with increased use of sunscreen and mammography screening (Prochaska, Velicer, Rossi, Goldstein et al, 1994). Other health-related behaviour change interventions have been associated with altering behaviours linked with obesity, such as adoption of exercise and intake in fruit and vegetables (Riebe et al., 2005).

Throughout this research the use of the terms TTM and stages of change model will be used interchangeably to describe the model.

The TTM has been used to understand psychopathology as well as health risk behaviours and is underpinned by a number of popular theories of psychotherapy including affective, behavioural, cognitive, experiential, dynamic, relationship, and systems approaches (Suris, del Carmen Trapp, DiClemente, & Cousins, 1998).

Originally, the change process was delineated in five stages. These included pre-contemplation, contemplation, action, maintenance and termination (Prochaska, DiClemente & Norcross, 1992). More recently the model has been altered to incorporate the preparation stage, which is suggested to occur prior to the action stage. During the pre-contemplation stage the individual does not intend to alter their behaviour in the foreseeable future. They may be unaware or under-aware a problem exists and, therefore, behaviour change is unlikely (Prochaska, et al., 1992a). The contemplation stage is characterised by problem awareness and consideration of change. However, the individual does not presently possess the commitment to modify the problem behaviour. Some individuals may find themselves trapped in the contemplation stage for long periods of time without

progression to further stages. The preparation stage is characterised by intention to change a particular behaviour. The individual may not be at the point where change is imminent, but change is considered within the next month or so. For some individuals; however, small changes have been made, such as reduction in the intake of high fat foods, or delay in having the first cigarette of the day (Nigg, et al., 1999). A hallmark of the action stage is overt behaviour change that has occurred within the last 6 months. Individuals at this juncture have altered their behaviour, experiences or environment in order to effect change. As perhaps is axiomatic, this is the stage of change that is most visible to others and, therefore, garners the greatest recognition (Lambert, 2004). Maintenance is the penultimate stage of the TTM. This stage is characterised by sustained behaviour change. Continued efforts are made to consolidate the gains made in the former stage and to avoid relapse. Prochaska, et al. (1992a), propose the maintenance stage should not be viewed as a continuation of change, but rather as an absence of change. Termination is the final stage of the TTM. This stage is defined as the period in which the individual no longer experiences the temptation to return to the former behaviour. The person at this stage demonstrates 100% self-efficacy in replacing new health behaviours that counter previous deleterious ones (Prochaska & Velicer, 1997). The termination stage has not been given much emphasis due to the fact that research shows the majority of individuals do not achieve zero temptation.

The TTM has developed ten processes of change. These processes are overt or covert activities that are utilised over the course of the stages of change. Prochaska and Velicer (1997) suggest the ten processes are consciousness raising, dramatic relief, self-reevaluation, environmental reevaluation, self-liberation, social liberation, counter-conditioning, stimulus control, contingency management, and helping

relationships. Each of these processes is thought of as an independent variable that requires application at a particular interval in order to progress from one stage to the next (Prochaska & Velicer).

Studies examining weight loss, propose that individuals attempting weight loss should be in the preparation, action or maintenance stage of change in order to achieve a successful outcome (Wee, Davis and Phillips, 2005; Prochaska et al, 1992a). An understanding of what stage an individual is in assists with the content of the intervention provided as well as the timing of its delivery (Sarkin, Johnson, Prochaska, & Prochaska, 2001). In a study of a worksite weight control programme by Prochaska Norcross, Fowler, Follick, and Abrams (1992b), the stages and processes of change were shown to be related to therapy attendance and outcome. In this study 184 adult hospital staff (with a mean age 40) undertook a 10-week behavioural-oriented worksite programme for weight control. Findings showed that participants' ability to reach the action stage by mid-treatment appeared pivotal to their successful completion of treatment and maximal weight loss.

Just as the study illustrated above was adult oriented, most of the research on the stages of change model appears to be focused on adolescent or adult populations; however the behaviours investigated to date vary widely covering topics from breastfeeding (Kloeblen, Thompson, & Miner, 1999) to condom use (Lauby et al., 1998). There is a dearth of research investigating the use of this model and its application to children or families. The current research has been undertaken in an effort to remedy this deficiency.

In summary, as has been highlighted, childhood obesity is a serious problem and research shows that its prevalence is on the increase. Childhood obesity is associated with deleterious physical and psychological health outcomes. The causal

mechanisms implicated in the onset of obesity are also complex and multi-faceted and likely to be relevant in why intervention is successful for some families and not for others. In the past behaviour change theory has been applied to other health problems, and, its utility to childhood obesity will be investigated in this current research. Given that parents have the most influence over their children's eating habits and physical activity levels from a young age their readiness to change will be examined. As suggested earlier, early intervention tends to produce the most favourable outcomes. It should also be noted that research on parental readiness to change childhood obesity has not been investigated before, hence the lack of literature on this topic in the above review.

### ***1.8 Background and Research Aims***

In order for this research to be undertaken the Body wise childhood obesity programme, managed by the Waikato District Health Board, provided the data and participant pool from which information has been collected and analysed. The programme is run over a period of 12 months, with five weeks (two sessions per week) of education and skills building, followed by monthly meetings at the family's home.

The focal points of the programme include:

- The goal of a stable or decreased body mass index.
- Key targets for change are nutrition and physical activity.
- The agent of change is the parent/caregiver, via modelling of health behaviours, controlling children's access to and reinforcing consumption of healthy food, and providing access to and reinforcing physical activity.

- The TTM and its stages of change are incorporated in the clinical assessment and introduced to families as part of planning changes, setting goals, and relapse prevention.
- Achievable goals are set in collaboration with each family and identification of individual barriers to achieving those goals identified. In addition, problem solving is done on a monthly basis and progress is monitored and discussed with the family at 3, 6, and 12 month intervals.

This research has been conducted with three primary aims. The first is to review the Waiata District Health Board questionnaire adapted by Galyer and McClintock (2004) for use with the families of obese children between the ages of 5 and 12 years from a Readiness to Change questionnaire originally developed by Heather, Rollneck, and Gold (1992). The second aim of this research was to determine if the families stage of change is related to changes in target behaviours (eating and activity), and to outcome data (zyme). The third aim was to investigate, through interview, what prompted families to initiate change, what supported change, and what barriers families faced as they endeavoured to make lifestyle changes.

## Chapter Two

### Method

#### 2.1 *Introduction*

In order for the research to be conducted ethical approval was obtained from the University of Waikato Human Ethics Committee and the Northern-Y Regional Health and Disability Ethics Committee (NTYREF). The protocol of the study was also discussed and approved by the Kunihera Kaumatua Group,(local iwi representatives).

#### 2.2 *Quantitative Research – Part 1*

This part of the research was undertaken in order to review the Waikato District Health Board questionnaire adapted by Galyer and McClintock (2004) from a Readiness to Change questionnaire originally developed by Heather, Rollnick, and Gold (1992) utilised with the families involved in the Bodywise programme. The original instrument was formerly employed in the drug and alcohol field and given that the adaptation was used in a very different field an investigation into the instrument's reliability was undertaken.

##### 2.2.1 *Original and Adapted Questionnaires*

Using the questionnaire adapted by Galyer and McClintock (2004) from a Readiness to Change questionnaire originally developed by Heather, Rollnick, and Gold (1992) data was gathered from participants at the outset of their involvement with the Bodywise programme. The original questionnaire consisted of 12 items (See Appendix A) while the total number of questions on the adaptation comprised of 18 items (See Appendix B). Questions in the adapted version of the questionnaire had to

be analysed to identify what stage of change each item tapped. In this instance pre-contemplation, contemplation, or action were the focus of this research as described by the transtheoretical model. Each question on the adapted questionnaire by Galyer and McClintock (2004) was matched in content with a respective question on the original version. Table 2, located in the Results section, provides a comparison of both instruments.

Once the matching process had been completed the items could to be categorised. Pre-contemplation items on the adapted questionnaire comprised items 6, 11, 15, and 18 investigating eating patterns, while question 5 investigated physical activity. Items that tapped the contemplation stage of change consisted of items 4, 8, 9, and 12 for eating patterns, and item 10 for physical activity. The questionnaire items related to the action stage of change comprised of items 2, 3, and 17 for eating patterns and items 7, 13, and 14 for physical activity. Questions 1 and 16 on the adapted questionnaire tapped the agent of change rather than any particular stage of change, therefore, they were excluded from analysis.

### ***2.2.2 Procedure***

As is usual clinical procedure before the initial interview, participants were posted the adapted questionnaire and other screening measures, which they completed and then brought with them to the first appointment. The scoring system was a 5-point scale, which ranged from -2 for strongly disagree, -1 for disagree, 0 for unsure, +1 for agree and +2 for strongly agree. Totals of each of the scales on the questionnaire (pre-contemplation, contemplation, or action) were calculated by adding each item score together. This was with the exception of the pre-contemplation scale score, which was reverse-scored due to positive scores in this category signifying the participant's lack of readiness to change. The purpose of this analysis was to identify

the stage of change category for eating and physical activity (undertaken separately) that best represented each family. If, scores on any of the respective scales were identical, the scale that was further along the change continuum was chosen as the participants current change category.

Ninety three stages of change questionnaires from the Bodywise programme were collected for the purposes of this study. These questionnaires had been completed by the adult parent of the child participant (five to 12 year-olds) as a routine part of programme screening between July 2003 and March 2007. The actual number of families seen over the aforementioned period was unavailable. Once all questionnaires had been checked to ensure they had been completed correctly, 12 were discarded, leaving the remaining 81 questionnaires available for analysis. Questionnaire invalidation criteria was conferred if two or more items were absent from one particular scale. If, however, only one item was omitted from each scale the questionnaire was retained for analysis with its score being pro-rated, that is, the total overall score was multiplied by 1.33. The remaining 81 stages of change questionnaires were transferred to an Excel computer spreadsheet for analysis. Following this, the data was entered into SPSS for Windows Version 12.0 for analysis (SPSS Inc, 2003). Each individual's stage of change for eating and physical activity was then calculated.

### ***2.3 Quantitative Research – Part 2***

In this part of the research data collected by the Bodywise programme was analysed with a focus on stage of change at the start of the programme, BMI, nutrition, and physical activity for child participants at baseline, 3, 6 and 12 monthly intervals. The standardized BMI score (zBMI) was used rather than the BMI score as it is not possible to compare children of different ages with different BMI, therefore, a

standardised score was utilised in order to identify how many standard deviations the child was above the mean for their age (Centers of Disease Control and Prevention, 2000).

### **2.3.1 Participants**

This sample comprised of all the families who had completed the full 12 months of the Bodywise Programme at the time of this research. There were 14 girls and 22 boys, aged between 5 and 12 years. Of the 36 participants, 17 identified as Pakeha, 10 as Maori, 4 as Pacific Islander, and 5 identified in the 'other' category.

Twelve children were referred by the Waikato District Health Board, 14 children by their general practitioner, and six children by the public health nurse. Four children were referred by other sources.

### **2.3.2 Outcome Measures**

The researcher did not have any involvement in the collection of the data supplied for analysis as it was collected by specialists. They measured the children's height and weight. The resultant zBMI scores were derived based on statistics developed by the Centers of Disease Control and Prevention (2000) for population mean and standard deviation for each child's gender and age. A derived overall score for children's food intake was provided by the Bodywise programme dietician. A four point rating scale was utilised in which children were categorised as significantly requiring improvement in nutrition (1) to excellent diet achieved (4). Each child's knowledge of which foods should be consumed the most, in moderation, and the least was determined by their ability to categorise 20 food models into a puzzle consistent with the healthy food pyramid. The Bodywise programme specialist in children's physical activities provided data on the duration of time each child spent being outdoors and being active. Physical activity information was collected via a

checklist that was completed with the parent and the child at each programme review.

Data for this part of the research was collated and analysed using SPSS for Windows Version 12.0 (SPSS Inc, 2003).

#### ***2.4 Semi-structured Parent Interviews***

This part of the study comprised a series of interviews undertaken with families willing to share their experiences of change throughout their involvement in the Bodywise programme.

##### ***2.4.1 Participants***

Currently enrolled parents/caregivers in the Bodywise programme (n= 32) were invited to participate in a one hour long interview to discuss their experience of lifestyle change. Of these families, 4 families with children aged between 7 and 9 years agreed to participate.

##### ***2.4.2 Ethnicity***

All families supplied details of their ethnic identity. The majority of the sample identified as European or New Zealand European (n = 3, 75%), one family identified as New Zealand Pakeha/Maori (n = 1, 25%). The tribal affiliation of the latter family was identified as Tainui.

##### ***2.4.3 Apparatus***

An I-River MP3 recorder was utilised in order to audiotape the participant interviews.

##### ***2.4.4 Procedure***

A letter of invitation to participate in an interview with the researcher (see Appendix C) was forwarded to the aforementioned families affiliated with the Bodywise Programme by the Waikato District Health Board. This procedure was followed in

order to maintain the families' anonymity from the researcher until they had provided their consent to participate. The families were informed of the purpose and relevance of the research to healthcare. Accompanying this letter was an information sheet (see Appendix D); which outlined facts regarding the study and consent forms; one family copy and one project copy (see Appendix E). The information sheet included a tear-off slip which, once signed and forwarded, signalled agreement to participate. Responses were forwarded to the Department of Psychology, University of Waikato, thereby maintaining participant anonymity from Bodywise personnel also. Those who were in agreement supplied their contact details and forwarded the slip and the project consent form in the self-addressed envelope provided back to the researcher at the University of Waikato. The family copy of the consent form was retained by the family.

Once a decision to participate had been made by each respective family, the parent was contacted by telephone and an appointment arranged to meet for approximately one hour. Parents could choose the time and location of the meeting, either at their home or on the university campus, depending on the participant's preference.

Participants were informed that they could have a support person present at the interview.

Prior to the interview process a semi-structured interview schedule (Appendix F) was devised by the researcher and Bodywise personnel. It was intended to capture experience of change. Topics covered in the interview included why the family decided to join the programme, what they hoped to achieve by joining, what they felt were the benefits of achieving the stated goals, how confident they were of achieving those goals, what changes they had made so far, what assisted them to start those changes and what helped them keep the changes going, what difficulties had they

encountered and how they had addressed those difficulties, and whether there was any other significant influence that either assisted or impeded the family's progress in making change. The topics discussed were guided but not limited to those on the interview schedule in order to allow for participants to tell the researcher what was important to them.

At the commencement of the interview the researcher introduced herself and gave a standardised overview of the project to the participant (See Appendix D). Written consent was then obtained (if it had not already been supplied earlier by mail). A reminder was given regarding participant anonymity and the fact that the parent could stop the interview at anytime. Consent to audiotape the interview was also requested. The interview schedule (discussed above) that sought family background information and tapped salient aspects of change, such as what initiated change, what promoted change, and what were the perceived barriers to change, was utilised as the framework for the interview. At the conclusion of the interview, the participant was informed that the interview would be transcribed and a copy of it forwarded to them for checking. Participants were advised that any corrections or additional comments would be welcomed and that their audiotape would be destroyed once the transcription was complete.

At the conclusion of the interview the participant was thanked for their assistance and provided with a \$20 gift voucher as a token of appreciation for taking part in the study.

Once transcribed, each participant was forwarded a copy of the case study to peruse. None of the participants contacted the researcher with any amendments. The information provided by each individual family was then analysed using a case study format. This type of format was utilised as a substantial amount of information is

able to be gathered from a small number of exemplars of the phenomenon in question (Patton, 1986). Using qualitative content analysis, the information provided by the participants was then analysed across cases in an effort to identify themes and patterns in the data. This deductive approach allowed for the themes in the case studies to be compared and contrasted in order to effectively answer the research questions surrounding the initiators, promoters and, barriers to successful change (Mayring, 2002).

## CHAPTER THREE

### Results

#### *3.1 Quantitative Data*

The quantitative data from this research is presented in two parts (as explained in the Method). The first section reviews the Waikato District Health Board questionnaire adapted by Galyer and McClintock (2004) from a Readiness to Change questionnaire originally developed by Heather, Rollnick, and Gold (1992) utilised with the families involved in the Bodywise programme. The second aim of this research is to determine if the families stage of change is related to changes in target behaviours (eating and activity), and to outcome data (zBMI).

All quantitative data was analysed using SPSS for Windows Version 12.0 (SPSS Inc, 2003).

#### *3.2 Part One*

##### *3.2.1 Factor Analysis - Questionnaire Analysis*

A factor analysis, including a Varimax rotation, was conducted in order to explore whether the questionnaire, adapted by Galyer and McClintock (2004) had a similar factor structure to the original questionnaire. The adapted questionnaire comprised of 18 items. As items 1 and 16 related to agent of change, these were omitted from the analyses.

In order to complete a satisfactory factor analysis, it is desirable to have at least five participants per item on the questionnaire (Coakes & Steed, 2007). In this instance, the factor analysis had the minimum number of participants required. Eighty-one questionnaires were included in this analysis.

In order to compare the structure of this questionnaire with the original, a three factor solution was requested. The three factor solution explained 50.75% of the variance.

A Varimax rotation was conducted as the three factors were uncorrelated. The item loadings on each of the three factors are presented in Table 1.

