EATING BEHAVIOUR, PERSONALITY TRAITS AND BODY MASS

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Tatjana van Strien

EATING BEHAVIOUR, PERSONALITY TRAITS AND BODY MASS

PROEFSCHRIFT

ter verkrijging van de graad van
doctor in de landbouwwetenschappen,
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STELLINGEN

1. Psychometrische schalen voor eetgedragingen zijn onmisbaar voor onderzoek naar de behandeling van overgewicht.
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2. Het heeft geen zin een "emotionele eter" een vermageringsdieet voor te schrijven.
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4. In een vrouwelijke onderzoekspopulatie is er in longitudinaal onderzoek een grotere kans voor het optreden van response sets dan in een cross-sectioneel onderzoek.
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   Advies inzake Adipositas aan de Gezondheidsraad, 1984.

6. Probleemgericht onderwijs bevordert de integratie van nieuwe kennis in bestaande kennisstructuren.
   H.G. Schmidt. Activatie van voorkennis, intrinsieke motivatie en de verwerking van tekst, 1982.

7. Het vergroten van mondigheid van vrouwen verkleint hun medische consumptie.
   Gezondheidszorg en Vrouwen. Emancipatieraad, 1984.

8. "Feminism is not concerned with a group of people it wants to benifit, but with a type of injustice it wants to eliminate".
   J. Radcliffe Richards. The Sceptical Feminist, 1982.

9. Het opzetten van onderzoek dat voor het merendeel drijft op tijdelijke wetenschappelijk personeel loopt het gevaar gelijk te staan aan het bouwen van een brug zonder pijlers.

10. De gebrekkige begeleiding van passagiers tijdens treinstoringen wekt de indruk dat de Nederlandse Spoorwegen een Sociale Dienst zijn noch hebben.

11. In dubio pro arte.
    D. Ronte. Museum Moderner Kunst Palais Lichtenstein. Museum des 20 Jahrhunderts, Wien, Museum, 1982, 3, 19.

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AAN MIJN OUDERS

blz.

Contents

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CHAPTER 1

This study forms a part of a multi-disciplinary research project on overweight which was initiated in 1979[1] at the Department of Human Nutrition, The Agricultural University, Wageningen, the Netherlands. This study focuses on psychological aspects of overeating and weight gain. Others involved in the project have covered such aspects as epidemiology, health and nutrition (e.g., Baecke, 1982; Rookus, Burema, Deurenberg and Hautvast, in preparation; Seidell, Bakx, de Boer, Deurenberg and Hautvast, 1985; Van Staveren, Deurenberg, Burema, de Groot and Hautvast, submitted).

Three psychological theories, dealing with development and maintenance of human obesity, are central to the research. Associated with these theories are three types of eating behaviour. The first of these is psychosomatic theory, which focuses on the phenomenon of emotional eating, that is, eating in response to arousal states such as anger, fear or anxiety. Secondly, externality theory concentrates on the phenomenon of external eating, that is, eating in response to food-related stimuli regardless of the internal state of hunger or satiety. Thirdly, the theory of restrained eating focuses on the psychological side-effects of dieting, that is, the possible breakdown of restrictive control, which results in the disinhibition of suppressed eating behaviour and excessive food intake. The main problem associated with the three theories is that they differ in their explanations of exactly why individuals overeat, which makes it difficult to determine how overeating or overweight can best be treated.

The principal aim of this study, therefore, was to examine the validity of each of these theories. This was carried out in two ways (Parts One and Two). The published studies central to the three theories are examined in Part One. The nature of the processes described in each of these theories, and a review of the most central research findings, are covered in this part. In addition, a brief description of the different principles of weight management advocated by the three theories is given. Part One concludes with an outline of the empirical research which has been carried out in order to test the three theories. In Part Two a series of psychometric studies which looked at the relationships between the three types of eating behaviour (emotional eating, external eating and restrained eating) and body weight, personality characteristics and life events, were conducted.

[1] The author joined the project in September, 1982.

PART I. THE THREE THEORIES OF EATING BEHAVIOUR: REVIEW OF LITERATURE

CHAPTER 2

PSYCHOLOGICAL THEORIES OF OVEREATING AND WEIGHT GAIN

The introduction has already referred in brief to the three psychological theories of overeating and weight gain. In this part the theories will be further examined. As the three theories are central to the research conducted in this thesis, the nature of the different processes outlined in them will be described in detail. Each of these theories has been subjected to empirical testing but only partial validation could so far been obtained. Though the three points of view will be presented as theories, they might also be depicted as a set of hypotheses. The theories will be presented in chronological order to demonstrate how the externality theory originated from the psychosomatic theory, and how the theory of restrained eating originated in its turn from the externality theory. One danger of this procedure is that it may give the impression that the development of a new theory refutes the veracity of the earlier theories. The truth, however, is that all three theories still have great influence, not only in the areas of therapy and weight management, but also upon research. Recently, a number of attempts have been made to combine the viewpoints expressed in the three theories so as to formulate one single theory (e.g., Slochower, 1983[a]; Herman and Polivy, 1984).

From a historical point of view, it is not surprising that the first attempts to explain overweight in psychological terms were made by psychoanalysts. Overweight was long considered as an exclusive medical problem. But the conclusion that the overwhelming majority of cases of obesity were not caused by any organic disorder of the metabolism, but were simply the result of overeating, moved the area of interest from biochemical regulatory mechanisms to the psychological factors which cause an increase in food intake. However, ties with the somatic determinants of obesity were not completely broken. Obesity was first dealt with by using psychoanalysis, an offshoot of medical practice, by psychoanalysts, who often had a medical training. Most of those active in this field worked as practical therapists, and a theory of overeating originated from their experience with clients. As a result, a variety of viewpoints, all falling within the category of psychoanalytic thought, were developed; these will be summarised under the general heading of "psychosomatic theory".

As a result of an increased interest in carefully conducted empirical research, an attempt was made to test the psychosomatic theory empirically,

with an initially negative outcome. In an endeavour to better explain the observed results, the externality theory was formulated, and this theory, in its turn, was "replaced" by the theory of restrained eating.

CHAPTER 3

PSYCHOSOMATIC THEORY

A normal response to emotional arousal states such as anger, fear or anxiety is loss of appetite. Emotional arousal inhibits gastric motility (Carlson, 1916), and leads to the suppression of gastric movement and the liberation of sugar from the liver into the bloodstream (Cannon, 1915). As these physiological states are similar to the chief peripheral physiological correlates of anxiety, emotional arousal and stress generally lead to decreased eating and subsequent weight loss. However, for some individuals emotional arousal and stress lead to an excessive intake of food. This so-designated "emotional eating" is, according to psychosomatic theory, found in individuals who eat in response to emotional states, especially anxiety and depression, rather than in response to internal cues of hunger and satiety.

Classical psychoanalysts have explained emotional eating in terms of fixation at the oral stage. As food intake is the principal source of pleasure during the first year of life, the mouth functions as the predominant erogeneous zone. During this period, the mother constitutes the central love object of the child, as she is the source of many instinctual gratifications, and the child learns to associate food consumption with maternal care. In a normal developmental process the focus on oral needs becomes gradually integrated with other sensory processes. However, if some traumatic event occurs during this process, the child may become fixated at one of the early stages of development. If it becomes fixated at the oral stage, it is possible that the child will not easily relinquish its need for oral gratification, and in adulthood will continue to recognise food as a symbol of maternal care. When undergoing emotional stress, such individuals are likely to turn to food in an attempt to recapture the security and comfort experienced in infancy (Slochower, 1983[a], pp. 12-13).

The psychoanalytic explanation of the generation of emotional eating has been criticised on the grounds that it does not identify the precise mechanism which transforms oral fixations into the specific symptom of overeating

(Slochower, 1983[a]). So many unconscious meanings have been associated with overeating, food and obesity by various psychoanalytic authors, that Kaplan and Kaplan conclude that it seems that"... any emotional conflict may eventually result in overeating" (Kaplan and Kaplan, 1957, pp. 196-197). For this reason, Kaplan and Kaplan maintain that overeating seemingly need not always have resulted from oral fixation, and describe emotional eaters as emotionally disturbed persons who have learned to use overeating as a means of coping with their psychological problems (l.c., p. 197). In a similar way Bruch (1961, 1964) moved from a classical psychoanalytic interpretation of eating disorders to a psychodynamic interpretation based on a distinction between what she termed "developmental" and "reactive" types of obesity.

Developmental obesity is associated with severe emotional and personality disturbances, and is conceptualised as beginning in infancy, and as being caused by a fundamental feeling of rejection on the part of the mother towards her child. According to Bruch (1961, pp. 470-471), the mother would often feel that the child was "too much" for her, and could pay very little attention to it, with the exception of stuffing it with food. If the response of the mother is continuously inappropriate, be it neglectful, oversolicitous, inhibiting or indiscriminatively permissive, the outcome for the child will be a perplexing confusion of his biological cues, and of his perceptions and conceptualisations. When the child is older, it will be unable to recognize whether it is hungry or satiated, or suffering from some other discomfort, and may overeat in response to virtually any arousal state. As an adult it suffers from a deficit in hunger awareness.

Reactive obesity is seen as occurring primarily in adults in response to traumatic environmental circumstances (Bruch, 1964, pp. 270). This type of obesity has not been associated with fundamental life relationships. Rather it is seen as occurring following situations that are akin to those usually accompanying grief and depression, such as severe mental shock, the death of a beloved person, separation from the home, or other events involving fear of desertion and loneliness.

Although psychoanalytic theorists agree that unconscious conflicts are central to the emotional distress that leads to overeating, they disagree about the meaning of overeating for the individual. Nevertheless, all of them regard overeating as a response to internal emotional arousal.

RESEARCH

Studies of the psychosomatic theory have examined firstly, whether obese individuals experience negative emotions more often and with a greater intensity than do normal-weight individuals, and, secondly, whether obese individuals increase food intake in response to emotional stress, and whether they show anxiety reduction as a result of emotional eating.

Emotional reactivity. Studies of emotional reactivity have consistently found that obese individuals experience negative emotions more often and with a greater intensity than do normal-weight individuals. Leon and Chamberlain (1973) noted that formerly and currently obese women reported a higher frequency of traumatic events and feelings of tension during three days of recording than did normal-weight subjects. Similarly, Lowe and Fisher (1983) found a significant association between negative emotional arousal and body weight, when subjects self-monitored their mood in their home environment immediately before each intake of food for twelve consecutive days. Finally, experiments by Abramson and Wunderlich (1972), Pliner, Meyer and Blankstein (1974), and Rodin, Elman and Schachter (1974) indicated that obese subjects were more distressed by a variety of noxious stimuli than normal-weight subjects.

However, in two studies where auditory feedback on heart rate was utilised as the arousal manipulation, no differences in the responsiveness of obese and normal-weight subjects, as recorded in self-reported manipulation checks, were found (Slochower, 1976; Slochower and Kaplan, 1980). Similarly, no obese/normal differences were found in the intensity of self-reported mood in response to the stress of taking exams or the relief of finishing them (Slochower, Kaplan and Mann, 1981). In all three studies, however, obese subjects showed less variability in their responses to manipulation check scales than normal-weight subjects. This indicates, according to Slochower (Slochower and Kaplan, 1980), that overweight subjects respond more consistently to experimental manipulations than do normal weight subjects. Slochower maintains that this is consistent with the notion of the increased external responsiveness of the obese.

Emotional eating and anxiety reduction. Interview and questionnaire studies of obese individuals in (mostly) psychiatric settings support the notion that the majority of obese individuals overeat when anxious, depressed or lonely (Freed, 1947; Hamburger, 1951; Hecht, 1955; Stunkard, 1959[a]; Atkinson and Ringuette, 1967; Holland, Masling and Copley, 1970; Leon and Chamberlain, 1973;

Kalucy and Crisp, 1974; Castelnuovo-Tedesco and Schiebel, 1975; Plutchik, 1976, and Rand and Stunkard, 1978). In contrast, tests of arousal manipulations on eating behaviour showed either slight increases or no increases in food intake by obese subjects tested under high versus low anxiety conditions. Schachter, Goldman and Gordon (1968) conducted the first test of the psychosomatic hypothesis, and for the purpose of illustration it will be described in some detail.

Schachter and his colleagues (e.g., Schachter, 1964; Schachter and Singer, 1962) carried out a series of experiments dealing with the interaction of the cognitive and physiological determinants of emotional states. Their experiments involved manipulating bodily state by injections of adrenaline or placebo. Simultaneously, they manipulated cognitive and situational variables which were presumed to affect a subject's interpretation of his bodily state. The results showed, that physiologically aroused subjects attached specific emotional labels to their arousal states, which are consistent with concurrently experienced situational cues or cognitive factors. This suggests that there is not a direct relationship between a set of physiological symptoms and a psychological state. Schachter concluded from these observations that, "Obviously, attaching a particular label to any particular internal or visceral syndrome is a learned, cognitively and socially determined act", (Schachter et al., 1968, p. 91).

Bruch (1961) made a similar observation concerning obesity during the same period, suggesting that obese individuals have not learned to discriminate between physiological symptoms of hunger or satiety and accompanying emotional internal arousal states, such as anger, fear or anxiety. When Stunkard and Koch (1964) demonstrated that some overweight individuals were much less likely than normal-weight individuals to relate their stomach contractions to the conscious experience of hunger, Schachter became interested in the idea (that in a similar way to the interpretation of emotional states) subjects may differ in the extent to which they interpret physiological states, such as gastric motility, as "hunger".

To test this hypothesis, Schachter and his co-workers conducted an experiment in which they attempted to manipulate gastric motility and other correlates of food deprivation in two ways (Schachter et al., 1968). Firstly, they directly manipulated food deprivation, so that some subjects had empty stomachs and others full stomachs before entering the experimental eating situation. Secondly, through the manipulation of fear, some subjects entered the eating situation frightened and others calm. Food deprivation was manipulated by feeding the subjects roastbeef sandwiches (the "preload condition"), or by giving them nothing to eat (the "no preload condition").

Fear was manipulated by threatening the subjects with a very painful or a very mild shock (high or low fear conditions). In the eating situation, following the manipulation, the subjects tasted and rated crackers for 15 minutes, under the guise of a "taste test", and Schachter and his co-workers simply counted the number of crackers that a subject ate. Both normal-weight and overweight (male) subjects participated in the experiment. The normal-weight subjects consumed more crackers when they had had no preload and were experiencing low anxiety, than when their stomachs were full and under high anxiety. In contrast, the obese subjects ate the same amount of crackers independently of the preload or fear conditions. It was found, in addition, that the obese subjects did not report any reduction in fear of the electric shock following eating.

The findings, therefore, did not lend support to the psychosomatic theory, as obese subjects did not increase consumption under high anxiety conditions, and eating did not function to alleviate their fear of a painful shock. Remarkably, as with the threat of shock, a preload did not affect the amount eaten by overweight subjects. Both these conditions, however, did affect the amount eaten by normal-weight subjects. From this observation, Schachter concluded that the internal state seems irrelevant to the food intake of the obese, and he suggested that their eating behaviour may be triggered instead by external food-related cues. This so-called "externality hypothesis" was examined in a series of experiments, which will be described in the following chapter.

Schachter's refutal of the results obtained through clinical experience provided the impetus for a whole series of studies relating to the validity of the psychosomatic theory, but the initial results were generally negative. Abramson and Wunderlich (1972) attempted to refine the type of stimulus used to induce arousal, by using the threat of shock for the manipulation of objective fear, and faulty feedback of scores on the Interpersonal Stability Questionnaire to manipulate anxiety. However, they found no increase in consumption by obese subjects under either of the high arousal conditions. (Data relating to normal-weight subjects was not discussed, as normal-weight subjects were found to be unresponsive to the anxiety manipulation.)

Both Schachter et al. (1968) and Abramson and Wunderlich (1972) had employed "neutral" crackers as the criterion food. McKenna (1972) manipulated, in addition to arousal conditions, the quality of test food by offering subjects either bland cookies or "extremely appetizing and tasty" chocolate chip cookies. It was found that obese subjects ate slightly more of the tasty cookies under the high rather than under the low arousal conditions ($p < 10$),

while they ate nearly identical amounts of bland cookies under both arousal conditions. In contrast, normal-weight subjects ate significantly fewer of both the good and bland tasting cookies when aroused than when calm. As overeating did not result in arousal reduction in the obese, only marginal support was obtained for the psychosomatic theory.

Utilising a food dispenser which disguised the visual feedback of the food intake of subjects, Meyer and Pudel (1972, 1977) obtained similar results. They found that a significant increase in food intake only occurred in older obese women when they had been exposed to stressors such as noise, flickering lights and insoluble anagrams. Jung (1976) also supplied limited support for the psychosomatic theory. While the stress of removing toys from four- to six-year old children reduced their food intake (Jung, 1973), suspense films seemed to enhance "oral responsiveness" and increase food consumption. This response was most significant in older, overweight girls (Jung, 1976).

Finally, in an experiment undertaken by Abramson and Stinson (1977) obese subjects ate more crackers whilst undertaking a boring rather than an interesting task. This tendency, however, was also found in normal-weight subjects, the results indicating no difference between the weight groups.

Reznick and Balch (1977), however, found evidence contradictory to the psychosomatic theory. In their experiment a higher number of overweight subjects ate test food (candies) under low rather than high anxiety conditions.

Contrary to clinical observations, therefore, experimental findings indicate that either no increase or only a minimal increase in food intake occurs in obese individuals under high arousal conditions. Eating does not appear to reduce anxiety. Most experiments showed, on the other hand, that normal-weight subjects ate less under high arousal conditions.

Slochower (1976) has suggested that the discrepancy between experimental and clinical observations may have resulted from differences in theoretical and experimental definitions of anxiety. These discrepancies may be reflected in the obese person's distinctive responses to different types of anxiety states. The psychosomatic explanation of obesity focuses on the role of diffuse (often unconscious) internal conflicts in producing the anxiety state that leads to overeating. This anxiety is probably experienced as "free-floating", rather than as having a clear source. In contrast, experimental tests of the psychosomatic hypothesis have induced anxiety through the manipulation of the external environment (e.g., through the threat of shock), which enabled subjects to clearly label the source of their affective state. Following this line of thought, Slochower hypothesised that emotional eating would occur only

when the source of the obese person's emotional arousal was unclear.

In an experimental test of this hypothesis Slochower (1976) demonstrated that overweight subjects increased their food intake only when they could not label the source of their emotional arousal. The amount eaten by normal-weight subjects was not affected by the availability of a label to explain their arousal state. Slochower and Kaplan (1980) found that the absence of a label and the inability to control the source of emotional arousal served independently to augment eating in obese, but not in normal-weight, subjects. Similar results were obtained in a study where the effects of a naturally occurring stressor (final examinations) were studied in a repeated measures design (during and three weeks after examinations) (Slochower, Kaplan and Mann, 1981).

Similarly, Lowe and Fisher (1983) found evidence in support of the emotional eating theory in a study conducted in a natural setting. In this study subjects self-monitored their mood prior to each instance of food intake. It appeared that obese subjects were more likely to engage in eating following negative emotions than normal-weight individuals. These findings applied only to snacks, and not to meals, and no obese/normal differences were registered with regard to consumption following positive emotions. In addition, it appeared that "negative" emotional eating, associated with both snacks and meals, was related to the subjects' percentage overweight.

Therefore, it has been seen that obese individuals overeat in response only to certain types of stressors. The above mentioned studies of Slochower showed that overweight individuals overate in response to diffuse emotional states, but not when the source of emotional arousal was clear.

Slochower observed in later studies (Slochower and Kaplan, 1980; Slochower, Kaplan and Mann, 1981; Slochower, 1983[b]; Slochower and Kaplan, 1983) that a crucial aspect of the "diffuse" anxiety experience is that it leaves the individual feeling relatively powerless to alter his or her internal state. These studies indicated that overweight subjects overate whilst experiencing high uncontrollable anxiety, but not when the anxiety was controllable. Two of these studies (Slochower, Kaplan and Mann, 1983; Slochower, 1983[b]) also demonstrated that a variety of uncontrollable emotional states may result in overeating on the part of obese individuals, a positive relationship being observed between low self-esteem and overeating in this group. Finally, findings obtained in studies of uncontrollable emotional arousal (Slochower, 1976; Slochower and Kaplan, 1980; Slochower and Kaplan, 1983) suggested that eating in response to uncontrollable stress has an anxiety-reducing function for the overweight. The results of these studies revealed a positive

association between emotional eating and arousal reduction in the overweight subjects, but not in the subjects of normal body weight.

According to Slochower, the observation of a positive relationship between overeating and low self-esteem suggests, firstly, that a variety of uncontrollable emotional states may result in overeating in obese subjects, and, secondly, that the dimension of the controllability of emotions is of relevance to virtually any emotional state. As confirmed by Kaplan and Kaplan (1957), what this means for psychosomatic theory is that overeating and obesity do not seem to be related to any single developmental fixation. The concept of the controllability of emotions does not seem to be state specific in a developmental sense, as it can be aroused at any time during the development of the individual.

SUMMARY

While agreeing that overeating results from internal emotional arousal, psychoanalytic theorists disagree about the meaning of overeating for the individual. Studies of emotional reactivity have consistently found that obese individuals experience negative emotions more often and with greater intensity than do normal-weight individuals. Interview and questionnaire studies of obese individuals, in mostly clinical settings, have found support for the psychosomatic theory in that the majority of the obese were seen to overeat when feeling emotionally aroused. However, experimental tests, examining the effects of arousal manipulations on the eating behaviour of obese and non-obese subjects, have initially found no or only weak indications that obese persons overeat in response to emotional arousal. Moreover, eating was not shown to reduce anxiety.

In an attempt to explain the discrepancy between "clinical" and "experimental" observations, Slochower introduced the concepts of "diffuse" as opposed to "clearly labelled" emotions, and controllability as opposed to "uncontrollability" of emotional states. Findings revealed that overweight subjects overate only in response to emotional states which are experienced as diffuse and out of control. In addition, it was shown that eating in response to uncontrollable stress has an anxiety-reducing function for the overweight.

Thus, it appears that obese individuals overeat in response to certain types of stressors, and that this overeating occurs because "it works", that is, because it has an anxiety-reducing function.

CHAPTER 4

EXTERNALITY THEORY

As has already been stated, Schachter formulated the externality theory when he did not find support for the psychosomatic theory in his experiment with Goldman and Gordon (Schachter, Goldman and Gordon, 1968). It was observed that neither a preload nor a threat of shock affected the amounts eaten by overweight subjects. Therefore, their internal state seemed to have no impact upon their eating behaviour. Reasoning from this, Schachter suggested that the eating behaviour of the obese may be triggered by external food-relevant cues, such as the smell, sight and availability of food.

In a similar way to the psychosomatic theory, therefore, the externality theory also posits that the eating behaviour of overweight individuals is comparatively unresponsive to internal physiological signals, such as gastric motility. But in contrast to the emphasis placed on internal, emotional factors in the psychosomatic theory, the externality theory focuses on the external food environment as a determinant of eating behaviour. Overweight individuals are considered as being hyperresponsive to external food-related cues. The sensitivity of obese persons to external cues high in salience was later extended to include externality as a general personality trait, rather than as a trait specific to eating behaviour (Schachter and Rodin, 1974).

RESEARCH

Sensitivity to external food-related stimuli. In a series of experiments, Schachter and his colleagues (Schachter and Gross, 1968; Goldman, Jaffa and Schachter, 1968; Nisbett, 1968[a],[b]) explored the experimental and theoretical implications of the externality theory. Two studies revealed that the eating behaviour of the obese was influenced more by time than that of normal-weight subjects. In a study undertaken by Schachter and Gross (1968) "dinnertime" was manipulated by the use of doctored clocks, and the results indicated that the obese ate more when they thought that they were eating after their regular hour than they did when they thought they were eating before their dinner hour. Similarly, a study of Goldman et al. (1968) demonstrated that fat fliers had less difficulty in adjusting to time-zone changes on long distance East-West travel than did their normal-weight counterparts.

Two further studies revealed that the eating behaviour of overweight subjects is more influenced by the sensory attributes than that of normal-weight subjects. Research by Nisbett (1968[a]) showed that overweight subjects ate less quinine-adulterated icecream and slightly more of an excellent and good tasting variety of vanilla icecream than individuals of normal weight. A similar observation was made by Goldman et al. (1968), who demonstrated that fat students appeared to be less tolerant of dormitory food than their normal-weight counterparts.

Finally, it appeared that the eating behaviour of overweight subjects was more influenced by the visuality of food than that of normal-weight subjects. Nisbett (1968[b]) found that overweight subjects ate an average of almost one sandwich less when one sandwich was visible, and more were available in a nearby refrigerator, than when three sandwiches were visually prominent and within easy reach on the table. Meanwhile, the visual prominence of presented food did not affect the eating behaviour of the normal-weight subjects. Similarly, Goldman, Jaffa and Schachter (1968) observed that fat, religious Jews were more likely to fast on Yom Kippur, when food cues were minimal, than their normal-weight counterparts.

The evidence obtained in these studies was summarised by Schachter (1967) in the form of two generalisations. Firstly, overweight individuals seemed to be highly responsive to "external cues", that is, to cues inherent in food or the environment. Secondly, overweight individuals seemed to a large degree to be unresponsive to "internal" physiological cues of hunger and satiety. Implicit in this distinction between external and internal determinants of eating behaviour, is the notion that overresponsiveness to external variables and unresponsiveness to internal variables on the part of obese individuals should lead to overeating and subsequent overweight (Nisbett, 1968[a]).

Sensitivity to external non-food related stimuli. The next series of experiments was undertaken in order to investigate whether the heightened responsiveness of the obese also holds good with respect to non-food-related stimuli, and to test the hypothesis that overweight subjects are stimulus bound and therefore generally sensitive to any sort of event.

In two experiments (Rodin, 1973) overweight subjects were found to be more disrupted than normal weight-subjects by interesting, emotionally-toned material in measures of proof-reading accuracy and reaction time latency. In contrast, they were found to perform better than the normal-weight group when there were no distracting events. The same study revealed that overweight subjects reflected more about the tasks in hand than normal subjects when there

were no distractions, which suggests that the difference between normal-weight and obese subjects in task performance may have been due to differences in attention.

A number of studies also demonstrated that overweight subjects were more emotionally responsive than normal-weight individuals to highly salient, affective stimuli, and less emotionally responsive to neutral stimuli (Pliner, 1974; Rodin, Elman and Schachter, 1974; Rodin, Slochower and Fleming, 1977). This accords with the result of previously mentioned studies conducted within the framework of the psychosomatic theory, in which it was consistently found that obese individuals were more distracted by a variety of noxious stimuli than normal-weight subjects (e.g., Abramson and Wunderlich, 1972; Pliner, Meyer and Blankstein, 1974). In other studies, obese subjects appeared to have a quicker mean latency in responding to complex external stimuli, lower tachistoscopic recognition thresholds and better immediate recall of food- and non-food-relevant cues than normal subjects (Rodin, Herman and Schachter, 1974; Rodin, Slochower and Fleming, 1977). This external responsiveness was shown to extend to such areas as time perception (Rodin, 1975) and information processing (Rodin, Herman and Schachter, 1974; Rodin and Slochower, 1974).

In conclusion, it appears that the obese differ from normal subjects in the way information is attended to and processed, and that overeating is just one aspect of externality as a personality trait (Rodin and Singer, 1976).

THE EXTERNALITY THEORY CHALLENGED

The stimulus binding concept. Results obtained by Nisbett and Temoshok (1976) strongly challenged the contention that obese persons differ from normal-weight individuals in their style of response to external stimuli, in that they exhibit a general tendency towards "stimulus binding", an "external" cognitive style. In their study a variety of tasks measuring the style of response to external stimuli were administered to a population, to assess whether the various measures of cognitive style are interrelated. It was their contention that it would only be sensible to speak of a single or broad "external" cognitive style dimension, if the correlations between the measures were found to be uniformly high. The results indicated that the correlations amongst the measures of cognitive style were generally low or zero. Even responses to the tasks which had been found by Schachter and Rodin (1974) to differentiate obese and normal-weight individuals were not correlated in the population examined by Nisbett and Temoshock. In a similar way, Isbitsky and White (1981) also failed

to find a pattern of intercorrelations amongst the various measures of external-cue sensitivity and locus of control, which would have offered support to the stimulus-binding concept of the externality theory.

Brand and Clotz (1982) similarly failed to find a single instance of a positive relationship between Rotter's measure of locus of control and Schachter's measures of externality, in their review of research investigating the relationship between these two variables. The authors contended that this absence of a relationship was not surprising, as the two concepts are theoretically incompatible. Schachter's stimulus-binding concept can be considered as a Stimulus Model. Because of its emphasis on the individual's response to external stimuli, and its lack of attention to cognitive processes, such as the decision not to eat in response to tempting external stimuli or internal cues of hunger, it must be classified as a behaviouristic learning theory (note 1)*. In contrast, Rotter's concept of locus of control can be considered as a contingency model, and must be classified as a cognitive theory (note 2), for reason of its emphasis on the individual's cognitive expectation that future events can be controlled by the individual himself, or are totally determined by outward circumstances. Brand and Clotz conclude that the usefulness of a global concept like externality is highly questionnable.

External control of feeding. Various studies failed to replicate the findings of Schachter and his co-workers (e.g., Milich, Anderson and Mills, 1976; Milich and Fisher, 1979; Meyers, Stunkard and Coll, 1980; Isbitsky and White, 1981), finding no evidence to suggest that overweight subjects differed from normal subjects in their responsiveness to external food cues.

Rodin, together with Schachter one of the main advocates of the externality theory, attributed this discrepancy in the results to the arbitrariness of sampling. In a study carried out with Slochower (1976) she observed that in every weight category there were individuals who were responsive to external stimuli, and individuals who were not. Her study with Wooley et al (1976) demonstrated that the same appeared to be true with respect to internal responsiveness. Thus, according to Rodin (1981[a]), the discovery of overweight/normal-weight differences in any a particular study is dependent on ".... how many individuals of each type wind up in samples divided according to weight" (l.c. p. 383). However, she observed in addition, that, across all weight groups, the degree of overweight was not strongly related to the degree of external or internal responsiveness demonstrated in these studies (Rodin,

* see page 39 for notes

Slochower and Fleming, 1977), and that "In fact, at extreme degrees of obesity, some individuals showed very little responsiveness to external cues" (Rodin, 1981[a], p. 363). These observations led Rodin to seriously question the validity of the externality theory, and stating that the use of the internal versus the external distinction to explain differences in the eating behaviour of obese and normal-weight individuals seems far too simple an interpretation (Rodin, 1978).