Table 1

*Item loadings for the Stage of Change components extracted from Varimax rotation*

		Factors		
		1 (Action)	2 (Contemplation)	3 (Pre- Contemplation)
<b>Items</b>				
2	I intend to change my child's eating habits	.430	.084	.346
3	I have recently made changes to my child's eating habits	.666	-.087	.386
4	My child's weight has reached the stage where I should consider doing something about it	.546	.593	-.025
5	It is alright for my child to keep doing the same amount of physical activity as they do now	.008	.065	.799
6	It is alright for my child to keep eating as they do now	.117	-.358	.595
7	I am trying to change my child's physical activity levels right now	.620	.165	-.340
8	My child enjoys eating but sometimes he/she eat too much	-.034	.710	.098
9	My child should cut down on food intake	.208	.773	.078
10	My child should increase physical activity	.486	.227	-.434
11	It is a waste of time trying to change my child's weight	-.019	-.081	.535
12	My child's weight is a problem	.085	.666	-.206
13	I have recently made changes to my child's physical activity habits	.816	-.163	-.094
14	I intend to change my child's physical activity habits	.634	.251	-.194
15	My child's weight is okay as it is	-.417	.052	.460
17	I am trying to change my child's eating right now	.617	.155	.211
18	My child's physical and psychological wellbeing would be the same even if his/her weight changed	.008	-.583	.292

Following completion of the rotated component matrix, each question was classed as loading on a factor if the correlation was 0.4 or higher. The first factor comprised of seven items (questions 2, 3, 7, 10, 13, 14, 17). Examples included questions such as "I have recently made changes to my child's eating habits", "I am trying to change my child's physical activity levels right now", and "I am trying to change my child's eating right now". The content of all questions appeared to suggest these items

related to the action stage of change. Cronbach's alpha for this factor was .749.

Nunnally (1978) suggests that scores over .7 indicate 'good' reliability. Therefore, these items meet the criteria for good internal consistency.

The second factor comprised of five items (questions 4, 8, 9, 12, 18). Examples of questions in this category included, "My child's weight has reached a stage where I should consider doing something about it", "My child should cut down on food intake", and "My child's weight is a problem". The general theme of these questions indicated that the parent was in the contemplation stage of change. For these items Cronbach's alpha was .156, suggesting that there was very poor reliability between items. Further analysis indicated that if question 18 was deleted ("My child's physical and psychological wellbeing would be the same even if his/her weight changed") from the item total statistics this would improve the internal consistency to 0.7.

The third factor comprised of four items (questions 5, 6, 11, 15). Examples from this category included "It is alright for my child to keep doing the same amount of physical activity as they do now", "It is alright for my child to keep eating as they do now", and "My child's weight is okay as it is". These responses were suggestive of a parent in the pre-contemplation stage of change. Cronbach's alpha was .569.

These results suggest that items had moderate internal consistency.

Some items loaded on more than one factor. For factor 1 this occurred with questions 2 and 10. Both these items also co-loaded on factor 3 (pre-contemplation). For factor 2 only one question in this factor category loaded on two factors, this was question 4. This also co-loaded on factor 1 (action). For factor 3 one factor was also found to co-load. In this instance question 15 co-loaded with factor 1 (action).

Table 2 provides a comparison of where the items were expected to load (on the basis of the original questionnaire) and where they actually loaded once the factor analysis had been completed. This table reveals that five of the items on the original questionnaire matched with two comparison items on the adapted questionnaire. Question 7 on the original questionnaire was the only item that did not have an equivalent item on the adapted questionnaire.

From Table 2 it can be seen that item 10 on the adapted questionnaire should have loaded on contemplation; however the factor analysis showed that it actually loaded on action. Item 18 also did not load where expected. On the adapted questionnaire the item should have loaded on pre-contemplation; however once the factor analysis was completed it loaded on contemplation.

As highlighted above questions 2, 4, 10, and 15 all co-loaded on two factors. This is illustrated in Table 2 and is undesirable as it undermines the ability to differentiate between what stage of change the item is identifying.

Table 2

## Comparison of the Factor Structure of the Original Questionnaire and the Adapted Bodywise Questionnaire

## Original Questionnaire

## Adapted Questionnaire

Original Questionnaire		Adapted Questionnaire		Loading Factors		Loading Factors	
Items	Pre-cont.	Cont.	Action	Items	Pre-cont.	Cont.	Action
1	My drinking is OK as it is			15	My child's weight is okay as it is	✓x	x
2	I am trying to drink less than I used to		✓	2	I intend to change my child's eating habits		✓x
3	I enjoy my drinking, but sometimes I drink too much	✓		14	I intend to change my child's physical activity habits	x	✓x
4	I should cut down on my drinking	✓		8	My child enjoys eating but sometimes he/she eat too much		✓x
				9	My child should cut down on food intake		✓x
				10	My child should increase physical activity	x	✓
5	It's a waste of time thinking about my drinking			11	It is a waste of time trying to change my child's weight	✓x	
6	I have just recently changed my drinking habits		✓	3	I have recently made changes to my child's eating habits		✓x
				13	I have recently made changes to my child's physical activity habits		✓x
7	Anyone can talk about wanting to do something about drinking, but I am actually doing something about it		✓		No equivalent		
8	I am at the stage where I should think about drinking less alcohol	✓		4	My child's weight has reached the stage where I should consider doing something about it		✓x
9	My drinking is a problem	✓		12	My child's weight is a problem		✓x
10	It's alright for me to keep drinking as I do know			5	It is alright for my child to keep doing the same amount of physical activity as they do now	✓x	
				6	It is alright for my child to keep eating as they do now	✓x	
11	I am actually changing my drinking habits right now		✓	7	I am trying to change my child's physical activity levels right now		✓x

12	My life would still be the same even if I drank less	✓				17	I am trying to change my child's eating right now			✓ x
	My child's physical and psychological wellbeing would be the same even if his/her weight changed					18		✓	x	

✓ = where the item should load, x = where the item loaded on the factor analysis

### *3.3 Bodywise Data Analysis - Part 2*

An anonymised SPSS data spreadsheet was provided by Bodywise programme personnel. The purpose of this data analysis was to investigate whether a relationship between the participant's stage of change related to changes in target behaviours (eating and physical activity), and to outcome data (zBMI). For example, would individuals in the action stage have altered and maintained eating and physical activity change more than those individuals in the pre-contemplation and contemplation stages of change?

From the data provided Table 3 was developed and summarizes the number of participants in each stage of change. From the eating questions subset no individuals were in pre-contemplation, 25 were categorized as in contemplation, and the remaining 11 were identified as in the action stage of change. From the physical activity questions, 3 participants were categorized in the pre-contemplation stage, 5 were identified as being in the contemplation stage, and 28 in the action stage. Of the 36 participants, 4 were found to be in the contemplation stage for both eating and physical activity. Eight participants were identified as being in the action stage for both eating and physical activity. Overall most participants' stage of change for eating and physical activity varied. Twenty of the 36 participants were categorized as being in the contemplation stage for eating and the action stage for physical activity.

The influence of eating stage of change was examined in relation to zBMI. A similar analysis of physical activity stage of change in relation to zBMI was also conducted. In addition, an analysis was also undertaken of changes made to nutrition, screentime, and outdoor time by participants at different stages of change throughout the duration of the programme.

Table 3  
*Number of Participants in Each Stage of Change*

	Pre- Contemplation	Contemplation	Action
Eating	0	25	11
Physical Activity	3	5	28

With the use of SPSS for Windows Version 12.0, a series of ANOVAs and *t*-tests were conducted. Data were normally distributed.

### 3.3.1 *Eating and Stages of Change*

A 2 (stage of change: contemplation or action) x 4 (time: baseline, 3 months, 6 months, 12 months) mixed ANOVA was conducted to test whether stage of change and time had any impact on the standardized BMI score (zBMI). A significant difference in zBMI score over time was found irrespective of stage of change,  $F(3,102) = 11.07, p < 0.05$ , partial  $\eta^2 = 0.31$ .

No significant interaction between time and stage of change was found, therefore, there was no difference in zBMI change between the two stage of change groups,  $F(3,102) = 0.95, p > 0.05$ , partial  $\eta^2 = 0.03$ . However, a significant difference was found in zBMI between those at different stages of change,  $F(1,34) = 4.93, p < 0.05$ , partial  $\eta^2 = 0.13$ . The mean zBMI scores decreased from baseline through to 12 months for individuals in both the contemplation and action stages of change. These data can be seen in Figure 1. The zBMI scores were higher at baseline in the contemplation stage than the action stage and a larger decrease was witnessed in the action group compared to the contemplation group over the 12 month period.

Table 4 provides a summary of the means and standard deviations of zBMI for participants in contemplation and action stages at the start of the Bodywise programme.

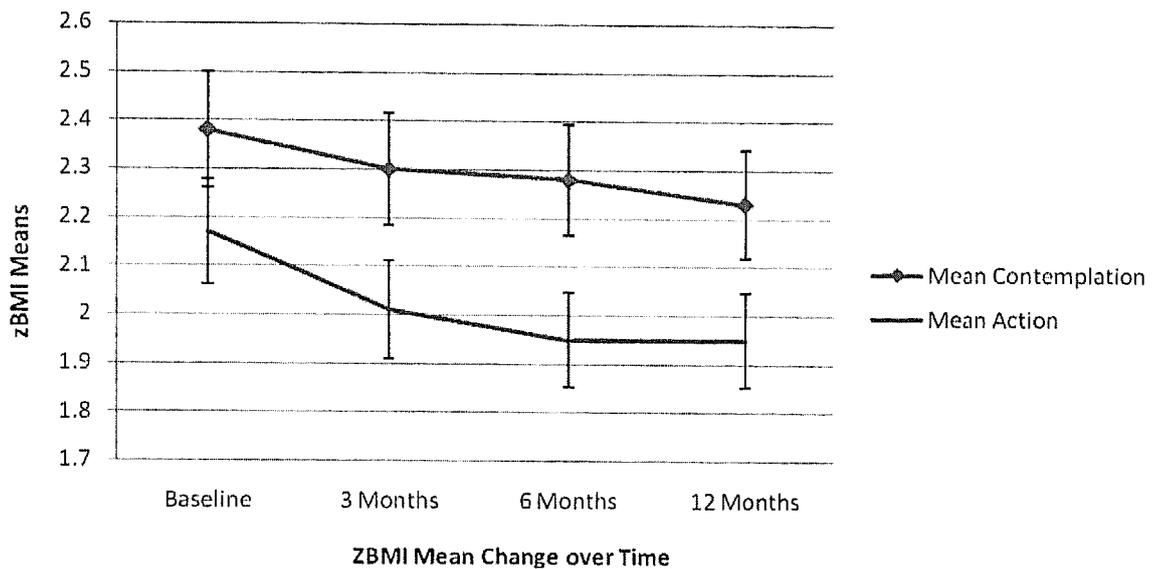


Figure 1. zBMI change over time for individuals in contemplation and action stages for eating from baseline to 12 months

Table 4

*Summary of means and standard deviations of zBMI for participants in contemplation and action stage of change in relation to eating behaviour at the outset of the programme*

Time	zBMI in Contemplation (n = 25)		zBMI in Action (n = 11)	
	M	SD	M	SD
Baseline	2.39	.23	2.17	.41
3 Months	2.30	.29	2.01	.50
6 Months	2.28	.27	1.95	.52
12 Months	2.23	.32	1.95	.60

### ***3.3.2 Comparison of zBMI score between Eating Stages of Change Group***

The following analysis of the two eating groups was conducted on the dependent variable, zBMI. Although there was no significant interaction, the graphed data did seem to show a differing pattern between the two groups. Therefore, analyses were conducted for the action and contemplation groups separately.

A repeated measures one-way ANOVA for the contemplation group revealed a significant difference in zBMI over time,  $F(3,72) = 6.64, p < 0.05$ , partial  $\eta^2 = 0.22$ . Similarly, a repeated measures one-way ANOVA for the action group also revealed a significant alteration in zBMI over time,  $F(3,30) = 0.01, p < 0.05$ , partial  $\eta^2 = 0.30$ . As post hoc tests cannot be conducted on repeated measures ANOVAs in SPSS, a series of *t*-tests were then conducted to determine between which time periods significant alterations in zBMI were observed for each stage of change group.

### ***3.3.3 zBMI and Contemplation Stage of Change Group for Eating***

For individuals in the contemplation stage, results showed that over the entire period of involvement in the programme a significant difference occurred between baseline and 12 months,  $t(24) = 2.98, p < 0.05$ . Although no significant difference was found between baseline and 3 months, a significant difference was found between baseline and 6 months,  $t(24) = 2.7, p < 0.05$ . In the contemplation stage no significant difference was found between 3 and 6 month intervals, however, significance was found in the 3 and 12 month interval,  $t(24) = 2.7, p < 0.05$ , and the 6 and 12 month interval,  $t(24) = 2.3, p < 0.05$ . These results demonstrate that a reduction in zBMI was observed over the course of the programme.

### ***3.3.4 zBMI and Action Stage of Change Group for Eating***

For the action group; however, the pattern of change in zBMI was considerably different. Significant difference was found only between baseline and six months,

$t(10) = 2.8, p < 0.05$ , and three and six month intervals,  $t(10) = 3.3, p < 0.05$ . This suggests that participants in the action stage made most of their changes to eating in the first half of the programme.

In summary, these data demonstrate that zBMI reduced for individuals in both the contemplation and action stages of change. While the zBMI for those in contemplation dropped throughout the course of the programme, the most notable change for the individuals in the action stage of change occurred between baseline and 6 months.

### ***3.3.5 Nutritional changes in the Contemplation and Action Stages of Change for Eating***

An analysis was also undertaken of nutritional change throughout the twelve month interval. Figure 2 presents the overall number of participants in the contemplation stage of change from baseline to 12 months. As can be seen in this figure, at baseline a significant amount of improvement was required by almost all participants in order for them to meet the appropriate nutritional requirements. Over the 12 month period it can be seen that participants increasingly improved their nutritional intake, with no participant's required to make more than moderate improvement in the last quarter.

A similar pattern of change was demonstrated by the participants in the action stage of change. At baseline a large proportion of these individuals were identified as requiring significant improvement in their overall nutrition; however steady improvement was made over the following 12 months. Figure 3 outlines the overall nutrition rating of participants in the action stage of change from baseline to 12 months.

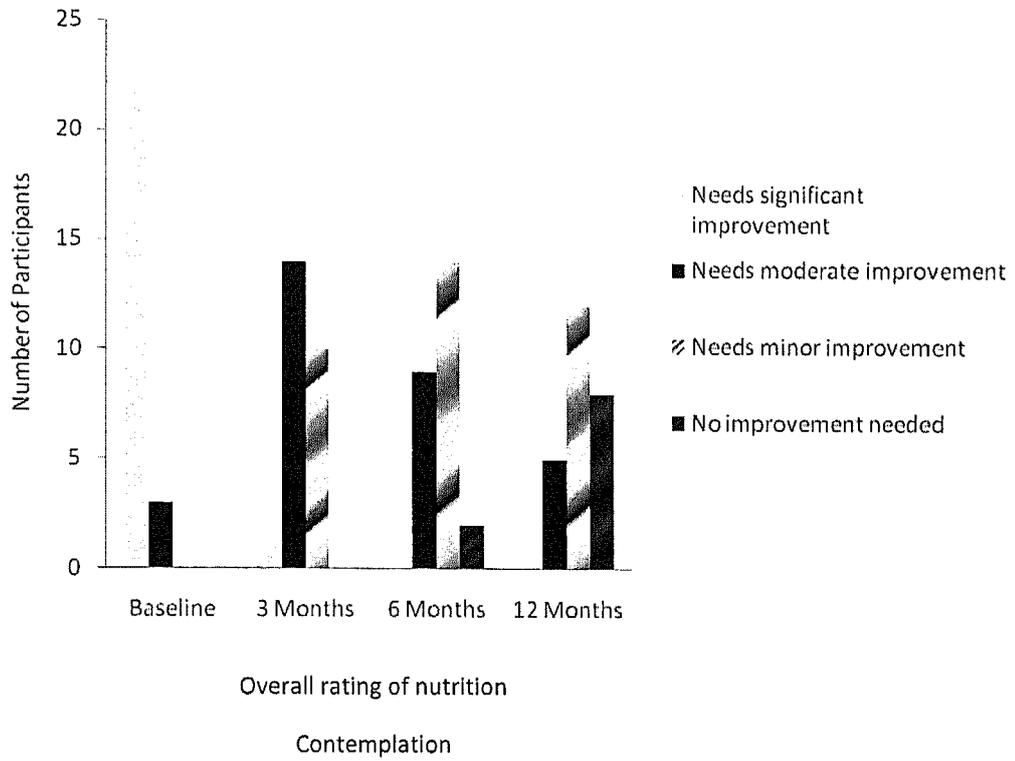


Figure 2. Overall nutrition rating for participants in the contemplation stage of change from baseline to 12 months

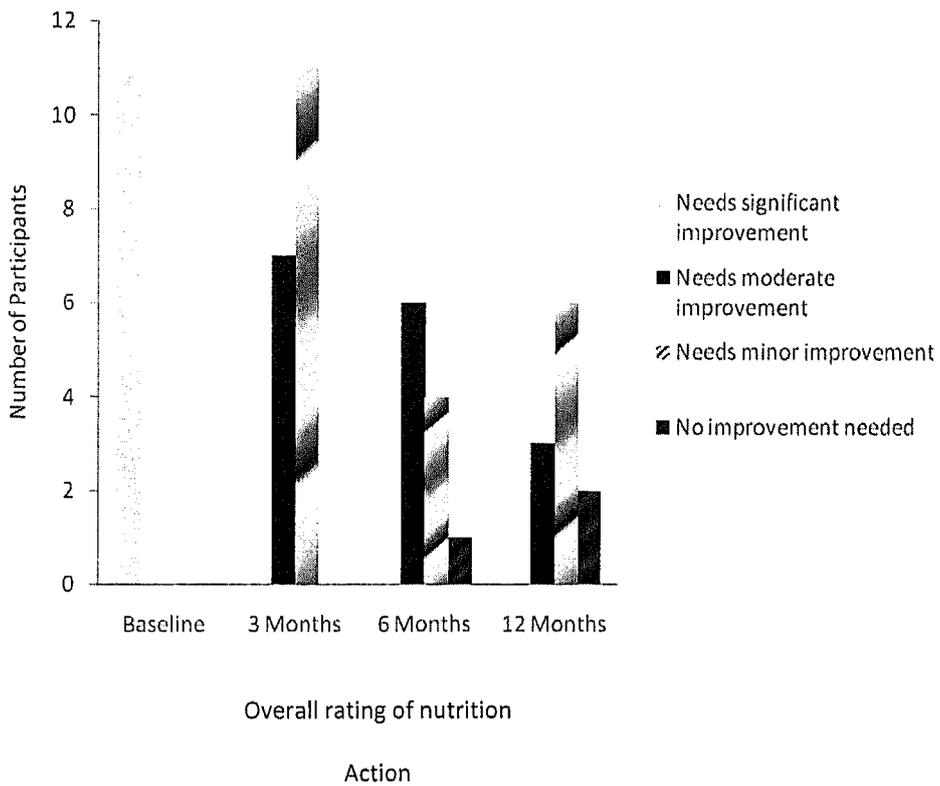


Figure 3. Overall nutrition rating for participants in the action stage of change from baseline to 12 months

### *3.3.6 Comparison of zBMI score between Physical Activity Stages of Change Group*

In order to examine the relationship between zBMI and physical activity stages of change a 3 (stage of change: pre-contemplation, contemplation or action) x 4 (time: baseline, 3 months, 6 months, 12 months) mixed ANOVA was conducted to test whether stage of change and time influenced zBMI score. It is recognized that participant numbers are low, however it was felt that it was desirable to keep the analyses consistent, and there is no equivalent non parametric test.

A significant difference in zBMI score over time was found irrespective of stage of change,  $F(3,99) = 3.00, p < 0.05, \eta^2 p = 0.08$ .

No significant interaction between time and stage of change was found, therefore, there was no difference in zBMI change between the three stage of change groups,  $F(6,99) = 0.86, p > 0.05, \text{partial } \eta^2 = 0.05$ . There was also no significant difference found in zBMI between those at different stages of change for physical activity  $F(2,33) = 0.61, p > 0.05, \text{partial } \eta^2 = 0.04$ .

Even though the data did not show any significant interaction between stage of change and zBMI; the graphed data (see Figure 4) suggested different patterns of change between the three groups, accordingly, a series of one way repeated measures ANOVAs were conducted.

Table 5 provides a summary of the means and standard deviations in pre-contemplation, contemplation, and action stages of change at various time intervals for physical activity.

For pre-contemplation no significant difference over time was determined  $F(3,6) = 1.36, p > 0.05, \text{partial } \eta^2 = .41$ . Given this no further results for this stage of change are reported. A significant difference in zBMI was found; however, for the

contemplation group over time  $F(3,12) = 3.79, p < 0.05$ , partial  $\eta^2 = .49$  and for the action stage of change group over time  $F(3,81) = 8.20, p < 0.05$ , partial  $\eta^2 = .23$ .

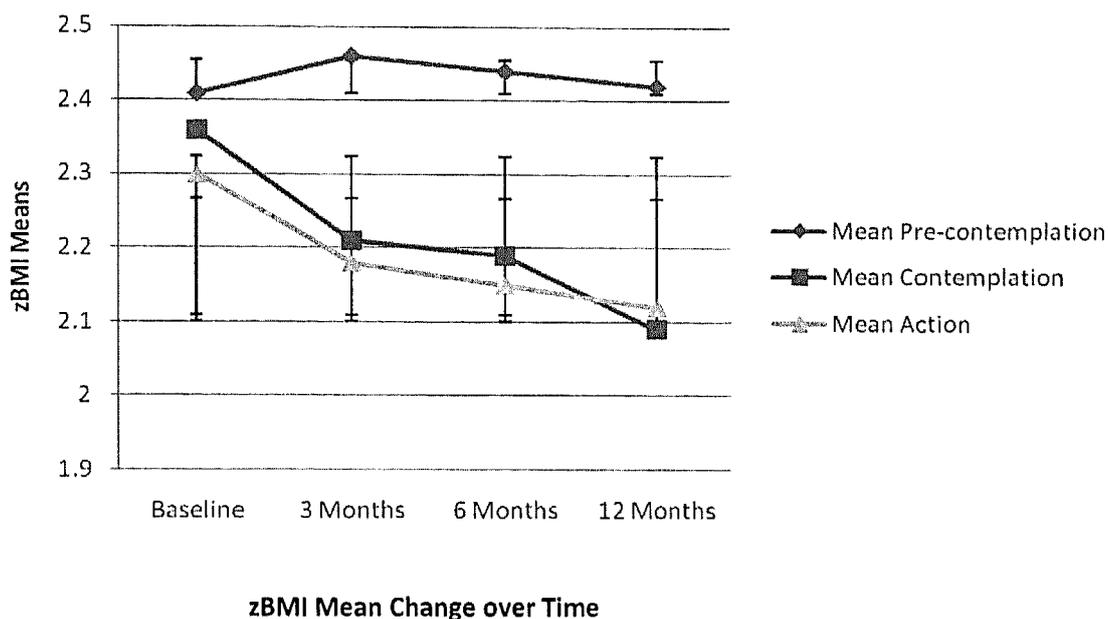


Figure 4. zBMI change over time for individuals in pre-contemplation, contemplation, and action stages for physical activity from baseline to 12 months

### 3.3.7 zBMI and Contemplation Stage of Change Group for Physical Activity

Utilizing the same time intervals as described earlier, zBMI change was investigated for participants in the contemplation stage of change. Only between baseline and 6 months was a significant difference found,  $t(4) = 3.49, p < 0.05$ . No other time periods were significant.

### 3.3.8 zBMI and Action Stage of Change Group for Physical Activity

A similar procedure was followed for participants in the action stage of change, utilizing the time intervals described above. A difference was found between baseline and 3 months, baseline and 6 months, and baseline and 12 months with significant decreases in zBMI being evident. These were respectively  $t(27) = 2.61, p < 0.05$ ,  $t(27) = 3.39, p < 0.05$ ,  $t(27) = 3.18, p < 0.05$ . A significant difference was

also found between 3 and 6 months,  $t(27) = 2.14, p < 0.05$ . These results show that zBMI reduction continued over the course of the programme. However, most change was witnessed during the time intervals between baseline and 6 months and baseline and 12 months.

Table 5

*Summary of means and standard deviations of zBMI for participants in pre-contemplation, contemplation and action stage of change for physical activity at the outset of the programme*

	Precontemplation (n = 3)		Contemplation (n = 5)		Action (n = 28)	
	M	SD	M	SD	M	SD
Baseline	2.41	.53	2.36	.19	2.30	.31
3 Months	2.46	.51	2.21	.31	2.18	.38
6 Months	2.44	.53	2.19	.22	2.15	.40
12 Months	2.42	.52	2.09	.39	2.12	.44

In summary, a comparison of the zBMI score between the stages of change groups for eating revealed that zBMI for the contemplation group reduced over the 12 month interval, whereas for the action group most reduction was seen in the first half of the programme. The overall nutrition rating across both the contemplation and action stage of change groups showed a steady improvement over the course of the programme. In addition, a comparison of the zBMI score between the stages of change groups for physical activity revealed a non-significant result for the pre-contemplation group, whereas a significant difference was found for contemplation between baseline and 6 months and for action over the entire 12 month period.

### ***3.3.9 Comparison of Screentime between Stages of Change Groups***

A comparison of screentime at each of the three stages of change was undertaken. Figure 5 illustrates the screentime viewing of participants in the pre-contemplation stage of change for physical activity. This revealed that at baseline 1 participant watched less than 2 hours of television, while 2 participants watched between 2 to 4 hours. At 3 months this had altered to 2 participants watching between 2 to 4 hours and 1 participant watching greater than 4 hours. From 6 months to 12 months screentime trended downwards with all participants watching less than 2 hours at 12 months.

Figure 6 reveals screentime for individuals at the contemplation stage of change. Screentime at baseline showed 1 participant viewed less than 2 hours, 2 participants viewed between 2 to 4 hours and a further 2 viewed greater than 4 hours. The remaining intervals (3, 6, and 12 months) were identical with 2 participants watching between 2 to 4 hours and 3 participants watching less than 2 hours.

Figure 7 illustrates the screentime viewing at the action stage of change. Screentime at baseline showed 9 participants viewed less than 2 hours, 11 participants viewed between 2 to 4 hours, and 6 participants viewed greater than 4 hours. At 3 months 14 participants viewed less than 2 hours, 12 participants viewed between 2 to 4 hours, and 1 participant viewed greater than 4 hours. At 6 months 20 participants viewed less than 2 hours, 7 participants viewed between 2 to 4 hours, and 1 participant viewed greater than 4 hours and at 12 months 18 participants viewed less than 2 hours, 6 participants viewed between 2 to 4 hours, and 4 participants viewed greater than 4 hours.

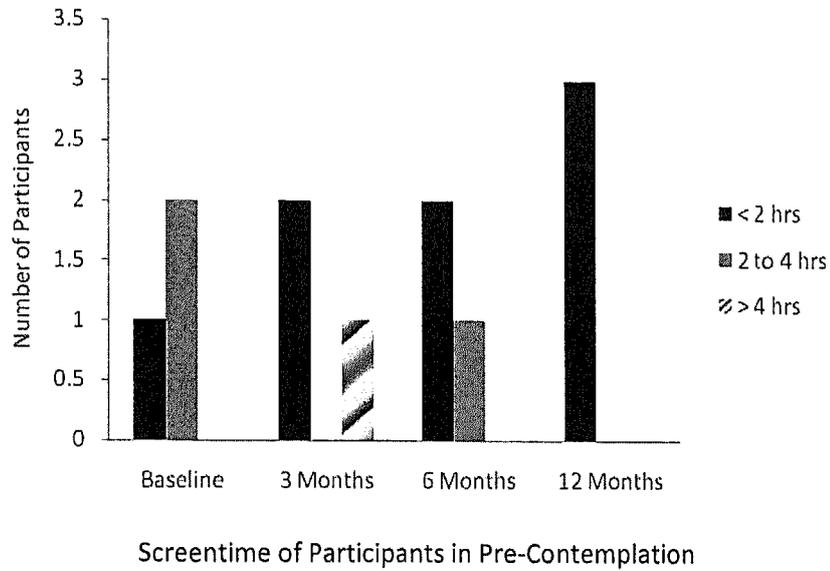


Figure 5. Screentime for participants in the pre-contemplation stage of change from baseline to 12 months

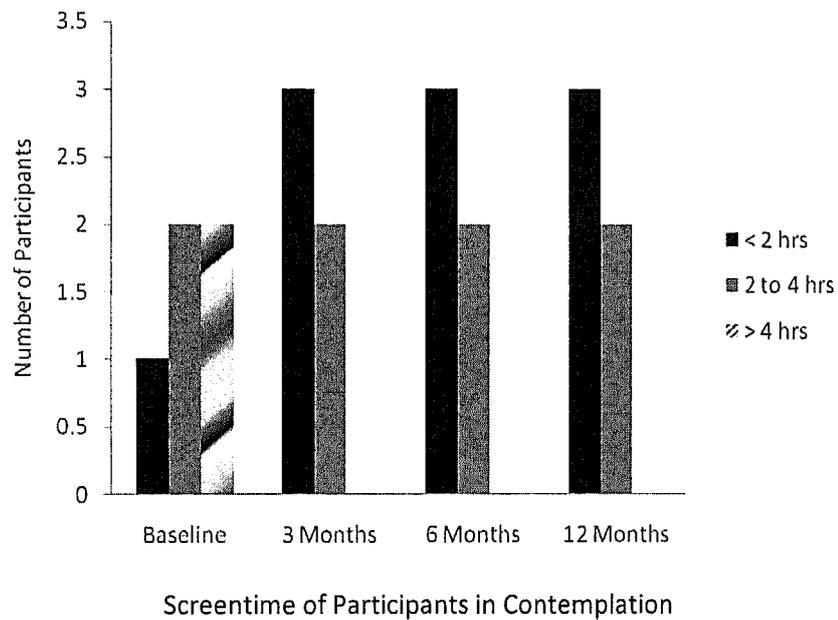
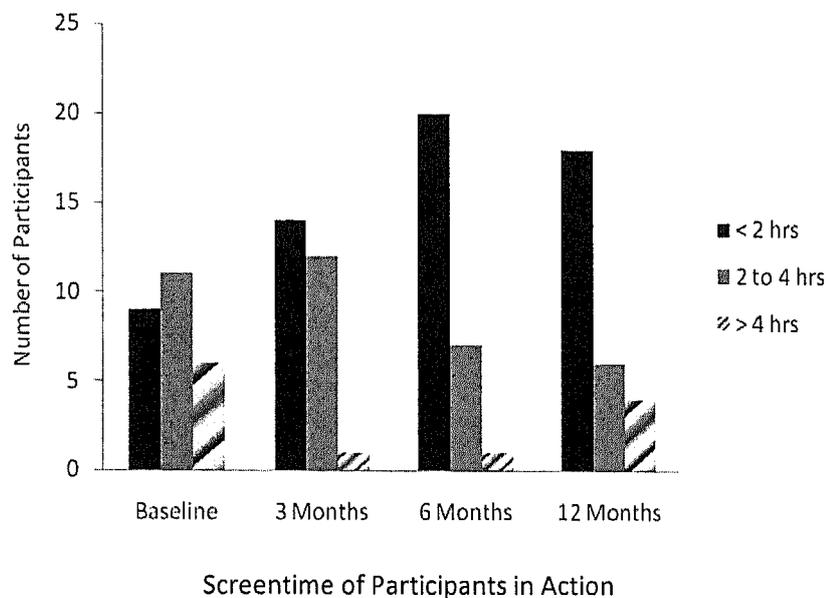


Figure 6. Screentime for participants in the contemplation stage of change from baseline to 12 months



*Figure 7.* Screentime for participants in the action stage of change from baseline to 12 months

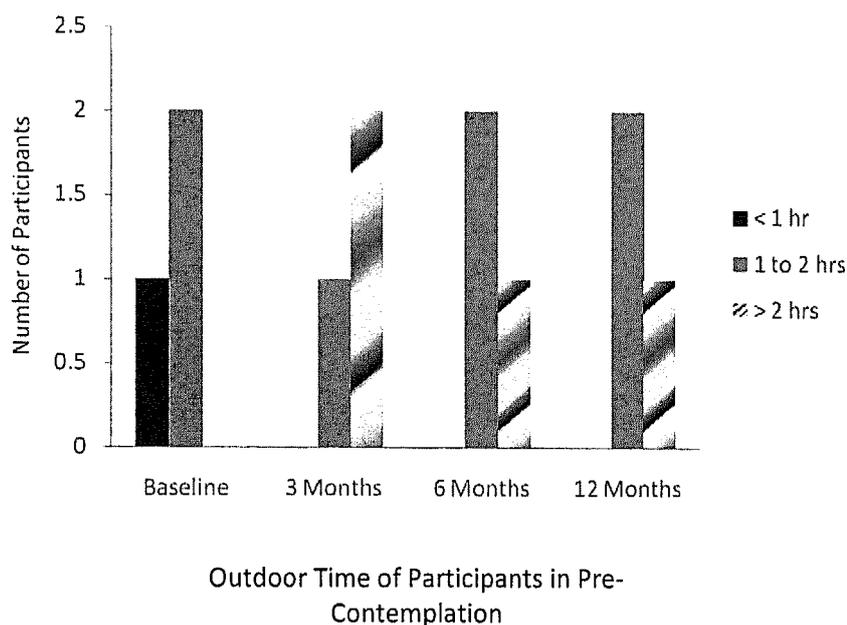
As mentioned earlier, it should be noted that the sample size was small for the pre-contemplation and contemplation groups in comparison with the action group.

In summary, from baseline to 12 months a general decrease in screentime was witnessed irrespective of stage of change. In pre-contemplation screentime at 3 months had increased from baseline, but by 12 months all participants had reduced viewing to less than two hours. In contemplation improvement was made between baseline and 3 months and remained static through to 12 months. For the action stage of change group a decrease in screentime viewing occurred at the 6 month interval and then increased again slightly at 12 months.

### ***3.3.10 Comparison of Outdoor Time between Stages of Change Groups***

Figure 8 illustrates the amount of outdoor activity undertaken by participants in the pre-contemplation stage of change for physical activity. Outdoor time at the pre-contemplation stage of change revealed that at baseline 1 participant spent less than 1 hour of time outdoors and 2 participants spent between 1 to 2 hours of time outdoors. At 3 months 1 participant spent between 1 to 2 hours of time outdoors,

while 2 participants spent greater than 2 hours outdoors. The 6 and 12 month intervals were identical with 2 participants spending between 1 to 2 hours of time outdoors and 1 participant spending greater than 2 hours outdoors.