Internal control of feeding. Early research on the causal factors of overeating has been greatly influenced by the impression that the eating behaviour of normal-weight individuals is determined by internal physiological signals like gastric motility, while these signals do not function as a hunger cue for the obese. Cannon (1915) and Carlson (1916) pointed to gastric hunger contractions as determinants of the experience of hunger and the regulation of food intake. Following this line of thought, Stunkard and his co-workers investigated the degree of correspondence between the state of the stomach and self-reports of hunger in obese and normal-weight individuals, using a gastric balloon to measure gastric contractions (Stunkard, 1959[b]; Stunkard and Koch, 1964). As has already been mentioned, within the framework of the psychosomatic theory, these studies demonstrated that some overweight individuals were much less likely than normal-weight individuals to relate their stomach contractions to the conscious experience of hunger.

However, there are indications that a lack of internal responsiveness alone does not lead automatically to overeating or weight gain. Firstly, obese/normal differences in the labelling of gastric contractions do not seen crucial for the prediction of obese/normal differences in eating behaviour and food intake. Stunkard and Fox (1971) utilised a more sophisticated measure of gastric motility in a later study, but failed to find a relationship between gastric motility and reports of hunger in subjects of normal weight. It even appeared that gastric motility played only a small role in the hunger experience of both obese and non-obese subjects. This is consistent with the contention of Janowitz (1967) that ".... at present no published data exists about any species that indicate whether or not food intake or other hunger-motivated behavioral parameters are actually correlated with gastric hunger contractions" (l.c., p. 220). As a consequence, the early observations of Stunkard and his co-workers concerning obese/normal differences in the labelling of gastric contractions do not tell us anything about obese/normal differences with respect to their responsiveness to internal cues of hunger or satiety.

Secondly, there are indications that normal-weight individuals also have difficulties in adjusting their eating according to internal signals (Wooley et al., 1976). When reporting hunger, both normal weight and overweight subjects were influenced more by their initial beliefs concerning energy value than by the actual energy value of the food, and showed almost no ability to identify meals as high or low in energy content (Wooley, Wooley and Dunham, 1972).

CONFOUNDERS OF THE INTERNAL/EXTERNAL DISTINCTION

Dieting. Pudel and his co-workers (Pudel, Metzdorff and Oetting, 1975; Meyer and Pudel, 1977; Pudel, 1978) studied the satiety curves of normal-weight and obese individuals, by using a food dispenser which disguised the visual feedback of the intake of food. They observed that the rate of consumption of a 20-minute test meal differentiated obese from non-obese persons (Meyer and Pudel, 1977). The eating rate of non-obese individuals slowed during the meal, while that of the obese did not, suggesting an impairment of feelings of satiety amongst the obese. The distinction between obese and non-obese individuals, however, was blurred by the discovery of a group of non-obese persons whose rate of eating did not lessen during the meal. Further questioning of all the subjects revealed that, in contrast to the remaining subjects, this so-called "latent obese" group - biologically programmed to be obese, but of normal body weight - had once been overweight, but had managed to maintain a normal body weight at the time of the experiment by means of a deliberate restriction of food intake. This observation led Pudel to conclude that body weight resulting from the degree of internal responsiveness is not necessarily the same as the actual body weight of an individual, as body weight can be controlled to some extent by dieting.

In an endeavour to identify those individuals who have obese eating patterns, but are of normal body weight due to a conscious restriction of food intake, Pudel, Metzdorff and Oetting (1975) constructed the Fragenbogen für Latente Adipositas (FLA). This questionnaire proved successful in identifying individuals of normal weight who failed to slow their eating during a meal, that is, the "latent obese" (Pudel, 1978).

The discovery of "latent obese" subjects within a sample of normal-weight subjects appeared to offer a possible explanation of the difficulties of replicating the experiments of Schachter and his co-workers. The possibility of identifying the "latent obese" by means of a questionnaire was considered as a major step forward in overcoming problems in sampling subjects (Pudel, 1978).

Physiological and further psychological factors. Rodin and Slochower (1976) observed, in a study of the weight changes of normal-weight girls in an eight week summer camp where food was abundant and freely available, that girls who were hyperresponsive to all kinds of external stimuli, as determined in a pre-test, were those who gained most weight in this "land of milk and honey". However, 70% of this group of externally responsive normal-weight girls who gained weight during the summer camp, reached their highest weight before the final week of the camp, and thereafter began to loose weight. According to Rodin (1981[a]), this suggested that physiological and psychological variables, such as body image, are ultimately more important than external responsiveness in determining an individual's final level of body weight. Rodin did not refute the contention that external responsiveness is the primary and, therefore, the possible causal factor of overeating and weight gain, given a plentiful food environment. However, she did propose a more differentiated model in which the regulation of food also depends upon the interaction of physiological, sensory, cognitive-motivational and socio-cultural variables (Rodin, 1981[a]).

SUMMARY

According to Schachter's externality theory, overweight individuals overeat, because they are unresponsive to internal cues of hunger or satiety, and hyperresponsive to external food-related cues. This external responsiveness was later extended to non-food-related stimuli, obese persons being considered to exhibit an "external" cognitive style.

Experiments carried out by Schachter and Rodin have discovered consistent obese/normal differences in responsiveness to food- and non-food-related stimuli. However, the contention that there exists an "external" cognitive style has been challenged by various investigators. Also Schachter and Rodin's experiments dealing with responsiveness to food-related stimuli have been difficult to replicate. Further studies revealed that the internal/external distinction of the externality theory may constitute too simple an explanation of differences in the eating behaviour of obese and normal-weight individuals - it appeared that in every weight category there are individuals who are responsive to external stimuli or unresponsive to internal stimuli.

Pudel's discovery of normal-weight individuals with obese eating patterns demonstrated that the internal/external distinction may be confounded by variables such as dieting. Along the same lines, Rodin proposed that physiological variables may have an influence on the final level of an individual's

body weight. As a consequence, the externality theory was replaced by a new model, in which the regulation of food depended not only on external responsiveness, but also on the interaction of physiological, sensory, cognitive-motivational and socio-cultural variables.

CHAPTER 5

THEORY OF RESTRAINED EATING

Set point theory. In 1972 Nisbett put forward an alternative explanation of obese/normal differences in eating behaviour. He suggested that a state of relative physiological deprivation, rather than externality as personality trait, accounted for the heightened external sensitivity of the obese, as demonstrated by Schachter and Rodin (1974). From this new perspective, Nisbett advanced the "set point theory" of obesity, which posits that some individuals are physiologically "programmed" to be obese because of an excess number of fat cells, a result of genetic factors or of overfeeding during pre-adult development. In order to nourish these cells such individuals are physiologically predisposed by their hypothalamic "feeding center" to overeat. However, at the same time, social and cultural constraints deter the individual from fully satisfying his biological requirements. The result could be a person who, in absolute terms, is overweight, but who is physiologically far below the set point at which the fat cells are adequately nourished. This compromise of biological and social demands would produce an individual who is both overweight and chronically hungry.

Nisbett's line of reasoning was greatly influenced by the observations of Cabanac and his co-workers. While researching obese/normal differences in sensitivity to internal stimuli, Cabanac and Duclaux (1970) had investigated the effects of glucose loads on the affective responsiveness to sweet solutions. The pleasantness or unpleasantness of the sweet sensation is controlled in part by internal signals of hunger and satiety. Therefore the affective response of obese individuals to gustative stimulation is of relevance to studies of their responsiveness to internal stimuli. The results indicated that normal-weight individuals found otherwise pleasant tasting sweet solutions to be aversive, when they sampled them a few minutes after a gastric load of glucose. This so-called alliesthesia was found to be absent in the obese. For them a glucose load only slightly decreased the attractiveness of

the sweet solutions. In a similar way to the obese group, subjects who had lost 10% body weight also failed to show alliesthesia following a glucose load. This phenomenon was also observed in a study in which Cabanac and two of his co-workers (Cabanac, Duclaux and Spector, 1971) investigated their own (sic!) response to glucose loads before, during and after weight loss. Prior to loss, and after weight was regained, alliesthesia was observed. During the weight loss and the maintenance of low body weight, alliesthesia was found to be absent.

Cabanac et al. (1971) interpreted these results as evidence of the existence of a "ponderostat", that is a regulatory system which homoeostatically controls body weight. The ponderostat detects when the organism is below its set point, with the results that events which would signal satiety to the organism at set point level are ignored, and alliesthesia is absent. Thus, according to Cabanac and his co-workers, the presence or absence of alliesthesia following a glucose load may indicate whether the subject is at or below set point. As a consequence, the absence of alliesthesia in the obese subjects studied by Cabanac and Duclaux (1970) was seen as an indication that these persons are, for reasons of health or aestheticism, below set point.

According to Nisbett, the contention that body weight is homoeostatically regulated implies that a person who is below set point should show "obese eating behaviour", regardless of whether this person is obese or of normal weight. Moreover, the behaviour of an obese person who is at set point should resemble that of normal-weight individuals. According to this line of thought, deviation from the set point is a more fundamental determinant, and a better predictor of behaviour than body weight. It may also explain why heightened external responsiveness and a lack of internal responsiveness was observed across all weight categories.

Cognitive restraint of food intake: dieting. With the contention that an individual may be able to suppress his or her body weight below set point by a conscious restriction of food intake, a new element was introduced into the complex range of determinants which govern eating behaviour, the essential mental element of self-control.

Herman, Polivy and their co-workers expanded the idea of self-control, and made cognitive restraint, that is, the cognitive resolve not to eat, the focal point of their theory of restrained eating. These investigators contended, in line with Nisbett, that obese/normal differences in eating behaviour may reflect a condition where the majority of obese individuals are chronic dieters, something which is probably not true for normal-weight individuals. However,

they later modified Nisbett's original explanation as to why dieting influences behaviour (e.g., Herman, Polivy, Pliner, Threlkeld and Munic, 1978). Nisbett had suggested that most obese individuals, because of their extensive dieting, and their resulting maintenance of body weight below "set point", are hungry. Alternatively, Hibscher and Herman (1977) suggested that dieting may act as a stressor, and the stress of dieting could possibly result in the heightened externality and emotionality of the obese. This means that even when dieting fails to produce substantial weight loss, and body weight does not fall below set point, side-effects may still occur.

RESEARCH

In order to be able to measure an individual's level of cognitive restraint, Herman, Polivy and their co-workers developed the Restraint Scale (Herman and Mack, 1975; Herman and Polivy, 1975; Herman, Polivy, Pliner, Threlkeld and Munic, 1978). At one end of the continuum are restrained eaters who restrict their food intake in order to control body weight. At the other end are totally unrestrained eaters who seldom give a thought to the amount of food they eat. This scale is administered to populations of predominantly normal-weight individuals, and a classification of subjects as dieters or non-dieters is achieved by means of a median split of scores on the Restraint Scale.

Effects of dieting on eating. The first experiment (Herman and Mack, 1975) was designed to test the hypothesis that if the chronic restraint of dieters is overcome, they would show a "latent" form of externality, and eat more when exposed to prominent food cues than individuals who do not chronically restrain their eating. The experiment was presented to the (female) subjects under the guise of a taste test. Subjects were required to consume 0, 1 or 2 milkshakes (preload), and then to "sample" some icecream. The results revealed that non-dieters ate less following a preload. In contrast, dieters ate much more icecream after having consumed a preload excessive in energy.

Herman and Mack suggested that the milkshakes serve to breakdown the cognitive restraint that dieters normally exhibit in the face of tempting stimuli. The excessive consumption of icecream by the dieters following a preload must be attributed to the breakdown of their normal restraint, a result of exceeding their caloric threshold; ".... without a realistic hope of staying within the caloric confines imposed for herself, the dieter was left without a sufficient reason for dieting" (Herman and Polivy, 1980[a], p. 245). Later studies (Polivy, 1976; Spencer and Fremouw, 1979; Ruderman and Wilson, 1979;

tion" does indeed have a cognitive effect. When perceived calories in the preload were distinguished from the actual calories, it was found that dieters overate only when they thought that they had consumed a high caloric preload.

The subsequent study investigated the effect of anxiety (threat of shock) upon the consumption of icecream in normal-weight dieters and non-dieters (Herman and Polivy, 1975). The results suggested two things. Firstly, the results obtained where the restraint/non-restraint distinction was applied were found to parallel those obtained using the obese/normal distinction in studies such as those undertaken by Schachter et al. (1968) and McKenna (1972). Normal-weight dieters, like obese subjects, ate slightly more when anxious. In contrast, normal-weight non-dieters, like normal-weight dieters, as assessed by emotional self-report measures, were found like obese subjects, to over-react to the anxiety manipulation. It seemed, therefore, that behaviour which had formerly been thought only to characterise the obese, also characterised normal-weight dieters. Secondly, the data suggested that anxiety, in the same way as a preload, serves to disrupt cognitively-mediated self-control processes, such as dietary restraint. The disinhibition of cognitive restraint results in an increased icecream consumption by the restrained eaters, but not by the unrestrained eaters, the latter group not being inhibited in their eating behaviour to begin with (note 3).

The same interpretative scheme was applied to data collected in a study of the relationship between weight change and clinical depression (Polivy and Herman, 1976[a]). A total of 12 clinically depressed patients was designated as restrained or unrestrained eaters, and it was found that the former group tended to gain weight as their depression increased, while the latter group tended to lose weight. Thus, depression, like anxiety, appeared to disrupt self-control processes with respect to food intake in restrained eaters.

The notion of the disinhibition of self-control processes was further explored using the classic disinhibitor, alcohol (Polivy and Herman, 1976[b,c]). It appeared that alcohol served to disrupt cognitive restraint in dieters only when they fully understood that they were consuming alcohol, that is, when both the cognitive and pharmacological pre-conditions for a disinhibitory experience were in force. Under these circumstances, the ingestion of alcohol increased the food intake of restrained, but not of unrestrained, eaters.

Further research revealed that under the influence of social factors restrained eaters are capable of "sensible eating" and unrestrained eaters of "counterregulatory eating". A study of Herman, Polivy and Silver (1979) showed that the presence of a research worker served to induce "sensible eating" in

that the presence of a research worker served to induce "sensible eating" in restrained eaters, in that they showed a compensatory response, eating less after a large preload and more after a small preload. It also appeared, however, that this sensible eating ".... is easily superseded by more habitual (and less sensible) eating patterns" (Herman and Polivy, 1980[a], p. 221). When left alone to carry out a further, this time unobserved, eating task, the same subjects who had just demonstrated sensible eating behaviour, abruptly reverted to their counterregulatory eating patterns. A study of Polivy, Herman, Younger and Erskine (1979), found that the presence of a dieting model who broke her diet, served to induce a counterregulatory response in unrestrained eaters.

Studies by Kirschenbaum and Tomarken also indicated that restrained eaters are capable of sensible eating and unrestrained eaters of counterregulatory eating. In one study (Kirschenbaum and Tomarken, 1982) restrained eaters demonstrated sensible eating behaviour when stimuli were provided that improved their self-monitoring abilities (presenting food in a small bowl, and informing the subjects about its energy content). Unrestrained eaters demonstrated counterregulatory eating patterns when these stimuli were not provided. Another study (Tomarken and Kirschenbaum, 1984) showed that both restrained and unrestrained eaters ate more test food when they had anticipated a dinner of high energy content, than when expecting a dinner of low energy content or no dinner at all. From the observation that unrestrained eaters are also capable of counterregulation, it was concluded that restrained eating is a continuous rather than a dichotomous variable (Herman and Polivy, 1980[a]): unrestrained eaters differ only from restrained eaters in that they have a higher threshold of counterregulation.

One general conclusion that can be drawn from the foregoing research is that, as they tend to overeat when their cognitive restraint is broken down, restrained eaters risk gaining weight. The ability to maintain restraint was found to depend on such factors as emotional state, the perception of having broken the diet, and the behaviour of other persons present, in short, factors ".... of the world around them" (Polivy and Herman, 1983, p. 153). It was also indicated that behaviour which had been thought formerly to characterise only the obese, also characterised normal-weight dieters. The study of the effects of anxiety on the consumption of icecream showed that normal-weight dieters, like the obese, appeared insensitive to internal signals of satiety, and ate slightly more when anxious. In addition, normal-weight dieters, like obese subjects, appeared emotionally reactive, in that they over-reacted to the anxiety manipulation.

Side effects of dieting. Further studies revealed that the restraint/non-restraint distinction also paralleled the obese/normal distinction in non-eating situations. Replicating a study of Pliner, Meyer and Blankstein (1974), it was observed that dieters, like the obese, responded more strongly to emotional stimuli than non-dieters. Similarly, by replicating Rodin's study of the effects of distraction and emotional arousal on proof-reading performance (1973), it was found that the performance of dieters, like that of the obese, was impaired by distracting stimuli (Herman, Polivy, Pliner, Threlkeld and Munic, 1978).

Herman and his co-workers interpreted the data obtained in the study of proof-reading performance as being indicative of an elevated arousal level in dieters. The arousal/performance curve, which portrays the relationship between performance and arousal as an inverted U-function, with optimal performance occurring during intermediate levels of arousal, was taken as a starting point. Dieters were in a state of arousal optimal for performance before the imposition of a distractor (arouser), showing superior performance on proof-reading tasks under conditions of no distraction, and impaired performance under conditions of distraction. As their performance improved under conditions of distraction, non-dieters were at an arousal level less than optimal for performance before the imposition of a distractor (arouser). According to Herman and his co-workers, the elevated arousal level amongst dieters results from the dieting, which acts as a stressor. Some support for this assumption was offfered by Hibscher and Herman (1977), who found that dieters have an elevated level of free fatty acids, which is presumed to be a physiological indication that the organism is experiencing stress.

The observation that dieters, like the obese, demonstrated elevated emotionality and distractability, was taken as an indication that ".... an external orientation appears to be a trait of dieters in general, and is not confined to the obese, the vast majority of whom, of course, are chronic if unsuccessful dieters" (Polivy, Herman and Warsh, 1978, p. 498) and that ".... dieting, rather than obesity is the critical determinant of at least some "obese/normal" differences" (Herman et al., 1978, p. 536). In addition, the hyperemotionality and distractibility of dieters (and obese persons) were regarded as consequences of the stress of dieting.

THE THEORY OF RESTRAINED EATING CHALLENGED

Its applicability to overweight persons. According to Ruderman and Wilson (1979), there are two major problems associated with the theory of restrained eating. Firstly, the notion that restraint is a more fundamental dimension than weight has never been adequately tested. Secondly, it has never been demonstrated that counterregulation is an eating style typical to the obese.

A study made by Hibscher and Herman (1977), which included a sample of obese individuals, did lead to the observation that consumption following a preload depended on the degree of dieting, and not on obesity, with dieters exhibiting counterregulation, irrespective of weight classification. In addition, elevated levels of free fatty acids (as explained above, a measure of stress), which are normally found in obese individuals, appeared to be associated with dieting, rather than obesity per se. It should be stressed, however, that Hibscher and Herman did not examine the interaction between weight and restraint, which is crucial to the assumption that restraint is a better predictor of consumption than body weight. Thus, according to Ruderman and Wilson, the notion that restraint predicts the behaviour of obese and normal-weight individuals equally well remains to be demonstrated.

In order to examine the main premise of restrained theory, that restraint is a more fundamental determinant of eating patterns than weight, Ruderman and Wilson (1979) modified the paradigm used in earlier studies of restrained eating theory by including weight as a factor. They examined the findings of their own study together with a reanalysis of data taken from two other studies of restrained eating behaviour (Hibscher and Herman, 1977; Spencer and Fremouw, 1979). The data indicated that counterregulation is not a pattern of behaviour typical to obese individuals. Neither restrained nor unrestrained obese individuals exhibited counterregulation, although unrestrained obese subjects appeared to be the better regulators, eating less following a preload than in the absence of a preload. The restrained obese group ate similar amounts with or without a preload. This finding was replicated in a second study (Ruderman and Christensen, 1983).

Thus, it appears that restraint scores can predict different behaviour patterns in obese and normal-weight groups of individuals: counterregulatory eating behaviour seems typical of restrained normal-weight individuals, but not of restrained obese individuals. This raises the question as to whether these results reflect inconsistencies in the theory of restrained eating, or difficulties in the measurement of cognitive restraint, that is, in the

Restraint Scale. As the Restraint Scale is central to the theory of restrained eating, the next sections will examine the Restraint Scale, as developed by Herman and Polivy, in more detail.

The Restraint Scale and its multi-dimensionality. Three different measures of cognitive restraint have been used in studies of restrained eating behaviour (Herman and Mack, 1975; Herman and Polivy, 1975; Polivy, Herman and Warsh, 1978). The first measure was designed to assess the extent to which chronic dieters, whether normal-weight or obese, tried to suppress their body weight below "set point", and was made up of 5 items. The second measure was designed ".... to assess the extent to which individuals exhibit behavioural and attitudinal concern about dieting and keeping their weight down" (Herman and Polivy, 1975, p. 668). No reference was made to the "set point", and it consisted of 11 items, the 5 original items, plus 6 additional items concerned with weight fluctuation. The rationale for including items on weight fluctuation was that individuals who are concerned about limiting their food intake, are vulnerable to bouts of overeating when their cognitive restraint is broken, and, therefore, demonstrate a history of considerable weight fluctuation. The third and final measure differed from the second measure only in the deletion of one item, and in giving all items, which in earlier versions had been set up to allow a free response, a closed response format.

Therefore, both the 11- and the 10-item versions of the measure of restraint, the so-called Restraint Scale, included questions dealing with fluctuations in body weight and conscious concern with dieting. Rodin (1981[b]) was the first to criticise the multi-factoriality of the scale. She pointed out that the inclusion of items on weight fluctuation in the scale may result in individuals having a high score on the Restraint Scale, simply on the basis of large weight fluctuations in the past, without currently watching their weight or consciously restraining their eating. This may be especially true for the obese, as their body weight tends to fluctuate more than that of normal-weight individuals, due to changes in activity level or spontaneous diuresis (Bray, 1976). Thus ".... a 5% weight fluctuation in a 300 lb subject would naturally lead to a higher "restraint" score than a comparable fluctuation in a 110 lb college student" (Drewnowski, Riskey and Desor, 1982, p. 274). Drewnowski et al. (1982) conducted a study to determine, firstly, whether the total scores on the Restraint Scale were an accurate reflection of concern with dieting, and secondly, whether the degree of concern with dieting changed with self-reported overweight. A principal component analysis (oblique rotation) revealed two underlying factors, which reflected weight history and fluctuations in body

weight, and actual concern with dieting. In addition, it was found that overweight subjects had higher weight history scores than normal- weight subjects, while having lower scores on the Dietary Concern factor. The authors concluded that ".... at least some self-reported overweight subjects who score high on the Restraint Scale do so not because they are excessively concerned with dieting, but because they are overweight to begin with" (l.c. p. 278).

Herman and Polivy (1982) responded to this criticism by pointing to the fact that the Weight History factor of Drewnowski et al. (1982) included the items "how often are you dieting?" and "do you eat sensibly in front of others and splurge alone?". According to Herman and Polivy, these two items pinpoint the sort of undereating/overeating that characterises the overweight, which, according to them, accounts for weight fluctuation.

Lowe (1984) replicated the study of Drewnowski et al. (1982) this time using a population which more closely resembled the one used in previous research on restraint. Weight suppression was used as a second validational criterion of restraint scores. Factor analysis revealed a factor structure composed of three factors. The first two factors corresponded with those obtained by Drewnowski et al., but the weight fluctuation factor did not include the items "how often are you dieting?" and "do you eat sensibly in front of others and splurge alone". Instead, the first of these two items loaded onto the Dietary Concern factor, and the second item loaded, together with the item "do you give too much time and thought to food" on a separate third factor. This finding contrasts with that obtained by Drewnowski et al. (1982), and weakens Herman and Polivy's argument (1982) that the "dieter instigated behaviour" of "undereating/overeating" is inextricably linked with weight fluctuation. Of more significance, however, was Lowe's observation that Dietary Concern was more strongly related to overweight than weight fluctuation, which contradicted the observations made by Drewnowski et al. Moreover, both factors appeared to be correlated with weight suppression.

Blanchard and Frost (1983) also conducted factor analyses (Varimax rotation) of the 10-item Restraint Scale. In their two studies, they identified a similar structure composed of two distinct factors. The first factor was made up of 6 items, representing concern with dieting, while the second factor was composed of the remaining items, all of which dealt with weight fluctuation. In a similar way to Lowe, Blanchard and Frost's analysis of the weight fluctuation factor did not include the items "how often are you dieting?" and "do you eat sensibly in front of others and splurge alone?". In contrast to Lowe (though similarly to Drewnowski et al.), Blanchard and Frost found that weight fluctua-

tion was more closely related to overweight than was concern with dieting. They also found that Concern for Dieting was positively correlated with Public self-consciousness and Social Anxiety, while Weight Fluctuation was not. According to Blanchard and Frost, this indicated that ".... the two factors are sufficiently distinct to preclude combination in a single scale" (l.c. 259).

Ruderman (1983) and Johnson, Lake and Mahan (1983) also found the 10-item Restraint Scale to be multi-factorial. Ruderman obtained a two-dimensional (Varimax) solution for the normal-weight subjects, and a four-dimensional solution for the obese. The two-dimensional solution was similar to the one obtained by Blanchard and Frost (1983). The first factor in the four-dimensional solution reflects weight fluctuation, the second factor, bingeing, the third tendency to diet, and the fourth overconcern with dieting. Johnson et al. (1983) found similar structures composed of three factors (Varimax rotation) within the Restraint Scale in groups of obese dieters, obese non-dieters and normal-weight subjects. The first factor was heterogeneous in content, while the second and the third factors referred respectively to preoccupation with eating and weight fluctuation. Both groups of investigators found, in addition, that the pattern of item-rest correlation coefficients differed according to weight category, and that the relationship between restraint scores and measures of defensiveness or social desirability differed amongst the various groups of subjects. This indicated that the reliability and construct validity of the scale differs for obese and normal-weight populations.

Thus it seems that the Restraint Scale is multi-dimensional, and measures different constructs in obese and normal-weight populations. In addition, there are indications that numerically equivalent scores represent less restraint in obese subjects than in normal-weight individuals, though findings on this subject are contradictory.

The Restraint Scale as a measure of cognitive restraint. The Restraint Scale may not only be an invalid measure of cognitive restraint in obese individuals: it is possible that the Restraint Scale is also an invalid measure of cognitive restriction of food intake in populations of normal-weight subjects. This point requires some expansion.

Wardle (1980) found no relationship between the 11-item version of the Restraint Scale and the intake of energy in a population of normal-weight subjects. Both Wardle (1980), and Hawkins II and Clement (1980) found, in addition, a strong relationship between the Restraint Scale and measures of binge eating. These observations suggest that, while the Restraint Scale does measure the disinhibition of restraint, it does not measure the degree of

restriction of food intake. It can be argued that this observation is in line with the contention of Herman, Polivy and their co-workers, that individuals who are concerned with limiting their food intake, are vulnerable to bouts of overeating, when their cognitive restraint is broken. Following this line of thought, it would be logical to suggest that the Restraint Scale does not predict the restriction of food intake, but rather the inability to maintain cognitive control over food intake, that is, counterregulation.

More recently, however, it has been shown that eating behaviour is not necessarily the consequence of dieting per se (Stunkard and Messick, 1985). These findings were obtained using the Stunkard and Messick questionnaire, the Three Factor Eating Questionnaire (TFEQ) which assesses restrained eating. The TFEQ separately measures cognitive restraint of food intake (Factor I), disinhibition of cognitive restraint (Factor II) and hunger (Factor III). The results of a laboratory test on food intake (Shrager, Wadden, Miller, Stunkard and Stellar, 1983), showed that Factor II, rather than Factor I, was closely associated with overeating. The importance of these findings is demonstrated by the fact that the correlation between the Herman and Polivy Restraint Scale and the restraint subscale of scores on the TFEQ (Factor I) was statistically insignificant (r=.168), while the correlation between scores on this scale and the disinhibition subscale (Factor II) of the TFEQ was highly significant (r=.840) (Stunkard and Messick, 1985 ; Weissenburger, Rush, Giles and Stunkard, submitted). From this it can be suggested that the counterregulatory eating behaviour of Herman and Polivy's "restrained eaters" is related to disinhibition of restraint rather than to restraint per se, and, also, that the Restraint Scale is not a measure of restriction of food intake, but of disinhibition of cognitive restraint.

SUMMARY AND CONCLUSION

The theory of restrained eating attributes overeating to dieting. This paradoxical notion is based on the contention that each individual has his own range of body weight which is homoeostatically regulated. Attempts to lower body weight by a conscious restriction of food intake may result in persistent hunger. When self-control processes are undermined by disinhibitors such as alcohol, anxiety, depression or the consumption of energy dense food, excessive food intake or counterregulation may occur. The stress of dieting may also result in an elevated level of emotionality or distractability. It is assumed that while the majority of obese individuals are chronic dieters, this is not

the case for normal-weight individuals, and that this fact explains obese/normal differences in eating behaviour.

Herman, Polivy and their co-workers found support for the theory of restrained eating, by showing that individuals who restrain their food intake - in the same way as obese individuals presumably do - behave like the obese. However, these results could not be replicated in studies of restrained obese individuals. Counterregulation does not seem to be a type of eating behaviour typical to the obese. This means that the main premise of the theory of restrained eating, that the eating patterns of obese individuals are caused by a high level of restraint, has not been corroborated.

This result could well reflect difficulties in the measurement of cognitive restraint, that is, in the Restraint Scale. The Restraint Scale was found to contain at least two factors, fluctuations in body weight and actual concern with dieting. There are indications that while overweight subjects achieve higher scores with respect to weight history, they score lower on concern with dieting than individuals of normal body weight. This means that numerically equivalent scores represent less restraint in obese individuals than in normal-weight individuals. However, findings on this are contradictory. The Restraint Scale was also found to measure different constructs in obese and normal-weight populations. Finally, it is possible that the Restraint Scale does not measure cognitive restriction of food intake, but rather the disinhibition of cognitive restraint. This means that counterregulatory eating behaviour is not caused by dieting *per se*, but by a tendency towards the disinhibition of dieting.

Thus, problems linked with the use of the Restraint Scale may explain the fact that restraint scores did not predict the behaviour of obese individuals. However, the possibility that these negative findings reflect problems in the theory of restrained eating cannot be ruled out, and a fair test of the theory calls for a new instrument to measure restrained eating.

Postscript: As a postscript to this section the boundary model proposed by Herman and Polivy for the regulation of eating will be described. In 1984 Herman and Polivy (1984) proposed a new model, which attempted to better explain the couterregulatory eating behaviour of dieters - the "boundary model" for the regulation of eating. According to this model, the consumption of food is regulated by two boundaries, corresponding to hunger and satiety. The assumption that consumption is regulated by boundaries (rather than a point) gives rise to a "zone of indifference", that is, a zone where food intake is

not constrained by physiological factors of hunger or satiety, but where non-physiological agents, such as cognitive, social and other psychological factors, are in force. Dieters are assumed to have a lower hunger boundary and a higher satiety boundary than non-dieters, for the reason that on normal occasions they eat less than non-dieters, but on other occasions considerably more. In addition, dieters are assumed to have a diet-boundary, which is entirely cognitive in character, and which falls well short of the satiety boundary. In non-dieters the satiety boundary constitutes the upper boundary for food intake. In dieters the diet-boundary provides the upper boundary for the regulation of food intake, so long as it has not been breached. Once it has been surpassed, that is, when the dieter thinks that is has been transgressed, it no longer has a regulatory function, and the satiety boundary becomes the boundary of reference.