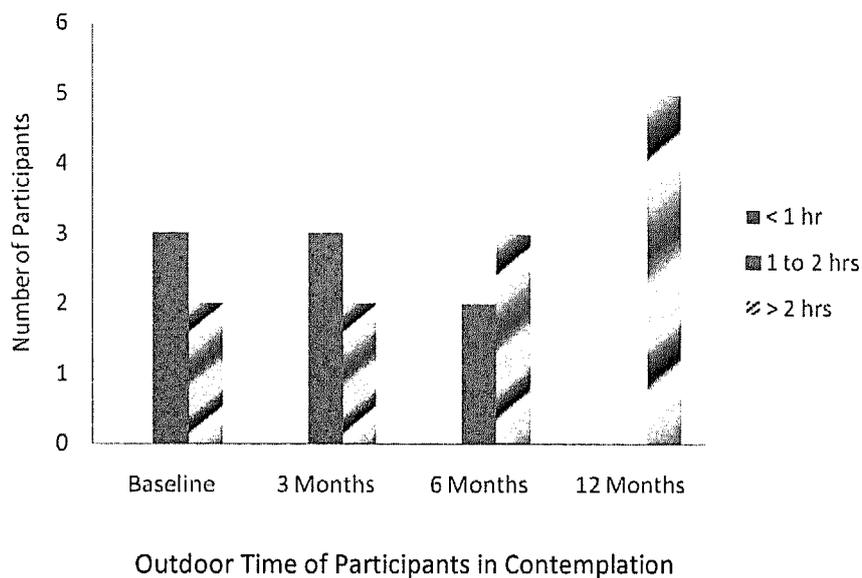


*Figure 8.* Outdoor time for participants in the pre-contemplation stage of change from baseline to 12 months

Figure 9 shows the time spent outdoors for participants in the contemplation stage of change from baseline to 12 months. This shows that at baseline 3 participants spent between 1 to 2 hours of time outdoors and 2 participants spent greater than 2 hours outdoors. At 3 months this trend was identical. At 6 months 2 participants spent between 1 to 2 hours of time outside and 3 participants spent greater than 2 hours outdoors. At 12 months all 5 participants spent greater than 2 hours outdoors.

Figure 10 illustrates the outdoor time for participants in the action stage of change. Outdoor time at baseline showed that 9 participants spent less than 1 hour of time outdoors, 12 participants spent between 1 to 2 hours of time outdoors and 6 participants spent greater than 2 hours of time outside. At 3 months 7 participants spent less than 1 hour of time outdoors, 13 participants spent between 1 to 2 hours of

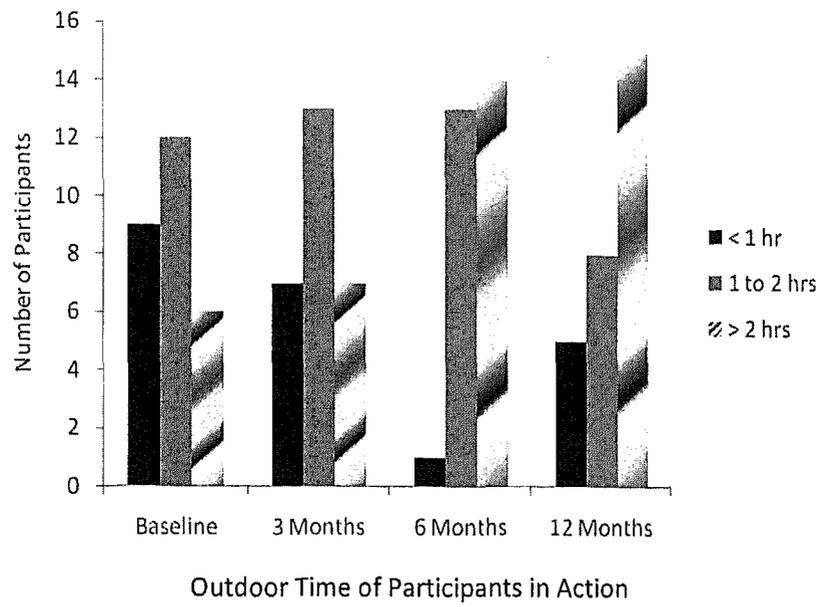
time outside and 7 participants spent greater than 2 hours outdoors. At 6 months 1 participant spent less than 1 hour of time outdoors, 13 participants spent between 1 to 2 hours of time outside and 14 participants spent greater than 2 hours outdoors. At 12 months 5 participants spent less than 1 hour of time outdoors, 8 participants spent between 1 to 2 hours of time outside and 15 participants spent greater than 2 hours outdoors.



*Figure 9.* Outdoor time for participants in the contemplation stage of change from baseline to 12 months

In summary, outdoor time increased from baseline to 12 months irrespective of stage of change. In the pre-contemplation stage of change most outdoor time was spent at 3 months then decreased slightly at 6 months and remained static through to 12 months. In contemplation outdoor time was identical at baseline and 3 months with steady improvement witnessed through to 12 months. In the action stage of change time outdoors was the greatest at 6 months and then reduced again slightly at 12 months.

Analysis of the three stages of change for physical activity and the three stages of change for outdoor time shows a similar trend.



*Figure 10.* Outdoor time for participants in the action stage of change from baseline to 12 months

### **3.4 Semi-Structured Interviews**

Research for this part of the project comprised of a series of interviews undertaken with families willing to share their experiences of change throughout their involvement in the Bodywise programme. Four interviews were conducted at the participants' homes. The parents' responses have been presented below in case study format and, subsequently, a qualitative content analysis is provided that outlines consistencies and inconsistencies in the parents' responses, which were salient to the research questions related to change. These questions related to the initiators, promoters, and barriers to successful change.

Pseudonyms have been provided for all participants and their family members. All geographical locations have also been changed.

#### **3.4.1 Case Study - Family 1**

Sarah's family was the first to participate in the current research. Sarah was a seven year-old European girl, who had formerly lived overseas. She had three siblings who lived offshore with their father and she lived with her mother and step-father.

Sarah's mother, Helen, reported that the weight of her other three children was in the normal to small range. She reported that the family decided to join the programme on professional advice received from the school nurse. The nurse is reported as saying that "Sarah was rather big for her age". Helen had recognised this fact; however nothing had been done to address the problem to date. When asked what the family hoped to achieve by joining the programme Helen stated,

*We didn't know at the beginning really just what they could do for us, um, I guess really just to bring her weight under control and to teach her and us how to eat healthy and to manage her weight without it becoming an issue. Especially with her being a girl ... it was a case*

*of wanting to learn to eat healthily and how much exercise we should be doing, and in this process managing the weight.*

Helen commented on the benefits of having achieved changes in eating and exercise patterns. She stated,

*We have done what we intended to do. It's just keeping it going from here on in. It was never an issue in the family we would just eat what we wanted when we wanted. They have given us such good advice. It's done the whole family good really. So, yeah, it's sort of we went into it not knowing really what to expect and, you know, we all know how to eat healthily but we found things about reading labels on packets that we didn't know and how much exercise a child her age should be doing, and so on.*

At the outset of the programme Helen commented that she was not confident change would occur. She revealed that the family was very set in its ways and that Sarah was completely against change. However, Helen stated that she was amazed at what Sarah would do in a situation away from home. In addition, Helen reported that change became easier as time progressed and that her daughter is now quite open to change. Two aspects Helen highlighted as beneficial were, firstly, that during the programme the children were separated from their parents and that in a situation where a child may refuse a request from their parents, they were more willing to undertake a request from an unrelated adult. Secondly, she felt it had been helpful that Sarah was participating with children of a similar age.

Helen reported that the two biggest changes the family had made related to diet and exercise.

*I suppose the two biggest changes are the way we eat and the amount*

*of exercise that she does. She was, I can't say a lazy child before, but we really didn't encourage her to do anything and it really got to a point that I knew she was overweight but we couldn't find anything that she liked and it was all kind of spiralling out of control and it was good when the nurse came in. She exercises now about four or five evenings a week.*

Sarah participated in several activities including karate twice a week, hip hop dancing once a week, and a weekly exercise class she attended with her mother.

Helen further commented,

*They (Bodywise personnel) suggested trying all types of sports to find out what she liked. She tried soccer for a while, she did hip hop, decided jazz dancing wasn't for her. Again, that was a good thing to do with the kids in a social situation because she joined in with all the games. She might not necessarily been good at all of them and there were some things that she didn't enjoy, but she was there with other people and joined in with all of them.*

Helen added that the whole emphasis was on trying an activity to see if you liked it.

*That's been the great thing about Bodywise all along, there's never any pressure on the child, it's not about telling these children they're fat and they have to exercise. It's nothing really to do with their weight as such, although obviously exercising and eating will make them lose weight. It's about long term eating healthily when you become an adult and making it a regular thing so that when they are an adult rather than automatically reaching for a bottle of fizzy pop,*

*they will reach for a glass of water. It's very much a long term thing as well without putting too much pressure on the child.*

Helen commented that Sarah's attitude to exercise had completely changed.

Change had also been seen in relation to diet, Helen stated that the biggest change she had witnessed was that Sarah will now try new foods.

*There are so many things that they miss out on. You know, she's finally realised that if she doesn't try things she doesn't know whether she likes them. And very often she will say to me, "I've got karate today so can you give me a healthy dinner".*

Helen added, *"It's the total mindset of the child they've changed with Sarah, from a child that was so resistant to it in the beginning. Even they've said they've seen a real difference in her from beginning to end."*

She appeared pleased and surprised that now, on occasion, Sarah will decline takeaways when they are offered. Helen felt that it was more than just changing the amount of exercise Sarah did, it was also about educating her as to what foods were and were not healthy. She commented,

*One of the activities they did was giving them fake plastic foods and putting it into food groups. They choose and find out what is good for them and what's not. I think most kids of around about six years have an idea of what is healthy and what's not. They know that too much chocolate isn't good, but they haven't got the willpower to say no to that, which is another good thing with the karate, the self-discipline. If there's three pieces of chocolate on the table just take one of them, don't eat all three. Yeah, so focusing very much on helping the child*

*make the right decision as to what is good for them. It's about keeping an open mind.*

Furthermore, Helen reported that she did not want food to become an issue for her daughter and stated that if Sarah occasionally wants a treat (e.g. a chocolate bar) she is allowed one. She added,

*We watched a programme on the telly about denying. They put two healthy things on the table for the children: raisins or apricots. They told them that for the first five days there were not allowed the raisins but they could have as many apricots as they wanted and then, of course, when the sixth day came, they said you can have the raisins and the children said "yeah, yeah, yeah". They had been denied it so long they wanted it even more. It's a huge thing with children, denial does want them to eat it more. I try and be sensible, you know, she's the one who makes the good decisions. I say to her, "Would you like a treat?", and she says "no". It's a fine balance of teaching her the right things to do and letting her be a child and not making an issue of things as well.*

Helen described how Sarah would go through phases as to whether she liked certain foods,

*She goes through phases, for example, recently it was raisins. She never liked them, in seven years she wouldn't eat them, except chocolate raisins, but plain raisins you couldn't get them down her neck, but she went to a shared luncheon at school a couple of weeks ago and she decided she liked them, then she doesn't, and now she has them for afternoon tea everyday. It's, I think, when she gets used*

*to the idea that she does like something, it's the same attitude.*

*Familiarity definitely is good.*

Occasionally Sarah would help with meal preparation. Helen commented,

*We might bake a cake or make a pizza or chop up the potatoes. She's not too keen on it. I know it does encourage some children to eat.*

*Now and again she will help and choose what goes in her lunchbox.*

*Not necessarily cooking in the kitchen or cooking food she wants to eat, but it does help sometimes but not always in Sarah's case. She*

*likes to be served food and doesn't care where it came from. She*

*knows I know what she likes and she tends to trust that I will put in*

*front of her something that she does like.*

More frequently Sarah would assist with the supermarket shopping and the choices made. Helen commented that sometimes she will ask Sarah to pick a new fruit, in order that she try new foods.

*It's very psychological with children, but no, she knows I know what*

*she likes and tends to as long as she likes it she eats it. If I'm going*

*to give her something new I tell her, I don't try to hide it in food. She*

*gets no nasty surprises because that will put her off totally.*

Helen stated that there was only one rule surrounding food and that was if her daughter wanted dessert she had to eat everything on her plate. Although she added,

*If it's something I know she likes, she does have to eat it, if she*

*doesn't like it or it's a new food as long as she's tried it she doesn't*

*have to eat it, that's fine. So it's about letting her make the choice.*

Helen reported that Sarah's weight initially went down and then plateaued back to where it was the previous year. She remarked on Sarah's BMI,

*I think it's maybe .1 or .2 higher than it was last year. So, she's still got a way to go, but also by the same token, she could also be a lot worse if she carried on as she was.*

Along with an increase in Sarah's BMI, Helen commented that her self-esteem had also greatly improved. Helen remarked,

*There were numerous questionnaires that we filled in and they had a child psychologist available at the appointments to ask if the child was being bullied or had any problems in school. Luckily Sarah didn't, but they made a shield one day out of a piece of cardboard and paper about what to do if you are bullied; how to walk away from it, how to tell someone about it. Yeah, very big on self-esteem.*

The school nurse was the catalyst for change. Helen remarked,

*The school nurse first identified that she was overweight for her age. I mean, she's very tall for her age so fortunately she's got that on her side as well. She identified it first, so I got in touch with the Bodywise team. There was the paediatrician, Mary from Sport Waikato, a dietician and a psychologist, who I got in touch with and said I'd like to get involved in this programme. I attended the hospital to get an initial appointment going and get checks done and from there on in they sent appointments and gave us things to do in the meantime, you know, targets to achieve and goals to set for the next time.*

Helen added,

*Sometimes with the actual appointments they would separate the parents and children, so the parents could have a chin wag with the psychologist and whatnot and Mary from Sport Waikato would take*

*them off to the other side of the partition and play games and things with them. Yeah, you could say we were given homework to do, different goals to achieve that Sarah understood also. It wasn't she should be eating so many calories a day, it was Sarah you should be doing three hours walking a week. Something that she understood as well.*

The programme, Helen felt, was quite child-specific and this assisted with change.

*I think it was quite specific to each child as well. I mean Sarah particularly hates skipping and they did set her a target of learning to skip but she just couldn't take to it, didn't enjoy it. So it was like, right, let's try something else. It was quite specific to each child. It's not we want you all to go walking or swimming it was very much dependent on what the child liked and was good at. A child is never more resistant than if you say to them they have to do something.*

Seeing results and seeing her daughter taking responsibility for her health and well-being were described as being key to helping to keep the change going. Helen stated,

*She's still not quite where we want her to be yet, but she's on the right road. You sort of look back and think this time last year she would be begging for Burger King and now she'll say, "Don't take me there." So I think results. Not necessarily that she's lost weight, but slowed down. Just seeing her every day making good decisions and not growing as fast as she was, actually seeing physical results, definitely spurs you on to want to keep going and me as well. I get so much from it.*

Helen described how the parents were educated as well as the children, giving the example of a trip to the supermarket with the Bodywise dietician on how to read food labels. She stated,

*They (food labels) are so hard to recognise and understand, it's no wonder people have problems. There are things, for example, a bottle of Coke that contains ten teaspoons of sugar and it's like, right, we're not having that in the house then.*

She further stated she was surprised to learn how food companies manipulate the public,

*It makes you realise, it just really brings it home how deceptive some of the food companies are. They get the heart tick and you think it's ok, but what you don't realise is they actually pay for those heart ticks. They've got to be at a certain level, you wouldn't find it on a bar of chocolate or a fizzy drink, but not just any one can get a heart tick, you pay for them to go on products.*

Helen was pleased with the Bodywise programme. Clearly involvement with the programme has assisted with change. She commented,

*I would do it again in a heartbeat if I found myself in the same situation again; I would really recommend it to anyone. It's such a good programme. I think it covered every area because they had the paediatrician for the physical health side of it, the psychologist for the mental side of it, Mary for the sports side of it, and the dietician for learning the technical side of it. She tried so many different activities there. You know what's good for you, and what's bad for you and what's involved in healthy weight loss with a child. Not just*

*for the weight aspect of it, but the whole self-esteem thing, the confidence thing, I mean, she would not talk to anyone, but I think it has a lot to do with the karate. It's such a huge aspect of her life. I think teamed with the Bodywise and the karate, it's just brought her out of her shell and it's really not all to do with the weight, but attitude to life and everything, and wanting to be healthy and wanting to enjoy your life, which is, you know, hard for children, especially when they have started at such a young age as being identified as being overweight. It can be a huge issue for them and, you know, Sarah, she was never massively overweight. She wasn't the biggest child there, but it was good from our point of view because we nipped it in the bud if you like, before she got too big and, you know, her confidence, everything, has improved. Most definitely for her and everybody's benefit.*

Another factor that Helen described as helpful was that she found the literature provided by the Bodywise programme beneficial and easy to understand.

Despite all the factors that assisted change, Helen remarked on a number of difficulties encountered with keeping change on track,

*I suppose as an example when we go back to Australia once a year. We get into a very good routine here, you know, morning tea, lunch, afternoon tea, dinner, and you go on holiday and it's hard to stick to that routine, and especially if she's in the care of someone else. They don't necessarily know what to do or appreciate how important it is. We did fall into that trap when we last went back to Australia and especially holidays. I make her a healthy packed lunch every day and*

*when I'm not doing that sometimes it's easy to reach for something unhealthy you can get sidetracked quite easily. You know occasionally we still have Burger King. We're not going to go crazy over it, but there are times when it's difficult to stick to, like when we are away and school holidays. The routine goes to pot!*

A second example of a barrier to remaining on track in the early stages was when Sarah was mixing with her friends.

*It used to be she would get peer pressure to eat when she would go to a friend's place. It used to be a big issue. The last couple of times she has been around at her friend's house who had chocolate and fizzy pop and Sarah had an apple and water. It comes back to the issue of self-discipline with her, learning what's right and what's wrong. It actually did matter and did make a difference in the beginning learning to understand that it's okay to be different.*

According to Helen, Sarah now had no difficulty in making healthy choices and limiting intake of less nutritious foods.