Thus, using this model, the counterregulatory eating behaviour of dieters following an energy dense preload is not unregulated. Instead, it is regulated on a different basis, by the satiety boundary rather than the diet boundary. Severe hunger and satiety remain as the determinants of eating behaviour. Herman and Polivy note that in this respect dieters differ from patients with eating disorders, such as anorectics and bulimics, as these individuals regularly transgress the hunger or satiety boundary.

CHAPTER 6

THE THREE PSYCHOLOGICAL THEORIES OF OVEREATING AND WEIGHT MANAGEMENT: THERAPY

All three psychological theories attribute obesity to overeating. However, they differ in their assumptions as to precisely why individuals overeat, and this, of course, has implications for therapy. According to psychosomatic theory, which assumes that overeating results from a confusion of physiological symptoms of hunger and satiety, and the accompaniment of emotional stress by internal arousal states, overweight can never be treated per se. Instead, therapy focuses on psychic conflicts, rather than on eating behaviour or weight, and while weight loss may occur during the course of treatment, it is not the focus of the psychoanalytic process (Rand, 1982). The usefulness of psychotherapy and psychoanalysis in the treatment of obesity has for some years been seriously questionned. However, the results of a recent large-scale

assessment of obese patients undergoing psychoanalysis indicated not only an improvement in psychological well-being, but also considerable weight loss, and a satisfactory maintenance of this loss (Rand and Stunkard, 1978). While it is not clear what mechanism in psychotherapy causes weight loss, it seems, according to Stunkard (1980), likely that if psychotherapy helps individuals to lead less stressful and more contended lives, that they have less occasion to overeat. Patients may even loose weight, and this weight loss could be permanent. Yet, psychoanalysis is an expensive form of treatment to achieve weight reduction, and psychotherapy may be warranted only in the case of individuals who have repeatedly failed to loose weight with simpler and less costly methods (Stunkard, 1980).

Externality theory, attributes overeating to a hypersensitivity to external food cues, the outcome of an "external cognitive style", and treating external responsiveness constitutes the main method of dealing with overweight. Patients are provided with techniques for controlling their food environment and their food-related thoughts by stimulus control procedures (such as eating in only one place, separating eating from other activities, pre-planning, and minimising food cues). It does not seem that the use of stimulus control procedures as single treatment modality is effective in producing significant weight loss (Loro, Fisher and Levenkron, 1979). However, it is usually combined with other behaviour modification procedures (such as self-monitoring of food intake, calories, weight and physical activity, slowing the rate of eating, and increasing physical activity) (see for example Stuart and Davis, 1972). The data indicates that these multi-faceted behavioural treatment programmes are effective in producing significant weight reduction on a short-term basis, and a satisfactory maintenance of weight loss during the first year following treatment. There are indications, however, that beyond one year the maintenance of weight loss is far less satisfactory (Stunkard and Pennick, 1979).

Slochower (1983[a]) suggested that the psychosomatic theory and the externality theory may be related, in that a state of high, uncontrollable anxiety may enhance the overweight person's reactivity to external cues. The results of the (previously mentioned) study of McKenna (1972) showed an interaction between levels of anxiety and the salience of food - obese individuals ate somewhat more food when it tasted good and when they were anxious. Two studies undertaken by Slochower and Kaplan (1983) and Slochower (1983[b]) produced similar results, obese individuals being found to be responsive to levels of food salience only when they were anxious. Similarly, obese individuals were found to overeat when anxious only when highly salient

food was available. Slochower concluded that ".... both high uncontrollable anxiety and prominent food must be present for the obese person to overeat" (Slochower, 1983[a], p. 79).

These results indicate that both psychotherapy and behaviour modification treatment programmes may be warranted in order to produce weight loss. However, Slochower hastens to point at the importance of treating emotional problems, for the reason that it is difficult to alter the fact that prominent food cues are usually present in our food-abundant Western world. Moreover, stimulus control procedures may lose importance for a person when he is anxious or emotionally upset, and this may explain the less satisfactory long-term results of behaviour modification programmes.

The theory of restrained eating sees overeating as one of the side-effects of dieting. Teaching individuals to accept their own "natural weight" and to return to "natural eating", by means of the "natural weight undiet" procedure, constitutes the major approach in the treatment of overeating (Polivy and Herman, 1983). Polivy and Herman contend that those individuals who have always been overweight, the 30 - 40% so-called "juvenile onset obese", do better to accept their body weight, instead of trying to loose weight by "chronic semi-starvation". In contrast, individuals who have become overweight later in life through overeating or following a sedentary lifestyle, the 60 - 70% so-called "adult onset obese", may expect to loose weight by means of the "natural weight undiet" procedure.

The "natural weight undiet" procedure aims to teach individuals to become more responsive to pressures of hunger and satiety. Their boundaries of hunger and satiety, which had been pushed apart because of continuous attempts to defy these physiological controls, may by this method, draw more closely together again, recreating the situation that existed before the person started to diet. Individuals using this approach are allowed to eat as much of whatever food they want in order to become satieted. To prevent counterregulation, there should be no forbidden food, and small portions of energy dense food should be incorporated in weekly diets. Individuals are advised to think in terms of a week rather than a day. As yet, however, no research data is available on the results of this approach. Therefore, its effectiveness remains to be assessed.

CHAPTER 7

SUMMARY AND OUTLINE OF THE RESEARCH

There are three psychological theories of overeating and weight gain. The psychosomatic theory focuses on internal emotional factors, and attributes overeating to a confusion due to the incapability to distinguish between the internal arousal states accompanying hunger and satiety, and the physiological symptoms of hunger and satiety. The externality theory focuses on external food cues, and attributes overeating to a hyperresponsiveness to food-related cues in the environment, combined with an unresponsiveness to internal cues of hunger and satiety. The theory of restrained eating attributes overeating to the conscious restriction of food intake. The essential factor distinguishing the psychosomatic theory from the externality theory is their differing emphasis on the impact of internal instigation (psychosomatic theory) and external instigation (externality theory) on eating. What essentially distinguishes the theory of restrained eating from both psychosomatic and externality theory is the contention that dieting may cause (theory of restrained eating) rather than result from (psychosomatic and externality theory) overeating and weight gain.

The theories, therefore, differ in their assumption as to why individuals overeat, and this, naturally has implications for therapy and weight management. The psychosomatic therapy focuses on psychic conflicts and the solution of emotional problems. Therapy based on the externality theory concentrates on stimulus control procedures, while therapy based on the theory of restrained eating focuses on "natural weight undiet" procedures.

All three theories have been laboratory tested, but the hypotheses derived from each theory have not always been confirmed by the tests. The psychosomatic hypothesis was supported by most clinical studies, in the sense that the majority of obese individuals were found to overeat when feeling emotionally upset, but these findings have been difficult to replicate in controlled laboratory studies. Only recently, following the introduction of the concepts of clearly labelled versus diffuse emotions, was it also possible to demonstrate in controlled studies that overweight individuals overeat in response to certain types of stressors, and that this overeating has an anxiety-reducing function.

Similarly, the internal/external distinction of the externality theory was found to be too simple an explanation of obese/normal differences in eating

behaviour, as it was found that in every weight category there are individuals who are hyperresponsive to external stimuli or unresponsive to internal stimuli. The discovery of normal-weight individuals with "obese" eating patterns, and the observation that an individual's final level of body weight is influenced by physiological variables, made it clear that the relationship between external responsiveness and food intake and body weight is mediated by cognitive and physiological variables.

The theory of restrained eating was supported by studies of restrained non-obese individuals, but not by studies of restrained obese individuals. There are indications that this inconsistency in findings may have resulted from difficulties in the measurement of cognitive restraint, that is, in the Restraint Scale. However, the notion that these negative findings reflect problems in the theory of restrained eating cannot be ruled out.

All three theories, therefore, have been partially validated, but in no way permit definite conclusions. This makes it difficult to determine on the basis of research of literature which theory is the most valid, and further to specify the best procedure for the treatment of overeating and overweight.

OUTLINE OF THE RESEARCH

The principal aim of the empirical research was to examine which theory may prove to be the most valid, psychosomatic theory, externality theory or the theory of restrained eating. It was the intention to determine this by means of psychometric studies of the relationships between scales of emotional eating, external eating and restrained eating on the one hand, and variables such as measures of body fatness (note 4) and personality scales on the other hand. It was reasoned that on the basis of the ideas expressed in psychosomatic theory, externality theory and the theory of restrained eating, different findings were to be expected with regard to the relationships between the three types of eating behaviour and/or personality traits. Thus, from the degree to which observed findings are similar to anticipated findings within one single theoretical viewpoint, it would be possible to draw tentative conclusions regarding the validity of each specific theoretical point of view. In this way, insight would be gained into the potential causes of overeating and into strategies for the treatment of overeating.

A further aim of the research was to determine, which variables are associated with each particular type of eating behaviour, and also, which variables are associated with successful weight loss. Not only would this

provide further insight into the potential causes of overeating and successful weight management, but this would also give an indication as to which categories of individuals should be given special attention in the treatment and prevention of overweight.

As no satisfactory scales were available when the project was initiated, the first task was to construct unidimensional scales applicable to the three types of eating behaviour. The construction of the Dutch Eating Behaviour Questionnaire (DEBQ), with scales of emotional eating, external eating and restrained eating, is discussed in Chapter 8. The predictive validity of the restrained eating scale of the DEBQ, as a measure of restriction of food intake, is studied in a sample of women in Chapter 9.

Chapter 10 constitutes the main core of the research. The validity of the three psychological theories of overeating, as applied to a sample of women, were examined. This chapter also attempted to assess which personality traits are related to successful weight loss. This was determined by inspecting the relationships between scales of the three types of eating behaviour, a measure of body fatness, and various personality scales, and, in addition, by exploring the difference between "obese" and "latent obese" women, with respect to eating behaviour and personality. Unfortunately, the final scales of eating behaviour as constructed in Chapter 8 were not yet available when this study was undertaken, so only preliminary scales could be used to measure the types of eating behaviour (note 5).

Chapter 11 describes the relationships between the three eating behaviour scales, and scales for sex-role orientation and psychological adjustment as based on a study of women. In Chapter 12, the modifying effect of emotional eating on the relationship between stress and change in body weight, based on a study of men and women, was described.

Chapter 13 is of another nature. It is composed of a methodological treatise which explores the possibility that longitudinal studies are more susceptible to the generation of response sets than cross-sectional ones. This treatise was inspired by the observation that results obtained for <u>women</u> on one assessment date of a longitudinal study of the municipality of Ede were found to differ significantly from those of a cross-sectional study. It is of relevance to the present research to note that subjects for the Final study in Chapter 8, and for the studies reported in Chapter 11 and 12, are derived from this longitudinal study. While it is not clear to the author what effects these reponse sets may have had upon the observed results, it cannot be ruled out

that in these studies in particular the results obtained for women may have been confounded by response sets.

Most chapters of Part Two of this thesis consist of original papers. Some chapters show slight overlap, but this was inevitable, in view of the fact that the project dealt with a continuous series of seperate studies.

NOTES

1. It seems remarkable that Schachter - advocate of the cognitive-physiological theory of emotional arousal - did not give more emphasis to the role of cognition in his theory of overeating. Schachter's emphasis on external stimuli must be explained from the fact that he found no support for the psychosomatic hypothesis, as this also meant that no evidence was obtained for the "... labelling view of matters" (Schachter et al., 1968, p. 97) with regard to the aetiology of overweight.
2. Rotter's concept of locus of control can also be classified within social learning theories, for reason that individual differences in expectancies for internal versus external locus of control of reinforcement are considered to be due to differences in socialisation.
3. It should be noted that Herman and Polivy (1980[a]) maintain that this interpretation accounts for the anxiety-induced increase in eating found also in obese subjects. However, they do not believe, in contrast to the psychosomatic theorists, that this increase in eating acts as a source of emotional comfort or relief. "Overeating under stress is better regarded as "released" rather than reinforced, a perspective that does not require that anxiety-induced eating be relaxing" (Herman and Polivy, 1980[a], p. 219).
4. That is, the body mass index (weight/height^2 (kg/m^2).
5. These scales had been constructed on the basis of the factor structure of the preliminary itempool as used in "Preliminary Study One" (see Chapter 8).

PART II. PSYCHOMETRIC STUDIES

CHAPTER 8

THE DUTCH EATING BEHAVIOUR QUESTIONNAIRE (DEBQ) FOR ASSESSMENT OF RESTRAINED, EMOTIONAL AND EXTERNAL EATING BEHAVIOUR

Tatjana van Strien with Jan E.R. Frijters, Gerard P.A. Bergers and Peter B. Defares*.

According to both psychosomatic theory and externality theory the development and maintenance of human obesity is attributed to overeating. Psychosomatic theory (e.g., Kaplan and Kaplan, 1957) focuses on the phenomenon of emotional eating. While a normal response to arousal states, such as, anger, fear or anxiety, is loss of appetite (Carlson, 1916; Cannon, 1915), some individuals respond by excessive eating. Bruch (1961, 1964), the main advocate of this theory, attributes excessive eating to confusion between internal arousal states and hunger, probably because of early learning experiences. Externality theory concentrates on the phenomenon of "external eating" which is eating in response to food-related stimuli regardless of the internal state of hunger or satiety (e.g., Schachter, Goldman and Gordon, 1968). Schachter and Rodin (1974) view externally regulated eating behaviour as a personality disposition.

In both psychosomatic and externality theory an individual's misperception of his internal state prior to eating is considered to be a causal factor in the development of obesity (Robbins and Fray, 1980). But, a high degree of externality or a strong tendency to emotional eating does not necessarily lead to overweight. Individuals may react to being overweight by consciously restricting food intake irrespective of whether they are emotional or external eaters (Rodin, 1975; Rodin and Slochower, 1976; Rodin, 1978). Dieting, can be used to correct body weight, therefore a high degree of emotional and external eating, can be found in all weight categories, and thus not only in the "obese".

However, according to Herman, Polivy and coworkers (e.g., Herman and Polivy, 1980[a]) each individual has his own range of body weight, which is homeostatically regulated (Polivy and Herman, 1983).

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Some individuals with a weight range at a high level (a high "natural weight" range according to Polivy and Herman, 1983) are under strong social pressure to lose weight and therefore may diet, but intense dieting in these individuals may result in persistent hunger. When self-control processes which monitor dieting behaviour are undermined by, for example, consumption of alcohol or high caloric food, or anxiety or depression, "counterregulation" may occur. This is the breakdown of restrictive control so that suppressed eating behaviour is disinhibited, and excessive food intake occurs. A further consequence of the continuous struggle against hunger sensations may also be loss of contact with internal feelings of hunger and satiety. Thus in this theory of restrained eating, both "external" and "emotional eating" are considered to be consequences of intense dieting (Herman and Mack, 1975; Herman and Polivy, 1975; Polivy and Herman, 1976[a], 1976[b,c]).

All three theories, externality theory, psychosomatic theory and restraint eating theory, have been tested in laboratory studies, but the hypotheses derived from each have not always been confirmed. The main problem in testing the psychosomatic theory and the externality theory is the classification of individuals in weight groups on the basis of measured body weight. As body weight can be controlled to some extent by dieting, measured body weight does not necessarily represent the body weight of an individual on the basis of his emotional or external tendency. In an endeavour to overcome this problem, Pudel, Metzdorff and Oetting (1975) constructed the Fragenbogen für Latente Adipositas (FLA) to identify those individuals having obese eating patterns but being of normal body weight due to conscious restriction of food intake. This group referred to as the "latent obese", were individuals of normal weight who had similar satiety curves as obese individuals for the consumption of liquid formula diets in the laboratory (Meyer and Pudel, 1977; Pudel, 1978). Although this questionnaire represents a major improvement, inspection of it reveals that it is a heterogeneous set of items containing questions on, for example, weight history, weight consciousness, dieting, hunger and satiety, and external eating. Principal component analysis (Varimax) of the FLA in a sample of 108 subjects has revealed no less than ten factors when using the Eigenvalue one criterion for factor extraction (note 1*). Even though this multifactorial questionnaire has proved to be suitable for identification of the "latent obese", it precludes examination of the relative importance of each factor associated with overweight.

* see page 61 for notes

The theory of restrained eating has also been confronted with conflicting results. Findings for restrained non-obese subjects were consistent, in that after a preload, non-restrained eaters consumed less and restrained eaters consumed more. But these results could not be replicated in studies on restrained obese subjects (e.g., Ruderman and Wilson, 1979; Ruderman and Christensen, 1983). This inconsistency in findings may result from the Restraint Scale not being a valid operationalization of the concept of restrained eating. As the FLA, the Restraint Scale used by Herman, Polivy and co-workers has also been found to be multifactorial. In addition to the factor reflecting concern about dieting, another factor reflecting fluctuations in body weight has been distinguished (e.g., Drewnowski, Riskey and Desor, 1982; Ruderman, 1983; Blanchard and Frost, 1983; Johnson, Lake and Mahan, 1983). This multifactoriality may lead to erroneous classification of the obese especially. Even when not restricting food intake, obese individuals may obtain higher scores on the Restraint Scale, because they have greater fluctuation in body weight. Consequently, numerically equivalent scores can indicate less genuine restraint in overweight than in normal weight individuals and this may explain why results of restrained non-obese subjects could not be replicated in populations of restrained obese subjects.

It seems that the recently published (1981) Three Factor Eating Questionnaire developed by Stunkard and Messick (Stunkard, 1981) to measure restrained eating represents a major improvement of both Herman's Restraint Scale and Pudel's FLA. However, this questionnaire was not yet available when the present study started (May, 1980). Thus at the time of the present study no homogeneous scale on restrained eating was available to test these theories.

Not only a scale of restrained eating but also scales for emotional eating and external eating are required to improve understanding of obese eating patterns. Therefore the main purpose of this study was to develop a questionnaire containing three scales, the questionnaire developed is referred to as the Dutch Eating Behaviour Questionnaire (DEBQ).

PRELIMINARY STUDIES (note 2)

Aim and Method

The main aim of the preliminary studies was to select items for scales on restrained, emotional and external eating. Questions on the three types of eating patterns were administered to populations of normal weight and overweight subjects, data were factor analysed, and the resulting factor structure was used as the basis for revision of the questionnaire. This process

was then repeated and items achieving stability were retained for the final questionnaire.

Study One

The initial item pool consisted of 100 items, derived from three existing questionnaires translated into Dutch by Frijters and Roosen (note 3): the Eating Patterns Questionnaire (EPQ) (Wollersheim, 1970): The Fragenbogen für Latente Adipositas (FLA) (Pudel, Metzdorff and Oetting, 1975); and the Eating Behavior Inventory (EBI) (O'Neil, Currey, Hirsch, Malcolm, Sexauer, Riddle and Taylor, 1979). The EPQ was selected because, at first sight, it contains items related to emotional eating; the FLA, because it contains items related to restrained eating and external eating; and the EBI because it contains a series of statements on behaviour related to the assessment of external stimulus control. Items in the EPQ and the EBI have a five-point response format (1-5), and those in the FLA a two point response format (Yes and No).

The item pool was administered to a total of 120 subjects, 40 men and 80 women, all inhabitants of Wageningen. They were selected by their general practitioners so that the sample contained both normal weight and overweight subjects. The mean body mass index (BMI; weight/height^2) of the men was 26.2 (s=5.4) and their mean age 30.8 years (s=5.2); and the mean BMI of the women was 25.2 (s=4.8), and their mean age, 31.1 years (s=8.4).

After eliminating those items endorsed in one direction by more than 85% of the sample, the remaining 72 items were factor analysed using Varimax rotation. A minimum Eigenvalue of 1.0 was used for factor extraction. A large proportion of the variance (44.7%) was accounted for in the first three factors that emerged: the remaining 20 factors contained only a few items each and were uninterpretable. The first factor contained items on emotional eating; the second, items on restrained eating; and the third, items on external eating and perceived hunger.

Study Two

The results obtained in Study One were used to revise items and to develop new items. All items dealing with perceived hunger and satiety were deleted because they were considered to represent the internal component of both emotional and external eating. Since the main aim was to devise distinctive scales for emotional and external eating, only those items referring to the external as opposed to the internal component of eating behaviour were included in the external eating scale.

The item pool used in Study Two consisted of 21 items on restrained eating, 15 on emotional eating, and 15 on external eating. All items had the five-point response format; never (1); seldom (2); sometimes (3); often (4); and very often (5). The 51 items were administered to a second sample consisting of two subsamples. One subsample was drawn randomly from men and women aged between 34 and 36 years living in four villages in the municipality of Ede and is referred to as the Ede Sample. The mean BMI and mean age of the 161 women in this sample were 22.9 (s=4.1) and 29.9 years (s=4.7) respectively, and the mean BMI and mean age of the 103 men participants were 23.6 (s=2.8) and 26.8 years (s=4.5) respectively. Participants for the second subsample were obtained with the cooporation of dieticians who had invited their clients to complete the questionnaire on their first visit. This subsample referred to as Dietician Sample consisted of 75 women with a mean BMI of 32.8 (s=6.2) and a mean age of 31.1 years (s=8.6) and of 19 men with a mean BMI of 31.1 (s=2.9), and a mean age of 31 (s=8.3).

An orthogonal (Varimax) factor analysis was carried out for subjects of the Ede Sample. The Eigenvalue one criterion revealed an orthogonal structure of ten factors. Factor one contained items on restrained eating, factors two and three, items on emotional eating; and factors four and five, items on external eating. Together these five factors explained 88% of the total variance. Each of the 51 items was then reviewed to ascertain the degree of correspondence with the five factors. Twelve items were deleted which had either a low factor loading, or as decided by the investigators, an item content which did not correspond closely with the particular type of eating behaviour. The reduced item pool was again subjected to an orthogonal (Varimax) factor analysis. A factor analysis was also undertaken for subjects of the Dietician Sample. In both samples the pattern of factor loadings seemed to be very similar for items on emotional and restrained eating, but quite different for items on external eating. Also, in both samples, items on emotional eating were represented by two factors, one containing those referring to clearly labelled emotions (e.g., eating in response to anger or irritation), and the other items referring to eating in response to diffuse emotions (e.g., eating when feeling lonely, idle or bored (items 1, 2 and 7)). Further in both samples, items on restrained eating loaded high on one factor, although item loadings were in general higher in the Ede Sample than in the Dietician Sample. Items on external eating had high loadings on one factor in the Dietician Sample, but were spread over three factors in the Ede Sample. Evidently, eating

in response to external food cues is conceived as a more homogeneous type of eating behaviour by obese subjects than by normal weight subjects.

FINAL STUDY

Aim

The Final Study aimed to develop a final item pool and also to assess the dimensional stability of this item pool in subsamples of obese and non-obese subjects, and men and women, and then to replicate the factor structures obtained in the preliminary studies. Consistency of the factor structures in the various studies, and also stability of dimensions in various subsamples would warrant the construction of scales on eating behaviour, and also assessment of the reliability, means, standard deviations and intercorrelations of these scales.

Subjects and Procedure

At the time of the 6th of seven assessments of a longitudinal study being carried out in the municipality of Ede, the revised questionnaire from the preliminary Study Two was administered to 653 women and 517 men. Details of the study population and procedure have already been described elsewhere (Baecke, Burema, Frijters, Hautvast and Van der Wiel-Wetzels, 1983; Van Strien, in press).

Item pool

On the basis of the results of preliminary Study Two items were revised and new items developed. Eight items were added to the items on emotional eating, because the latter referred only to having a desire to eat when experiencing a particular emotion, and it was not clear whether they distinguished between desire for food and the act of eating.

The item pool of the final study consisted of 48 items. All items had the same response format never (1), seldom (2), sometimes (3), often (4), and very often (5). A not relevant response category was added to all items which were cast in a conditional format for example: Do you have a desire to eat when you feel bored or restless; when you have eaten too much, do you eat less than usual the following day; and when you have put on weight, do you eat less than usual. This was done because some subjects never experience a particular emotion, never eat too much, or never become heavier.

RESULTS

Development of the final item pool

Except for those items given a not relevant response, each item was subjected to an orthogonal (Varimax) factor analysis for all subjects, thus in total 616 subjects. The Eigenvalue one criterion revealed an orthogonal structure of seven factors. As in Study Two, items on emotional eating were represented by two factors, one containing items referring to clearly labelled emotions, and the other to items referring to diffuse emotions. In addition, those items referring to the act of eating were found to have high loadings on the same factors as those items referring to the desire to eat. Thus, it may be tentatively concluded, that the two domains of items refer to the same concept. All items on restrained eating loaded on one factor and three of these items had high loadings on a separate factor. Items on external eating loaded on two factors.

Further inspection of the factor loadings and the items content, led to seven items being deleted from the item pool on restrained eating and external eating. All eight items on actual emotional eating were deleted, because they were found to load on the same factors as the original items on emotional eating and therefore were considered to refer to the same type of eating behaviour as the original items. In addition, when scale scores were obtained the "actual emotional eating scale" correlated highly with the three other scales on emotional eating in all populations (r=.80).

Factor structures of subsamples and total sample of the final item pool

All 33 items in the final item pool were subjected to various orthogonal (Varimax) factor analyses for subsamples from the longitudinal study as described in the final study. The Eigenvalue one criterion revealed five factors for both the obese (men: BMI > 27; women: BMI > 26; in analysis: n=91), and non-obese subjects (men: BMI < 27; women: BMI < 26; in the analysis: n=566). In both subsamples, all items on restrained eating had high loadings on one factor. As previously, items on emotional eating had high loadings on two factors, one containing the four items on diffuse emotions, and the other the remaining items on clearly labelled emotions. Items on external eating had high loadings on two factors.

Three- and four-factor solutions were also carried out for the subsamples of obese and non-obese subjects. The four-factor solution appeared to be the best interpretable solution in both subsamples and was very similar to the five factor "Eigenvalue one" solution for items on restrained eating and emotional

eating, but most items on external eating loaded on one instead of two factors. At face value, the four-factor solution seemed to be similar for both obese and non-obese subjects.

To substantiate this, the goodness of fit of results of the factor analysis for both subsamples was assessed by an orthogonal congruence rotation towards the best least squares fit (ROTA 01; Borgers and Roskam, 1967; Roskam and Borgers, 1969). In the first solution the correlation matrix of obese subjects was rotated to the criterion factor pattern of the normal weight subjects. This result was checked in the second solution, in which the correlation matrix of the normal weight subjects was rotated to the criterion factor pattern of the obese subjects.

Table 1 shows that the percent lost variance, the total stress and the stress values of the individual factors is low in both solutions, which is an indication of a close similarity of factor structures of obese and normal weight subjects.

In orthogonal (Varimax) four-factor solutions obtained for the subsamples of men (in analysis: n=237) and women (in analysis: n=348), all items on restrained eating and external eating also had high loadings on one factor, and items on emotional eating had loadings on two factors. At face value, the four-factor solution was very similar for men and women. Again, the goodness of fit for the results of the factor analysis was assessed by a least squares orthogonal rotation. In the first solution, the correlation matrix of the women was rotated to the criterion factor pattern of the men. In the second solution, the correlation matrix of the men was rotated to the criterion factor pattern of the women. As can also be inferred from Table 1, the percent lost variance, the total stress value and the stress values of the individual factors were in both solutions very low, which is an indication for a close similarity of factor structures of men and women.

As the structure for the subsamples is similar, the results of factor analysis of the Varimax four-factor solution are reported for the sample of all subjects combined (in analysis, n=657). Table 2 shows that all items have loadings above .45 on the appropriate factor.

Construction of the final scales

Both Study Two and the Final Study have shown that emotional eating comprised two dimensions, one dealing with eating in response to diffuse emotions and the other with eating in response to clearly labelled emotions.

Table 1 Values of total stress, percent lost variance and stress values of individual factors when the correlation matrices of obese individuals and women respectively are rotated to the criterion factor patterns of normal weight and men respectively (first solution) and also those obtained when the correlation matrices of the normal weight and men respectively are rotated to the criterion factor pattern of obese and women respectively (second solution).

	Total stress	Percent lost variance	Stress values of individual factors			
			Restrained eating	Emotional eating clearly labelled	External eating	Emotional eating diffuse
Obese and non-obese subjects						
First solution	.0315	.0346	.0281	.0185	.0378	.0377
Second solution	.0246	.0326	.0148	.0156	.0267	.0352
Men and women						
First solution	.0319	.0677	.0234	.0201	.0358	.0430
Second solution	.0307	.0677	.0279	.0172	.0352	.0382

Table 2 Varimax Rotated Factor Matrix (four factor solution) on the 33 items of the Dutch Eating Behaviour Questionnaire for the sample of all subjects combined (in analysis n=657)**.

R	1.	If you have put on weight, do you eat less than you usually do?*
	2.	Do you try to eat less at mealtimes than you would like to eat?
	3.	How often do you refuse food or drink offered because you are concerned about your weight?
	4.	Do you watch exactly what you eat?
	5.	Do you deliberately eat foods that are slimming?
	6.	When you have eaten too much, do you eat less than usual the following days?*
	7.	Do you deliberately eat less in order not to become heavier?
	8.	How often do you try not to eat between meals because you are watching your weight?
	9.	How often in the evening do you try not to eat because you are watching your weight?
	10.	Do you take into account your weight with what you eat?
E	11.	Do you have the desire to eat when you are irritated?*
	12.	Do you have a desire to eat when you have nothing to do?*
	13.	Do you have a desire to eat when you are depressed or discouraged?*
	14.	Do you have a desire to eat when you are feeling lonely?*
	15.	Do you have a desire to eat when somebody lets you down?*
	16.	Do you have a desire to eat when you are cross?*
	17.	Do you have a desire to eat when you are approaching something unpleasant to happen?*
	18.	Do you get the desire to eat when you are anxious, worried or tense?*
	19.	Do you have a desire to eat when things are going against you or when things have gone wrong?*
	20.	Do you have a desire to eat when you are frightened?*
	21.	Do you have a desire to eat when you are disappointed?*
	22.	Do you have a desire to eat when you are emotionally upset?*
	23.	Do you have a desire to eat when you are bored or restless?*
Ext.	24.	If food tastes good to you, do you eat more than usual?
	25.	If food smells and looks good, do you eat more than usual?
	26.	If you see or smell something delicious, do you have a desire to eat it?
	27.	If you have something delicious to eat, do you eat it straight away?
	28.	If you walk past the baker do you have the desire to buy something delicious?
	29.	If you walk past a snackbar or a cafe, do you have the desire to buy something delicious?
	30.	If you see others eating, do you also have the desire to eat?
	31.	Can you resist eating delicious foods?***
	32.	Do you eat more than usual, when you see others eating?
	33.	When preparing a meal are you inclined to eat something?

R = Restrained Eating
E = Emotional Eating
Ext = External Eating
* = Items with a non relevant response category in addition to the categories never (1), seldom (2), sometimes (3), often (4), and very often (5).
** = Dutch version of the scales may be obtained from the first author.
*** = Response to this item has to be reversed.

	Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalue	10.847	4.447	2.078	0.803
PCT of Var	59.7	24.5	11.4	4.4
Cum PCT	59.7	84.1	95.6	100.0
R 1	**0.795**	0.042	0.118	0.075
2	**0.710**	0.210	0.124	0.086
3	**0.809**	0.118	0.001	0.058
4	**0.741**	0.142	0.024	0.006
5	**0.752**	0.198	0.002	0.068
6	**0.711**	0.105	0.170	0.044
7	**0.895**	0.113	0.025	0.031
8	**0.823**	0.172	0.094	0.083
9	**0.823**	0.215	0.099	0.091
10	**0.883**	0.145	0.010	0.055
E 1	0.233	**0.628**	0.172	0.275
2	0.140	0.332	0.385	**0.559**
3	0.252	**0.711**	0.185	0.220
4	0.151	**0.467**	0.255	**0.588**
5	0.217	**0.682**	0.118	**0.340**
6	0.161	**0.736**	0.166	0.174
7	0.090	**0.775**	0.218	0.103
8	0.121	**0.791**	0.149	0.050
9	0.146	**0.821**	0.197	0.003
10	0.132	**0.736**	0.147	0.026
11	0.210	**0.800**	0.142	0.142
12	0.095	**0.677**	0.239	0.127
13	0.142	**0.563**	0.241	**0.482**
Ext. 1	0.039	0.077	**0.575**	0.087
2	0.087	0.144	**0.599**	0.021
3	0.118	0.073	**0.583**	0.088
4	0.054	0.131	**0.451**	0.034
5	0.114	0.185	**0.465**	0.143
6	0.059	0.004	**0.516**	0.057
7	0.126	0.151	**0.551**	0.163
8	0.015	0.164	**0.516**	0.210
9	0.177	0.255	**0.468**	0.069
10	0.040	0.168	**0.496**	0.000

Therefore separate scales were constructed for each dimension containing four and nine items respectively and also an additional scale combining the two dimensions containing all 13 items.

The final scales on Restrained eating and External eating contained ten items each. Scores on each of the five scales, were obtained by dividing the sum of items scores by the total number of items on that scale.

Statistics and subscale correlations

Means, standard deviations (sd), standard error (se) and maximum and minimum value for each scale are presented separately for the samples of all subjects combined, the subsamples of obese and non-obese subjects; men and women; obese men and women; and non-obese men and women (Table 3).

Subscale correlations for the various subsamples of subjects of the Final Study are presented in Table 4. All correlation coefficients were significant, only the Pearson correlation coefficient assessing the relationship between Restrained eating and External eating was much lower.

Reliability

Table 5 contains the item-total correlation coefficients for each of the items of the five scales, in the sample of all subjects combined, and the subsamples of obese and non-obese subjects, and of men and women. Cronbach's alpha coefficients for each of these populations, and also for obese men and women, and non-obese men and women reflected adequate internal consistency in all subsamples (Table 3). The item-total correlation coefficients, were high in all five scales and in all subsamples. In addition, the item uniformity was very high for all groups of subjects.

Table 3 Statistics and Cronbach's alpha coefficients of the scales for Restrained Eating, Emotional Eating (the three versions), and External Eating as obtained in the samples of all subjects combined and the subsamples of obese and non-obese subjects; men and women; obese men and women; and non-obese men and women.

	All subjects					
	n	mean	sd	se	range	Cronbach's alpha
Restrained Eating	1169	2.21	.92	.03	1 -5	.95
Emotional Eating (13-items)	1051	1.92	.68	.02	1 -4.7	.94
Emotional Eating (9-items)	1131	1.76	.68	.02	1 -4.7	.93
Emotional Eating (4 items)	763	2.28	.82	.03	1 - 4.8	.86
External Eating	1163	2.66	.54	.02	1.2-4.8	.80

	obese						non-obese					
	n	mean	sd	se	range	*	n	mean	sd	se	range	*
Restrained Eating	114	2.66	.86	.07	1 -4.7	.94	996	2.14	.91	.03	1 -5	.95
Emotional Eating (13-items)	131	2.11	.73	.06	1-4.2	.95	920	1.89	.67	.02	1 -4.7	.94
Emotional Eating (9-items)	137	1.97	.76	.07	1-4.4	.93	994	1.72	.67	.02	1 -4.7	.93
Emotional Eating (4 items)	99	2.42	.85	.09	1-4.5	.85	664	2.26	.81	.03	1 -4.8	.86
External Eating	143	2.71	.58	.05	1.6-4.8	.83	1020	2.66	.53	.02	1.2-4.2	.80

	men						women					
	n	mean	sd	se	range	*	n	mean	sd	se	range	*
Restrained Eating	498	1.84	.77	.03	1 -4.4	.93	642	2.49	.93	.04	1 -5	.95
Emotional Eating (13-items)	449	1.72	.57	.03	1 -3.5	.92	602	2.06	.72	.03	1 -4.7	.95
Emotional Eating (9 items)	494	1.58	.57	.03	1 -3.6	.91	637	1.89	.73	.03	1 -4.7	.93
Emotional Eating (4 items)	323	2.01	.70	.04	1 -4.0	.82	440	2.48	.84	.04	1 -4.8	.86
External Eating	513	2.64	.53	.02	1.2-4.5	.80	650	2.68	.54	.02	1.2-4.8	.81

	obese men						non-obese men					
	n	mean	sd	se	range	*	n	mean	sd	se	range	*
Restrained Eating	71	2.35	.83	.10	1 -4.2	.93	427	1.76	.72	.04	1 -4.4	.92
Emotional Eating (13-items)	65	1.90	.60	.08	1 -3.5	.93	384	1.69	.56	.03	1 -3.4	.92
Emotional Eating (9-items)	67	1.79	.62	.08	1 -3.6	.90	427	1.55	.56	.03	1 -3.2	.91
Emotional Eating (4-items)	50	2.16	.51	.06	1 -4	.82	273	1.99	.69	.04	1 -4.0	.82
External Eating	71	2.73	.56	.07	1.7-4.5	.82	442	2.63	.53	.03	1.2-4.2	.79

	obese women						non-obese women					
	n	mean	sd	se	range	*	n	mean	sd	se	range	*
Restrained Eating	73	2.97	.77	.09	1 -4.7	.93	569	2.43	.09	.04	1 -5	.95
Emotional Eating (13-items)	66	2.31	.79	.10	1 -4.2	.95	536	2.03	.70	.03	1 -4.7	.95
Emotional Eating (9-items)	70	2.14	.85	.10	1 -4.4	.95	567	1.86	.71	.03	1 -4.7	.93
Emotional Eating (4-items)	49	2.69	.88	.13	1 -4.5	.85	391	2.46	.83	.04	1 -4.8	.86
External Eating	72	2.69	.60	.07	1.6-4.8	.85	578	2.68	.54	.02	1.2-4.2	.81

* Cronbach's alpha

Table 4 Pearson correlation coefficients assessing the relationship between the various eating behaviour scales for all subjects combined, obese ( ), non-obese[ ], men { }, and women] [

	Restrained Eating	Emotional Eating(13)	Emotional Eating(9)	Emotional Eating(4)	External Eating
Restrained Eating	1.00	.37(.32)[.36]{.25}].33[	.34(.31)[.33]{.23}].31[	.35(.33)[.35]{.25}].30[	.16(.18)[.16]{.18}].18[
Emotional Eating (13 items)		1.00	.97(.97)[.97]{.96}].97[	.89(.89)[.88]{.87}].88[	.48(.54)[.47]{.50}].50[
Emotional Eating (9 items)			1.00	.75(.76)[.74]{.70}].75[	.44(.52)[.42]{.46}].46[
Emotional Eating (4 items)				1.00	.49(.51)[.48]{.50}].50[
External Eating					1.00

Table 5 Corrected item-total correlation coefficients of the items of the scales for Restrained Eating, Emotional Eating (the three versions), and External Eating.

Restrained Eating	all subjects n=978	obese n=140	non-obese n=838	men n=416	women n=562
1. When you have put on weight, do you eat less than you usually do?	.77	.73	.76	.73	.74
2. Do you try to eat less at mealtimes than you would like to eat?	.72	.72	.71	.66	.71
3. How often do you refuse food or drink offered because you are concerned about your weight?	.78	.77	.78	.71	.78
4. Do you watch exactly what you eat?	.74	.76	.73	.67	.72
5. Do you deliberately eat foods that are slimming?	.74	.75	.74	.66	.73
6. When you have eaten too much, do you eat less than usual the following day?	.68	.68	.68	.55	.74
7. Do you deliberately eat less in order not to become heavier?	.87	.82	.88	.85	.87
8. How often do you try not to eat between meals because you are watching your weight?	.82	.78	.82	.77	.81
9. How often in the evenings do you try not to eat because you are watching your weight?	.81	.77	.81	.76	.79
10. Do you take into account your weight with what you eat?	.86	.84	.86	.82	.86
Emotional Eating (13-item version)	n=729	n=92	n=637	n=303	n=426
11. Do you have the desire to eat when you are irritated?	.73	.67	.74	.62	.75
12. Do you have a desire to eat when you have nothing to do?	.57	.54	.58	.54	.56
13. Do you have a desire to eat when you are depressed or discouraged?	.79	.81	.79	.72	.80
14. Do you have a desire to eat when you are feeling lonely?	.67	.69	.67	.61	.68
15. Do you have a desire to eat when somebody lets you down?	.78	.79	.77	.68	.79
16. Do you have a desire to eat when you are cross?	.77	.70	.78	.70	.79
17. Do you have a desire to eat when you are approaching something unpleasant to happen?	.71	.76	.70	.65	.74
18. Do you get the desire to eat when you are anxious, worried or tense?	.74	.80	.73	.75	.74
19. Do you have a desire to eat when things are going against you or when things have gone wrong?	.79	.80	.79	.73	.81
20. Do you have a desire to eat when you are frightened?	.72	.74	.71	.65	.74
21. Do you have a desire to eat when you are disappointed?	.81	.82	.81	.74	.83
22. Do you have a desire to eat when you are emotionally upset?	.71	.74	.71	.70	.72
23. Do you have a desire to eat when you are bored or restless?	.72	.75	.72	.71	.70

Table 5 continued

Emotional Eating (9-item version: clearly labeled emotions)	n=1012	n=120	n=892	n=417	n=595
24. Do you have a desire to eat when you are irritated?	.70	.68	.70	.59	.72
25. Do you have a desire to eat when you are depressed or discouraged?	.76	.74	.76	.70	.76
26. Do you have a desire to eat when you are cross?	.75	.72	.75	.70	.75
27. Do you have a desire to eat when you are approaching something unpleasant to happen?	.74	.76	.73	.66	.76
28. Do you get the desire to eat when you are anxious, worried or tense?	.76	.78	.76	.77	.76
29. Do you have a desire to eat when things are going against you or when things have gone wrong?	.81	.80	.81	.76	.83
30. Do you have a desire to eat when you are frightened?	.72	.77	.71	.67	.74
31. Do you have a desire to eat when you are disappointed?	.81	.83	.80	.77	.81
32. Do you have a desire to eat when you are emotionally upset?	.69	.74	.68	.68	.68
Emotional Eating (4-item-version: diffuse emotions)	**n=763**	**n=99**	**n=664**	**n=323**	**n=440**
33. Do you have a desire to eat when you have nothing to do?	.67	.64	.68	.63	.68
34. Do you have a desire to eat when you are feeling lonely?	.75	.73	.75	.71	.75
35. Do you have a desire to eat when somebody lets you down?	.65	.69	.64	.60	.65
36. Do you have a desire to eat when you are bored or restless?	.75	.72	.75	.69	.75
External Eating	**n=1163**	**n=143**	**n=1020**	**n=513**	**n=650**
37. If food tastes good to you, do you eat more than usual?	.49	.56	.48	.53	.49
38. If food smells and looks good, do you eat more than usual?	.53	.58	.53	.50	.57
39. If you see or smell something delicious, do you have a desire to eat it?	.53	.55	.53	.52	.54
40. If you have something delicious to eat, do you eat it straight away?	.42	.41	.42	.37	.47
41. If you walk past the baker do you have the desire to buy something delicious?	.47	.52	.46	.46	.49
42. If you walk past a snackbar or a cafe, do you have the desire to buy something delicious?	.45	.50	.44	.49	.42
43. If you see others eating, do you also have the desire to eat?	.54	.61	.52	.52	.55
44. Can you resist eating delicious foods?	.49	.46	.50	.46	.52
45. Do you eat more than usual, when you see others eating?	.46	.56	.45	.46	.48
46. When preparing a meal are you inclined to eat something?	.43	.47	.43	.44	.43

SUMMARY AND DISCUSSION

In the Dutch Eating Behaviour Questionnaire (DEBQ) constructed, emotional eating was shown to comprise two dimensions, one dealing with eating in response to diffuse emotions and the other with eating in response to clearly labelled emotions.

The three scales in the questionnaire (Restrained eating, Emotional eating and External eating) have a high internal consistency and also a high factorial validity. The similarity of the pattern of corrected item-total correlation coefficients and of the factor pattern in all subsamples also indicates a high dimensional stability of the eating behaviour scales.

In recent studies reported by Stunkard and Messick (Stunkard, 1981, Stunkard and Messick, 1985), also three eating behaviour dimensions were obtained, i.e. (1) "cognitive restraint of eating", (2) "disinhibition" and (3) "hunger". Our Restrained Eating Scale is highly similar to the Stunkard and Messick Cognitive Restraint factor. This is not surprising, because both had items from Pudel's Fragenbogen für Latente Adipositas (Pudel et al., 1975) in the initial item pool. The precise relation between the Stunkard and Messick Disinhibition and Hunger scales and our Emotional eating and External eating scales remains to be assessed, however.

The two-dimensionality of items on emotional eating is in accordance with the observation of Slochower (1983[a]) that various types of emotional states produce different types of eating response: only diffuse emotional states trigger the overeating response, and clearly labelled emotions do not affect eating behaviour. However, there are indications that obese individuals perceive those emotions which are clearly labelled in most normal weight individuals as diffuse. In a pilot study, Slochower (1983[a]) found that overweight subjects had more difficulty than normal weight subjects in describing or labelling emotional experiences. The present data may be considered to substantiate this finding on the basis of the following line of thought. Although the factor structures of the items on emotional eating were very similar in all subsamples of obese and normal weight subjects, in that these items were divided into two dimensions in both the samples, post hoc inspection of the item loadings showed that the difference between these two dimensions was less distinct in the obese subsamples. In the obese, three of the four items dealing with the diffuse emotions seemed to have higher loadings on the dimension dealing with clearly labelled emotions, indicating that these emotions are also experienced as diffuse by the obese.

To investigate this in future studies, three scales for emotional eating have been constructed: one is a two-dimensional scale recommended for general assessment; and two are homogeneous scales dealing separately with "clearly labelled" and "diffuse" emotions to be used for more specific hypotheses.

The positive relationship between the Emotional eating scales and the External eating scale is in line with the psychosomatic theory, that emotionality and food cues can operate together to elicit eating behaviour: a state of high uncontrollabe anxiety may enhance the reactions of the overweight to external cues (Slochower, 1983[a]). However, the same observation can also be explained in terms of externality theory, in which a high degree of emotionality is considered to be a manifestation of the general trait of externality, postulated as being characteristic of obese individuals (Schachter and Rodin, 1974).

The significant relationship between the Emotional eating scales and the Restrained eating scale may be due to the side effects of intense dieting, which generate stress, and may result in emotional instability and hyperemotionality (Hibscher and Herman, 1977; Herman, Polivy, Pliner, Threlkeld and Munic, 1978; Polivy, Herman and Warsh, 1978).

However, the observed relationship between emotional eating and restrained eating in this longitudinal study should be interpreted with caution, because in two earlier cross-sectional studies no relationship was found between these two types of eating behaviour (Van Strien, Frijters, Roosen, Knuiman-Hijl and Defares, in press; Van Strien, 1984[a]). Although as yet there is no clear explanation for this discrepancy it may be explained by response sets which may have been more prevalent in the longitudinal study due to prolonged contact with the investigators (Van Strien, 1984[b]).

Endorsement of items on the emotional eating and external eating scales is probably less socially desirable for obese than for normal-weight individuals. But, in contrast, the reverse is probably the case for endorsement of items on the restrained eating scale. This can be derived from the fact that scores on the Herman and Polivy Restraint Scale were found by Ruderman (1983) to be negatively related to scores on the Eysenck Lie scale in the normal weight, but in the obese, no relationship was found between these two scales. This suggests that obese individuals consider endorsement of restraint scores not to be negative, which is consistent with the observation in this study, that the obese had significantly higher scores on restrained eating than normal weight subjects. In contrast, however, Johnson, Lake and Mahan (1983) found significant negative relationships between restrained eating and the MMPI Lie scale, and the Crowne and Marlowe Social Desirability scale in a sample of

obese dieters, and no such relationship in samples of normal weight and obese non-dieters.

In a mixed sample of obese and normal weight subjects (Van Strien, Frijters, Roosen, Knuiman-Hijl and Defares, in press), a significant negative relationship was found between the Dutch version of the Crowne and Marlowe Social Desirability scale and a short version of the present Emotional eating scale, but no relationships were found between social desirability and earlier versions of the present scales for restrained eating and external eating. No data were available on the relationships between social desirability and the present eating behaviour scales in subsamples of obese and normal weight subjects.

The extent to which social desirability tendencies affect scores on the eating behaviour scales, and the consequence for construct validity is not known and the degree of external validity of the eating behaviour scales has yet to be investigated. Nevertheless the three eating behaviour scales, constructed in this study, permit exploration of the validity of the main theories on the development and maintenance of human obesity.

NOTES

1. Unpublished data set.
2. A more detailed description of the Preliminary Studies is given in Van Strien, T., Frijters, J.E.R., Bergers, G.P.A. and Defares, P.B. The Dutch Eating Behaviour Questionnaire (DEBQ). Assessment of Restrained Eating, Emotional Eating and External Eating. Internal publication, rapport nr. 0-1185, Department of Human Nutrition, Agricultural University, Wageningen, 1984.
3. Frijters, J.E.R. and Roosen, R.G.F.M.
   Translation of three eating behavior questionnaires.
   Internal publication, Department of Human Nutrition, Agricultural University, Wageningen, 1980.

CHAPTER 9

THE PREDICTIVE VALIDITY OF THE DUTCH RESTRAINED EATING SCALE

Tatjana van Strien with Jan E.R. Frijters, Wija A. van Staveren, Peter B. Defares and Paul Deurenberg*.

Herman and Polivy constructed the Restraint Scale (e.g., Herman, Polivy, Pliner, Threlkeld and Munic, 1978), which in our view has two main problems. Firstly, the scale does not seem to be unidimensional, and secondly, it probably does not measure cognitive control of food intake.

Drewnowski, Riskey and Desor (1982) and Blanchard and Frost (1983) have shown that this scale measures two underlying factors which reflect fluctuations in body weight and concern about dieting, respectively. Lowe (1984) found a third factor containing items on splurging and thought about food. In separate analyses of data from normal weight and overweight subjects, Ruderman (1983) obtained the same two-dimensional solution in the normal weight as in the studies mentioned previously, but a four-dimensional solution in the obese. The first factor in this four-dimensional solution reflects weight fluctuation, the second bingeing, the third a tendency to diet, and the fourth overconcern with dieting. Finally, Johnson, Lake and Mahan (1983) found three factors within the Restraint Scale in groups of obese dieters, obese non-dieters, and normal weight subjects. The first factor was heterogeneous in content, and the second and third factors referred to preoccupations with eating and weight fluctuations, respectively.

The fact that the Restraint Scale can be reduced to at least the two factors, fluctuations in body weight and actual concern with dieting, may have the consequence that individuals score high on the Restraint Scale, simply on the basis of large weight fluctuations in the past, without currently watching their weight or consciously restraining their eating.

Other indications have been found that the Restraint Scale may not measure cognitive restriction of food intake. Wardle (1980) found no relationship between the Restraint Scale, and intake of energy.

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In addition, both Wardle (1980) and Hawkins II and Clement (1980) found a close relationship between the Restraint Scale, and measures of binge eating. These observations suggest that the Restraint Scale does not predict the degree of restriction of food intake, but disinhibition of restraint to some degree. It may be argued, that this observation is in line with Herman and Polivy (1980[a]), that the essential feature of Restrained Eating theory is not the relationship between the Restraint Scale and food intake, but the inability to maintain cognitive control over food intake (i.e., susceptibility to disinhibition). According to this interpretation, intense dieting results in counterregulatory eating behaviour or excessive food intake, when self control is undermined by disinhibitors, such as alcohol, anxiety or depression (Herman and Mack, 1975; Herman and Polivy, 1975; Polivy and Herman, 1976[a,b,c]). However more recently, counterregulatory eating behaviour has been shown to be not necessarily the consequence of dieting per se (Stunkard and Messick, 1985). This finding was obtained with a questionnaire to assess restrained eating, the Three Factor Eating Questionnaire (TFEQ), which measures separately cognitive restraint of food intake (Factor I), disinhibition of cognitive restraint (Factor II) and hunger (Factor III). Results of a laboratory study on food intake, obtained by Shrager, Wadden, Miller, Stunkard and Stellar (1983) showed that not Factor I, but Factor II was closely associated with overeating. The significance of these findings becomes clear from the fact that the correlation between the Herman and Polivy Restraint Scale and the restraint subscale of scores on the TFEQ (Factor I) was not statistically significant (r=.168), while the correlation between scores on this scale and the disinhibition subscale (Factor II) of the TFEQ was highly significant (r=.840) (Stunkard and Messick, 1985; Weissenburger, Rush, Giles and Stunkard, submitted). Thus, it can be tentatively concluded that the counterregulatory eating behaviour of the Herman and Polivy "restrained eaters" is related to disinhibition of restraint and not to restraint per se, and also, that the Restraint Scale is not a measure of restriction of food intake, but of disinhibition of cognitive restraint.

PURPOSE OF THE PRESENT STUDY

The Stunkard and Messick scale with three dimensions of restrained eating is a major improvement but was not available when the present study was initiated. Hence, The Dutch Eating Behaviour Questionnaire (DEBQ) with scales on Emotional Eating, External Eating and Restrained Eating was developed independently (Van

Strien, Frijters, Bergers and Defares, in press). The focus of the present study is the Restrained Eating scale of the DEBQ. This scale has been shown to have high internal consistency and factor validity (Van Strien et al., in press). However, the decisive factor determining its usefulness is its degree of predictive validity. As the scale is very similar to the cognitive restraint subscale (Factor I) of the Stunkard and Messick TFEQ (Van Strien et al., in press), it has a high predictive validity if it predicts adequately restriction of food intake. However in general, determination of the relationship between a score on a particular restrained eating scale and food intake (Wardle, 1980) does not seem to be the best way to establish the predictive validity of the scale. In our view, a restrained eating scale is only valid if a score reflects the degree to which an individual eats less than he or she actually would like to eat, because eating less than desired is the very nature of restrained eating behaviour. Absolute intake of energy does not measure the degree to which an individual eats less than desired. However, it is very complicated, if not impossible, to conduct an eating behaviour study to investigate simultaneously actual food consumption and restriction of food intake. This results from the practical difficulty of determining the quantity of energy, or food not eaten by the individual but which the individual would have eaten without cognitive inhibition. One derivative, and therefore an indirect way to assess the difference between actual intake of energy and desired intake of energy is as follows. The energy required by an individual depends largely on his body weight, body composition and physical activity. In most people, physical activity does not influence to a large extent the energy required, and also the energy required for activities depends on body weight. From this postulate, it follows that under the stated conditions the necessity to eat a certain quantity of food is mainly controlled by the individual's body weight. Heavy individuals need more energy than lean individuals in order to remain body weight constant and to be able to perform the same physical activity. Therefore when an individual is in energy balance, the energy requirement is an indirect estimate of the energy content of the food desired. Thus, if this assumption is correct, the difference between energy requirement estimated from body weight and activity pattern, and energy intake as assessed in a food consumption study can be taken as an indirect measure of degree of restraint. If the Dutch Restrained Eating Scale has a high predictive validity, there should be a high correlation between scores on the scale and estimation of deviation in energy required. If this is correct, then a high negative correlation may also be expected between scores on the scale and intake of fat and sugars (mono- and

disaccharides), because these energy sources are perceived as being fattening by many dieters.

METHOD

Overview

Estimates of values of actual intake of energy, fat and sugar were obtained from those participating in an ongoing study on seasonal variations in energy intake in women (Van Staveren, Deurenberg, Burema, De Groot and Hautvast, submitted). From this study, three 24-hour food intake recalls taken at three-month intervals were undertaken to assess various measures of energy. The DEBQ was administered to the subjects during the second assessment date.

These data were examined to determine whether there were relationships between restrained eating scores and the magnitude of the deviation from energy requirement, and also between restrained scores and the intake of fat and sugar (mono- and disaccharides).

Subjects and procedure

Three 24-hour food recalls were obtained for 110 women participating in a longitudinal study on seasonal variation in energy intake carried out in Renkum, the Netherlands. All women were in the age group 31 to 34 years as at 1 January 1983. No one was on a diet prescribed by a doctor, or was pregnant. At June 1983, the mean body mass index (BMI; weight/height^2) was 22.3 kg/m^2 (s=2.7). The 24-hour food recalls had been obtained on different days in the months of April, June, and September 1983 by trained dieticians on unannounced home visits. To ensure that the records were as accurate as possible, they weighed the portions of food most frequently consumed (other portions were estimated in terms of household measures), and the reported food intake of the previous day was recorded. The following day, after rising and urinating, the women themselves measured their body weight on calibrated scales to the nearest 0.5 kg (note 1)*. On the first visit, body height was measured by the dietician to the nearest 0.1 cm. On the home visit in June, the Restrained Eating Scale was administered by the dieticians.

* see page 68 for notes

Measures

Restrained Eating Scale. The Restrained Eating Scale consists of ten items having a Likert response format: never, seldom, sometimes, often, and very often. Two items (see Table 2, chapter 8) have an additional category, "not relevant", to indicate that a respondent has never eaten too much, or never gained weight in adult life. A score for this scale is obtained by dividing the sum of item scores by the total number of items, thus a high score indicates a high degree of restrained eating. Those (n=6) who gave a not relevant response were excluded from analysis. Table 1 shows the items and their item-rest correlation coefficients of the Dutch Restrained Eating Scale.

Conversion into nutrients. Intake of daily energy, fat and sugar (mono- and disaccharides) was calculated by multiplying the estimated amounts of foods consumed by the appropriate values obtained from a computerized food composition table (Hautvast, 1975).

Mean one-day intake. For each subject, the mean one-day intake of energy and nutrients was obtained from the mean intake of energy and nutrient intake of the three 24-hour recall periods.

Deviation from the required energy intake. A total of 2200 Kcal is the average daily requirement for women in the age group 20-35 years and of 60 kg body weight having moderately strenuous habitual activity levels (Committee on Caloric Requirements, 1950) (note 2). Correction for body weight was made by either decreasing or increasing the required 2200 Kcal by 150 Kcal for every 5 kg below or above 60 kg, respectively (Dutch Expert Committee on Energy and Nutrient Requirements, 1983). Deviation of an individual's mean one-day caloric intake from the required caloric intake was obtained as follows:

$$\frac{\text{Caloric intake n days}}{n} - \left[2200\ \text{Kcal} - \left(\frac{60\ \text{kg} - \text{body weight}}{5} \times 150\ \text{Kcal}\right)\right]$$

RESULTS

The mean score on the Restrained Eating Scale was 2.52 (s=.89). This value is similar to that found in an earlier study (Van Strien et al., in press). The mean deviation of energy intake from energy requirement was -278 Kcal (s=641). From the negative sign of this value it can be concluded that the mean intake of energy was less than the calculated mean energy requirement. The mean intake of fat and sugar was 85 g (s=28) and 114 g (s=39), respectively.

The correlation coefficient showing the relationship between restrained eating and deviation of energy intake from energy requirement was -.37 ($p<.01$). After correction for attenuation (note 3), this correlation increased to -.45. This means that a subject ate less than required the higher she scored on the Restrained Eating Scale. The correlation coefficient between restrained eating and intake of fat was -.28 ($p<.01$), and this correlation increased to -.38 after correction for attenuation. The correlation between restrained eating and intake of sugar was -.38 ($p<.01$), and this correlation increased to -.46 after correction for attenuation. Thus, all correlations between restraint scores and the measures of food intake were significant, and in the direction predicted.

CONCLUSION

About 20% of the variance in the scores on the Dutch Restrained Eating Scale was explained by most measures of food intake. These results should be considered from the perspective that the present measures may be contaminated by a number of unwanted sources of errors. Firstly, the measures of food intake are only estimates of the actual food intake (Block, 1982). Secondly, the derived estimate of the stability of the mean over-three-day food intake may not have been the best possible. Thirdly, the estimate of the required intake of energy is only an approximation of the actual energy requirement, which for an individual could be biased by many factors. Finally, the deviation from energy requirement is only a derivative of the discrepancy between an individual's actual food intake and his or her desired food intake.

Another source of error may be that food intakes assessed in the months of April and September may not have been accurate estimates of the degree of restrained eating assessed in the month of June. An individual's degree of restriction of food intake may have changed in the period between April and June or between June and September. It would have been preferable to have obtained all food recalls within a time span close to the asssessment of restrained eating.

Taking these factors into consideration, it can be concluded that the results of the present study suggest that the Dutch Restrained Eating Scale has moderate to good predictive validity but that the effects of possible sources of error should be investigated further.

NOTES

1. Weight was reported by the women themselves because it was not possible for the dieticians to measure the women's body weight without clothes, before breakfast, and with empty bladder. Although relying on self-reporting may have introduced a degree of unreliability to weight measurements, a recent study by Stunkard and Albaum (1981) suggests that this error may have been minimal.
2. These conditions hold for the group under study (Van Staveren et al., submitted).
3. Correction for attenuation was obtained by application of the equation:

$$r_{corr.att.} = \frac{r_{xy}}{\sqrt{rel_x \cdot r_{3s}}} ,$$

in which,
r_{xy} = the correlation coefficient between the Restrained Eating Scale and a measure of food intake
$rel._x$ = the reliability coefficient of the Restrained Eating Scale (.94)
r_{3s} = the reliability coefficient of a measure for food intake (deviation from required intake = .73; intake of fat = .58; intake of sugar = .72)

The reliability coefficient of a measure for foodintake (r_{3s}) was obtained by application of the Spearman-Brown equation as follows:

$$r_{3s} = \frac{3(r_s)}{1 + 2r_s}$$

in which,
r_s = the stability coefficient for one-day intake
r_{3s} = the stability coefficient for the mean over-three-days food intake.