Helen reported a third barrier to change was Sarah's step-father's attitude to family dining. He was not keen to sit down for a family meal. She stated that Sarah was then of the opinion that she did not have to sit at the table either if her step-father did not.

*It would be nice if the three of us could sit, but it's not going to happen and she's managing it without. So I'd say it's a bit of a hindrance but it's not major.*

Another concern Helen had that could have created a barrier for change for Sarah was Helen was afraid the Bodywise staff might tell Sarah she was really overweight.

Helen was concerned that weight would become an issue for her daughter and did not want this to be the case as she developed into a teenager. Luckily this was not the focus of the programme and did not occur.

In summary, Helen identified that change first occurred as a result of Sarah's evaluation by the school nurse. This change was also driven by Helen's desire for Sarah to have a better lifestyle that included an improved diet and regular exercise in order that she would be healthier in the future. She felt that involvement with the Bodywise programme had been of assistance in keeping the process of change going. Helen highlighted several aspects that she had felt were beneficial. Firstly, the programme had taught the family about appropriate lifestyle change and this knowledge had empowered the family to make positive change. Secondly, within the programme itself there had been options and choice presented to the children, which assisted with their compliance and helped to develop a sense of autonomy. Thirdly, monitoring and feedback was provided to both the child and their parents, which was designed to positively reinforce changes made or where changes had been unsuccessful, to problem solve in order to find solutions. Finally, the focus on the child's self-esteem was designed to increase their self-efficacy to deal with change and this positive change in attitude had subsequently impacted on their parent's belief that change was possible. In relation to the latter, Helen said that actually seeing results had given her confidence to continue, providing an additional motivator for change. Helen was convinced that changes in normal routine were responsible for failure to keep up the change momentum. For instance school holiday periods and times when the family returned to their country of origin were highlighted as times when lifestyle change was impeded. In addition, when Sarah was in the care of others and Helen lacked control around what she was eating and

how much activity she was doing were other barriers. Furthermore, Helen remarked that Sarah encountered peer pressure to continue to eat like her friends at the outset of the programme and this required some mediation. Finally, Helen commented that the only other difficulty was that her husband refused to eat at the dinner table. Despite this, Helen and Sarah made an effort to do so.

#### **3.4.2 Case Study - Family 2**

Despite being separated, both Wiremu's parents participated in this interview. Wiremu was a nine year-old part Maori boy who lived with his mother, Fran, but had frequent contact with his father, Charlie. Wiremu was an only child.

The family decided to make some changes as Fran had heard through word of mouth that it was a really good programme. Mary Barbour, the programme co-ordinator was known to the family and they made contact with her. Mary advised a doctor's referral was required so Fran arranged this.

Fran commented that there were two areas she wanted to change; she wanted to achieve a reduction in Wiremu's weight and an improvement in his self-esteem. She commented,

*He was getting a little bit of teasing and he was also a little bit self-conscious when trying on clothes and things like that, and we did not want that to escalate into anything, and then also the weight management side of things. Yeah, those were the two main things.*

Fran felt that the primary benefits achieved from change would be staying healthy and happy. She commented,

*The weight management side of things was obviously for his health. If he kept on the same track he could have ended up with a whole host*

*of weight-related health problems and the self-esteem thing because I want him to be confident and happy with himself.*

Fran added that in regard to staying happy there was an emphasis paid to self-esteem. *“They did a lot of education with the kids. Like how to deal with bullying. How to feel good about yourself, that sort of thing.”* Fran also provided an example of how staff promoted self-esteem.

*They run it so the parents are having a session while the children are having a session, so I wasn't directly involved”. However, one of the things that they did that I thought was really cool, which contributed to boosting self-esteem, was ... they took a picture ... and then they passed it around all the kids and they all wrote good things about each of the other children, so they then got to take that home. So they've got a whole host of cool stuff about them.*

Fran reported that confidence about change could fluctuate. She said at the outset little was known about the programme, but as the time went on she began to feel quite confident. Fran added that they went to the initial appointment as a family and found the clinical psychologist and paediatrician very good.

Although not initially that confident, Wiremu's parents commented the first changes made were to increase their son's physical activity and reduce his portion sizes. Fran advised that they were making small changes such as purchasing high fibre bread and cutting chips out of the lunch box. She also reported that changes had been made to snacking and eating junk food and takeaways.

*So like, with takeaways, because I used to work such long hours, which isn't an excuse, but we did have takeaways quite regularly so*

*that's something that we've looked at. So we still have takeaways, but it's down to once a fortnight.*

As far as changes in activity were concerned, Fran advised,

*A lot of Bodywise's focus is on backyard games, backyard play, that sort of thing, so just making sure that Wiremu gets incidental activity. Like I've started dropping him off, that is, he goes to a country school so he can't bike or walk, but I've started dropping him off on the main road and he walks around the corner. So just little things like that or he comes home and we will get out there and skip and we played a chalk game the other day like four square, like hopscotch; old school games.*

In addition, Fran reported that Sports Force also assisted with change and would take sessions in different sports during the Bodywise programme. The activities were pre-set and the children didn't have a choice as to what activity they participated in. Even if they didn't like the activity they would still participate. Sports Force would demonstrate how the children could play the games at home and they were often allowed to take the equipment home. Wiremu played rugby and soccer in winter, and swam and played cricket in the summer.

Fran felt that involvement in the Bodywise programme had been of assistance.

*Well, it's definitely effective. Actually, I think it's effective if you want it to be effective. I don't think it would work with a family that was not prepared to make the changes, but then I think that to a degree that's part of the screening process at the beginning, because they meet with you as a family to make sure you are ready to make changes and things like that. It's definitely aimed towards family.*

*We had that initial appointment with the paediatrician and the psychologist and after that, but before we had actually started Bodywise, they had a meeting with extended family to talk about what Bodywise was, so that you are not having inconsistent messages.*

Wiremu's parents commented that he will frequently stay with his grandparents and that they felt it was important his grandparents knew about what they were trying to achieve. Charlie commented,

*They (the grandparents) like spoiling him. If they hadn't come to the meeting and we had just told them but because they were there they saw that we were trying to make a difference, they took it on board.*

Follow-up visits were another example of what the family found effective. Fran stated,

*The follow-up visits are helpful because it does help you stay on track. For instance, if you have a month where you're not on track and they come back in, you can say "we've had this happen and this happen" and they say "you could try this or try this".*

She provided the example of using a Swiss ball on winter evenings rather than skipping outside in the dark. Therefore, the Bodywise programme would assist to problem-solve if things were not going to plan.

The material provided by the Bodywise programme was also highlighted as being of assistance. Fran commented,

*With each session, if we needed it, they would give us information to take away. We did a sugary drinks one, so we took away the conversion information so you can convert it. I've got a booklet of*

*recipes, good recipes to have, the food groups and the servings, and things like that. Lots and lots of different stuff.*

The fact that changes had been made slowly was credited with helping to keep them going. Fran commented,

*Like for example the bread, we started before Bodywise not having white bread, or we had a mix of white and brown and then slowly we brought in the whole meal and the whole grains and now we don't have white bread at all. Now we are working on buying breads that are high in fibre That's something Helen brought up at our last session, so that's what we have been working on, so just the small, slow changes.*

However, it was not always easy to keep the change process going and Fran commented that there had been difficulties encountered keeping on track,

*I think one of the ones is slipping back into your old routine and that's just a matter of being focused on the end result. You've got to put the work in to get the results. There are times like the school holidays when we are slack or he's away with other people and we don't have the control.*

Work commitments could interfere if Wiremu's parents were working long hours. Winter was also difficult because by the time they returned home it was often dark. Fran commented that sometimes she and Wiremu would be outside skipping in the dark. One example provided of keeping change on track was the goal sheet. Fran reported that the children were given a goal sheet with nutrition and physical activity goals on it at each session. They were also given a goal sheet for home visits. In the case of the goal sheet a record of change could be kept using either a checklist, a star

chart or a paper chain. Wiremu had chosen to complete a paper chain. On the chain every instance of activity or change in food pattern was written on a piece of coloured paper that was then made into a chain. At this point they had made a chain with 44 links and were working to beat that target.

A further example of a significant influence that had assisted the family to keep motivated was that Fran had started a new job in a sports orientated field. Part of her responsibilities focused on exercise and nutrition and as a result she felt that this had assisted Wiremu's progress in the programme.

Fran provided answers to several diet-related questions. She commented that Wiremu will frequently assist with meal preparation in the evenings. Tonight he had helped prepare bacon, egg, and vegetable quiches. Wiremu reportedly cut up the vegetables and made the pastry. Fran also commented that Wiremu is given choice as to what goes into his lunchbox.

Charlie stated that he felt Wiremu's assistance with meal preparation had a positive impact on what his son would eat. His father stated, "*He's taken more ownership because he understands now that what he was doing before wasn't helping.*" Fran added,

*We got the serving chart and he worked out with us his food for the day, where it should be and what happens if you have a giant cookie in your lunchbox instead of sandwiches and things like that, and what it takes away.*

She commented further that Wiremu now understood about food groups and what servings he should be eating from each.

*So he is aware he needs to be eating fruit and veges. His attitude to eating has definitely changed. He still, at times, can want to have lots*

*and lots and lots, but he is getting much better at his portion sizes and a bit more responsible about eating vegetables.*

Fran advised that the only rule around food was that her son was required to eat his breakfast, even if it was only something small and that the family did not implement any punishments.

Fran had worried that the joining the programme “*would work the opposite to the self-esteem. I didn’t want him to think that he was there with a bunch of, dare I say it, fat children, but it didn’t work that way because that’s not a focus*”. She added that Wiremu had only been weighed once or twice at most and that the focus was never about losing weight, but about maintaining the weight. At the end of the programme Wiremu’s BMI was reported to have “dropped a little bit”. Although his weight had been maintained, his height had increased.

In summary, Fran commented that change was first initiated by her hearing from others about the benefits of the Bodywise programme. Fran’s desire to improve Wiremu’s self-esteem was integral to change being initiated. She felt that through healthy eating he would maintain long-term health and successfully manage his weight. Fran felt that the Bodywise staff and the format of the programme had been responsible for assisting with change. All the family had benefited from the knowledge provided as well as the monitoring and feedback given. Wiremu’s positive attitude to change had encouraged Fran that change was possible, along with her own intrinsic motivation that it should be pursued. She felt that along with her change in occupation, that the support of friends and family was essential in promoting change. Barriers to change in lifestyle patterns were identified as any change to regular routine (e.g. school holiday periods and when Wiremu was in the care of others). She remarked that time constraints could interfere with change and

provided examples of work commitments and the time of the year (winter) as barriers. Finally, Fran felt that getting lazy and reverting back into old habits were also barriers that impeded change

### **3.4.3 Case Study - Family 3**

Ann's mother, Christine, was the third participant in this research. Ann was an eight year-old girl of European descent. She was part of a blended family and lived with her mother, her mother's partner, two biological siblings and one of her mother's partner's children. An additional two of her mother's partner's children would stay intermittently at weekends. Christine reported that the weight status of her two sons was variable; one was "short and stocky" and the other was "skinny". However; Christine commented that her "skinny" child was medicated and his weight was a possible side-effect of the medication.

Christine stated the family decided to join for health-related reasons (onset of precocious puberty) and bullying and teasing by other children. Christine commented that the school health nurse had advised her that Ann could be referred to the Bodywise programme. Ann subsequently met with a paediatrician regarding the early onset of puberty.

By joining the programme the family hoped to achieve a greater understanding of what more could be done to assist Ann and, in particular, how to promote her self-esteem and help her develop coping strategies to manage the bullying at school.

Christine also said she was keen to enhance Ann's understanding.

*We didn't have to change our diet much because we eat pretty healthy anyway, but Ann's awareness that she'll take a piece of fruit instead of a biscuit and she went through a phase where everything had to be healthy and she did check everything was healthy and if she saw*

*someone with a bottle of flavoured water she would tell them how many teaspoons of sugar there was in it.*

Identified benefits of having achieved goals included a greater understanding of healthy eating. Christine provided the following example,

*We went to Valentines after the programme had ended for my birthday and she was very careful with what she chose. In the past she would have gone back two or three times, but she had her plate and that amazed me. You put kids in front of a buffet and you can't stop them!*

A further benefit was that this awareness has translated through to her partner's son. Christine added, *"Since he's moved in with us he's lost 12 kilos since January because he was quite a big boy, but he's grown into it. He's lost 10 centimetres in jeans size"*.

In addition, an activity-related benefit was that Ann was playing more sport than she previously used to and she was particularly enjoying hockey.

Christine's confidence in achieving change altered throughout the course of the programme.

At the outset she stated that she was not *"perfectly confident because Ann is stubborn"*, but that almost immediately Ann became quite receptive. This came as a surprise to her mother and she stated that once she knew Ann was willing, she was open minded about doing the programme and did not feel forced to complete it. Christine stated that she had done different types of courses in the past and was always keen to get more information or help.

In relation to the attention the programme paid to self-esteem Christine commented,

*Quite a bit I think. I think a lot of it boarded around it without there being a sit down lecture on it and they had to do a thing on what they liked about themselves and kids can do that so easily. They did a poster which I think is on her wall, they put a photo of each kid on it and they had to write something nice on it and it went round each kid and all the kids did it for each other. They laminated the posters they'd made.*

Christine remarked that she felt that the programme was very positive and there was never any emphasis on there being anything wrong with the children. She described the approach as “constructive criticism”.

A further factor that Christine considered had impacted positively on her daughter's self-esteem was that she had made a good friend by joining the programme.

Christine remarked,

*One of the best things that she got out of the programme, and I suppose its got nothing to do with what we learned at the programme, was she met another girl who is a year older than her who lives just down the road. Nancy is a big girl, she wears glasses as well and they were alike and from minute one they have been best friends.*

The two biggest changes the family had made related to monitoring their diet and doing more exercise.

*It's just watching what Ann eats and, I mean even doing the paper run, it's more exercise and she's playing two sports. Diet-wise we didn't have to change much at all because I've always been a big vege fan and cook dinner. We still have fish and chips now and again, but we probably don't as much. It's more of a convenience*

*thing. That's what annoys me now I could go and buy a \$10 fish and chip pack and a \$2 bottle of Coke every night and it would be a damn sight cheaper than buying decent food. We probably spend \$60 per week on fruit and veges.*

The school health nurse was credited with initiating change and seeing results and receiving reinforcement from the team at Bodywise were identified as factors that kept the change process going. A further factor was that the family also had an increased awareness of the goals of the programme given that all the children attended with Ann and Christine on Mondays. Christine and her partner read the material provided by the programme and felt it was logical and understandable. She stated, *"It wasn't too onerous or textbooky, that could turn a lot of people off"*. Christine felt that how the Bodywise programme had been structured had assisted in change promotion. She thought it was an awesome concept and an awesome programme and commented that she felt the personnel were,

*Just bang on, just wonderful. They are all very approachable and, I don't know if emphatic is the right word, but they weren't .... I suppose if you went and you hadn't managed your goals for that week, there was no come back.*

A further remark she made was *"It was very casual, but not in a bad way. You were always made to feel comfortable and it wasn't that you were doing things wrong or someone was better than you."* Christine described the atmosphere as *"just very comfortable and easy. Everyone made you feel welcome and really positive"*.

Christine felt that the most beneficial impact of the programme was the positive effect it had had on Ann and, subsequently, the whole family. She commented that the end result was, *"If I do slack off a bit they (the family) are on at me"*.

Another factor considered to be of assistance was that the family were already very healthy eaters. They ate a wide variety of fruits and vegetables and Christine felt the Bodywise staff who made a recent home visit were impressed with Ann's ability to identify a wide array of vegetables.

In addition, Christine identified the fact that other people had similar problems was a comfort. She said we "*knew we weren't the only family in that boat*".

Constant change was not an easy task and Christine reported there had been some difficulties encountered in keeping on track. She commented,

*The biggest difficulty I had was my nine year old, because he wanted to be "the man" on the Mondays and he wanted it to be about him. The world must revolve around Matthew so he had issues with doing something that was especially for Ann. He's since done an anger management course so that's helped, but he can't let go and let it be about someone else.*

Furthermore, Christine reported that often she and Ann would have personality clashes and that Ann can become "clingy" on a Monday and as a result she would leave and let Mary take over.

Both time and money were factors that also impacted upon the family and these are encapsulated by the following remark,

*Finances to some degree. Some days I struggle to go to Bodywise. I had to take time off work, which you do for your kids but then that's money you don't earn. I mean we always went but it was an extra trip to Smithville and we don't have a lot of money so the petrol costs were astounding and just the fact it's cheaper and easier to buy crap food. It is hard to justify, well not justify the money because I know*

*it's good for us, but to actually spend all that money on the good food.*

The support of family was thought to counteract some of the difficulties experienced.