The stability coefficient for one-day intake (r_s) was obtained as follows:

$$r_s = \sqrt{\frac{r_{1,2}^2 + r_{1,3}^2 + r_{2,3}^2}{3}}$$

in which,
r_s = the stability coefficient for one-day's intake
$r_{1,2}$ = the correlation coefficient between quantity consumed on day 1 and day 2
$r_{1,3}$ = the correlation coefficient between quantity consumed on day 1 and day 3
$r_{2,3}$ = the correlation coefficient between quantity consumed on day 2 and day 3

CHAPTER 10

EATING BEHAVIOUR, PERSONALITY TRAITS AND BODY MASS IN WOMEN

Tatjana van Strien with Jan E.R. Frijters, René G.F.M. Roosen, Wil J.H. Knuiman-Hijl and Peter B. Defares*

THEORY

In both psychosomatic and externality theory obesity is attributed to overeating. In psychosomatic theory eating is considered to be a response to emotional arousal. Intrapsychic conflict has been put forward as a central element inducing the eating pattern of emotional eaters (Bruch, 1957, 1961, 1973; Slochower, 1983[a]). Overeating, has been discussed as a means of: diminishing anxiety; sedation; counteracting a feeling of being unloved; an expression of hostility; and the avoidance of competition (Kaplan and Kaplan, 1957). In general, such individuals are considered to be less adjusted, to exhibit distinctive personality traits, and a characteristic emotionality (McReynolds, 1983). Externality theory accounts for the phenomenon of eating in response to food cues, which is considered to be only one manifestation of a generalized stimulus sensitivity. This point of view is based on observed differences in normal weight and obese subjects in tasks, including reaction time, short-term memory, tachistoscopic thresholds (Rodin, Herman and Schachter, 1974), distractability (Rodin, 1973), time estimation (Pliner, 1973a), focused thinking (Pliner, 1973b), emotional reactivity (Pliner, 1974; Rodin, 1973; Rodin, Elman and Schachter, 1974) and classical conditioning (Yaremko, Fisher and Price, 1975). Recently, however, this generalized stimulus binding concept has been criticized, because no pattern of intercorrelations has been found between the various measures of externality (Isbitsky and White, 1981). Even those measures used by Schachter and Rodin and shown by these investigators to differentiate between obese and normal weight subjects were not intercorrelated (Nisbett and Temoshok, 1976).

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Common to both psychosomatic theory and externality theory is the misperception of hunger and satiety for food intake as a causal factor in overeating (Robbins and Fray, 1980). Recently, Slochower (1983[a]) has proposed that emotionality and food cues operate conjointly to elicit eating behaviour: a state of high uncontrollable anxiety may enhance reactions to external cues. In externality theory, a close relationship between emotionality and externality is also assumed, if a high degree of emotionality is considered to be a manifestation of the general trait of externality, as asserted by Schachter and Rodin (1974).

The observation, that some normal weight individuals have a high degree of externality (e.g., Rodin and Slochower, 1976) has led to the contention that other mechanisms unrelated to external responsiveness determine body weight (Rodin, 1978). These mechanisms may be either physiological or psychological, for example, conscious restriction of food intake. Even though this construct is not incorporated in psychosomatic theory, the same may hold for emotional eaters. External responsiveness and high emotional eating may thus be prevalent in all weight categories.

Pudel (e.g., 1978) devised a questionnaire, the Fragenbogen für Latente Adipositas (FLA) for the identification of normal weight subjects having "obese" eating patterns that is the "latent obese". The "latent obese" were shown not to reduce their eating rate during a test meal of 20 minutes duration, which is an eating pattern similar to obese subjects. This phenomenon suggests a disturbance of the hunger-satiety mechanism, which, as already stated, is in line with both psychosomatic theory and externality theory (Pudel, Metzdorff and Oetting, 1975; Meyer and Pudel, 1977; Pudel, 1978).

Pudel stressed the theoretical importance of assessing personality differences between "obese" and "latent obese" regarding body weight control, and referred to "Prometheischer Wille" (will power) as one of the determinants of successful weight loss. The degree of internal control has also been suggested as a predictor of successful weight loss in obesity therapy (e.g., Salzer, 1982; Balch and Ross, 1975; Weiss, 1977).

In contrast to both psychosomatic and externality theory, the theory of restrained eating attributes overeating to dieting (Herman and Polivy, 1980a; Polivy and Herman, 1983). This paradox is based on the concept of natural weight, a range of body weight which is homoeostatically preserved by the individual. Attempts to lower body weight by conscious restriction of food intake initiate physiological defenses, such as, lowering the metabolic rate and arousal of persistent hunger. When self-control is undermined by disinhi-

bitors, such as, alcohol, anxiety, depression, or even by the consumption of high calorie foods, counterregulation may occur and in this excessive food intake (Herman and Mack, 1975; Herman and Polivy, 1975; Polivy and Herman, 1976a,b,c). In addition, continuous denial of hunger may result in loss of contact with feelings of hunger and satiety (Polivy and Herman, 1983). Thus, intense dieting may ultimately result in obese eating patterns, since both arousal and external stimuli disrupt the cognitive restraint normally exercised by dieters faced with persistent hunger (Herman and Polivy, 1980b).

Aim of the study

The principal aim of this study was to examine which theory seems most valid, psychosomatic theory, externality theory or the theory of restrained eating. It was the intention to determine this by means of psychometric studies of the relationships between scales of emotional eating, external eating and restrained eating on the one hand, and variables such as body fatness and personality scales on the other hand. It was reasoned that on the basis of the ideas expressed in psychosomatic theory, externality theory and the theory of restrained eating, different findings were to be expected with regard to the relationships between the three types of eating behaviour and/or personality traits. Thus, from the degree to which observed findings are similar to anticipated findings within one single theoretical viewpoint, it would be possible to draw tentative conclusions regarding the validity of each specific point of view.

The theory of restrained eating suggests that a heightened degree of externality and emotionality is the consequence of dieting. If this line of reasoning is correct, then a significant relationship may be expected in the present study between restrained eating and emotional eating and between restrained eating and external eating.

In contrast to the theory of restrained eating, in which "obese" eating patterns are considered to be a consequence of dieting, in both the psychosomatic and the externality theory, dieting is considered to be one of the possible reactions to overweight caused by overeating. These theoretical positions imply that "obese" eating patterns preceed restrained eating. If this supposition is correct, no difference should be found between "obese" and "latent obese" women in the degree of emotional and external eating.

As a consequence of both theories, but on different grounds, a significant relationship is to be expected between emotional eating and external eating. From the viewpoint of externality theory, this relationship seems most proba-

ble, because a high degree of emotionality is considered to be a manifestation of the general trait of externality. From the viewpoint of psychosomatic theory, this relationship is also to be expected, since high arousal and tempting food must be present for a person to overeat.

The following exploration may warrant tentative conclusions as to which theory is to be favoured, psychosomatic theory or externality theory. An indication of the validity of the stimulus-bound concept of externality theory may be obtained if relationships between external eating and personality measures reflecting aspects of externality, for example, Rotter I-E scales and social approval, and personality scales measuring aspects of emotionality are found to be significant. An indication of the impact of the emotionality of emotional eaters in psychosomatic theory may be obtained if relationships between emotional eating and scales indicating aspects of emotional instability and low adjustment are found to be significant.

In addition to these theoretical considerations, also personality differences between "obese" and "latent obese" women have been explored for indications as to which traits are related to a high degree of restrained eating and successful weight loss.

METHOD

Subjects

The sample consisted of 80 women, all inhabitants of Wageningen, who were selected by their general practitioners. The sample was selected in such a manner, that it consisted of both normal-weight and overweight subjects. Seventeen had a BMI of 30.0 or higher and a mean age of 31.4 years (s=3.0). The remaining 63 women had a BMI less than 30.0 and a mean age of 31.1 years (s=9.4). The mean BMI of the whole sample was 25.2 (s=4.8), and the mean age was 31.1 years (s=8.4).

Session and Questionnaires

During an evening session (7.00 pm to 10.30 pm), the subjects were requested to complete three types of questionnaires. As time limits were imposed, some subjects did not complete all questionnaires. At the end of the session, body weight and height were measured.The following questionnaires were used:

- a questionnaire on age, marital status, height, weight and degree of weight loss or weight gain in the preceding two years,
- three scales to assess emotional eating, external eating, and restrained

eating, derived from the first version of the Dutch Eating Behaviour Questionnaire; (DEBQ) (see Preliminary Study One, chapter 8). The "Emotional Eating" scale consisted of seven five-point items (1 - 5) (Cronbach's alpha =.89); the "External Eating/Perceived Hunger" scale, seven dichotomous items (1,3) (KR-20 =.83); and the "Restrained Eating" scale, six dichotomous items (1,3), (KR-20 =.78) (See Table 1)

- a set of Dutch personality questionnaires (see Table 2).

Table 1 Items of the three eating behaviour scales and their corrected item-total correlation coefficients.

Emotional Eating	corrected item-total correlation coefficients
1. Do you have a desire to eat when you have nothing to do?	.65
2. Do you have a desire to eat when you are bored and restless?	.70
3. Do you have a desire to eat when you are anxious, worried or tense?	.76
4. Do you have a desire to eat when you are depressed or discouraged?	.79
5. Do you have a desire to eat when you are feeling lonely?	.66
6. Do you have a desire to eat when you are worried about something or when you are under stress?	.60
7. Do you have a desire to eat when you are excited?	.68

Restrained Eating	
1. Do you not eat certain foods because they make you fat?	.61
2. Do you weigh yourself at least once a week?	.61
3. So as not to become heavier, do you deliberately eat less?	.54
4. Do you often read advice on how to slim in the newspapers and magazines?	.49
5. Do you watch your figure carefully?	.46
6. Do you watch precisely how much you eat?	.47

External Eating/Perceived Hunger	
1. When you see food, do you have a desire to eat?	.68
2. When you see others eating, do you have a desire to eat?	.80
3. Even though you eat at regular times, do you feel hungry at other times during the day?	.47
4. Do you eat even when you are not feeling hungry?	.42
5. When you see something that is really delicious do you want to eat it immediately?	.60
6. Can you let an open packet of delicious food lie in the cupboard for a few days without eating it?	.56
7. When you smell freshly baked food, do you have a desire to eat, even if you have just had a meal?	.55

Table 2 Personality scales administered to the study sample

Abbreviation	Personality scale used: Dutch	English translation
NPV	Nederlandse Persoonlijkheids-Vragenlijst (Luteyn, Starren en Van Dijk, 1975)	Dutch Personality Questionnaire
-IN	Scales: inadekwatie	Scales: inadequacy
-SI	sociale inadekwatie	social inadequacy
-RG	rigiditeit	rigidity
-VE	verongelijktheid	feeling wronged
-ZE	zelfgenoegzaamheid	self-sufficiency
-DO	dominantie	dominance
-ZW	zelfwaardering	self-esteem
GLTS	Guilford LTP Temperament Survey	Guilford Zimmerman Temperament Survey (1949) edited in Dutch by: Laboratorium voor Toegepaste Psychologie (1974)
-E	Scales: sociale extraversie	Scales: sociability
-G	gevoelsmatigheid	sentimentality,
	emotionele labiliteit	emotional instability
-R	reagibiliteit, temperament	impatience
-A	autoritair gedrag, geldingsdrang	authoritarism, assertiveness
-O	onbezorgdheid, optimisme	carefree, optimistic,
	oppervlakkigheid	superficiality
-M	masculiniteit	masculinity of emotions and interests
SA	Sociale Angst (Willems, Tuender-de Haan en Defares, 1973)	Questionnaire to measure social anxiety as a trait
SD	Sociale Goedkeuringschaal	Social Approval Scale (Crowne and Marlowe, 1964) edited into Dutch by Groffen and Van Kreveld (1972)
ZOET	Punt 9 van de EPQ	Item 9 of the Eating Patterns Questionnaire (EPQ) (Wollersheim, 1970)
	Bent u gek op zoetigheid (1-5)	Do you like sweet foods?
AS	Sociale stijgingschaal	A scale to measure social ascendancy from the Guilford Zimmerman Temperament Survey, Guilford & Zimmerman, 1949)
I-E	Interne-Externe Beheersingschaal	Internal-External Control Scale (Rotter, 1966) Edited in Dutch by Andriessen (1972)
-18	Scales: I-E 18	Scales: 18 items internal - external control
-RuwSC	I-E Ruwe score	Raw scores of internal - external control on remaining items
PMT*	Prestatie Motivatie Test (Hermans, 1968)	Achievement Motivation Test
-P	Scales: prestatie motivatie	Scales: achievement motivation
$-F^-$	negatieve faalangst	disfunctioning in unstructured task situations
$-F^+$	positieve faalangst	functioning well in unstructured task situations

* Results on the PMT have not been presented in the original paper for reason of missing data (n=55).

RESULTS

Relationships between BMI and eating behaviour, and interrelationships between the three eating behaviour components

The Pearson correlation coefficients showing the relationship between BMI and each of the three eating behaviour components are given in Table 3, and also for the correlations between the eating behaviour components. Partial correlation coefficients are also presented to exclude confounding effects of one of the other two eating behaviour components, and of BMI.

Table 3 Pearson correlation coefficients showing the relationships between the three eating behaviour components and body mass index (BMI) and partial correlation coefficients adjusting for the effect of confounding factors.

Emotional Eating and BMI	.46**
adjusted for the effect of Restrained Eating	.46**
adjusted for the effect of External Eating/Perceived Hunger	.34**
Restrained Eating and BMI	.09
adjusted for the effect of Emotional Eating	.11
adjusted for the effect of External Eating/Perceived Hunger	.10
External Eating/Perceived Hunger and BMI	.38**
adjusted for the effect of Emotional Eating	.20*
adjusted for the effect of Restrained Eating	.38**
Restrained Eating and Emotional Eating	.00
adjusted for the effect of BMI	-.05
External Eating/Perceived Hunger and Emotional Eating	.49**
adjusted for the effect of BMI	.39**
External Eating/Perceived Hunger and Restrained Eating	.01
adjusted for the effect of BMI	-.03

** $p < .01$
* $p > .05$

Both "Emotional Eating" and "External Eating/Perceived Hunger" were found to be significantly related to BMI, but "Restrained Eating" was not shown to be related to BMI. A significant relationship was found between "Emotional Eating" and "External Eating/Perceived Hunger", but "Restrained Eating" was not found to be related to either "Emotional Eating" or "External Eating/Perceived Hunger".

Relationship between eating behaviour components and personality traits

Pearson correlation coefficients showing the relationship between the eating behaviour components scales and personality scales are presented in Table 4.

Partial correlation coefficients adjusting for the effect of BMI are also given to allow for assessment of the relationship between behavioural components and personality traits after exclusion of the BMI value as a confounding variable. The analysis was restricted to the partial correlation coefficients only.

Table 4 Pearson's correlation coefficients showing the relationships between the three eating behaviour components and the personality scales and partial correlation coeffcients ( ) adjusting for the effect of the body mass index (BMI)

Personality scale[a]	Emotional Eating		Restrained Eating		External Eating Perceived Hunger	
NPV-IN	.51**	(.50**)	-.07	(-.09)	.09	(.05)
-SI	.13	(.05)	-.14	(-.16)	.12	(.05)
-RG	-.10	(-.13)	.15	(.14)	-.08	(-.10)
-VE	.13	(.09)	.01	(.00)	-.00	(-.05)
-ZE	-.10	(-.20*)	-.14	(-.15)	-.04	(-.10)
-DO	-.07	(-.00)	.16	(.17)	-.10	(-.05)
-ZW	-.32**	(-.29**)	.18*	(.20*)	-.13	(-.07)
GLTS-E	-.25*	(-.12)	.13	(.17)	-.17	(-.05)
-G	.32**	(.30**)	.13	(.12)	.01	(-.04)
-R	.10	(.20*)	-.06	(-.05)	-.04	(.03)
-A	.05	(.03)	.22*	(.22*)	-.04	(-.07)
-O	.20*	(-.19*)	.06	(.07)	.03	(.07)
-M	-.21*	(-.15)	-.06	(-.04)	.05	(.13)
SA	.23*	(.14)	-.02	(-.04)	.13	(.05)
SD	-.21*	(-.28**)	-.16	(-.16)	-.13	(-.18)
ZOET	.30**	(.28**)	-.25*	(-.27**)	.43**	(.43**)
AS	-.20*	(-.10)	.20*	(.23**)	-.14	(-.04)
I-E-18	.02	(-.03)	.03	(.02)	-.01	(-.06)
-RuwSC	.10	(.02)	-.06	(-.08)	-.01	(-.09)
PMT-P[b]	-.31**	(-.28*)	.12	(.14)	-.15	(-.10)
-F^-	.29*	(.32**)	-.15	(-.15)	-.04	(-.04)
-F^+	.04	(.06)	-.04	(-.03)	.25*	(.28*)

* P <.05
** P <.01

[a] see Table 2
[b] see footnote Table 2

"Emotional Eating": The higher a woman scored on "Emotional Eating", the more she reported feeling anxious and acting inadequately (NPV-IN), lacking in self-sufficiency (NPV-ZE), lacking in self-esteem (NPV-ZW), being sentimental and emotionally unstable (GLTS-G), being worried (GLTS-O), lacking patience (GLTS-R), showing no signs of social desirability (SD) and the more she reported to have a high preference for sweet foods (ZOET), to have low achievement motivation (PMT-P) and the more she reported to be unable to function well in unstructured task situations (PMT-F^-).

"External Eating/Perceived Hunger": The higher a woman scored on "External Eating/Perceived Hunger", the more she reported to have a high preference for

sweet foods (ZOET), and to function well in unstructured task situations ($PMT-F^+$).

"Restrained Eating": The more restrained in eating a woman indicated to be, the more she reported high self-esteem (NPV-ZW), of being authoritarian (GLTS-A), having a low preference for sweet foods (ZOET), and having a need for social ascendance (AS).

Differences in personality and eating behaviour between "latent obese" and "obese" women

In the present study, a subject was classified as being "obese" if she had a BMI of 30.0 or higher. In the manner proposed by Pudel (e.g., Pudel, 1978), a subject was classified "latent obese" on the following criteria:

- if her BMI was less than 30.0;
- if she considered herself to have been overweight at least once in her life; this was considered to be the case, if she gave a negative answer to the question: I have never been overweight;
- if her score on the "Restrained Eating" scale was higher than the average of the sample ($\bar{x}$=2.3).

On the basis of these criteria, 17 women were classified as "obese" and 10 as "latent obese". The significance of the differences between the mean of each group on various personality scales was assesses by a t-test, and the results are given in Table 5.

"Latent obese" subjects reported feeling more socially adequate (NPV-SI), less social anxiety (SA) and being more outgoing (GLTS-E) than "obese" subjects. Furthermore, they reported being more dominant (NPV-DO), having a greater need for social ascendance (AS), and being able to function better in unstructured task situations ($PMT-F^-$). They showed a higher preference for male occupations, were less sentimental (GLTS-M), and had a higher degree of self-esteem (NPV-ZW) than "obese" women. Finally, "latent obese" women reported a higher degree of internal control, as measured on the Rotter internal-external control scale (IE-RUW). No differences were obeserved between the "latent obese" and the "obese women, in respect of "Emotional Eating" and "External Eating/Perceived Hunger" (see Table 6).

Table 5 Personality differences between "latent obese" and "obese" women.

Personality* scales	Latent obese Mean	SD	n	Obese Mean	SD	n	p
NPV-IN	11.8	7.5	10	14.9	9.6	17	.36
-SI	6.9	3.7	10	13.7	5.8	17	.00
-RG	25.7	7.8	10	26.4	6.4	17	.80
-VE	14.9	7.7	10	17.8	8.5	17	.37
-ZE	10.6	3.9	10	11.9	5.8	17	.50
-DO	15.3	7.1	10	8.9	5.3	17	.03
-ZW	29.7	3.6	10	24.9	6.7	17	.02
GLTS-E	23.0	6.1	10	10.8	6.7	16	.00
-G	21.8	8.4	10	25.6	7.2	17	.24
-R	17.7	8.6	10	16.5	5.8	17	.71
-A	24.4	10.4	10	22.8	9.3	17	.70
-O	18.2	8.0	10	12.8	7.4	17	.10
-M	14.6	6.6	10	9.4	4.5	17	.05
SA	40.1	12.4	10	64.9	11.9	17	.00
SD	8.0	3.1	10	10.2	3.7	14	.12
ZOET	2.7	1.1	10	3.2	1.2	17	.30
AS	16.6	4.3	10	10.3	3.1	14	.00
I-E-18	25.0	3.9	10	27.9	4.4	16	.09
-RLWsc	22.2	6.1	10	27.4	4.9	16	.04
PMT-P[a]	19.0	8.7	8	16.6	6.8	9	.53
$-F^-$	12.5	4.4	8	17.8	5.7	9	.05
$-F^+$	7.8	4.2	8	5.9	2.9	9	.32

* see Table 2
[a] see footnote Table 2

Table 6 Differences in the three eating behaviour components between the "latent obese" and the "obese" women

Eating Behaviour component	Latent obese Mean	SD	n	Obese Mean	SD	n	p
Emotional Eating	2.8	1.1	10	3.2	.8	17	.24
External Eating/ Perceived Hunger	2.1	.6	9	2.5	.7	15	.16
Restrained Eating*	2.8	.2	9	2.1	.5	17	.00

* This difference is found by definition of "latent obesity" as a result of the classification

DISCUSSION

"Restrained Eating" was not found to be related to BMI. No relationship was found between "Restrained Eating" and either "External Eating/Perceived Hunger" or "Emotional Eating", which is not in accordance with the findings of Herman

and coworkers. They found that a heightened degree of emotionality and externality was characteristic of dieters, but not of non-dieters, and hypothesized that restrained eating elicits externality or emotionality (Herman and Polivy, 1975; Herman, Polivy, Pliner, Threlkeld and Munic, 1978; Polivy, Herman and Warsh, 1978).

Recently, it has been shown by means of factor analysis that the Herman Restraint Scale can be reduced to at least two underlying factors reflecting fluctuations in body weight, and actual concern with dieting (e.g., Drewnowsky, Riskey and Desor, 1982; Ruderman, 1983; Blanchard and Frost, 1983). Thus, in retrospect, the relationship found by Herman and coworkers between restrained eating and externality, and between restrained eating and emotionality may have been caused by the dual effect of a weight history component and a dieting component in their scale, because a high score on restrained eating can be the result of a high subscore on either of these two dimensions.

In contrast to Herman's scale, the "Restrained Eating" scale used in the present study contained only statements about dieting and weight consciousness. The absence of a significant relationship between "Restrained Eating" and either "Emotional Eating" or "External Eating/Perceived Hunger" in this study is not in agreement with the hypothesis of Herman and Polivy, that dieting is the causal agent of increased externality or emotionality.

No significant differences were found between "obese" and "latent obese" women in the degree of "Emotional Eating" and "External Eating/Perceived Hunger". At the time of assessment, the "obese" women were overweight, and the "latent obese" women were of normal weight but had been overweight at least once in their lives and were highly restrained eaters. Thus it may be tentatively concluded that these "obese" eating patterns are potential causal factors for overweight and also for restrained eating. This finding does not violate the theoretical stands of either externality theory or psychosomatic theory.

Significant relationships were found between BMI and "External Eating/ Perceived Hunger", BMI and "Emotional Eating" and also between the two eating behaviour components. This also is not in contradiction with either externality theory or psychosomatic theory. As stated previously but on different grounds, a significant relationship can be expected between emotional eating and external eating. According to externality theory, such a relationship should be found, because a high degree of emotionality is considered to be a manifestation of the general trait of externality. Psychosomatic theory also requires such a relationship because high arousal and food must be present for overeating to occur.

In the present study, significant relationships were not found between "External Eating/Perceived Hunger" and personality scales reflecting aspects of externality, for example, Rotter I-E scales and social approval (SA) (Table 4). Furthermore, significant relationships were not found between "External Eating/ Perceived Hunger" and personality scales measuring aspects of emotionality, for example, emotional instability (GLTS-G), social anxiety (SA) and worry (GLTS-O) (see Table 4). The absence of significant relationships between "External Eating / Perceived Hunger" and personality measures of externality and emotionality is not in accordance with the generalized stimulus-binding concept of Schachter and Rodin (1974). However, the results are in accordance with findings reported by Nisbett and Temoshok (1976) and Isbitsky and White (1981). Significant relationships were found between "Emotional Eating" and a number of personality scales indicating aspects of emotional instability, for example, low self-esteem (NPV-ZW), emotional instability (GLTS-G), anxiety (NPV-IN) and worry (GLTS-O).

Thus in summary, the absence of a significant relationship between "Restrained Eating" and either "Emotional Eating" or "External Eating/Perceived Hunger" in the present study is not in accordance with the theory of restrained eating, that dieting results in increased externality or emotionality. The present data suggest that "External Eating/ Perceived Hunger" and "Emotional Eating" are potential causal factors for overweight and also for restrained eating, which is in line with both the psychosomatic theory and the externality theory. BMI was found to be significantly related to both "External Eating/Perceived Hunger" and "Emotional Eating". In addition these two eating behaviour components were not found to be significantly different in "obese" and "latent obese" women. However, on the basis of the relationships between each of these two eating behaviour components and the pattern of relationships between these and personality scales, the present authors are more inclined to stress the importance of "Emotional Eating" as a causal factor of overweight. Therefore, of the three eating behaviour components studied, "Emotional Eating" seems to be the most promising for a better understanding of causal factors of overweight, and the present data point to psychosomatic theory as being most valid.

The personality traits shown by "latent obese" and "obese" women may indicate which traits are related to a high degree of restrained eating and successful weight loss. Both groups can be considered to have been confronted with weight problems. By definition the "latent obese" had a normal BMI as a result of subjecting themselves to a severe weight reduction regime. As compared with the "obese" women, they indicated that they functioned more effectively in

social situations and were more outgoing in attitude; and also they demonstrated a higher degree of self-esteem and stronger self-control.

The higher degree of internal control by the "latent obese" is in line with findings in other studies (Balch and Ross, 1975; Weiss, 1977; Stuart and Guire, 1978; Salzer, 1982; Hartigan, Baker-Strauch and Morris, 1982). It is difficult to determine whether the difference in other personality traits between these two groups, precedes or follows weight loss. It may well be, that a woman who successfully reduces her weight no longer anticipates negative evaluation of her appearance by others, and consequently, feels more at ease in social situations. On the other hand, if a woman is more outgoing in attitude, and is striving for acceptance by others, she may well continue with a strict weight reduction programme.

Karpovitz and Zeis (1975) have suggested that an improvement in mental and emotional state precedes weight loss. They found that individuals who refused to take part in a weight reduction programme had more emotional problems than those who participated; "... the nonparticipating subjects were using so much energy to cope with the many other very troublesome problems, that they did not want to work on weight control" (Karpovitz and Zeis, 1975).

Thus, in a therapeutic context, it would seem useful to assess the structure of an individual's eating behaviour before deciding on the type of weight reduction programme to be recommended. For example, for an individual demonstrating a high degree of emotional eating, it is likely to be more productive to counteract feelings of inadequacy, emotional instability, and low self-esteem, before prescribing a strict weight reduction programme.

CHAPTER 11

EATING BEHAVIOUR AND SEX-ROLE ORIENTATION IN WOMEN

Tatjana van Strien with Gerard P.A.Bergers

The hypothesis that the degree to which particular types of eating behaviour is related to sex-role orientation was tested in a study on women. Three types of eating behaviour are distinguished: emotional eating, eating in response to arousal states such as anger, fear or anxiety (e.g., Slochower, 1983[a]); external eating, eating in response to food related stimuli regardless of internal feelings of hunger or satiety (Schachter and Rodin, 1974) and restrained eating, the conscious attempt to control body weight by cognitive restriction of food intake (e.g., Herman and Polivy, 1980[a]).

Eating behaviour and sex-role orientation

Various studies on eating behaviour have considered the possible effect of adherence to the female stereotype on various types of eating behaviour. Leon and Finn (1984) noted with respect to emotional eating, that the female sex-role stereotype of dependency, passivity and lack of assertiveness "can function to reinforce non-effective responses to interpersonal situations requiring assertive behaviours" (p.328). A means of coping with these situations and feelings of anger or anxiety may be consumption of food. "Given particular learning experiences in relation to food.... some women will overeat and gain weight as part of coping with various stressful events in their life" (p.330). Hall and Havassy (1981) stated with respect to external eating that the central role of food in traditional women's work may lead to a permanent seduction to eat, especially for those women who eat in response to external food cues rather than in response to internal physiological states. Also, the social expectation that women should be sensitive to the needs of others may result in refusal to stop purchasing tempting foods on the grounds that the rest of the family enjoys them.

Thus, nurturance, lack of assertiveness and lack of adaptive coping behaviour associated with female stereotype traits are thought to play a central role in the generation of emotional eating and external eating. Opposing hypotheses have been formulated with respect to the relationship between adherence to female stereotype traits and restrained eating (Rodin, Silberstein and Striegel-Moore, 1985). Attempts to loose weight and restrict food intake may be associated with female stereotype traits, because women adhering to the female sex-role status, referred to as sex-typed women, were found to have lower body satisfaction (Kimlicka, Cross and Tarnai, 1983) and to show more conformity in interpersonal situations (Bem, 1975; Brehony and Geller, 1981) than non-sex typed women did. This may extend to conformity to social pressure for female slenderness, because according to a study of Playboy centre-folds and Miss America Pageant contestants, beauty has become equated increasingly with slimness (Garner, Garfinkel, Schwartz and Thompson, 1980). Traditionally beauty has been the central asset of women to obtain upward social mobility by marriage (Maccoby and Jacklin, 1974). Therefore, particularly sex-typed women may desire to be slim because most of them do not pursue high status careers or financial independence (Clarey and Sanford, 1982).

Non-sex typed women may also strife for slimness. Fallon and Rozin (1985) suggest that the pursuit of thinness by women may not simply derive from an attempt to please men. In their study they found that women wanted to be thinner than they thought men want them to be, and even their estimate of men's ideal female shape was significantly slimmer than men's actual preferences. Also, women who have perfectionistic standards and high expectations for personal performance were found to have a tendency to be more dissatisfied with their own bodies than less achievement-oriented women of identical weight (Rodin and Striegel-Moore, 1984). Beck, Ward-Hull and McLear (1976) found that women who valued non-traditional roles and greater options for women preferred a smaller thinner female body, and associated a more ample female body with "wife and mother". This finding is in line with the observation of Chernin (1981) that by emulating the angular male figure, women symbolically attempt to secure social rights that are traditionally viewed as being male (this being analogous with George Sand wearing male dress in order to gain acceptance in male society in the early 1800's) and so reject earlier female forms and their associated roles.

In summary, it is proposed that emotional eating and external eating are associated with female stereotype traits. Opposing hypotheses have been formulated about restrained eating. Although each seems to be intuitively

plausible, at present neither has been tested empirically (note 1)*. Thus, in the present study, the relationships between each of the three types of eating behaviour and sex-role orientation was investigated.