Christine advised,

*My mum and dad are really supportive with it and I suppose we got our healthy eating habits from growing up with mum and dad and I think if people she went to didn't understand and she would go there and eat crap that would have made it difficult, but we didn't have that issue.*

This provides another example of how extended family appears informed and of assistance with change promotion. However, Christine was not too concerned if Ann ate fast food when she stayed with friends. She commented,

*I mean she may go to a friend's and get taken out to McDonalds but I don't see that as being too much of an issue because it's a one off, it's not happening three days a week, every week. They are still a kid and need treats.*

Christine responded to several questions regarding food. She revealed that Ann will assist her in the kitchen at least once a week by peeling vegetables and mixing ingredients. However, she did not feel Ann's assistance with food preparation had any impact on her eating patterns. Ann reportedly was not a fussy eater

There were also a number of rules surrounding food consumption that Christine would implement. She stated,

*They (the children) have to have breakfast and Ann didn't used to but has got very good at that. If they don't eat all their lunch and they want something to eat they finish what's in their lunchbox. They*

*always have afternoon tea. They may make a sandwich for themselves and if they've got training or we are going somewhere after school, I'll take afternoon tea with me.*

There were also some rules around snacking. Christine reported,

*They can have fruit or water without asking, anything else they have to ask and when we have all six kids in the weekend we go through food. It's lucky we've got a mandarin tree and a feijoa tree and they drink water. We don't even make up Refresh anymore. Occasionally, maybe once a month they get a fizzy but they generally drink water.*

In addition, Christine reported there were no punishments surrounding food per se, just natural consequences of behaviour. She added,

*If they are playing up at the table then they will go to bed without finishing their dinner, but that's more a consequence of behaviour than of not eating. Like tonight Ann said she didn't want vege soup and I said "we're not a restaurant, you don't get to choose. If you don't want vege soup you can have the toast". In the end she had two bowls of vege soup.*

At three month follow-up Christine commented that Ann had gained two kilograms and her waist had reduced by five centimetres. Her BMI had also dropped and she had grown 3.2 centimetres.

In conclusion, Christine identified that change first occurred as a result of Ann's evaluation by the school nurse. Reasons that underpinned this change were a desire to improve Ann's self-esteem due to bullying and teasing at school and also to manage potential health problems, along with delaying onset of precocious puberty. Participating in the programme had been of assistance in keeping the process of

change going, in particular, knowledge about appropriate levels of activity and, to a lesser extent, eating healthily had empowered the family to make changes to their lifestyle. Ann's psychological well-being was enhanced by an improvement to her self-esteem and this assisted her to take responsibility for her own health and fitness. Christine felt that Ann's positive attitude to change had fostered her own confidence that change could occur. Furthermore, the monitoring and feedback provided to all the family helped to positively reinforce the changes being made. The assistance and support of friends and family was another important change promoter. Also, the family already had strengths in regard to appropriate nutrition, therefore, only small changes were required, which made it easier for them to initiate and maintain those changes. Finally, Christine commented that knowing that other families also struggled with similar issues provided encouragement and made her more determined to continue with the change process. Two primary barriers that competed with effective change were time constraints (e.g. trying to juggle work commitments and Bodywise and dealing with the needs of multiple children), and financial constraints

#### **3.4.4 Case Study - Family 4**

The final participant in this research was Olive. She discussed her daughter Laura, who was a seven year-old European girl. Laura lived with her parents and had one newborn infant sibling.

Olive reported that she had decided to join the programme to get help and more information. Olive commented, "*Just by looking at my daughter you can see she's overweight and I had those problems when I was younger as well*".

By joining the programme the family hoped to achieve "*Some goals and things to look at, so she (Laura) can start now and be healthier when she's older*". Olive

hoped to gain information regarding nutrition and was not focused on weight loss but rather weight maintenance.

Olive described the benefits of achieving those goals as “*influencing your life, your health, your everything*”. She also stated that it was beneficial because working together created a bond between herself and Laura and that she was pretty confident of achieving the goals and change.

Getting more physically active was described as the main change Laura had made.

Olive commented that Laura was involved in morning and after school activities for two to three hours per week which kept her active. In addition, Olive commented that an effort had been made to watch less television.

Change was not necessarily easy for this family at this time; however Olive remarked that her determination to succeed and the assistance provided by the Bodywise team were main influences. In relation to the latter Olive felt that the programme was beneficial and child-specific and commented,

*How they separated us from our children. I guess it was more they taught the adults about the child side of health things and then the children separately away from us. So I guess the whole thing was based on them. We didn't really get to see what they did do, but the after things. Laura would come home and say things so it was definitely sinking in. Yes, it was definitely child-specific.*

Olive commented that momentum to keep the change process going were achieved by her wanting change for her daughter and also the assistance in the form of home visits from Mary (from Bodywise), who would demonstrate how to goal set. Furthermore, Olive stated information regarding nutrition was also of major assistance.

*I think knowing the nutritional side of things, like the difference between what I need and what my daughter's needs are. I was just going off what I thought was right and then learned more.*

Olive also found the material provided by Bodywise to be practical, informative, and easy to read.

Other factors that promoted change were described. The support from family and friends was considered important. Olive reported that her sister and brother-in-law were supportive and had attended the programme on one occasion. She also commented that most of her friends were aware of the changes trying to be made and would help to keep them on track if Laura was in their care. Furthermore, Laura's attendance at a holiday programme was considered to be helpful. This had involved physical activity, which had assisted in meeting exercise goals. As far as dietary change was concerned, the preparation of quick and nutritional meals also assisted with time management.

Despite having resources available and successfully implementing some change in lifestyle, Olive identified several difficulties the family had encountered keeping on track. These were identified as Olive's pregnancy, work commitments (which comprised of full-time employment), and lack of organisation. Winter was also suggested as a further factor that interfered with keeping change on track.

Overall, although Olive remarked that her pregnancy had been a barrier to successful change, she was confident that now she had given birth and would be at home full-time this would positively influence how much change the family could make. She was also aware another barrier to successful change had been general disruptions to normal routine, which had come in the form of many things but did include the

family shifting house and, a change of position at work, which had necessitated time be found to learn a new role.

As far as rituals surrounding food were concerned, Laura did not really assist with meal preparation. Olive reported that sometimes she would grate cheese and put out breakfast. Olive remarked that, in the past, Laura had not assisted with meal preparation due to time constraints and that this would now alter with her being at home on a full-time basis. In addition, Olive commented that she did not believe that the small things Laura did in relation to meal preparation had any particular impact on her eating patterns. She reported that her daughter was a “pretty good eater anyway”.

Olive also commented that there were no punishments surrounding food consumption, but there were a few rules. Firstly, Olive actively made an effort never to reward good behaviour with food. Secondly, she advised that an effort was made to keep to the guidelines the programme set and that takeaways were considered a “treat” and not an everyday food. Furthermore, Olive commented that beverages Laura drank generally comprised of water or milk. Fizzy drink was also considered a “treat” and she advised she would never give her daughter Coke due to its caffeine content and her understanding that children were unable to metabolise caffeine. Olive commented that she felt that Bodywise was a successful programme, but qualified her statement.

*Definitely, but not for everyone, though. I really feel it's got to be the parents that actually want change, they see it as a problem. They (Bodywise personnel) are there, they're sharing everything, but it's up to the individual parent to make it happen.*

Olive identified the pros of the programme as being that it was beneficial for her family and also that great information and support were provided. The only con Olive highlighted was that perhaps group length could have been longer in order to provide time for the parents to have any questions answered. She stated, "*There were always so many questions the parents wanted to ask and there wasn't time*". However, she did also add this was not critical as they could be answered at a later date.

At the outset of the programme Olive described Laura's BMI as "quite high" and at follow-up it was one to two points higher due to the relapses the family had experienced in the latter six month period. This had been exacerbated, in the main, by the fatigue Olive had experienced with her pregnancy. Olive implied that she was disappointed with this outcome and sought to change it given that she now had the opportunity to be at home permanently.

In summary, Olive felt that change had initially come about through her desire to intervene with Laura's weight problems. She was focused on Laura's long-term health, which she felt would be promoted through better nutrition and weight management. Olive was adamant that the involvement in the Bodywise programme had been of assistance in the change process, in particular, treating each child as an individual and allowing them some independence during parts of the programme may have assisted them to be responsible for themselves. Monitoring and feedback given throughout the programme and during the follow-up visits assisted to positively reinforce changes being made. Also, Laura's positive attitude to changes made had motivated Olive further that change could be achieved and heightened her determination to succeed. Olive remarked that the support of family and friends had also been of assistance. Implementing strategies that would ensure dietary guidelines

and physical activity requirements were met also fostered change. Laura's family faced numerous barriers to the change process while enrolled in the programme. The primary barrier was Olive's pregnancy which left her constantly fatigued. Olive identified several other impediments including general time constraints (e.g. time of the year, lack of organization), together with changes in routine (e.g. shifting house and starting a new role at work).

### **3.5 *Thematic Content Analysis***

A thematic content analysis of the four families change experience is presented in the following section. Although all participant families varied on several dimensions, many similar themes were evident in the data provided.

The research aims were to identify the change initiators, the factors that assisted change, and the impediments to achieving change. Table 6 provides a summary of the initiators, promoters and, barriers to change identified by each family.

#### **3.5.1 *Change Initiators***

Two of the families were encouraged to initiate change following assessment and feedback from the school nurse. Word of mouth prompted one family to instigate change and one family decided to initiate change in order to address their child's weight-related issues.

The primary factor underlying change initiation for all families was a concern for the future health and well-being of their child both in the short and longer-term. Most families spoke of the need to improve the health of their child and they sought to implement change through good nutrition and/or weight management. Furthermore, two of the four families had concerns for their child's self-esteem and were motivated to alter and improve their child's self-perception.

Table 6

*Summary of the factors identified in the change process*

	<b>Initiators of Change</b>	<b>Promoters of Change</b>	<b>Barriers to Change</b>
Sarah's Family  (Mother = Helen)	Concern for child's health and well-being  Prompt from school nurse	Increase in physical activity Improvement in nutrition Change in attitudes and beliefs Increase in confidence and motivation Structure and delivery of Bodywise programme Reinforcement from extended family/friends	Disruption to routine Peer pressure Lack of parental cohesion
Wiremu's Family  (Mother = Fran, Father = Charlie)	Concern for child's health and well-being  Prompt = Word of mouth	Increase in physical activity Improvement in nutrition Change in attitudes and beliefs Increase in confidence and motivation Structure and delivery of Bodywise programme Reinforcement from extended family/friends Maternal occupation	Disruption to routine Time constraints
Ann's Family  (Mother = Christine)	Concern for child's health and well-being  Prompt from school nurse	Increase in physical activity Improvement in nutrition Change in attitudes and beliefs Increase in confidence and motivation Structure and delivery of Bodywise programme Reinforcement from extended family/friends Previous healthy eating	Time constraints Financial constraints

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		habits Other families struggle with weight issues	
Laura's Family	Concern for child's health and well-being	Increase in physical activity	Disruption to routine Time constraints
(Mother = Olive)	Prompt = Self- directed	Improvement in nutrition Change in attitudes and beliefs Increase in confidence and motivation Structure and delivery of Bodywise programme Reinforcement from extended family/ friends Improved time management Child's attendance at a holiday programme	

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### 3.5.2 Promoters of Change

#### *Increased physical activity and improved nutrition*

An increase in their child's level of physical activity was the primary change identified by all families since joining the programme. This was closely followed by improved nutrition. Two of the families revealed that their children participated in more organised sport, whereas, one family spoke of the importance of incidental activity, such as being dropped off further from the school gate and playing backyard games. One family used morning and after school activities as a means of ensuring their child completed an adequate amount of exercise and reduced the amount of television viewing. Three of the four families commented that changes in diet had been made, with all four families revealing that they had either reduced the frequency with which they eat takeaways or that takeaways were now considered a "treat" food. Also the majority of families noted that their child appeared to have

developed a greater awareness of what types of food were considered healthy and what amounts of food (from each food group) were considered appropriate. Children also appeared more receptive to trying new foods. The change process appears to have been promoted by the knowledge the families gained while enrolled in the programme. A number of the parents revealed that they would approximate the amount of food or exercise their children needed based on their own requirements, with a greater understanding of appropriate guidelines this became unnecessary.

#### *Change in attitudes and beliefs*

Once the families had a greater knowledge of the benefits of increased physical activity and good nutrition this resulted in a change in attitudes and beliefs surrounding lifestyle. For the children, in particular, attitudinal change was accompanied by a heightened responsibility for their own health and well-being. This behaviour change was then subsequently reinforced by their parents.

#### *Increased confidence and motivation*

Confidence was another factor highlighted by the majority of families. Many of the parents reported that their confidence in the ability to effect change fluctuated; it was limited at the outset but it grew as time progressed. Once the children's confidence had grown and change had begun to emerge, this subsequently encouraged and further motivated the parents that change was possible. As a result then the parents further supported their children to continue with lifestyle change. Research suggests that there is a correlation between increased self-efficacy and readiness to change, which may explain how increased confidence assisted in promoting change (Marcus & Simkin, 1994).

#### *Structure and delivery of the programme*

The structure and delivery of the Bodywise programme also assisted to bring about

change. Firstly, the family-based approach allowed for parents to oversee and encourage changes made by their children. Secondly, the atmosphere was friendly and non-threatening making all children and parents feel welcome. Thirdly, the programme was presented in a group, rather than a one-to-one format which also allowed the children to socialise. As far as the activities were concerned, all children were asked to participate; however, participation was not mandatory. At times during the programme children were separated from their parents, which allowed them a measure of independence. Fourthly, a main focus of the programme was on weight maintenance, rather than weight loss, lessening the likelihood that the children would develop the belief that their weight was problematic (rather than their lifestyle). Finally, once the programme had concluded follow-up visits were made to the families. This enabled programme personnel to monitor change and provide feedback to the families. If lifestyle change was not occurring as anticipated, Bodywise personnel would offer alternative strategies to those families. The general framework of the programme fostered change on several levels as well as offering problem solving strategies when change had stagnated.

#### *Influence of extended family and friends*

The inclusion of extended family and/or friends in the change process was another factor highlighted as a change promoter. The majority of families reported this had resulted in family and friends who were informed about the goals trying to be achieved and who were supportive of change. The fact that the extended family had been invited to see how the programme ran and what it entailed had assisted them to be responsible carers. Furthermore, the positive reinforcement provided by extended family and friends promoted change continuance.

Thematically this is where the comparison ends as all other factors identified as being of assistance were unique to each family. Sarah's family identified seeing positive results as being a catalyst for change continuance, along with seeing their child taking responsibility for her own health, making good decisions and, as a consequence, growing more slowly. Wimeu's parents credited a change in Fran's occupation (work in a sports orientated field) as a motivator for change. In addition, Wimeu's parents felt it was helpful that any change they had made had been done so slowly.

Ann's family identified previous healthy eating habits as being of benefit with assisting change. This family ate a wide variety of fruits and vegetables and, therefore, nutritional change was less of an upheaval. The final factor of assistance for Christine was the peace of mind gained from knowing they were not the only family struggling with weight issues. In contrast, Olive identified better time management as beneficial, together with Laura's attendance at a holiday programme which involved a considerable amount of physical activity.

### ***3.5.3 Barriers to Change***

Throughout their involvement in the Bodywise programme each family encountered barriers to change, which created challenges for them. All families had experienced periods where they reverted back to former unhealthy eating patterns and sedentary behaviours and the following barriers usually precipitated this occurrence.

#### *Disruption to routine*

For the majority of families disruption to routine was a significant contributor to failing to adhere to nutritional and physical activity guidelines. Both Sarah and Wiremu's families highlighted the difficulties they faced during school holiday periods. An additional barrier for Sarah's family was returning to their country of

origin. Both families also identified having their child in the care of others as problematic. Change was also hindered for Laura's family by routine disruption in the form of her mother's new role at work, together with the upheaval brought about by a change of residence.

#### *Time constraints*

Time constraints were another major theme identified as an impediment to change by almost all families. Wiremu and Laura's families felt that work commitments interfered with change, in particular, the need to work long hours. Both families also noted that the time of the year played a part in disrupting the implementation of change. Winter time was the season found to be most challenging, with one family endeavouring to exercise outside in the dark in an effort to keep physical activity at the appropriate level. Laura's mother also identified her lack of organisational ability and the exhaustion related to her pregnancy as being responsible for impacting on time availability. Ann's family also highlighted time constraints as a barrier; however difficulty arose for the family in the domestic arena rather than the occupational arena with this family's requirement to cater for the demands of several children.

#### *Financial constraints*

Financial constraints were identified by one family as hampering change. This family highlighted the fact that it would be cheaper for them to follow an unhealthy diet, which would also be easier to prepare than to ensure quality food was eaten.

#### *Peer pressure*

One child encountered pressure at the outset of her change process from school friends who wished her to return to previous eating patterns. In order to address this

problem her parents instructed their child that it was in her best interests to continue to follow her current regime.

*Lack of parental cohesion*

A final barrier, identified by only one family, was an attitudinal difference surrounding eating rituals. Sarah's mother advised that there was a lack of parental cohesion between her and her husband over their attitude to dining together as a family. Although encouraged to do so, Sarah's step-father would not join the family at the table for their evening meal. This resulted in Sarah being resistant to this arrangement, which is highlighted in the literature as being beneficial in the reduction of obesity.

## CHAPTER FOUR

### Discussion

#### *4.1 Introduction*

There were three primary aims of this thesis. The Readiness to Change questionnaire adapted by Galyer and McClintock (2004) for use with the families of obese children was reviewed to determine its psychometric value as an indicator of stage of change. The relationship between parents' stage of change as defined by this questionnaire and the target areas for intervention in the Bodywise programme (zBMI, eating, and physical activity) were investigated. Finally, interviews were conducted to gain more in depth information about parents' experiences of change throughout their involvement in the programme.

#### *4.2 Stages of Change questionnaire*

The questionnaire in its current format is a reasonably reliable instrument. Most of the questions were consistent with the stage of change category on the original version of the questionnaire. Analysis revealed that two of the questions on the adapted questionnaire did not relate to the same stage of change as they had on the original questionnaire. One question ("My child should increase physical activity") loaded on contemplation in the original version of the questionnaire, but was found to load on action in the adapted version. It also co-loaded on pre-contemplation. Another question ("My child's physical and psychological wellbeing would be the same even if his/her weight changed") loaded on pre-contemplation in the original version of the questionnaire, but was shown to load on contemplation in the adapted version. Three other questions ("I intend to change my child's eating habits", "My child's weight has reached the stage where I should consider doing something about it", and "My child's weight is okay as it is") were also found to co-load. Of the two

questions that did not load where expected, one related to physical activity, while the second question tapped two constructs (physical well-being and psychological well-being). It is unclear why the question “My child should increase physical activity”, did not load where expected given that other questions with ‘should’ statements did. Some of these other ‘should’ questions were also found to co-load. It is possible that the question that focused on two constructs was inconsistent with the original version because individuals using the questionnaire were unsure which construct they should be responding to. The three questions that related to more than one stage of change category incorporated ‘should’ or ‘intend’ statements which may have caused confusion. A reason for this can be elucidated by the underpinnings of the transtheoretical model. This model also incorporates a ‘preparation’ stage of change. The difference between the preparation stage and the contemplation stage is that the former stage is characterized by intention to change a behaviour in the next month or so, whereas the latter stage is characterized by problem awareness and consideration of change (Prochaska, et al., 1992a). As this present study did not include a preparation category this may be the reason the ‘should’ and ‘intend’ statements were not as consistent. There is also a possibility that a person may be able to recognize the fact that they should address a particular problem behaviour, but their readiness to change is low. Once again, this is a phenomenon that has been identified in the literature (Anthis & La Voie, 2006).

#### ***4.2.1 How Could the Questionnaire be Improved?***

Firstly, the four items described above as co-loading on more than one factor should be removed or revised in order that they do not impact on the internal consistency of the questionnaire. It would affect the reliability of the questionnaire to remove all items, but the question that contained two constructs would be a logical one to

remove. Poorly worded statements do not assist in placing individuals in the correct stage of change category. A revision of the wording of some of the items with 'should' or 'intend' statements could be of assistance. For example it might be beneficial to reword such statements as "I am thinking about...".

Secondly, given that two constructs (eating and physical activity) are the focus, there is an increased likelihood that the participants will not be in the identical stage of change for each and together the result, depending on which are more or less advanced, may falsely identify a person at a particular overall stage of change. As the results of the Bodywise data analysis showed, individuals were at quite different stages of change in the eating and physical activity groups. Finally, is a self-report questionnaire the ideal method to screen individuals at various stages of change?

Although questionnaires are often utilised, perhaps a semi-structured interview would be a better and more accurate method to identify factors like motivation that are associated with change than these types of instruments that are open to misinterpretation.

It would be an overstatement to suggest that any of the themes derived from the parent interview data could definitively place an individual into a particular stage of change category; however, the creation of another screening questionnaire tapping motivation to change could be of use if administered alongside the stage of change questionnaire. This may improve the functionality of the latter.

During parent interviews various themes were highlighted that could be useful if incorporated into a motivation for change questionnaire. For example, parents reported that risk to their child's health and well-being was pivotal to instigating change. A question directly related to concern about health risk may assist in identifying parents who are motivated to change. Secondly, the literature reveals that

increased confidence/self-efficacy is a hallmark of the action stage of change (Ward-Begnoche & Speaker, 2006), therefore the questionnaire could benefit from the inclusion of a question related to this as it may assist in identifying those families who feel ready to make lifestyle change.

Thirdly, the reinforcement of extended family/friends has also been shown to be of importance to change. A question related to the parent's perceptions of family/friends potential support with change may highlight whether these people would act as motivators or demotivators.

Finally, given that peer pressure has a significant influence on children's behaviour, a question related to the weight status or lifestyle patterns of the child's closest peers may be helpful in identifying possible peer considerations that may support or impede change.

#### ***4.3 Relationship between Stage of Change and subsequent Eating and Physical Activity Changes***

This section of the discussion reviews the results of the analysis of the stages of change questionnaire in relation to Bodywise programme data. The purpose of this data analysis was to determine if a families stage of change was related to changes in target behaviours (eating and activity), and to outcome data (zBMI).

A significant decrease in zBMI score over time was found irrespective of the stage of change the parent was in, which suggests that over the 12 month period zBMI reduced from baseline to 12 months for both groups, although there was no significant interaction between time and stage of change. This result suggests that there was no difference in the degree to which zBMI changed between the two stages of change groups. The action group was found to have a lower zBMI at baseline than the contemplation group.

Alterations to eating patterns and physical activity are essential in order to address childhood obesity (Barlow, et al., 2002). Given that the data provided by the Bodywise programme showed that individuals were commonly in different stages of change for eating and physical activity it appears that the two should be considered separately by clinicians. The families that were interviewed also seemed to consider them differently too. The point was raised by a number of families that their child was treated as an individual and goal setting for particular behaviours was more or less important depending upon the family's circumstances. For example, one family commented that they already consumed a healthy and balanced diet, therefore changes to physical activity were the emphasis for this family.

#### ***4.3.1 zBMI score changes across the Contemplation and Action Stages of Change for Eating***

The analysis revealed that for those in contemplation for eating there was a steady decline in zBMI over the 12 months of the programme. Significant decreases were observed between baseline and 6 months, 3 and 12 months, and 6 and 12 months.

In contrast, those in action for eating showed a markedly different pattern of change, namely that the greatest reduction in zBMI occurred during the first 6 months of the programme. This suggests that participants in the action stage made more changes to eating in the earlier half of the programme than the latter part. This is analogous with the stage of change model, as according to this model individuals in action are more likely to have made changes to their behaviour than those individuals in contemplation (Prochaska, et al., 1992a).

#### ***4.3.2 Nutrition score changes across the Contemplation and Action Stages of Change for Eating***

Analysis of nutritional change revealed that individuals in both the contemplation

and action stages of change required significant improvement to the quality of their nutrition at baseline. For individuals at the contemplation stage of change steady improvement was made over the 12 month period. In the action group a large number of participants had considerably improved their nutrition by 3 months and improvement continued through to 12 months. These findings are consistent with the pattern of reduction in zBMI for the various eating stages of change groups described earlier. Once again these findings are consistent with the underpinnings of the TTM insofar as individuals in contemplation are slower to make lifestyle change than individuals in action (Prochaska, et al., 1992a). This suggests that the TTM is useful and relevant for this type of intervention.

Most families noted that they had made alterations to their child's diet. As with most interventions to modify diet, targets for change included a reduction in calorific consumption through a revision in fat and sugar intake and the incorporation of high nutrient foods such as fruits and vegetables (Daniels, et al., 2005; Epstein, Gordy, Raynor, et al., 2001). As a result all families revealed that they had limited the frequency with which they ate high energy dense foods, such as takeaway foods; however, most families reported that they were not averse to their children enjoying "treat" foods on occasion.

#### ***4.3.3 zBMI score changes across the Contemplation and Action Stages of Change for Physical Activity***

No significant difference in zBMI was found for individuals in the pre-contemplation stage for physical activity. However, a significant difference in zBMI was found in both the contemplation and action stages of change. This outcome resonates from a common-sense perspective as one would not expect participants in the pre-contemplation stage of change to have increased physical activity levels more than

individuals in action. Individuals in contemplation showed a decrease in zBMI over the first six months. In contrast, those in action showed a decrease in zBMI over the course of the programme.

A comparison of the eating and physical activity groups revealed that more participants were in the action stage of change for physical activity (n = 28) than for eating (n = 11). This suggests that at the outset of the programme more families considered their activity levels needed to alter.

Research has shown that one of the effects of heightened physical activity is a reduction in sedentary behavior (Epstein, Paluch, Consalvi, Riordan, & Scholl, 2002). Television viewing, which is one of the foremost sedentary behaviours linked to obesity (Dietz & Gortmaker, 2001), was highlighted by one family as being reduced over the period of involvement in the programme. A review of the screentime and outdoor time findings later in this section shows that screentime reduced over the course of the programme, while outdoor time increased. Therefore, a reduction in sedentary behaviours possibly resulted in an increase in physical pursuits.

#### ***4.3.4 Screentime and Outdoor Time changes across Pre-contemplation, Contemplation and Action Stages of Change***

The data collected by the Bodywise programme and supplied for analysis included five different categories, namely screentime, active transport, outdoor time, structured activity, and incidental activity. As the literature supports changes in screentime and outdoor activity as markers for increased levels of physical activity it was felt these were appropriate targets for investigation (Biddle, et al., 2004; De Mattia, et al., 2007).

Television screentime in the pre-contemplation stage of change revealed that screentime was higher at baseline than at 12 months with all participants viewing decreasing to less than two hours by the 12 month interval. Television screentime was also higher at baseline than at 12 months for participants in the contemplation stage of change; however most change was made between baseline and 3 months and then remained consistent from 3 months through to the 12 month interval.

A small shift was found in screentime viewing for participants in the action stage of change. It appeared that a reduction in screentime viewing occurred at the 6 month interval and then increased again slightly at the 12 month interval. A non-linear reduction in screentime was found. This is in accordance with the TTM, which states that relapse to an earlier stage of change is not uncommon (Prochaska, et al., 1992a).

The above results reveal some interesting trends. Firstly, the Bodywise intervention appeared to be effective in reducing screentime viewing for those individuals in the pre-contemplation stage of change, even though research suggests individuals at this stage of change have no intention of altering their behaviour (Prochaska, et al., 1992a).

Secondly, similar to the results found in pre-contemplation, in the contemplation stage of change screentime was also higher at baseline than at 12 months. Most change occurred between baseline and 3 months with this pattern then remaining unaltered through to 12 months. This shows that although the participants theoretically were only considering change that the Bodywise programme was positively impacting on change at the outset, with a plateau in change occurring at 3 months until the conclusion of the programme.

Finally, at the action stage of change results revealed that a reduction in screentime viewing occurred from baseline through to 6 months. From 6 months to 12 months viewing then increased again slightly. This would suggest that between 6 months and 12 months that the factors that were supporting change promotion began to diminish. From the interview data collected it is possible to speculate about what the factors were that interfered with change. Disruption to routine (e.g. school holidays) appeared to impede change. Also time constraints were identified as being a further factor that resulted in less family time being available. For several parents work commitments reportedly took precedence. Furthermore, financial constraints were also identified as having a negative effect on commitments to the programme.

In relation to the outdoor time data, it was noted that participants in all groups (pre-contemplation, contemplation, and action) spent the least amount of time outdoors at baseline. A marked increase was found between baseline and 3 months for the pre-contemplation group, with outdoor time reducing again slightly through to the conclusion of the programme. For the contemplation stage of change group all participants spent two or more hours of time outdoors by the end of the programme. Similar to the contemplation group, change in the action group did not transpire to any great extent until mid-programme. Time outdoors was the greatest at 6 months and then reduced again slightly at 12 months. Once again, this finding is consistent with the TTM, in that change is not linear in all cases (Prochaska, et al., 1992a).

The intervention worked differently for individual participants, and even though the individuals at pre-contemplation were less likely to make successful change, they actually did. This finding may suggest a difficulty with the classification system. However, it is more likely that the small sample size has affected the generalisability of the results.

Possible reasons for this reduction in outdoor time for individuals in the action stage of change could be related to seasonal variation (winter time was identified by families as hindering physical activity), time constraints or disruption to routine (i.e. school holidays).

A review of the above data on screentime and outdoor time suggests that as screentime trended downwards, outdoor time trended upwards. Research has shown that a reduction in sedentary behaviours may assist in promoting greater physical activity (Epstein, et al., 2000)

In summary, individuals in the action stage of change for both eating and physical activity made more rapid change than individuals in the contemplation stage of change. From a theoretical perspective, this is consistent with the TTM (Prochaska, et al., 1992a). The implications of this finding are that individuals in the action stage are likely to require rapid goal setting early on in the programme and they may respond positively to being set larger goals. In addition, these individuals may also benefit from relapse prevention being incorporated earlier on in the programme.

Furthermore, literature on the outcome of long-term obesity interventions reveals that gains made often worsen over time (Riebe et al., 2005). This suggests the need for monitoring and booster sessions to facilitate self-efficacy rather than an intensive supportive intervention that may be required for other stage of change groups.

Furthermore, although the stages of change model suggests individuals readiness to change and the cognitive and behavioural processes that accompany each stage of change vary, change is still possible at all stages. As can be seen from the data provided by the Bodywise programme, some individuals were in pre-contemplation for outdoor time and screentime; however they still made positive change.

#### ***4.4 Initiators, Promoters, and Barriers to Change***

The main objective of this part of the research was to investigate what prompted parents to initiate change for their child, what assisted and supported change to occur, and what were the barriers faced by these families as they sought to make lifestyle changes.

##### ***4.4.1 Initiators of Change***

Three of the four families involved in the Bodywise programme stated that they had joined as a result of advice or feedback from others. The remaining family was self-directed. From the dialogue with the parents the catalyst for change appeared to be a concern for the physical and mental health of their child. Some of this concern was identified as being focused on the short-term. For instance one family sought to make immediate change in order to delay the onset of their child's precocious puberty. Concern was also held for the longer term insofar as parents reported wanting their children to avoid weight-related health problems that commonly emerge in adulthood. Similar to earlier studies that have investigated family-based obesity programmes (Epstein, Paluch, Kilanowski, & Raynor, 2004), half of the families in the current research were enlisted through the advice of a health professional, in this case the school nurse. Other avenues identified in the literature that were not currently used included the use of various forms of media (e.g. posters, television and newspaper advertising) (Epstein, et al., 2000) or researchers approaching schools for participants (Golan, et al., 1998).

##### ***4.4.2 Seeing the benefits of change***

The four families who participated in the current research had, at the very least, contemplated a need for lifestyle change and it is reasonable to suggest that given some change had been made, this indicated they were in the action stage of change.

Several families directly spoke of the benefits of seeing results from the changes they had made. According to behaviour change theory, change is most likely to occur if the individual perceives that a problem exists (Wee et al., 2005). Once a discrepancy has arisen between engaging in a particular behaviour and the threat that accompanies it, the stages of change model suggests readiness to change is heightened (Prochaska, et al., 1992a). According to this model, individuals in the latter stages of change reduce cognitive processes and increase behavioural processes. In other words, they stop thinking about changing a behaviour and start to action that change. As Wee et al. (2005) suggest this would explain the families desire to increase the level of their child's physical activity and modify their diet. The parents described how their beliefs about their child's eating and physical activity needs changed over the course of the program, which then led to a change in how they structured those aspects of their child's life. This finding was consistent with research that has shown that attitudinal change frequently influences physical activity levels and dietary patterns (Gable, & Lutz, 2000; Williden, Taylor, McAuley, Simpson, Oakley, et al., 2006).

Changes in the beliefs the parents held were brought about by information provided by the programme. All families commented that they had found the material provided over the course of the programme informative and of use. In some cases, it was read by all family members, not just the parents alone. None of the families felt that they were uninformed about issues surrounding physical activity and diet; however all parents revealed that they had acquired new knowledge in specific areas (e.g. ability to read labels on food products, understanding of daily intake from various food groups). The children's attitudes also altered, this alteration was accompanied by an increased sense of responsibility for their own physical health

and well-being. An earlier study found attitudinal change in children occurred when, among other things, they gained a sense of control over their weight status (Ward-Begnoche & Speaker, 2006).

The abovementioned sense of control appears to also be associated with confidence and motivation. A reoccurring theme from parents during this research was that 'the Bodywise programme was effective if you wanted it to be'. At the outset there was a reported lack of confidence that change could occur. However, once the families had successfully made some change their confidence increased. According to the stages of change model self-efficacy is "the individual's degree of confidence that he or she can engage in a positive behaviour, or abstain from engaging in a problem behavior across a broad range of specific, salient situations" (Marcus, & Simkin, 1994, p.1401). Research has shown that the more confident a person is, the more likely they are to make improvements to lifestyle (Ward-Begnoche & Speaker, 2006). Confidence is often accompanied by increased motivation and behaviour change theory suggests that highly motivated individuals also demonstrate imminent readiness to change (Ward-Begnoche & Speaker). In the interviews held with parents they discussed the fact that once their child had successfully achieved goals set by the programme that this fostered the child's confidence to continue with change. For the parents witnessing this goal achievement assisted in keeping them motivated to continue the change process.

In addition, parents described the family-based format of the program as salient in supporting change. This is highlighted in other studies and in best practice guidelines in which a family-based approach to childhood obesity is shown to be the most efficacious form of intervention (Epstein, et al., 1990a; Stice, Shaw, & Marti, 2006). With this type of format the parent is commonly the agent of change, as was

the case in this instance. In addition, group interventions appear to have superior outcomes (Dietz & Robinson, 2005) as well as those that are of a longer duration (Germann, et al., 2006).

A number of the families spoke of their concern that the programme might be emotionally damaging to their child as it would potentially focus on the child's need to lose weight, or emphasize weight as a "problem". However, the focus of the programme was on weight management rather than weight loss, which parents reported successfully addressed that potential barrier. This was an important emphasis as it did not result in the children developing the belief that there was anything defective about themselves. An article by Galyer, Faucett, Barbour, Lourens, & Stockman (under review) showed that the Bodywise intervention improved physical self concept and no harmful effects on the Tennessee Self-Concept Scale-II were found.

In contrast to O'Dea's (2005) research that suggests interventions to reduce weight may have deleterious psychological sequelae, all parents reported that their children were happier and more confident following involvement in the programme.

Throughout the programme and at follow-up families were monitored and provided with feedback as to progress made. All families felt that the regularly scheduled contact from programme personnel had been beneficial. This structure enabled families to discuss any difficulties they may have encountered that had impeded change and allowed problem solving strategies to be employed to counter these difficulties. Current literature suggests both regular follow-up and problem solving techniques to be of value in assisting change to occur (Sabin et al., 2007; Ward-Begnoche & Speaker, 2006).