Sex-role orientation, adjustment and eating behaviour

Bem (1974) introduced the concept of psychological androgyny in reaction to the conventional assumption that healthy functioning implies masculinity for men and femininity for women. She suggested that it is more advantageous for an individual to have a relative balance of sex-typed characteristics than to adhere rigidly to role characteristics of his or her own sex, as the former condition results in a more flexible behavioural repertoire, higher self-esteem and positive self-evaluation. Based on the observations of Spence, Helmreich and Stapp (1975), that subjects scoring low on masculinity and femininity are less well-adjusted than those scoring high on both dimensions, the one dimensional balance model of androgyny was replaced by the two-dimensional masculinity-femininity model (Bem, 1977). In this model, subjects are characterized as androgynous if they have a high degree of both masculinity and femininity, but as undifferentiated if they score low on both dimensions. Subjects scoring high on either masculinity or femininity are characterized as masculine or feminine sex-typed, respectively.

The androgynous sex role has been shown to be associated with flexible behavioural repertoire (Bem, 1975; Bem and Lenney, 1976); high self-esteem (Spence et al., 1975; Bem, 1975); adjustment (Bem, 1975; Deutsch and Gilbert, 1976; Heilbrun, 1976); and positive self-statements (Kelly, Caudill, Hathorn and O'Brien, 1977; Wiggins and Holzmuller, 1978). However, various studies have failed to differentiate consistently androgynous and masculine-typed females (e.g., Jones, Chernovetz and Hansson, 1978; Bernard, 1980). According to Kelly and Worell (1977), this latter finding suggests that adjustment is related mainly to masculine-typed characteristics.

A similar observation was also made by Taylor and Hall (1982) who re-examined evidence of androgyny using the two-way analysis of variance (ANOVA) model. The two-dimensional masculinity-femininity androgyny is tested by examining the main effects of masculinity and femininity on the relevant dependent variable, and the balance model is tested by examining the masculinity-femininity interaction term. No support has been obtained for either model of androgyny. In addition, masculinity has been shown to be more highly related

* see page 97 for notes

to measures of psychological health than femininity has (note 2).

Further support for a positive relationship between endorsement of female stereotype traits, and emotional eating and external eating is the observation, that femininity is less advantageous for psychological health than masculinity is. In an earlier study (Van Strien, Frijters, Roosen, Knuiman-Hijl and Defares, in press) low self-esteem and emotional instability were shown to be associated with emotional eating, and emotional eating associated with external eating. Thus, low adjustment, which is common to both femininity and the two types of eating behaviours, may be the reason for the interrelationship between these variables.

The present study is a psychometric study on the relationship between the adherence of women to sex-role stereotypes, their eating behaviour, and their anxiety, and self-concept. The main hypothesis investigated is that emotional eating and external eating are positively associated with female stereotype traits but not with masculine stereotype traits. Because it was expected that this observation is due to low adjustment associated with female stereotype traits, it was predicted that the relationships between both types of eating behaviour and feminine stereotype traits would be reduced when scores for the scales for anxiety and self-concept were partialed out.

No specific hypotheses were formulated for the effects of sex-typed characteristics on restrained eating. In addition, it was left as an open empirical question whether eating behaviour, anxiety and endorsement of negative self-statements are associated with androgyny, conceived of as either the two-dimensional model of masculinity and femininity, or as balance of masculinity and femininity.

METHOD

Subjects and procedure

Subjects were 540 female participants in an ongoing longitudinal study on overweight carried out in the Municipality of Ede, the Netherlands, in three age groups (20-21, 25-27 and 30-32 years as at 1 January 1981). Details of the municipality, the study population and the procedure followed have been described elsewhere (Baecke, Burema, Frijters, Hautvast and Van der Wiel-Wetzels, 1983; Van Strien, 1985). All participants in this study completed the Dutch Eating Behaviour Questionnaire (DEBQ; Van Strien, Frijters, Bergers and Defares, in press) with scales on emotional eating, external eating and restrained eating; a Dutch version of the trait anxiety scale of the Spielberger State Trait Anxiety

Inventory (STAI; Spielberger, Gorsuch and Lushene, 1970; Van der Ploeg, Defares and Spielberger, 1980, 1981); the self-concept scale of the Dutch Self-Partner Scale (Preventie-project, 1976); and the Groninger Androgyny Scale (GRAS; De Graaf, 1984), which is a measure of sex-role identification.

The first three measures were administered on one date of the longitudinal study (Autumn, 1983); the last six months later on another assessment date of the same study (Spring, 1984).

Instruments

Groninger Androgyny Scale (GRAS).

As a description of the Groninger Androgyny Scale (GRAS) is published only in the Dutch language, this scale is discussed in detail.

Both the BSRI and the GRAS have been designed to measure masculinity and femininity separately. However, the GRAS differs from the BSRI in two ways (De Graaf, 1984). Firstly, the masculinity (M) and femininity (F) scales of the BSRI assess only positively valued personality characteristics, while on the GRAS these scales also contain negatively valued personality characteristics. This has been done because a scale containing exclusively positively valued personality characteristics may not take into account a potentially important component of sex roles, that is, the extent to which negatively valued sex-correlated traits form part of an individuals stereotype of masculinity and femininity (Kelly and Worell, 1977; De Graaf, 1984).

Secondly, the BSRI items were selected from an initial itempool of personality characteristics that "seemed ... positive in value and either masculine or feminine in tone" (Bem, 1974, p. 156). Potential items were rated by university students, who evaluated the desirability of each characteristic for either an American man or woman. The final items on the BSRI scale were those characteristics which both male and female judges considered to be significantly more desirable for females than for males (masculinity scale items), and significantly more desirable for females than for males (femininity scale items). The items on the GRAS were selected from the initial pool of virtually all Dutch personality characteristics. University students rated themselves and their partner on these items. Those items selected by males and females as being used significantly more for females than for males, were considered to be feminine personality characteristics, and similarly those items used significantly more for males than females were considered to be masculine personality characteristics. Thus, the initial item pool of the GRAS contained not only stereotype characteristics, but all personality characteristics. Further, the final stereotype

traits were not derived from ratings of the hypothetical "American man or woman" but from actual self and partner ratings.

The GRAS contains 29 masculine, 29 feminine and 24 neutral (e.g., social desirability) personality adjectives. In a sample of 500 students of the University of Groningen (304 men and 196 women), Cronbach's alpha coefficients appeared satisfactory for the masculine and feminine scale (M scale: alpha = .79; F scale: alpha = .86), but not for the neutral scales (positive social desirability scale: alpha = .60; negative social desirability scale: alpha = .67). In addition, a relationship was found between these scales in men ($r = -.29$; $p < .01$), but not in women ($r = 0.3$; NS). In the present sample of women, similar Cronbach's alpha values were obtained (M scale: alpha = .83; F scale: alpha = .83; positive social desirability scale: alpha = .63; negative social desirability scale: alpha = .74), but in contrast to the sample of women students in Groningen, the relationship between the masculine and the feminine scales appeared to be significant ($r = .14$; $p < .05$). In both samples, orthogonal factor analyses of all 82 items revealed similar structures of "best interpretable" solutions of four factors, and items of the masculine and feminine scales do not load on seperate factors (De Graaf, 1984; note 3). This observation is similar to factor analyses of the M and the F scales of the BSRI (e.g., Bernard, 1980; Gaudreau, 1977; Pedhazur and Tetenbaum, 1979), and indicates that masculinity and feminity are not independent subset of traits, but are multidimensional constructs.

A respondent indicates on a four point (1-4) bipolar scale how well each of the 82 characteristics describes him or herself (e.g., not at all independent/very independent; not at all romantic/very romantic). Scores for each scale are obtained by dividing the sum of scores on each scale by the total number of items endorsed, so that each scale has a possible score range of 1-4. In the present study, neutral items were not considered because of their low reliability.

Dutch Eating Behaviour Questionnaire. This Questionnaire (DEBQ) contains 33 items; ten on restrained eating (e.g., do you try to eat less at mealtimes than you would like to eat; do you take into account you weight with what you eat (note 4); ten on external eating (e.g., if food smells and looks good, do you eat more than usual; if you walk past the bakery do you have the desire to buy something delicious; and 13 on emotional eating (e.g., do you have a desire to eat when you are irritated; do you have a desire to eat when you have nothing to do).

Each of the three scales has been shown to have internal consistency and factorial validity (Van Strien et al., in press). A respondent indicates on a five-point Likert scale (never (1) ... very often (5)) how often he or she resorts to each of the 33 types of eating behaviour. Scores for each scale are obtained by dividing the sum of item scores by the total number of items endorsed, a high score indicating a high degree of eating behaviour in question. Thus each scale has a possible score range of 1-5.

Spielberger State Trait Anxiety Inventory. The original inventory, the Dutch version of the Spielberger State Trait Anxiety Inventory (STAI, Spielberger et al,, 1970), which was developed by Van der Ploeg et al. (1980) contains separate scales for state and trait anxiety. In the present study, only the trait anxiety scale was used, because only anxiety as disposition was considered to be relevant for the present hypothesis.

The trait anxiety scale contains 20 items, ten on "anxiety present" and ten on "anxiety absent". Validation studies of the STAI indicate that scores on the trait anxiety scale remain stable in various situations, for example in both a lecture and an exam (Van der Ploeg, 1979; Van der Ploeg, Defares and Spielberger, 1979). This indicates that the trait anxiety scale measures a stable disposition. In a sample of University students of the University of Leiden (205 men and 202 women) the Cronbach's alpha coefficient of the trait anxiety scale was .90 and in the present sample of women inhabitants of Ede it was .85.

A respondent indicates on a four-point bipolar scale how well each of the characteristics describe him or herself (e.g., I feel secure very seldom/most of the time). A score for this scale is obtained from the sum of scores on the "anxiety present" and the recoded score on the "anxiety absent" items, so that a high score indicates a high degree of anxiety. The possible score range is 20-80.

Dutch Self-Partner Scale. This scale (Preventie Project, 1976) measures the personality of the respondent as rated by the respondent himself and by his or her partner. In the present study, only self ratings were used, as measured by the self-concept scale of the Dutch Self-Partner scale. This scale contains two subscales of ten items each, measuring positive self-concept and negative self-concept respectively. In the present sample of women inhabitants of Ede, Cronbach's alpha coefficients of these scales were .87 and .88 respectively. A respondent indicates on a four-point bipolar scale how well each of the

characteristics describes him or herself (e.g., I think I am a firm person/not a firm person at all. I think I am a restless person/not a restless person at all). Scores for the positive and for the negative self-concept scales are obtained by dividing the sum of scores on that scale by the total number of items endorsed. The score range of each scale is 1-4, with a high score indicating a high degree of negative self-esteem.

Analyses

Product-moment correlation coefficients were calculated between the masculinity and femininity scales, the three eating behaviour scales and scales of anxiety and self-concept. In more detailed analyses of the relationships between eating behaviour, anxiety and self-concept and androgyny, a hierarchical multiple regression was used for each of the dependent variables, as was employed by Feather (1984). In this analysis, the scores for each subject on the masculinity and the femininity scales were entered as independent variables in the regression equation, and their effects were assessed. Subsequently, these variables together with an interaction term were entered and the effect of the interaction term assessed (note 5).

This analysis permits the two-dimensional masculinity-femininity (or additive) model of androgyny to be tested by examining the main effects of masculinity and femininity by inspecting the associated bèta coefficients in the first step of the analysis. This analysis also allows the balance model to be tested by examining the contribution of the interaction term of masculinity and femininity (note 6) to the explained variance of the regression equation, by examining whether the explained variance of the regression equation shows a significant increase after inclusion of the interaction term in the second step of the analysis. However, the interaction term was not determined as a simple product of M x F, because the correlation between M x F and M and F would be so large that multicollinearity would emerge in the correlation matrix, thus giving rise to estimation problems including the weights b_1, b_2 and b_3 (Winnubst, Marcelissen and Kleber, 1982, p. 478). Instead, the interaction term was determined using the method employed by Winnubst et al. (1982) as follows:

$$y = a + b_1M + b_2F + b_3(M-c_1)\ (F-c_2), \quad \text{where:}$$

M is masculinity

F is femininity

y is the dependent variable.

The constant factors are chosen in such a way that the interaction term $(M-c_1)(F-c_2)$ is independent of M and F. The constant factors c_1 and c_2 are the regression weights of M and F, determined in a separate regression analysis with the product of M and F as dependent variable.

For this conservative regression method $p < .10$ was selected as the minimum level of significance, which is in line with Winnubst et al. (1982).

RESULTS

Total sample

Relationships between the scales. The Pearson correlation coefficients showing the relationships between the masculinity and femininity scales, the three eating behaviour scales and the scales for anxiety and self-concept are presented in Table 1 for the total sample. The means and standard deviations of these scales are also presented.

Both emotional eating and external eating were found to be related to feminine stereotype traits but not to masculine stereotype traits; and restrained eating to be positively related to both feminine and masculine stereotype traits. Emotional eating was found to be positively related to external eating, and both types of eating behaviour were positively related to anxiety and negative self-concept and negatively related to positive self-concept. Further, endorsement of feminine stereotype traits was positively related to anxiety and negative self-concept, and negatively related to positive self-concept. While endorsement of masculine stereotype traits was positively related to positive self-concept and negatively related to anxiety and negative self-concept.

Two subsamples

As correlation coefficients of the total sample were generally low, the total sample was divided randomly into two independent subsamples and regression analyses were carried out in these subsamples. Sample 1 consisted of 260 women, and sample 2, which was used to cross-validate sample 1, of 280 women.

Table 1. Correlation matrix and mean and standard deviations of the scales (n=540)

	1	2	3	4	5	6	7	8
1. M scale		.14**	.07	.04	.11**	-.09*	.30	-.11**
2. F scale			.24**	.19**	.14**	.47**	-.29**	.46**
3. Emotional eating				.52**	.35**	.34**	-.24**	.30**
4. External eating					.19**	.27**	-.20**	.23**
5. Restrained eating						.10**	-.05	.06
6. Anxiety							-.53**	.72**
7. Positive self-concept								-.63**
8. Negative self-concept								
Mean	2.23	2.67	2.12	2.69	2.55	38.53	3.44	2.33
Standard deviation	.32	.33	.73	.54	.92	9.40	.56	.57

* $p < .05$

** $p < .01$

Androgyny: the additive model. The bèta coefficients associated with the main effects of masculinity and femininity (step 1) on the three types of eating behaviour, anxiety and self-concept are presented in Table 2.

In sample 1, there was no support for the additive model of androgyny, as all regression equations revealed either a main effect of femininity in the case of emotional, external and restrained eating behaviour, or main effects opposite in direction, of both masculinity and femininity in the case of anxiety, positive self-concept and negative self-concept. In sample 2, all results were cross-validated, except those on restrained eating. In the case of restrained eating, some support for the additive model of androgyny was obtained because the bèta coefficients for masculinity and femininity were both in the same direction and significant in this sample.

Androgyny: the balance model. The interaction effects of masculinity and femininity (step 2) associated with the three types of eating behaviour, anxiety and self-concept are shown in Table 2. In sample 1, a significant increase in explained variance was obtained after inclusion of the interaction term of masculinity and femininity for emotional eating, positive self-concept and negative self-concept. The interaction term in the regression equations for emotional eating and negative self-concept was negative and for positive self-concept, it was positive. This indicates that women having a balance of masculine and feminine stereotype traits have a lower tendency to eat in response to negative emotions, and have a higher positive and a lower negative self-concept. However, these results were not cross-validated in sample 2, as none of the regression equations revealed a significant increase in explained variance after inclusion of the interaction term of masculinity and femininity.

Anxiety and self-concept as moderating variables. The regression analyses indicated that masculinity and femininity (although the latter was significant) do not account for a substantial amount of variance in the case of the three types of eating behaviour, but these variables explain a substantial amount of variance in the case of anxiety and self-concept. Thus the significant positive contribution of femininity to emotional and external eating may be due mainly to anxiety and negative self-concept associated with female stereotypes traits. To investigate this, anxiety, positive and negative self-concepts were entered in a stepwise incremental fashion in the regression equation which already contained masculinity, femininity and the interaction term as independent variables. The bèta coefficients of these regression equations are given in Table 3.

Table 2. Hierarchial regression analyses of masculinity (M scale), femininity (F scale) (step 1), and the interaction term of masculinity and femininity (M x F) (step 2) on eating behaviour, anxiety, positive and negative self-concepts

		Emotional eating		External eating		Restrained eating		Anxiety		Positive self concept		Negative self concept	
		Bèta	R^2 change[a]	Bèta	R^2 Change	Bèta	R^2 Change	Bèta	R^2 Change	Bèta	R^2 Change	Bèta	R^2 Change
Sample 1													
step 1	M scale	.07		.01		.05		-.19***		.35***		-.22***	
	F scale	.24***	.06***	.22***	.05***	.17***	.03**	.50***	.28***	-.27***	.18***	.45***	.25***
step 2	M x F	-.11*	.01*	-.03	.00	-.02	.00	-.06	.00	.13**	.02	-.10*	.01*
Sample 2													
step 1	M scale	.01		.03		.10*		-.14**		.32***		-.15***	
	F scale	.23***	.05***	.17***	.03**	.11*	.02**	.44***	.21***	-.38***	.24***	.49***	.26***
step 2	M x F	-.04	.00	-.03	.00	-.01	.00	.06	.00	-.04	.00	.04	.00

a = R^2 in first step of analysis

* : $p < .10$

** : $p < .05$

*** : $p < .01$

Table 3. Regression of masculinity (M scale), femininity (F scale) the interaction term (M x F), anxiety, positive and negative self-concepts on emotional, external and restrained eating behaviour (Bèta coefficients and standard errors)

	Emotional eating		External eating		Restrained eating	
	Bèta	se	Bèta	se	Bèta	se
Sample 1						
M scale	.20***	.06	.08	.06	.05	.07
F scale	.03	.07	.10	.07	.19***	.08
M x F	-.07	.06	-.03	.06	-.02	.06
Anxiety	.21***	.08	.11	.09	-.05	.09
Positive self-concept	-.13*	.08	-.10	.08	-.03	.08
Negative self-concept	.12	.09	.05	.09	-.01	.09
R^2	.18***		.08***		.03**	
Sample 2						
M scale	.07	.06	.10*	.06	.12*	.06
F scale	.07	.07	.00	.07	.06	.07
M x F	-.05	.06	-.05	.06	-.02	.06
Anxiety	.29***	.08	.32***	.08	.25***	.09
Positive self-concept	-.09	.08	-.12	.07	-.02	.08
Negative self-concept	-.02	.09	-.08	.09	-.17*	.10
R^2	.37***		.34***		.22***	

* : $p < .10$

** : $p < .05$

*** : $p < .01$

In both sample 1 and cross-validation sample 2, femininity no longer contributed significantly to emotional and external eating when anxiety, positive and negative self-concept were included in the analysis. This indicated that the contribution of femininity to emotional and external eating behaviour is due mainly to anxiety and negative self-concept associated with female stereotype traits. The results on restrained eating obtained in sample 1, were not cross-validated in sample 2 (Table 3).

Finally, in sample 1 the contribution of masculinity to emotional eating became significant after inclusion of other variables in the regression analysis, and the same was the case for external eating in sample 2. Although these findings were unexpected, they can be easily explained, because anxiety and negative self-concept which both contributed significantly and positively to emotional and external eating, were negatively related to masculinity. By removing their variance in masculinity, the contribution of masculinity to emotional and external eating behaviour was increased. However, in both cases, the results were not replicated in the other sample.

DISCUSSION

The results of the present study on women are in line with the view that the degree to which particular types of eating behaviour are exhibited is related to sex-role orientation. Results on emotional and external eating behaviour were consistent, and indicated a main effect of femininity, but not of masculinity. The results on restrained eating were equivocal, as findings in one sub-sample were not cross-validated in the other independent subsample. This inconsistency makes it difficult to determine whether restriction of food intake is particularly prevalent in sex-typed women or in women having both masculine and feminine stereotype traits. However, the results indicate that the supposition that non-sex typed women strife for slimness requires modification, as in both subsamples, no support was obtained for restrained eating prevailing in the subgroup of masculine sex-typed women, because this would imply a main effect of masculinity only. In addition, the low variance explained by masculinity, femininity and the other variables in restrained eating behaviour indicates that other factors not considered in the present study may be more important for this type of eating behaviour.

The positive relationships between a female sex-role orientation, and emotional and external eating behaviour are in close agreement with the suppositions of Leon and Finn (1984) and Hall and Havassy (1981), and indicate

again that femininity is detrimental to well-being. Both emotional and external eating behaviour have been shown to promote overeating, and are considered to be primary causal factors for weight gain and obesity (e.g., Slochower, 1983[a]; Lowe and Fisher, 1983; Schachter and Rodin, 1974), and as is known, overweight is hazardous to physical and psychological health. For example, in the present sample of young women (maximum age at time of assessment 31 years) overweight was shown to be associated with a number of pathological conditions, especially hypertension, back and joint problems and headache, and a large proportion of those overweight has visited their family doctor or another physician in the year preceding the study (Deurenberg, Van Poppel and Hautvast, 1984). In addition, public attitudes toward the overweight in Western society are generally extremely negative (De Jong, 1980), and this may lead to the generation of low self-esteem, negative mood states and poor self-image in the obese (Allon, 1982).

In the present study, femininity accounted for only a small amount of total variance in both emotional and external eating behaviour. The contribution of anxiety and negative self-concept was much higher to both types of eating behaviour. Further, high relationships were found between femininity, and anxiety and negative self-concept. When the variance of anxiety and negative self-concept in femininity scores was partialed out, femininity no longer contributed significantly to emotional and external eating. This indicates that the contribution of femininity to both types of eating behaviour is due mainly to anxiety and negative self-concept associated with female stereotype traits.

In the present study, support for the balance model of androgyny was obtained in one sample for emotional eating, and positive and negative self-concepts, but these findings were not cross-validated in the other subsample. These results are in line with Taylor and Hall (1982), who in their review also found little evidence of balance androgyny but instead found a potent effect of masculinity. This is in contrast with present findings, because masculinity had only a strong positive effect on positive self-concept, and the relationships with all other variables were found to be weak or not present at all. A possible explanation for these contradictory results is, that the present results were obtained from community residents, whereas most studies on psychological androgyny are carried out on college students. In the predominantly protestant and conservative community of Ede, masculinity may have less obvious utility for women than in a university community. However,

even in this population, no support was obtained for the notion that femininity contributes to well being in women.

NOTES

1. In populations of women the relationships between scales of masculinity and femininity and the Restraint-Scale of Herman and Polivy (1975) has been studied by Hawkins II, Turell and Jackson (1983). However, this scale may not measure dieting per se, but disinhibition of cognitive restraint. This finding was obtained with the Three Factor Eating Questionnaire (TFEQ), which measures separately cognitive restraint of food intake (Factor I), disinhibition of cognitive restraint (Factor II) and Hunger (Factor III) (Stunkard and Messick, 1985). The Herman and Polivy Restraint Scale was found not to be related to the cognitive restraint scale of the TFEQ (Factor I), but this scale was highly related to the disinhibition scale of the TFEQ (Factor II). In addition, not Factor I, but Factor II of the TFEQ was related to overeating (Shrager, Wadden, Miller, Stunkard and Stellar, 1983), which indicates that the excessive food intake found in subjects scoring high on the Restraint Scale in the studies of Herman and Polivy (e.g., Herman and Polivy, 1980[a]) may not be related to restraint per se, but to disinhibition of restraint.
   Also, the Diet subscale of the Eating Attitudes Test (Garner and Garfinkel, 1979), which was used in the study of Hawkins II et al. (1983) in only one of the populations measured a more extreme (unhealthy) type of dieting than considered in the present study.
2. According to Taylor and Hall (1982), in many reports this masculinity effect has been camouflaged in the dominant methods of data-analysis of relying on pairwise comparison of the four sex-role subgroup means. Many reports have not recognized that the observation, that androgynous and masculine subjects score equally high, and indifferent and feminine subjects equally low, *implies a main effect of masculinity.*
3. Unpublished dataset.
4. This restrained eating scale which measures a "healthy" type of dieting, is similar in item content to the cognitive restraint scale of the TFEQ (see note 1) (Van Strien, Frijters, Bergers and Defares, in press), and was found to have good predictive validity for restriction of food intake (Van Strien, Frijters, Van Staveren, Defares and Deurenberg, in press).
5. As the effects at each level are adjusted by taking into account within-level effects and prior level effects, this form of analysis corresponds to the "classic ... analysis of variance" (Feather, 1984, p.615)
6. As stated by Taylor and Hall (1982) "... for an ANOVA table of any size, interaction effects are represented as deviations from zero after the grand mean and main effects have been subtracted from the cell means. The requirement that such deviations must sum to zero in each column and row implies that in the two-by-two ANOVA table, interaction must always take one particular form: the two diagonals must be equal in magnitude but opposite in sign from the two deviations in the other diagonal" (p. 349). Thus, a significant interaction effect implies that subjects in the balanced diagonal of the ANOVA Table (low masculine, low feminine; high masculine, high feminine) differ with regard to the dependent variable from subjects in the sex-typed diagonal (male sex-typed; female sex-typed).

CHAPTER 12

LIFE EVENTS, EMOTIONAL EATING AND CHANGE IN BODY MASS INDEX

Tatjana van Strien with Matti A. Rookus, Gerard P.A. Bergers, Jan E.R. Frijters and Peter B. Defares*.

It is a commonly held belief that stressful life events can be important aetiological factors in human obesity. As early as 1949, Shorvan and Richardson (1949) cited cases of individuals, most of them women, who became obese after severe psychic trauma (for example, the bombing of London during the Second World War, the death of a parent, financial reverse). Other studies have also provided evidence of obesity associated with traumatic events (Atkinson and Rinquette, 1967; Meyer and Tuchelt-Gallwitz, 1967; Nutzinger, 1979).

Stress, defined as an imbalance between environmental load and the ability of the individual to cope, creates hightened arousal or activation. As this state of arousal inhibits the physiological correlates of hunger (Cannon, 1915), most individuals respond to such arousal with loss of appetite and subsequent weight loss. In contrast, others respond to such arousal with excessive intake of food. If this type of emotional eating occurs frequently, it may lead ultimately to weight gain or obesity.

The present study describes results of a study on the interaction effect of negative life events and emotional eating on change in body mass index (BMI; weight/height^2 (kg/m^2)). It is predicted that low emotional eaters gain less weight and high emotional eaters gain more weight after experiencing negative life events, than those who have not experienced such events.

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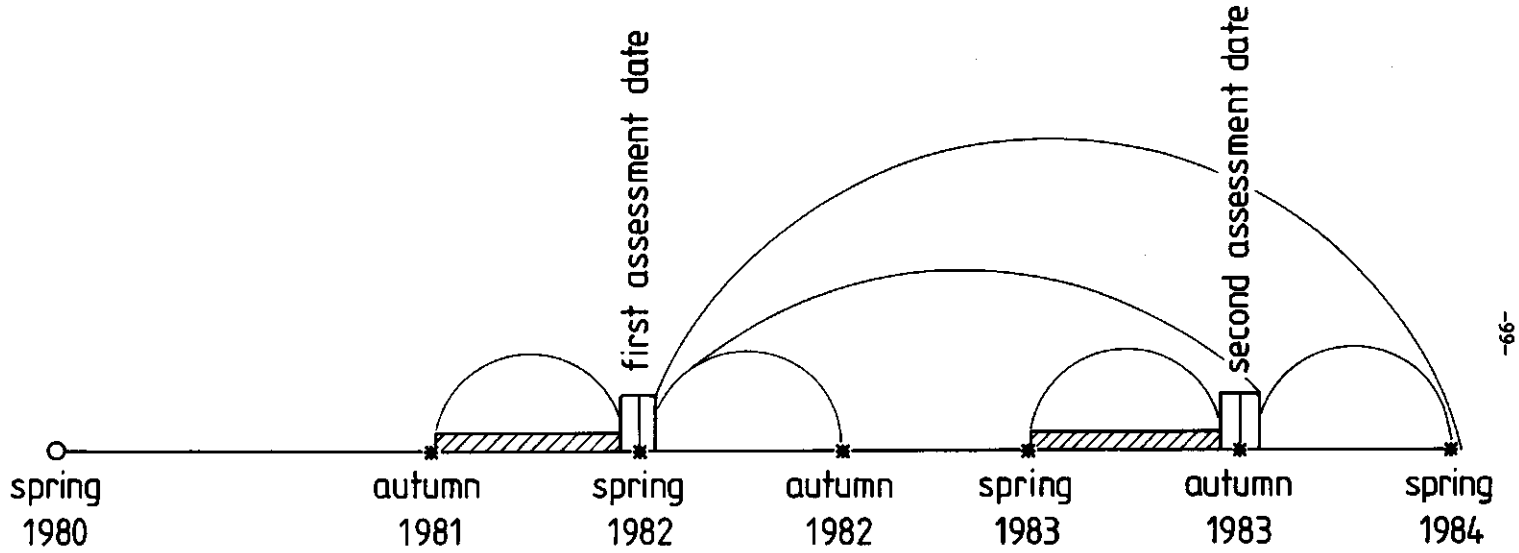

Fig. 1. Periods in which the differential effects of negative life events on change in body mass were assessed.

Period during which change in body mass had been assessed

Administration of scale for emotional eating and questionnaire of life events

Period in which occurrence of negative life events had been assessed

Measurement of body weight

Measurement of body height

METHOD

Overview

In a longitudinal study on overweight, a scale on emotional eating and a questionnaire on life events experienced during the preceding six months were administered on two measurement dates. In addition, body weight of subjects was measured on these two measurement dates, and also six months before and after both dates. Body height had been measured earlier in the same study (Fig. 1).

On the basis of their score on the scale on emotional eating and the questionnaire on life events, subjects were classified as either high or low emotional eaters, who had experienced either no negative life events or more than three negative life events. The interaction effect was assessed during six periods, the six months preceding the two assessment dates, the six months following these two dates, and 18 months and two years after the first assessment date. Short-term effects were analysed for the total sample. Long-term effects were analysed for a subgroup whose emotional eating behaviour and life events status had not altered during the course of the study (see Fig. 1).

Subjects and procedure

The subjects were participants in a longitudinal study on overweight carried out in the municipality of Ede, The Netherlands. Details of the study population have been described elsewhere (Baecke, Burema, Frijters, Hautvast and Van der Wiel-Wetzels, 1983; Van Strien, 1985). In the present study, information was obtained from 589 men and 619 women in three age groups (19 to 21, 24 to 26 and 29 to 31 years as at 1 January, 1980). Women, pregnant for three months or longer on at least one of the assessment dates were excluded from analysis.

On each measurement date of the longitudinal study, subjects were invited by mail to complete a questionnaire. Several days later, they were visited at home by a trained assistant who collected the questionnaire and checked it for completeness. She also measured body weight without shoes and jacket to the nearest 0.5 kg. Body height of the subjects had been measured at a mobile research unit earlier in the longitudinal study, so it was possible to assess the body mass index of the subjects.

On two measurement dates (Spring 1982 and Autumn 1983) (note 1)*, the questionnaire contained the Dutch Eating Behaviour Questionnaire (DEBQ) (Van Strien, Frijters, Bergers and Defares, in press) including, a scale on

* see page 106 for notes

emotional eating (note 2), and a questionnaire about life events experienced during the preceding six months. As these two measurement dates are central to the present study, they are henceforth referred to as the first and the second assessment date.

Instruments

The scale for emotional eating. This scale contains 11 items (for example, do you have a desire to eat when you are irritated; do you have a desire to eat when you have nothing to do). The scale has been shown to have high internal consistency and factorial validity (Van Strien et al., in press). A respondent indicates on five-point Likert scales (never (1) ...very often (5)) how often he or she resorts to each of the 11 types of eating behaviour. A score for the scale is obtained by dividing the sum of item scores by the total number of items endorsed, a high score indicates a high degree of emotional eating. Thus, the possible score range for the scale is from 1 to 5.

Dutch Life Events Questionnaire. Life events were assessed by means of a Dutch Life Events Questionnaire (Lennings, 1980), which contains questions derived from the Social Readjustment Rating Questionnaire (Holmes and Rahe, 1967), the Questionnaire of Paykel and Uhlenhuth (Paykel and Uhlenhuth, 1972), the Recent Life Change Questionnaire (Rahe, 1975), the Life Experience Survey (Sarason, Johnson and Siegel, 1978) and the Life Events Inventory (Tennant and Andrews, 1978). On both assessment dates, the subjects were asked to mark events which had occurred in the six months prior to the assessment date.

Life event index

In the present study, only negative events were taken into consideration, because undesirable life changes have been shown to be better predictors of stress reactions than neutral or desirable life changes (Sarason et al., 1978; Tennant and Andrews, 1978; Gersten, Langner, Eisenberg and Orzak, 1974; Vinokur and Selzer, 1975; Mueller, Edwards and Yarvis, 1977; Ross and Mirowsky II, 1979).

An additive index based on a cumulative score of all 47 negative life events was used, because it is known that weighted indices, for example as derived from the Social Readjustment Rating Questionnaire (Holmes and Rahe, 1967), do not predict dependent variables any better than indices based on simple counts (Mueller et al., 1977; Ross and Mirowsky, 1979; Lorrimor, Justice, McBee and Weinman, 1979; Lei and Skinner, 1980; Zimmerman, 1983). The classification

of life events as being negative was made independently by the first and the third author, and was found to be in close agreement.

RESULTS

Classification of the subjects

Analyses for men and women were carried out separately. Subjects were classified as being either low emotional or high emotional eaters on the basis of a median split of scores on the emotional eating scale, administered on the first assessment date. Scores ranged from 1.00 to 4.17 for men and from 1.00 to 4.50 for women. Cut off points for low and high emotional eating were 1.9 and 2.1 for men and women respectively.

Subjects were placed in the "no negative life events" category, if they had not experienced any such event during the assessment-period. They were classified in the negative life events category if they had experienced three or more negative life events, corresponding to the upper quartile of distribution of values of the negative life events index. Subjects in the middle two quartiles were excluded from analysis.

The final result consists of a cross-classification table of the following four categories: low emotional eater/no negative life events; low emotional eater/negative life events; high emotional eater/no negative life events; and high emotional eater/negative life events.

Short-term effects of negative life events on change in body mass in low and high emotional eaters

A two-way analysis of variance was carried out over the six-months periods preceding and following the two assessment dates (classic approach with unequal cell frequencies; Nie, Hull, Jenkins, Steinbrenner and Bent, 1970; note 3). It was predicted that the effect of negative life events on change in BMI would be larger in high emotional eaters than in low emotional eaters. Thus in the paper, the results are considered in terms of whether they are in agreement with this supposition and whether these interaction effects are significant. Main effects are not reported as they are not of relevance to the present hypothesis.

The results were not as predicted in both sexes in the periods preceding the first and second assessment dates, and no significant interaction effects were obtained.

In the six months subsequent to the first assessment date, results were as predicted in the sample of men (Table 1). Low emotional eaters gained less weight and high emotional eaters gained more weight after experiencing negative life events, than those who had not experienced such events. In general, there was a significant interaction effect of emotional eating and negative life events on change in BMI ($F(1,326) = 6.43$; $p=.01$). This interaction remained significant after adjustment for BMI, as observed on the first assessment date ($F(1,325) = 6.59$; $p=.01$). However, in the period after the second assessment date, this interaction effect was not replicated ($F(1,390) = .43$; not significant (ns)). For women, no interaction effects were obtained in the same periods ($F(1,377) = .54$; ns) and $F(1,455) = .01$; ns, respectively) (Table 1).

Table 1. Change in body mass index six months after the first assessment date (positive = weight gain; negative = weight loss, see footnote 1)

	Negative live events			
	Men		Women	
	No negative life events	> 3 negative life events	No negative life events	> 3 negative life events
Low emotional eater				
mean	.01	-.19	-.11	.05
sd	.79	.70	.74	.98
n	83	84	89	75
High emotional eater				
mean	-.15	.07	.19	.21
sd	.73	.72	.80	.73
n	63	100	55	162

Long-term effects of negative life events on change in BMI in low and high emotional eaters

It is not clear why no interaction effects were found for men on the second assessment date. To determine whether the results of the first assessment date could be attributable to chance variation or to genuine effects, long-term effects of negative life events on change in BMI in low and high emotional eaters were studied in the 18 months and two years following the first assessment date in a subsample of subjects classified in the same category of emotional eating/negative life events on both assessment dates.

The differential long-term effects are shown in Table 2. In the men, similar results were found in the periods of 18 months and two years after the

first assessment date. These results were as predicted and similar to short-term effects obtained on the first assessment date.

Table 2. Changes in body mass index 18 months and 2 years after the first assessment date*

Period after first assessment date	Men		Women	
	No negative life events	> 3 negative life events	No negative life events	> 3 negative life events
18 months				
Low emotional eater				
mean	.24	- .08	- .10	.06
sd	1.00	.96	1.11	1.14
n	25	25	30	44
High emotional eater				
mean	- .22	.24	- .32	.40
sd	1.15	1.20	.66	1.23
n	16	51	16	102
2 years				
Low emotional eater				
mean	.51	.13	.15	.23
sd	1.25	1.04	1.03	1.50
n	25	25	30	44
High emotional eater				
mean	- .06	.60	- .01	.66
sd	1.04	1.19	.99	1.54
n	16	51	16	102

* In a subsample of men and women who had the same emotional eating/negative life events classification on both the first and second assessment date.

In general, these interaction effects were borderline significant for the 18-months period after the first assessment date, and significant for the two-year period after this date ($F(1,113) = 3.16$; $p=.08$) and $F(1,113) = 4.98$; $p=.03$). The effects remained the same after adjustment for BMI as observed on the first assessment date ($F(1,112) = 3.21$; $p=.08$ and $F(1,112) = 4.70$; $p=.03$ respectively).

For women, similar interaction effects were not found ($F(1,188) = 1.71$; ns, and $F(1,188) = 1.31$; ns), although the results were as predicted for high emotional eaters (Table 2).

DISCUSSION

A significant interaction effect was found in the six months following the first assessment date for men. This suggests that the impact of negative life events becomes manifest after a certain delay or latent period. Although this interaction effect was not found on the second assessment date, the long term effects suggest that the significant effect obtained on the first assessment date is probably attributable to a genuine effect and not to chance variation.

The effect two years after the first assessment date was stronger than that obtained 18 months after this assessment date. This indicates that the short-term effects of negative life events as experienced on the second assessment date strengthen the long-term effects, although they do not have a significant interaction effect (see Figure 1).

Similar interaction effects were not found in women. The long-term results were as predicted for high emotional eaters, but low emotional eaters did not show the normal reaction of less weight gain in response to stress and therefore no interaction effect was found.

Thus, the present hypothesis was confirmed to some extent in men, but not in women. It is possible that dieting has obscured the results in women, as women tend to be more conscious of their appearance and body weight. However, this explanation does not seem plausible, as similar results were obtained after post hoc adjustment for dieting, as assessed by the Restrained Eating Scale of the DEBQ. Also, response sets may have obscured the classification of women into high or low emotional eaters, as there are indications that the response sets acquiescence and social desirability are prevalent in women in the present longitudinal study (Van Strien, 1985). In men, there are no indications of response sets in this study (Van Strien, 1984[b]), so they have been classified more according to their real emotional eating status. Although the precise effects of these response sets on the women's emotional eating scores are not clear, they may have confounded the effect of emotional eating and life events on change in BMI.

There are indications that stress-illness relations are mediated by variables such as the individual's ability to cope with stressful life events (Rahe, 1974), the degree of social support during and just after stressful circumstances (Cobb, 1976), and the perceived control over an event (Johnson and Sarason, 1978). Further, subjective weights regarding the undesirability of life events may also reflect individuals' vulnerability to life events (Sarason et al., 1978; Zimmerman, 1983). Unfortunately, these variables are not accounted for in

the present study, and this may be the reason that the hypothesized effect was not found for women, and for men in only one of the two six months periods.

NOTES

1. As the BMI shows a rythmic fluctuation with the season of the year the absolute body mass changes preceding or following the two assessment dates are not comparable. Instead, the difference between the subgroups should be taken in consideration and can be compared.
2. This questionnaire also contained a scale on restrained eating.
3. Examination of homogeneity of variance which underlies analysis of variance indicated that performing analysis of variance on the raw data was appropriate in all analyses on men, but not in all analyses on women. Even in the latter case, however, analyses of raw data seemed preferable to the alternatives, as treatment of the data by either a square root, or a log transformation would make findings difficult to interpret, making such transformations counterproductive.

CHAPTER 13

ON LONGITUDINAL VERSUS CROSS-SECTIONAL STUDIES OF OBESITY: POSSIBLE ARTEFACTS

Tatjana van Strien*

Scales on emotional eating and restrained eating developed in a large-scale research project on overweight were administered to a cross-sectional sample of normal weight and overweight women (Van Strien, Frijters, Roosen, Knuiman-Hijl and Defares, in press), and also to a sample of women who had participated in a longitudinal study on overweight on the third assessment date (Van Strien, 1984[a]). In both samples, relationships between each of these two types of eating behaviour, and also between eating behaviour and body mass index (BMI; weight/height^2) were determined.

In the cross-sectional study, emotional eating was found to be related to BMI, but no relationship was found between BMI and restrained eating. In addition, no relationship was found between emotional eating and restrained eating. However, in the longitudinal study, both emotional eating and restrained eating were found to be related to BMI, and also a significant relationship was observed between restrained eating and emotional eating. When the differences between the corresponding correlation coefficients between emotional eating, restrained eating and BMI in the two studies were tested, all three pairs of correlations differed significantly (Van Strien, 1984[a]).

Thus the question arose whether these earlier results could be replicated in another assessment date of the same longitudinal study and in a new cross-sectional sample, and further, whether systematic differences in results of these two studies can be explained.

Response sets as artefacts in longitudinal studies

Longitudinal studies are considered to be preferable to cross-sectional studies because repeated measurements on the same individuals enables the investigator to draw conclusions about causal effects and intra-individual changes (Nesselroade and Baltes, 1979).

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However, difficulties may arise when methods are based on the individual's own report of his behaviour. Studies which rely heavily on tests, questionnaires and interviews for data are confronted with response sets, such as, acquiescence and social desirability (Cronbach, 1959; Jackson and Messick, 1958; Bentler, Jackson and Messick, 1971; Paulhus, 1984). The response set, acquiescence, that is a "tendency to be agreeable in a rather submissive way, that is a desire to say what is expected" (Rorer, 1965; p 134) may result from the motivation of subjects to be supportive and compliant to the perceived experimental hypothesis (Orne, 1962). The response set, social desirability, that is a tendency to consciously dissemble a self-report by denying socially undesirable characteristics and admitting socially desirable characteristics may result from the subject's willingness to make a good impression on the investigator (Riecken, 1962).

Longitudinal studies may be particularly susceptible to the generation of response sets. Repeated measurement which is a characteristic of longitudinal design may sensitize subjects to the nature of the tests used (Windle, 1954). In addition, intensive contact between subjects and investigator as a consequence of repeated measurements may lead to a greater degree of compliance and a higher motivation to give socially desirable responses, that is to "look good" to the investigator. Therefore, the response sets, acquiescence and social desirability, may be more prevalent in longitudinal than in cross-sectional studies.

Response sets reduce the validity of results obtained with a particular measuring instrument (Philips and Clancey, 1970), especially so when the responses of one group are systematically either more positive or more negative than another group within the same sample (Cunningham, Cunningham and Green, 1977). In the present longitudinal study on overweight and eating behaviour, this may have been the case for groups of normal weight and obese subjects; acquiescence may have been the dominant response set in the normal weight, and social desirability in the obese.

Body weight and response sets

Obese individuals have been demonstrated to be more concerned about self-presentation than normal weight subjects (Elman, Schroeder and Schwartz, 1977; Glass, Lavin, Henchy, Gordon, Mayhew and Donohoe, 1969; Rodin and Slochower, 1974; Younger and Pliner, 1978) because of their deviant status in a culture where slimness is the desired norm (Krantz, 1978). As a need to be accepted and approved of socially is associated with giving socially desirable responses

(McGee, 1962[a,b]), it may be expected that the responses of obese individuals are more affected by the response set, social desirability than were those of normal weight individuals. Self-reports of eating behaviour especially may be systematically distorted by impression management in the obese (Stunkard and Messick, 1985).

More specifically, for questions on restrained eating and emotionale eating, it may be proposed that it is socially desirable for obese subjects to endorse questions about being on a diet (Ruderman, 1983), and not to endorse those about eating when feeling annoyed or lonely. Thus, it may be expected that obese subjects overreport dieting behaviour and underreport emotional eating when social desirability is their dominant response set. In contrast, normal weight subjects are less motivated to give socially desirable responses to questions on dieting and emotional eating. This inclination, together with the fact that normal weight individuals are in general less concerned than the obese about self-presentation, makes it highly plausible that normal weight subjects are more motivated to support the perceived experimental hypothesis than to give a socially desirable response. Thus it may be proposed that acquiescence is the dominant response in the normal weight.

Indications of the prevalence of response sets

Although no independent scales for the relevant response sets (Bentler et al., 1971; Paulhus, 1984) are included in the present study, examination of the pattern of correlation coefficients on the scales for emotional eating and restrained eating may indicate the prevalence of particular response sets in groups of subjects. The procedure used was analogous to that used by Jackson and Messick (1961), who observed high correlations between scales which were similar in social desirability, and that the correlation became increasingly smaller and negative as they became more dissimilar in desirability. Jackson and Messick contended that: "Since high correlations between ... scales probably indicate the covariation of acquiescent responses to items similar in desirability, it seems likely that these correlations will prove to be interpretable primarily in terms of these two stylistic determinants" (e.g., acquiescence and social desirability) (l.c. p 775).

Thus, an indication of social desirability being the dominant response set in the obese may be obtained from a low or zero correlation between emotional eating and restrained eating, because of the relatively large discrepancy in social desirability of these two types of eating behaviour for these subjects. Similarly, an indication of acquiescence being the dominant response set in

normal weight subjects may be obtained from a high correlation between emotional eating and restrained eating, because of the relatively small discrepancy in desirability of these two types of eating behaviour for these subjects.

Indications of a high degree of prevalence of a particular response set in subjects participating in the longitudinal study compared with those participating in the cross-sectional study may be obtained from tests of differences of the correlation coefficients between emotional eating and restrained eating, and also from the mean scores on the two scales.

METHOD

Subjects

Study population. In the first part of 1980, a study was carried out in the municipality of Ede, the Netherlands, in which all inhabitants in three age groups (19-21, 24-26 and 29-31 years as at 1 January 1980) were invited to participate. Their addresses were obtained from the Civil Registration Office in Ede. Complete information was obtained from 3,936 subjects, representing 33% of all invited subjects. Details of the municipality, the study population, and the procedure followed have been presented elsewhere (Baecke, Burema, Frijters, Hautvast and Van der Wiel-Wetzels, 1983). Some of the participants in this longitudinal study were selected to participate in a longitudinal study on overweight, and participants in cross-sectional studies were selected from the remaining subjects.

Longitudinal sample. From the total study population, a sample of 1663 individuals, the distribution of sex, age, and level of education, of whom was comparable with the study population, was invited in November 1980 to participate in the present longitudinal study. This study comprises a total of seven assessment dates, two per year. On the first assessment date (Spring 1981), complete information was obtained from 1533 subjects representing 92% of all those invited. Data discussed in the present paper were obtained for women on the third (Spring 1982) and sixth (Autumn 1983) assessment dates, because the scales on eating behaviour were administered on these two assessment dates only, and because in the crosssectional study, data were obtained for women only. Women, pregnant for three months or longer, and women who had moved out of the district, were excluded from analysis.

Complete information was obtained on the third assessment date from 744 women and on the sixth assessment date, from 570 women (note 1)*.

Cross-sectional sample. A sample of 345 women, the distribution of the age and level of education of whom was comparable with the study population was selected to participate in this study.

Procedure

Longitudinal study. On each assessment date of this study, subjects were invited by mail to complete a questionnaire at home. Several days later, they were visited at home by a field-worker who collected and checked the questionnaire for completeness. She also measured body height and body weight without shoes and jacket to the nearest 1 mm and 0.5 kg respectively. On all assessment dates, subjects were visited by the same field-worker.

The questionnaire contained three parts. Two parts were adminsitered to the subjects on all assessment dates, and contained questions on life events, and changes in behavioural and socio-demographic aspects. The third part was different on each assessment date, and on the third and sixth assessment date contained the scales on eating behaviour.

Cross-sectional study. Subjects of the cross-sectional study were invited by mail to participate. Several days later, they were visited at home by a field-worker, who measured body height and weight without shoes and jacket to the nearest 1 mm and 0.5 kg respectively. The field-worker also left a questionnaire to be completed. Several hours later, it was collected and checked for completeness.

Scales for emotional and restrained eating

The scales on emotional eating and restrained eating are derived from the Dutch Eating Behaviour Questionnaire (DEBQ), and have been shown to have a high internal consistency and factorial validity (Van Strien, Frijters, Bergers & Defares, in press). The Restrained Eating scale consists of seven items, and the Emotional Eating scale of eleven items. All items have the response format: never (1); seldom (2); sometimes (3); often (4); and very often (5). A high score indicates a high degree of the eating behaviour in question. Table 1 shows English translations of the items, and their item-rest correlation coefficients.

* see page 118 for notes

Table 1. Items of the two eating behaviour scales and their item-rest correlation coefficients for the third assessment date of the longitudinal study.

Restrained Eating	Item-rest correlation coefficient
1. When you have put on weight, do you eat less than you usually do?	.71
2. Do you try to eat less at mealtimes than you would like to eat?	.68
3. How often do you refuse food or drink offered because you are concerned about your weight?	.76
4. Do you watch exactly what you eat?	.68
5. Do you deliberately eat foods that are slimming?	.71
6. When you have eaten too much, do you eat less than usual the following day?	.66
7. Do you take into account your weight with what you eat?	.83
Cronbach's alpha coefficient	.90

Emotional Eating	Item-rest correlation coefficient
1. Do you have a desire to eat when you are bored or restless	.70
2. Do you have a desire to eat when you have nothing to do?	.60
3. Do you have a desire to eat when you are depressed or discouraged?	.79
4. Do you have a desire to eat when you are cross?	.65
5. Do you have a desire to eat when you are expecting something unpleasant to happen?	.70
6. Do you get a desire to eat when you are anxious, worried or tense?	.70
7. Do you have a desire to eat when you are feeling lonely?	.67
8. Do you have a desire to eat when things are going against you or when things go wrong?	.81
9. Do you get a desire to eat when you are irritated?	.78
10. When you are excited, do you get a desire to eat?	.65
11. Do you have a desire to eat when somebody lets you down?	.76
Cronbach's alpha coefficient	.93

RESULTS

Difference between the longitudinal study and cross-sectional study

The means and standard deviations of scores on the scales for emotional eating and restrained eating, and BMI and age for the two assessment dates of the longitudinal study, and the cross-sectional study are given in Table 2. As scores for the two assessment dates of the longitudinal study were similar to each other and also to scores on the cross-sectional study, sample characteristics of the longitudinal study and the cross-sectional study may be considered to be similar.

Table 2. Means and standard deviations of the Restrained Eating and Emotional Eating Scales, body mass index (BMI) and age*, obtained for the two assessment dates of the longitudinal study, and for the cross-sectional study.

	Longitudinal study				Cross sectional study	
	Third assessment (n=744)		Sixth assessment (n=570)		(n=345)	
	mean	sd	mean	sd	mean	sd
Restrained eating	2.45	.94	2.63	.84	2.51	.92
Emotional eating	2.21	.76	2.13	.74	2.27	.68
BMI	22.56	2.78	22.64	2.91	22.67	3.29
Age	27.72	3.95	28.72	3.95	29.55	4.49

* As at 1 January of the year of assessment

Pearson correlation coefficients showing the relationship between the two eating behaviour components and BMI, partial correlation coefficients adjusting for confounding effects and results of tests of differences (Fisher's r to Z transformation; Hays, 1969) between corresponding pairs of correlation coefficients are presented in Table 3. For the longitudinal study, the correlation coefficients between the two eating behaviour components and BMI for the third assessment date differed not significantly from the corresponding correlation coefficients for the sixth assessment date. However, two of the three correlation coefficients of the cross-sectional study differed significantly from the corresponding correlation coefficients for both assessment dates of the longitudinal study. Thus, it may be concluded that there are systematic differences between results of these two studies.

Acquiescence and social desirability

Pearson's correlation coefficients between the two eating behaviour components for the normal weight (BMI < 26), and overweight women (BMI ≥ 26) in the three studies are presented in Table 4. For all three sets of data, a significant relationship was found between restrained eating and emotional eating in the normal weight women, but no such relationship was obtained in the overweight women. Thus, it may be suggested that acquiescence was the dominant response set in the normal weight women, and social desirability in the overweight women.

Table 3.

Pearson correlation coefficients of the relations between scores on two eating behaviour scales and body mass index (BMI) partial correlation coefficients adjusting for the effect of confounding factors, and the test of differences.

	Longitudinal Study		Cross-sectional study	Test of differences between pairs of correlation coefficients		
	(A) Third assessment (n=744)	(B) Sixth assessment (n=570)	(n=345)	A ↕ B	A ↕ C	B ↕ C
Emotional eating and BMI	.17**	.20**	.18**	-.55	-.16	-.30
adjusted for the effect of restrained eating	.06	.07	.16**			
Restrained eating and BMI	.38**	.34**	.20**	.82	3.02**	2.21*
adjusted for the effect of emotional eating	.35**	.29**	.18**			
Emotional eating and restrained eating	.31**	.32**	.11*	-.19	3.21**	3.23**
adjusted for the effect of BMI	.27**	.27**	.07			

** $p < .01$

* $p < .05$

Table 4.

Pearson correlation coefficients of scores on the two eating behaviour scales for normal weight (BMI < 26) and overweight (BMI ⩾ 26) women on the longitudinal and the cross-sectional studies

	Normal weight women (BMI < 26)			Overweight women (BMI ⩾ 26)		
	Longitudinal study		Cross-sectional study	Longitudinal study		Cross-sectional study
	Third assessment (n=674)	Sixth assessment (n=497)	(n=307)	Third assessment (n=70)	Sixth assessment (n=76)	(n=38)
Emotional eating and restrained eating	.32**	.32**	.13*	.03	.19	-.04

Table 5.
Comparison of the mean scores for normal weight (BMI < 26) and overweight women (BMI ⩾ 26) on the longitudinal and cross-sectional studies

	(A) third assessment date	(B) sixth assessment date	(C) cross-sectional	Test of differences between pairs of means A ↕ B	A ↕ C	B ↕ C
Normal weight women	(BMI < 26)					
	n=674	n=497	n=307			
Emotional eating						
Mean	2.18	2.10	2.25	.02	-.02	-.03
S.D.	.75	.72	.66			
Restrained eating						
Mean	2.40	2.58	2.48	-.34	-.01	.02
S.D.	.93	.85	.92			
Overweight women	(BMI ⩾ 26)					
	n=70	n=73	n=38			
Emotional eating						
Mean	2.55	2.37	2.44	1.34	.68	.44
S.D.	.82	.80	.80			
Restrained eating						
Mean	3.08	2.99	2.73	.75	2.16**	1.71*
S.D.	.75	.68	.90			

* $p < .05$ (one-tailed)
** $p < .01$ (two-tailed)

A test of the difference of the correlation coefficients between emotional eating and restrained eating for normal weight women in the three studies, revealed that this relationship was stronger in both assessment dates of the longitudinal study than in the cross-sectional study ($t = 2.88$; $p < .01$), and $t = 2.75$; $p < .01$). Thus the response set, acquiescence, may have been more prevalent in the normal weight women in the longitudinal study than in the cross-sectional study.

The tests of differences (t-tests) between the means on emotional eating and restrained eating scores for normal weight and overweight women in the three data sets are presented in Table 5. In the normal weight women, no significant differences were obtained. In the obese women, no significant differences were found in emotional eating, but those participating in the longitudinal study scored significantly higher on the Restrained Eating scale on both assessment dates than those participating in the cross-sectional study. Thus, the restrained eating score of overweight women of the longitudinal study may have been affected more by the response set social desirability than the same score for overweight women in the cross-sectional study.

SUMMARY AND CONCLUSION

Most results of the cross-sectional study differed significantly from those of the longitudinal study, indicating that there may be systematic differences between the results in these two studies. There are also indications that these differences may be due to increased prevalence of the response set, acquiescence, in the normal weight, and social desirability, in the overweight participants in the longitudinal study. However, it should be stressed that this explanation can only be a supposition at this stage and requires confirmation with independent response-set marker scales which were not used in the present study. It would be preferable to check self-reports against objective external criteria, because substantive traits cannot always be separated from response bias by means of independent response-set marker scales (McGrae and Costa, 1983). For example, an alternative explanation for the high scores on restrained eating in the overweight women of the longitudinal study may be a higher level of restriction in food intake as a result of increased weight consciousness, because of the half-yearly measurement of body weight in the longitudinal study. This explanation does not seem very plausible. As obese women are notorious for underestimating the amount of food they eat (Beaudoin and Mayer, 1954), it would be surprising if their responses to questionnaires

on eating behaviour did not reflect this tendency. However, this can only be confirmed by checking self-reports against objective external criteria. A high score on a social desirability scale indicates a high sensitivity to social approval in the individual. In self-reporting of dieting, a high sensitivity to social approval may result in compliance with the normative pressure of slimness and thus actual dieting, but also in report of dieting, irrespective of the actual level in restriction of food intake (Blanchard and Frost, 1983; p 261). Thus by means of a self-report scale on social desirability in the assessment of restrained eating, the confounding effect of actual dieting cannot be eliminated completely.

Often, it is very difficult to verify this against external criteria. Also, substantive traits are not always entangled to such a great extent with response sets in all aspects of self-reports and in all contexts. Thus it is recommended that use be made of independent response-set marker scales in such studies so that response sets can be identified, and the variance attributable to stylistic tendencies partially adjusted statistically (Gadourek, 1972), or by use of the ipsative process to reduce response-set bias (Cunningham et al., 1977). Recently, a short social desirability inventory which is phrased in dietary terms (Worsley, Baghurst & Leitch, 1984) has been developed which will be of use in studies on overweight and eating behaviour. Response-set marker scales are recommended especially in longitudinal field studies. Repeated measurement sensitize subjects to the nature of the tests used. This, together with close contact between subjects and investigator, may lead to greater compliance, and in turn to the response set, acquiescence, in some subjects, while in other subjects a higher motivation for social approval may lead in turn to the response set, social desirability.

NOTES

1. The drop-out of subjects on the sixth assessment date is due partly to missing data. On this assessment date, subjects could give a not relevant response to all items which were presented in a conditional format (that is, do you eat when you feel bored or restless). Subjects giving such a response to more than one item were excluded from analysis.

CHAPTER 14

GENERAL DISCUSSION

The main aim of this study was to assess which theory seems the most valid with reference to the aetiology of obesity, psychosomatic theory, externality theory or the theory of restrained eating, and to determine which variables are related to emotional, external and restrained eating behaviour. This ultimately may lead to more insight in what the best method of treating overeating and overweight might be. The construction of a questionnaire for the assessment of these types of eating behaviour, which would enable psychometric studies to be carried out on the relationships between these eating behaviour components and other variables, comprised a further important goal.

The Dutch Eating Behaviour Questionnaire

In the Dutch Eating Behaviour Questionnaire (DEBQ) which was constructed for the purpose of this study (Chapter 8), the scales for restrained, emotional and external eating behaviour were shown to have high internal consistency, factorial validity and dimensional stability. The scales for restrained and external eating behaviour were found to be unidimensional. The scale for emotional eating was shown to comprise two dimensions, one dealing with eating in response to diffuse emotions and the other dealing with eating in response to clearly labelled emotions. However, the difference between these two dimensions was found to be less distinct in the overweight rather than in the normal weight subjects. This is in accordance with findings of Slochower (1983[a]). She observed that various types of emotions produce different types of eating responses: only diffuse emotional states trigger the overeating response and clearly labelled emotions do not affect eating behaviour. However, she also found indications that obese individuals perceive those emotions, which are clearly labelled in most normal weight individuals, as diffuse. This finding demonstrated that overweight individuals also overeat in response to so-called clearly labelled emotions, and this may explain why the difference between the two dimensions of the items on the emotional eating scale were found to be less distinct in the overweight. Though scales have been constructed dealing separately with clearly labelled and diffuse emotions, this issue was not further examined in the current project. Instead, the two-dimensional emotional eating scale was used, for a general assessment of emotional eating.

The predictive validity of the restrained eating scale of the DEBQ was studied in a population of women (Chapter 9). The ultimate criterion of restrained eating, that is, the degree to which a woman eats less than she desires, was studied indirectly, using estimates of the deviation from required energy intake. It was necessary to use this technique because of the impossibility of conducting a study of both actual food consumption and restriction of food intake. However, the use of the magnitude of deviation from energy requirement as the criterion of restrained eating may have resulted in an underestimate of the scale's ability to predict deviation of energy intake from desired intake for the following two reasons. Firstly, energy requirement may give a conservative estimate of the food intake desired by a women who would like to eat more than is required to maintain the present body weight. Secondly, a woman may eat less than she desires, and yet still eat no less than required for the maintenance of her body weight, when this body weight has been reached following successful weight loss due to dieting (note 1)*.