An additional factor reported to be of assistance in the change process was social support in the form of extended family and friends. The parents felt that the ability for members of their immediate support network to view the programme first-hand assisted on a number of levels. Firstly, it heightened their awareness of the goals the family were pursuing. Secondly, it sought 'buy in' from the friends and family and, thirdly, once the children were in the care of members of the support network the latter were conscious of the need to provide responsible care and adhere to appropriate guidelines. Finally, the influence of extended family and friends was clearly important as they were able to positively reinforce the lifestyle changes being made by the family. The finding that a social support network is beneficial in the promotion of behaviour change is evident in the literature (Wu, Tudiver, Wilson, & Velasco, 2007). Not only does this phenomenon impact on activity levels, it has been shown to assist lifestyle change as a whole (Steptoe, Rink, & Kerry, 2000).

#### ***4.4.3 Impediments to positive change***

Several barriers to effective change were identified by the families. In concert with the theoretical underpinnings of the stages of change model, which suggests that change does not occur in a linear fashion but rather an expectation exists that regression to an earlier stage of change is likely to occur before behaviour change is finally achieved (Connor, 1994).

Most of the families involved in the current research revealed that a change in routine interrupted their ability to make lifestyle change. The main sources of disruption were described as holiday periods, including school holidays, and when their children were in the care of others. In relation to the latter, the parents commented that when their children were elsewhere they lost the ability to monitor their behaviour. Likely reasons these disruptions caused changes were that the

children may have had access to food not normally available, and that the structure of their day was diminished without the necessity of being in the classroom.

Furthermore, activity levels may have reduced during holiday periods due to the physical education provided during the school day being absent. Literature on routine disruption appears sparse; therefore, there has been no ability to compare whether this factor was a barrier for change in other child-focused interventions. A lack of time reduced the opportunity to engage in physical activity and lead to more convenient and less nutritious food options being sought by some families. Demands on time often originated from the occupational sphere and flowed on to impact on the domestic household. Research shows that maternal employment has been on the rise in past decades and this was a factor highlighted by some of the participants as resulting in less time available for the family (Hawkins, et al. 2007). A further impact of a dual-income family is that domestic responsibilities may be neglected due to time spent at work. Some of the participants spoke of the desire to provide healthy and nutritious food for their children; however they commented that it was often more time consuming to prepare healthy food than to buy takeaways for the family at the end of a busy day. This difficulty is also illustrated in the literature (Gable & Lutz, 2000). Familial composition has also been reported to effect food consumption, with single parent and dual-worker families reported as purchasing foods high in sodium and energy-density (Crockett & Sims, 1995).

Time of the year was also reported to impact on change. For working families the logistics of incorporating the appropriate amount of physical activity for their child on week nights in winter time proved challenging. One family spoke of the effort they made to exercise outside in the dark and noted that it was far from optimal.

However, on cold, dark, and rainy nights the barriers for this family were reported to

be too high to continue. In the literature season of the year as a change impediment factor does not appear to be reported.

Along with constraints on time, financial constraints were described by one family as being problematic. The cost of healthy food was highlighted by this family as being of concern. Although the family continued to purchase healthy food and follow a nutritious diet, there was a sense of frustration that energy-dense, poor quality items, which were also quicker to prepare, could be purchased at less cost. Economic constraints, together with the criticism outlined by the family, have both been acknowledged in the literature as a barrier to healthy lifestyle (Pagnini, Wilkenfeld, King, Booth, & Booth, 2007; Swinburn & Egger, 2002; Williden, et al., 2006).

The experience of peer pressure reportedly interfered with one child's efforts to make lifestyle change. Being with peers who would try to coerce the child to consume formerly acceptable foods and beverages created a source of temptation for this child. In addition, making change affirmed the child's sense she was different from her peers. These factors disrupted change at the outset and resulted in the need for her parents to counsel their child regarding eating behaviour change. In a study by Hesketh, Waters, Green, Salmon, and Williams (2005) they too noted parents reported peer pressure as being a significant impediment to change. The ubiquitous sharing of food and snacks during the school day and the inability of parents to monitor food intake both contributed to this problem.

Lack of parental cohesion was also found to act as a barrier rather than a promoter of change. In this instance attitudinal difference between parents over family meal patterns created problems. One parent wished to dine together as a family in the evenings, while the other did not. As no agreement could be reached only one parent child dined with their child, with the child being restraint to this arrangement.

Research has shown that there is a decline in the prevalence of family dining (Jabs & Devine, 2006). Neumark-Sztainer et al. (2003) reviewed the association between family meal patterns and nutritional content. Results from their study showed that meals shared as a family tended to be more nutrient dense. Therefore, dining together has benefits from a weight control perspective.

#### ***4.5 Limitations of Research***

This research was subject to several limitations therefore caution should be exercised when interpreting the results. The first drawback was the use of an untried questionnaire. In addition, the data provided for analysis was limited in size, therefore this limited statistical power. A larger sample would have remedied this problem and provided more robust findings.

Thirdly, the research would have benefited from more breath, that is, more people at each stage of change would have allowed for better generalization of results.

In addition, although the Bodywise data was obtained from an ethnically diverse, population, a more even ethnic distribution may have provided different and more robust outcome data. As far as the interview participants were concerned, they were predominantly European or New Zealand European. This being the case, findings from this current research may not generalize to the wider population.

Furthermore, the data supplied by the Bodywise programme did not include an overall physical activity rating that could be compared with the overall nutrition rating provided. This hindered the ability to elucidate results related to physical activity. As it was not possible to review an overall rating of physical activity, screentime and outdoor time were chosen for analysis as the literature suggests they identify patterns in activity change.

Together with the sample size limitations noted above in the data provided by Bodywise, only a small number of interviews with families were held (four families). More participants would have increased the breadth of the study. Finally, as far as the data obtained from the interviews were concerned, this was provided by a self-selecting sample who was highly motivated to discuss their largely favourable experiences of change.

#### ***4.6 Conclusions and Future Research Considerations***

Overall the Readiness to Change questionnaire adapted by Galyer and McClintock (2004) was found to be reasonably reliable for use with the families of obese children. Suggestions to improve the questionnaire included the deletion of certain questions or a revision of their wording. In addition, taking into consideration the themes identified from the semi-structured interviews, a motivation to change screen including questions comprised of parental concern for their child's health, level of parents' confidence/self-efficacy, perceived support for change from extended family/friends, and whether peer influences would aid or impede change could add to the usefulness of the screen in intervention planning.

Analysis of the data provided by the Bodywise programme revealed that families were frequently in a different stage of change for eating and physical activity, suggesting that perhaps it is more useful to consider the two target areas separately. Several possible clinical implications were identified for the action stage of change group including the provision of prompt goal setting at the commencement of the programme given that action is imminent. Also individuals at this stage of change will respond well to being set more substantial goals. In addition, these individuals will also benefit from relapse prevention being incorporated earlier on in the programme. Unlike individuals at earlier stages of change, monitoring and booster

sessions should be adequate to facilitate self- efficacy rather than intensive supportive interventions.

The information derived from the interviews with families provided valuable insight into what influenced change over the course of the intervention, illustrating that change was not linear. While the families are grouped at a particular stage of change at the beginning of the programme, the interview data suggests that stage of change may well alter over the course of the intervention depending on what barriers and supports are present in the families' immediate environments. Factors that assisted were observable improvements in physical activity and nutrition, leading to a change in attitudes and beliefs, along with an increase in confidence and motivation. In addition, the structure and delivery of the Bodywise programme was credited as being of assistance with change. Furthermore, the reinforcement from extended family and friends also appeared to be of considerable importance. Along with promoters of change, barriers to change were also identified. These included disruption to routine, peer pressure, financial and time constraints, together with a lack of parental cohesion.

Although the stages of change model has not been used in an intervention for childhood obesity before, this study lends support to its possible utility and recommends further investigation of similar childhood obesity programmes to examine whether they produce comparable findings . Additional research would also ideally include a wide cross section of families at various stages of change demonstrating different levels of satisfaction with the intervention undertaken.

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## Appendices

- A        Readiness to Change Questionnaire by Heather, Rollick, and Gold (1992)
- B        Readiness to Change Questionnaire by Galyer and McClintock (2004)
- C        Letter of Invitation
- D        Information Sheet
- E        Consent Forms
- F        Interview Schedule

## Appendix A

### READINESS TO CHANGE QUESTIONNAIRE

Please read the sentences below carefully. For each one please tick the answer that best describes how you feel. Your answers will be private and confidential

		Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1.	My drinking is OK as it is.	<input type="checkbox"/>				
2.	I am trying to drink less than I used to.	<input type="checkbox"/>				
3.	I enjoy my drinking, but sometimes I drink too much.	<input type="checkbox"/>				
4.	I should cut down on my drinking.	<input type="checkbox"/>				
5.	It's a waste of time thinking about my drinking.	<input type="checkbox"/>				
6.	I have just recently changed my drinking habits.	<input type="checkbox"/>				
7.	Anyone can talk about wanting to do something about drinking, but I am actually doing something about it.	<input type="checkbox"/>				
8.	I am at the stage where I should think about drinking less alcohol.	<input type="checkbox"/>				
9.	My drinking is a problem.	<input type="checkbox"/>				
10.	It's alright for me to keep drinking as I do now.	<input type="checkbox"/>				
11.	I am actually changing my drinking habits right now.	<input type="checkbox"/>				
12.	My life would still be the same, even if I drank less.	<input type="checkbox"/>				

QUESTIONNAIRES NOT TO BE ADMINISTERED WITHOUT  
APPROPRIATE TRAINING AS INDICATED.



## Appendix B

NAME: \_\_\_\_\_

The following are statements about how parents might think about their child's weight, eating and level of activity. Please rate your own response to these statements on the scale provided. Put a tick in the column that best describes what you think.

		Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
1	Changing my child's weight is difficult but worth it in the long term					
2	I intend to change my child's eating habits					
3	I have recently made changes to my child's eating habits					
4	My child's weight has reached the stage where I should consider doing something about it					
5	It is alright for my child to keep doing the same amount of physical activity as they do now					
6	It is alright for my child to keep eating as they do now					
7	I am trying to change my child's physical activity levels right now					
8	My child enjoys eating but sometimes he/she eats too much					
9	My child should cut down on food intake					
10	My child should increase physical activity					
11	It is a waste of time trying to change my child's weight					
12	My child's weight is a problem					
13	I have recently made changes to my child's physical activity habits					
14	I intend to change my child's physical activity habits					
15	My child's weight is okay as it is					
16	My child is in control of his/her own weight					
17	I am trying to change my child's eating right now					
18	My child's physical and psychological wellbeing would be the same even if his/her weight changed					

\* Adaptation for the Bodywise Clinic only. Galyer & McIntosh (2004)

## Appendix C

Dear family

This year the Bodywise Program is lucky enough to have a masters student, Alison Thomson doing a research project on childhood obesity. The project is aimed at helping health workers like us understand more about what helps families change. It is important as there are no other New Zealand projects that have asked families about what works for them. We would like to use this information that Alison collects from families to help us improve Bodywise.

All of the information about the project, and the invitation to join is attached. If you are keen to take part please contact Alison by phone, or by mail. This project is completely voluntary and will not affect your relationship with Bodywise in any way. The Bodywise team will not know if you have taken part or not.

Thanks for taking the time to read through the information

Karma Galyer (on behalf of the Bodywise team)  
**CLINICAL PSYCHOLOGIST**

## Appendix D

### HELP FAMILIES CHANGE CHILDHOOD OBESITY INFORMATION SHEET

May 2007

Dear Family

My name is Alison Thomson and I am a student at the University of Waikato. This year I am completing my Masters thesis on childhood obesity and readiness to change lifestyle. This research involves investigating how families make changes to their eating habits and activity patterns. We would love to include your family's ideas.

#### **Why is the Project Happening?**

As you know, more and more children in New Zealand are having difficulties with childhood obesity. Programmes such as Bodywise have been set up to try and help families keep their children healthy. To make these programmes work better, it would be useful to know what really helps families to a) decide they want to change childhood obesity, and b) to make eating and activity changes that last. If we know more what types of barriers stop people changing we can help to solve those problems. If we know more about what keeps families on track, we can develop those strengths in the programme.

#### **What is Involved?**

The Bodywise programme has sent this invitation to participate in this project to you on my behalf. Please be reassured that your personal information remains completely confidential. The project is voluntary, that is **you do not have to respond to this invitation if you do not want to**. If you do not want to be part of the project it will not affect your relationship with the Bodywise programme in any way. If you decide to take part, **you can change your mind at anytime**.

As part of the project I would like to meet with each family and talk about their experience of changing eating and activity. This would be done at your convenience, either at your home or at the Waikato University. Only one meeting is planned and would be expected to last about 1 hour. You do not have to answer all of the questions and you can stop the meeting at anytime.

If you would like to take part, please call me at the number below. If you prefer, you can fill in your name and contact details on the slip below and send them in the free post envelope provided.

#### **What will happen to the Information that we have about you?**

All information that you share with me will be kept anonymous, that is no one else will be able to identify you. This includes the Bodywise team, who will only be shown the results of all the families together. All information will be kept securely at

the University of Waikato for a period of 5 years before it is destroyed. I will send a copy of the final study to all families who participated. It is also likely that the results of this project will also be shared with other health professionals at presentations, or in a journal article. Again, you cannot be identified in any way.

**Are there any Benefits in taking part in the Project?**

There is no direct benefit to your family for participating in this research. The real value of the information is the combination of everyone's ideas, which will be used to support future families wanting to help children with obesity. There are no additional risks for you in participating. As always you can contact me or the Bodywise team if anything comes up during our discussion that you want to talk about further.

**Has this Project been reviewed by an Ethics Committee?**

The project has been reviewed by the University of Waikato Human Ethics Committee and the Northern-Y Regional Health and Disability Ethics Committee (NTYREF).

**What should I do if I have concerns about the Project?**

If you have any questions or concerns about the project you can contact me, or one of my supervisors, Nicola Starkey (University of Waikato) or Karma Galyer (Bodywise Programme). Contact details are noted below.

Alison Thomson  
114A Lewis Street  
Hamilton  
PH 0274 408958

Nicola Starkey  
University of Waikato  
Private Bag 3105  
Hamilton  
PH 07 838 4466 ext 6472

Karma Galyer  
C/- Childrens Clinic  
Waikato Hospital  
Private Bag 3200  
Hamilton  
PH 07 839 8899 ext 6957  
Or 021 762 836

Please feel free to talk about the project with your family, or any other significant people to you. You can also obtain independent advice and support from the local Health and Disability Advocacy Service on 0800 4 ADNET (0800 423668).

Thank you for taking the time to read through this information. Please don't hesitate to contact me if you have any queries.

Alison Thomson

To:

Alison Thomson  
Department of Psychology  
University of Waikato  
Private Bag 3105  
Hamilton

I would like to talk more about the Helping Families Change Childhood Obesity Project. My contact details are as follows:

Full Name: .....  
(Please print)

Address: .....

Phone Number .....

## Appendix E

### HELP FAMILIES CHANGE CHILDHOOD OBESITY CONSENT FORM (FAMILY COPY)

I have looked at and understood the contents of the information sheet dated May 2007. Any questions that have arisen in regard to this study have been satisfactorily answered and it is my understanding that should any further queries arise I can contact the people named on the information sheet.

I understand that taking part in the study is my choice (voluntary). I understand I have the right to withdraw from this study at any time, and to decline to answer questions should I so wish. No material that could identify me will be used in any reports on the project.

It is my understanding that the information gathered will only be used for this research and publications arising from this research project.

I, ..... (participant's name) agree to participate in this study under the conditions set out in the information sheet.

Date: .....

Please sign both forms and keep the 'Family Copy' for yourself

✂-----

### HELP FAMILIES CHANGE CHILDHOOD OBESITY CONSENT FORM (PROJECT COPY)

I have looked at and understood the contents of the information sheet dated May 2007. Any questions that have arisen in regard to this study have been satisfactorily answered and it is my understanding that should any further queries arise I can contact the people named on the information sheet.

I understand that taking part in the study is my choice (voluntary). I understand I have the right to withdraw from this study at any time, and to decline to answer questions should I so wish. No material that could identify me will be used in any reports on the project.

It is my understanding that the information gathered will only be used for this research and publications arising from this research project.

I, ..... (participant's name) agree to participate in this study under the conditions set out in the information sheet.

Date: .....

Would you like to receive a summary of the results of this study?                      Yes/No

**Appendix F****INTERVIEW SCHEDULE**

Age and gender of child participant

Cultural affiliation

How many children are there in the family?

What is the weight status of the other siblings?

How long have they been involved with the programme?

Why did you decide to join the programme?

What did you hope to achieve by joining?

What did you feel were the benefits of achieving the stated goals?

How confident were you of achieving those goals/change?

How much attention was paid to self-esteem?

What changes have you made so far? (Eating and exercise)

What assisted you to start those changes? (Child specific programme?)

What helped you to keep those changes going?

What difficulties have you encountered and how you addressed those difficulties?

Was there was any other significant influence that either assisted or impeded the family's progress in making change either initially or now?

Does your child mix with other children in the programme out of programme hours?

How often will your child help prepare a meal?

What impact does that have on with he/she will eat?

Are there rules or punishment for not eating certain things?

Is there anything else you would like to tell me about the Bodywise programme?

Could you tell me about your child's pattern of weight loss?

Could you tell me about what info/literature the programme provided and how understandable you found it?

I will transcribe this and forward a copy to you so you can review it and also if you think of anything further perhaps you could contact me.