Thus, the observed relationship between restrained eating scores and the magnitude of deviation from energy requirement suggests that the scale predicts eating less than what the norms for weight say these women should be eating. This possibly results in a conservative estimate of the scale's ability to predict eating less than is desired. A further indication of the scale's ability to predict restriction of food intake was obtained from the high negative relationships observed between scores on the scale and the intake of fat and sugar. However, it should be stressed that these conclusions are based on the self-reports of the women studied, and such reports of food intake are particularly notorious for their inaccuracy in estimating actual food intake (Block, 1982).

Though not designed as such, the study in Chapter 12 may be considered as a validation study of the emotional eating scale of the DEBQ. It was found that in male subjects low emotional eaters gained less weight and high emotional eaters gained more weight after experiencing negative life events, than those who had not experienced such events. This is in line with the clinical observation that some individuals, so called 'emotional eaters' respond to stress with an excessive intake of food, while most individuals respond to such circumstances with a loss of appetite and subsequent weight loss. This can be considered as an indication that the emotional eating scale is successful in predicting weight change in persons designated as low or high emotional eaters, according to the scores on this scale. However, similar results were not found amongst

* see page 135 for notes

women. In the long term high emotional eaters gained more weight after experiencing negative life events than those who had not experienced such events, while low emotional eaters did not show the 'normal' response of less weight gain following stressful life events. A possible explanation for this finding may be that the emotional eating scale has been less successful in correctly classifying women as low or high emotional eaters. It may be proposed that socially it is less desirable for obese, rather than normal weight, women to endorse questions on eating when feeling annoyed or lonely. As a consequence, overweight women may underreport emotional eating more commonly than normal weight women, and this reduces the validity obtained using the emotional eating scale. As will be elaborated below, there are indications that such response sets have been prevalent to a heightened extent amongst the women studied in Chapter 12, due to prolonged contact with the investigator, in turn a result of the longitudinal design of this study. Though the precise effects of these response sets on the results are not clear, they may have confounded the influences of emotional eating and life events on change in BMI.

Endorsement of items on external eating is probably also less socially desirable for obese than for normal-weight women. It is likely that the reverse is true for items on restrained eating. However, the precise extent to which socially desirable tendencies affect scores on the eating behaviour scales in both longitudinal and cross-sectional populations is not known. It would be preferable to investigate this using objective external criteria, as substantive traits cannot always be separated from response bias by means of independent response-set marker scales (McCrae and Costa, 1983). A high score on a social desirability scale indicates a high sensitivity to social approval on the part of the individual. In self-reporting of dieting a high sensitivity to social approval may result in compliance with the normative pressure of slimness and, therefore, with actual dieting, and also in the reporting of dieting, irrespective of the actual level of restriction of food intake (Blanchard and Frost, 1983). Similarly, in self-reporting of external eating behaviour, a high sensitivity to social approval may be indicative of a generalised sensitivity to external stimuli of which a sensitivity to external food stimuli is just another aspect. It may also be indicative of an underreporting of external eating, because it is not socially desirable to admit to eating in response to external food cues. Thus, it is difficult to differentiate between response sets and substantive traits by means of socially desirability scales.

This project produced no data concerning the validity of the external eating scale, and only a start has been made with the construct validity of the

scales, through the assessment of their relationship with other variables. These associations will be reported in separate sections. Nevertheless, the study of the three eating behaviour scales permitted an exploration of the validity of the main theories in the development and maintenance of obesity. Firstly, however, it needs to be considered that data obtained from female participants of the longitudinal study may have been affected to a heightened extent by the response-sets acquiescence and social desirability.

The response-sets acquiescence and social desirability

Results obtained for women participating in the longitudinal study on overweight were found to differ systematically from those obtained for women in the cross-sectional study. No differences between the two types of studies were found when applied to male subjects (Van Strien, 1984[b]). As is shown in Chapter 13, the differences between the women may well be attributable to a greater prevalence in the longitudinal study of the response-sets, acquiescence and social desirability. The supposition is put forward that the intensive contact between subject and investigator, together with the sensitisation of the subjects to the questionnaires due to repeated measurements, may have led to an increased willingness to co-operate, and, as a consequence, to social acquiescence in the women of normal weight. However, an increased concern for self-presentation and, thus, social desirability as a response-set may have been more prevalent in obese women. As a consequence, in the longitudinal study responses obtained from overweight women may be systematically either more positive or more negative than those obtained from normal-weight women. This reduces the validity of the results obtained with a particular measurement instrument. The effect of this is, that the results obtained for women in the longitudinal study, as reported in the final study of Chapter 8, and the studies of Chapters 11 and 12, should be interpreted with caution, especially where the results differ from those obtained in the cross-sectional study or from generally accepted theoretical notions.

As already mentioned above, no differences between the results of the longitudinal and cross-sectional studies were found with respect to men. Therefore, there is no reason to suspect that response sets have been prevalent to a large extent in the results obtained from the male participants of the longitudinal study. Sex differences in response sets have not been examined in the present project. However, the higher prevalence of response sets may be explained by the following line of reason.

It has been found that women are expected to be more sensitive to the needs of others (e.g., Bakan, 1966; Parsons and Bales, 1955), and that they are more socially oriented (Carlson, 1971) and demonstrate more social conformity (e.g. Allen and Crutchfield, 1963; Tuddenham, 1958) than men. While these suppositions remain to be further investigated, it is possible that this general tendency 'to be agreeable' can be extended to research situations, and that in studies which rely on tests, questionnaires or interviews for data, the response-set acquiescence is more prevalent in women than in men.

However, it has also been demonstrated that women have a higher need for approval than men (e.g., Hoffman, 1972). As the need to be accepted and approved of socially is associated with socially desirable responses (McGee, 1962[a,b]), it may be expected that the responses of women are more affected by the response-set social desirability than those of men. As will be elaborated below, this may be especially true for obese women, particularly in self-reports of eating behaviour.

Public attitudes towards the obese in our society are extremely negative (De Jong, 1980). This derogation may have resulted in part from the presumption that fat persons are responsible for their own condition. Fatness is believed to be the outcome of "immoral self indulgence" (Maddox, Back and Liederman, 1968), and obese people can scarcely avoid interactions where weight and eating behaviour are topics of discussion or covert determinants of the evaluation of others (Wooley, Wooley and Dyrenforth, 1979). As a result of these negative attitudes, obese individuals may be highly self-conscious and very concerned with their appearance to others. It has been demonstrated in various studies that obese individuals are more concerned about their self-presentation than normal-weight subjects (Elman, Schroeder and Schwartz, 1977; Glass, Lavin, Henchy, Gordon, Mayhew and Donohoe, 1979; Rodin and Slochower, 1974; Younger and Pliner, 1978). Self reports of eating behaviour may be especially distorted by impression management in the obese (Stunkard and Messick, 1985). However, deception with respect to eating behaviour seems more likely to occur in obese women than in obese men.

Overweight is viewed more seriously in women than in men (Harris, 1983) by both society and by the women themselves (Allon, 1982), partly because being attractive is more important for women than for men. Traditionally, beauty has been a major asset for women in obtaining a suitable marriage partner and achieving upward social mobility (Maccoby and Jacklin, 1974), and, according to a study of Playboy centrefolds and Miss America pageant contestants (Garner, Garfinkel, Schwartz and Thompson, 1980), beauty has increasingly been equated

with slimness for the past 20 years. Not surprisingly, women are more likely to be concerned about their weight than men (Dwyer and Mayer, 1970), and dieting has become a way of life for many women. At the same time, however, body weight control is hampered by a number of elements central to the traditional female sex role, such as the role of food in traditional women's work and the encouragement of dependent attitudes in women. As observed by Hall and Havassy (1981), the position of a homemaker who is easily tempted by nice and appetising food is roughly analogous to that of an alcoholic bartender. And dependency, as will be elaborated in a separate section, may function to "...reinforce non-effective responses in interpersonal situations requiring assertive behaviours" (Leon and Finn, 1984, p.323), for example, emotional eating. The opposing pressures to eat or not to eat makes eating behaviour a highly laden subject for many women, and this may explain the fact that women frequently underestimate their food intake, whereas men rarely do so (Stunkard and Koch, 1964). This underestimation of food intake in women may be either unconscious, resulting from a lack of awareness of having eaten too much, caused by a reduction of cognitive dissonance, or conscious, dissembling overeating as a result of a willingness to make a good impression on the investigator, or both. In the light of the generally accepted notion that it is unladylike for a woman to eat large amounts of food (Leon and Finn, 1984) and society's pressure to be thin, overweight women may find it especially difficult to admit that they have overeaten, both to themselves and others.

In contrast to women, for men the amount eaten is often seen as a measure of masculinity, power and strength (Leon and Finn, 1984), and obese men have even been found to boast about the amount of food they ate (Mendelson, Weinberg and Stunkard, 1961). This sex difference in the "denial" of food intake may also result from variations in the opportunities available for concealing overeating. While men have little opportunity to eat unobserved between meals (so when they overeat, they must overeat in public), women have many opportunities to eat unobserved by others in the solitude of their kitchen (Stunkard and Koch, 1964, p.81). Thus, women have both the occasion and reason to deny that they have overeaten, and this may explain why the responses of obese women in the realm of research on eating behaviour may be more affected by the response-set social desirability than those of obese men.

The three theories of overeating

The theory of restrained eating behaviour. According to the theory of restrained eating, restriction of food intake is accompanied by psychological side-effects, which may promote overeating or weight gain. This supposition is based on the observation that restrained normal-weight individuals show "counterregulatory" eating behaviour or excessive food intake when their cognitive control over food intake is undermined by disinhibitors, such as a preload, alcohol, anxiety or depression (Herman and Mack, 1975; Herman and Polivy, 1975; Polivy and Herman, 1976[a],[b]). In these studies, however, subjects were designated as restrained eaters by means of the Restraint Scale, which may not measure dieting per se, but disinhibition of cognitive restraint. This finding was obtained using a new questionnaire to assess restrained eating, the Three Factor Eating Questionnaire (TFEQ) (Stunkard and Messick, 1985). The TFEQ separately measures cognitive restraint of food intake (Factor I), disinhibition of cognitive restraint (Factor II) and hunger (Factor III). It has been shown that while the Herman and Polivy Restraint Scale was not related to the cognitive restraint scale of the TFEQ (Factor I), it was closely related to the disinhibition scale of the TFEQ (Factor II) (Stunkard and Messick, 1985; Weissenburger, Rush, Giles & Stunkard, submitted). In addition, it was found that Factor II, rather than Factor I, of the TFEQ was related to overeating (Shrager, Wadden, Miller, Stunkard and Stellar, 1983). Thus, it can be tentatively concluded that the excessive food intake found in subjects scoring high on the Restraint Scale in the studies of Herman and Polivy was not related to restraint per se, but to disinhibition of restraint. This means that not all dieters, but only a sub-population having a tendency towards disinhibition, show excessive food intake when "coming off" a diet.

Examination of the restrained eating scale of the DEBQ revealed that most of its items were similar to those of the cognitive restraint scale (Factor I) of the TFEQ. This is not surprising as both contained items taken from Pudel's Fragenbogen für Latente Adipositas (Pudel, Metzdorff and Oetting, 1975) in the initial itempool. In addition, the restrained eating scale was found to have good predictive validity for the restriction of food intake. Therefore, it appears that the restrained eating scale differs from the Restraint Scale, in that it seems to measure dieting to a much larger extent.

In the study of women in Chapter 10 no significant relationships were found between the scales for restrained eating and either of the scales for emotional or external eating behaviour. These findings are not in accordance with the

theory of restrained eating, which suggests that dieting is a causal agent for emotional and external eating behaviour, the so-called "obese" eating patterns. Rather, indications were found that "obese" eating patterns precede restrained eating behaviour - no difference was found in the degree of emotional or external eating behaviour between women of current overweight and women of prior overweight, but of normal weight at the time of the study due to successful dieting, the "obese" and "latent obese" women. This finding is in line with both psychosomatic and externality theory, and indicates that "obese" eating patterns are potential causes of overweight and of dieting.

Lowe (1984) also found indications that "obese" eating patterns may precede dieting. In his study the degree to which subjects were currently suppressing their weight was calculated by subtracting the current percentage overweight from the precentage overweight at their greatest weight. It was found that high-restrained normals had suppressed their weight more than low-restrained normals. In addition, at their greatest previous weight high restrained normals had been more than four times more overweight than unrestrained normals. Also their current weight was higher than that of unrestrained normal-weight subjects. According to Lowe, these findings suggest that "... high restraint normals behave like the obese because they have retained characteristics associated with prior obesity rather than because of their current level of cognitive restraint" (l.c. p.247).

Shrager et al's (1983) finding that cognitive restraint was not related to overeating does not contradict the suggestion that "obese" eating patterns precede restrained eating. However, it is difficult to assess what implication their finding that disinhibition was related to overeating has on the current argument. Inspection of the disinhibition scale of the TFEQ (Factor II) reveals that it contains two sorts of items: those referring to restraint breaking and bingeing (e.g., while on a diet, if I eat a food that is not allowed, I often then splurge and eat other high calorie foods; do you go on eating binges even though you are not hungry) and those referring to emotional and external eating behaviour (e.g., when I feel lonely, I console myself by eating; when I smell a sizzling steak or see a juicy piece of meat, I find it very difficult to keep from eating, even if I have just finished a meal). Thus, the relationship between disinhibition and overeating may have been caused by the dual effect of disinhibition per se and "obese" eating patterns, as a high score on disinhibition can result from a high subscore on either of these two dimensions. Because of this interpretative difficulty, the question as to whether the overeating of those having a tendency towards disinhibition in the

study of Shrager et al. (1983) is caused mainly by "obese" eating patterns, such as emotional and external eating behaviour, or by tendencies towards restraint breaking and bingeing must be left open.

It should be noted that the results of the study in Chapter 10 should be interpreted with caution. Firstly, preliminary scales have been used in this study to measure the three types of eating behaviour, and inspection of the items of the scales in this study (see Table 1, Chapter 10) and those of the final scales (see Table 1, Chapter 8) reveals that the scales for restrained and external eating behaviour in particular contain different items in the final scales. Secondly, some of the results of the study in Chapter 10 have not been replicated by the female participants of the longitudinal study (Chapters 8 and 11). In this study significant relationships were found between restrained eating, and emotional and external eating. The differing results may have been due to the use of different scales for the assessment of the three types of eating behaviour. They may also have been caused by differences in the sample characteristics of the two studies: the women studied in Chapter 10 had a mean BMI of approximately 25, while those examined in the longitudinal study had a mean BMI of approximately 22.5. However, as argued by Van Strien (in press and in Chapter 13), it seems more feasible to attribute this discrepancy in the results to a heightened prevalence of response sets amongst the female participants of the longitudinal study, as two cross-sectional studies, which used sample characteristics and scales to measure emotional and restrained eating identical to those used in the longitudinal study, revealed no significant relationships between the two types of eating behaviour. The discovery of a significant association between restrained and emotional eating does not necessarily contradict the suggestion that "obese" eating patterns precede dieting, rather than being caused by dieting -- "obese" eating patterns may cause weight problems and make dieting necessary. The suggestion made here that the restrained eating theory appears invalid may possibly be premature. More research is needed, preferably utilising the final scales of the DEBQ to reach a more specific conclusion. As also suggested by Lowe (1984) future research should, in addition, take into account the prior and current weight status of the subjects under study.

The psychosomatic and externality theories

As already stated, the supposition that "obese" eating patterns precede dieting, rather than being caused by dieting, is in agreement with both the

psychosomatic and externality theories. The significant relationships found between BMI and emotional and external eating behaviour, and also between the two types of eating behaviour in the study contained in Chapter 10, also lent some support to the two theories. Slochower (1983[a]), one of the advocates of psychosomatic theory, has proposed that emotionality and food cues operate conjointly to elicit eating behaviour: a state of high uncontrollable anxiety may enhance reactions to external cues. According to externality theory, a close relationship between both types of eating behaviour is also assumed if, as stated by Schachter and Rodin (1974) a high degree of emotionality is considered to be a manifestation of the general trait of externality.

However, on the basis of the pattern of relationships found between the two types of eating behaviour and various personality traits in the study contained in Chapter 10, the author is inclined to stress the importance of emotional eating as a causal factor in the genesis of overweight. This inclination is based on the fact that no significant relationships were found between the scale for external eating and personality scales, which reflected aspects of externality or emotionality, in the study in Chapter 10. This result is not in accordance with the stimulus-binding concept of externality theory. Similar findings have also been reported by Nisbett and Temoshok (1976) and Isbitsky and White (1981). In contrast, the results were in accordance with the argument of psychodynamic theory that intrapsychic conflicts are central in inducing the eating patterns of emotional eaters - significant relationships were found between emotional eating and a number of personality traits which reflected aspects of emotional instability.

In the study of women contained in Chapter 11 significant relationships were also found between emotional and external eating. Moreover, both types of eating behaviour were found to be related to anxiety and negative self-concept. At first sight the significant relationship found in this study between external eating and emotional eating ($r=.27$ ($n=540$), $p=.00$) weakens the current argument, as this finding does not seem to contradict the stimulus-binding concept of the externality theory, that is, that a high degree of emotionality is just one other aspect of the general trait of externality. However, in a post hoc analysis, this relationship was markedly reduced after adjustments were made for the effect of emotional eating ($r=.12$ ($n=538$) $p=.00$). By contrast, the significant relationship between emotional eating and anxiety ($r=.34$ ($n=540$) $p=.00$) was not much reduced after making adjustment for the effects of external eating ($r=.25$ ($n=538$) $p=.00$). These findings suggest that only a small part of the explained variance between external eating and anxiety

is due to external eating itself. Emotional eating accounts for the largest part of the variance, indicating that the relationship between anxiety and emotional eating is the most significant. As a result, it has been suggested that the psychosomatic theory appears to be the most valid. However, it should be kept in mind that this conclusion was reached in part using preliminary scales to measure the three types of eating behaviour (e.g., the study in Chapter 10). More research is certainly needed in order to reach a definite conclusion regarding the validity of the three theories of overeating.

Emotional eating

The finding that in women emotional eating was positively associated with personality traits reflecting feelings of inadequacy, low self-esteem, low sociability, emotional instability and social anxiety is consistent with the contention of the psychosomatic theory that overeating is associated with emotional and personality disturbances. Bruch (e.g., 1981) has suggested that these problems have been caused by a lack of adequate parental response to cues originating in the child in infancy. If the parental response is continuously inappropriate, be it neglectful or over-apprehensive, the child is prevented from developing a sense of competency and autonomy. In the area of feeding, it will not learn to differentiate between feeling hungry or sated, or as to whether it suffers from some other discomfort. In addition, many other developmental aspects may be disturbed. The positive relationship found between emotional eating and fear of failure in the study contained in Chapter 10 supported this contention. Fear of failure - characterised as a debilitating anxiety in relatively unstructured situations - has been considered as being associated with a deficient inner cognitive and affective structure, and has been conceptualised as beginning in infancy, a result of a lack of adequate parental response to expressions of insecurity or a need for confirmation of attainment of prescribed standards by the child (Hermans, 1971). The positive relationship between emotional eating and fear of failure points to a general deficit and failure in self-awareness, and supports the suggestion of Slochower (1983[a]) that uncontrollable emotional states may result in overeating. Precisely unstructured situations may provoke uncontrollable anxiety, which may be associated with emotional eating in those having a deficient inner cognitive and affective structure due to specific parent-child interactions early in life.

Remarkably, a high fear of failure has also been found in girls being at risk for the development of anorexia nervosa (Weeda-Mannak, 1984). According to Bruch (1981), both anorexia nervosa patients and individuals tending to overeat have many features in common, though at first sight they may seem to be direct opposites. Both groups suffer from disturbances in body image and body concept, and, preoccupied as they are with non-eating or eating, both have in common an inability to correctly identify hunger or distinguish it from other bodily or emotional tensions. In addition, both groups have a "paralyzing sense of ineffectiveness which pervades all their thinking and actions" (l.c. p. 216). In anorexia nervosa patients, however, the sense of helplessness is camouflaged by excellent performance and high achievement motivation (Weeda-Mannak, 1984), which extends to every area of life, being most notable in the refusal of food. By contrast, overeating is the manifest expression of a lack of inner control and willpower. The study contained in Chapter 10 showed that emotional eating appeared to be negatively associated with achievement motivation (PMT-P) and social ascendency (AS).

One finding which needs further consideration is that emotional eating was shown to be more prevalent in women than in men (see Table 1, Chapter 8). This sex difference in emotional eating can be explained by the following line of reason.

One of the causes of parental "imperviousness" to the child's needs and emotions may be dissatisfaction with the sex of the child (Bruch, 1964, p. 270), and research findings suggest that girls are not so much wanted as boys (e.g., Pohlman, 1969; Gordon and Gordon, 1960; Gillman, 1968). Moreover, since girls are valued less for themselves, being a "good girl" may assume more importance for them. For fear of loosing the love of others, a girl is more motivated to show conforming and dependent behaviour, and less motivated to express anger or aggressiveness even when motivated to justifiable anger. Dependency and passivity also fit in with the ideal feminine sex-role stereotype; lest a woman be thought "masculine", she must avoid independence, aggressiveness, competence and dominance. However, dependency has its price. A passive dependent attitude is likely to evoke anxiety, since the person feels powerless and helpless in the face of life events (Sherman, 1971). Indeed, women have been found to be more anxious and emotionally unstable (e.g., Oetzel, 1966), to have a tendency to worry more (Bradburn and Caplovitz, 1965), and to be more frequently depressed than men (e.g., Warheit, Holzer and Schwab, 1973). It has been suggested that depression is an organismic response to suppressed hostility and aggression, the outcome of a belief that action is

futile (Seligman, 1975). Likewise, under- or overeating may be another organismic response to the perception of having no control over events, given specific learning experiences with regard to food. As women tend to perceive themselves as being less powerful in controlling events than men (Olsen, 1969), the development of "organismic responses" in general and eating disorders in particular is likely to be more common in women than in men.

The study of women described in Chapter 11 demonstrated the existence of a positive relationship between endorsement of feminine stereotype traits and emotional and external eating behaviour. In addition, it was found that the contribution of femininity to emotional and external eating was due mainly to the anxiety and negative self-concept associated with female stereotype traits. Therefore, in support of the foregoing argument, it seems that the dependency and passivity associated with female stereotype traits evoke low self-concept and high anxiety. Moreover, feminine sex-typed women seem to be especially at risk with respect to the development of eating disorders.

Successful dieting and weight loss

Some indications as to which traits are related to a high degree of restrained eating and successful weight loss have been obtained in the study of women contained in Chapter 10. In this study personality differences between "obese" and "latent obese" women were assessed. Both groups could be considered as having been confronted with weight problems. In addition, both groups have a high tendency to eat in response to negative emotions and external food cues. In contrast to the "obese" women, however, the "latent obese" had by definition a normal BMI as a result of strict dieting.

It was found that "latent obese" women as compared with the "obese", functioned better in social situations, were more outgoing in attitude, had a higher self-esteem, higher masculinity of interests and emotions, lower fear of failure and more internal control. The higher masculinity, lower fear of failure and higher internal control point to a better cognitive and affective functioning on the part of the "latent obese". This healthier psychic constellation is likely to be associated with better social functioning and higher self-esteem, and may be an important causal factor in successful dieting and weight loss. This supposition is in line with the findings of other studies, in which the degree of internal control has been reported to be an important predictor of the effectiveness of weight reduction programmes and successful weight loss (e.g., Balch and Ross, 1975; Salzer, 1982). A similar

hypothesis has also been put forward by Karpovitz and Zeis (1975), who claimed that mental and emotional functioning is one of the factors associated with a willingness and ability to work on weight control. It is even more likely, that there is a continuous interaction between weight loss and psychological and social functioning. A woman who successfully reduces her weight no longer anticipates negative evaluations of her appearance by others, consequently feels more at ease in social situations, and, accordingly, has a higher self-esteem.

Implications

For research. One of the serious methodological problems associated with this study concerned the possibility of a heightened prevalence of response sets amongst the female participants of the longitudinal study, which may have confounded the validity of the findings. Another problem pertains to the different versions of the eating behaviour questionnaire utilised in the study described in Chapter 10 and the other studies. Because of these methodological problems, the results of the longitudinal study could not be unequivocally interpreted, especially in cases where these differed from those obtained in the cross-sectional study in Chapter 10, or generally accepted theoretical notions. Moreover, the results permitted only tentative conclusions to be made with regard to the main object of the study, the assessment of the comparative validity of the three theories of overeating. For the purpose of research, it can be suggested that the study on women in Chapter 10 be replicated, using the final version of the DEBQ for the assessment of eating behaviour. In order to reach a definite conclusion regarding the contention of the theory of restrained eating that "obese" eating patterns are caused by dieting, more attention should be paid to the weight history of the subjects under study, preferably by means of a weight history questionnaire. In addition to weight categories, also the current weight status of the subjects should be taken into account. In order to determine whether counterregulatory eating behaviour is caused by "obese" eating patterns, such as emotional and external eating behaviour, or by tendencies toward restraint breaking and bingeing, or both, separate scales should be used for the measurement of the two dimensions. A scale has recently been developed measuring exclusively restraint breaking and bingeing, which facilitates the measurement of disinhibition per se (Witteman, Van Dusseldorp, Frijters and Van Strien, submitted). In addition, the supposition of the author that a deficient inner cognitive and affective structure,

and the perception of having no control over events, are causal factors in the development of eating disorders needs further confirmation. Use of the Rotter I-E scales, the Herman's PMT, scales for social anxiety, self-esteem, masculinity and femininity, and so on, are highly recommended in future studies.

However, the author does not favour a one-stage approach in the assessment of personality structure and obesity for the following reasons. Firstly, past research taught us that conclusions regarding the existence of an "obese personality structure" cannot be derived from psychometric studies on the relationship between weight status and personality characteristics (e.g., Leon and Roth, 1977; McReynolds, 1983; Diehl and Paul, 1985). Secondly, as has hopefully become clear from the above remarks, a one-to-one assessment of the relationship between personality and obesity constitutes an oversimplification of the problem. Instead, a two-stage approach is recommended, in which eating behaviour is conceived of as being the mediator between personality traits and body weight. No account was taken of the physical activity of the subjects in this study. A study of Baecke, Van Staveren and Burema (1983) using another sample taken from the Municipality of Ede, comparable regarding age and social status to the longitudinal sample used in this study, revealed that the female population was very homogeneous with respect to physical activity. Accordingly, it is not expected that physical activity scores would provide much additional information for the purpose of this study using the same population. However, as this could well differ amongst other populations, in future studies attention should be paid to the physical activity of the subjects analysed.

Finally, investigators should be aware of the fact that longitudinal studies are apt to evoke response sets. To improve the identification and control of response sets, the use of independent response-set marker scales is recommended. However, it would be preferable to check self-report against objective external criteria, as substantive traits cannot always be separated from response sets by means of independent response-set marker scales.

For practice. The structure of an individual's eating behaviour can in principle be assessed in a valid manner using the DEBQ. Taking additionally into account the person's weight history and current body weight, it becomes possible to decide which particular type of weight reduction programme can best be recommended[2].

A high degree of emotional eating points to a deficient inner cognitive and affective structure. For this reason, high scorers on the emotional eating scale may benefit best from therapy, which focuses on psychological problems

rather than weight. During the therapeutic process, feelings of inadequacy and lack of control over events should be counteracted, and treatment should focus on evoking awareness in the patient of impulses, feelings and needs originating within him or herself. In many cases high emotional eating may be associated with high levels of external eating, but this sensitivity to food cues may disappear in the therapeutic process. However, if a patient insists on working on weight control, one may consider sending him or her to an independent weight control programme, based, for example, on stimulus-control procedures. During the therapeutic process itself the problem of overweight should not be directly attacked, since overeating is probably only a symptom of underlying emotional problems; removal of the symptom probably does not last long if the underlying cause is left unsolved (Slochower, personal communication; Bruch, 1977; Wolman, 1982).

A high score with respect to external eating, unsupported by a high score regarding emotional eating, points to a sensitivity to external food cues. Though the patient may have low self-esteem and high social anxiety, this is more likely to be the result of negative social pressures concerning overweight, than underlying emotional problems. However, this should be checked before deciding on a stimulus-control programme.

Restrained eating scores should never be considered alone. In persons demonstrating a high degree of emotional or external eating behaviour, the strict restriction of food intake is not likely to result in lasting weight loss, unless the underlying psychic problems are solved, or the sensitivity to food stimuli is treated. For this reason, restrained eating scores should always be considered in conjunction with the other scales of the DEBQ. The weight history and the current weight status of the patient should also be taken into account, and, in addition, the tendency towards restraint breaking or bingeing (for example, by means of the Loss of Control Scale for Bulimic Eating Behaviour (Witteman et al. submitted). Though the restrained eating scale has been designed so that it refers to "healthy dieting", the fact that some of those having a high score on this scale, also have tendencies towards restraint breaking, bingeing or anorexia nervosa, cannot be disregarded. For example, underweight in combination with severe dieting may point to anorexia nervosa, while a high degree of weight fluctuation in combination with severe dieting and tendencies towards restraint breaking may indicate bulimia nervosa.

Finally, a person with a high restraint score, but showing a low level of emotional and external eating, may require more accurate information concerning nutrition and caloric balance. However, if this person has always been

overweight, he or she may do better to accept his or her heavy build, instead of continuously starving him or herself. With respect to this it should be noted that a more accepting social and medical attitude towards overweight would also be helpful in alleviating many of the psychological problems faced by the overweight, such as social anxiety and low self-esteem.

NOTES

1. It has been suggested that individuals with long dieting histories need less energy compared with their equal weight-height peers who have not engaged in similar dieting activities (Garrow, 1978). A study by Ravussin, Burnand, Schutz and Jéquier (1985) has shown that this decrease in overall energy expenditure during caloric restriction was due to three factors: the loss of lean body mass (which explains the lower resting metabolic rate), the lower thermogenetic effect of food which is related to lower energy intake, and the reduced cost of physical activity, a result of the lower body weight. On the basis of these findings, the investigators concluded that "...there seems little reason to evoke additional mechanisms to explain decline in energy expenditure during dieting".
2. It should be kept in mind that this procedure in no way accounts for physiological factors in weight gain or obesity, so that in the case of doubt hormonal, metabolic disturbances and such like should be separately assessed. However, there may be an interaction of physiological disturbances and psychological problems.

SUMMARY

In this study, three theories on the development and maintenance of human obesity are investigated. These theories are the psychosomatic theory, the externality theory and the theory of restrained eating. The psychosomatic theory focuses on emotional factors, and attributes overeating to confusion between internal arousal states accompanying emotional states and physiological states of hunger and satiety. Individuals having the tendency to eat in response to emotional states are considered to be unadjusted and to suffer from unstable emotionality. Externality theory focuses on external food cues, and attributes overeating to a hyper-responsiveness to food-related cues in the environment together with unresponsiveness to internal cues of hunger or satiety. This tendency is considered to be a manifestation of the general trait of externality. The theory of restrained eating focuses on side effects of dieting, that is, the possible breakdown of restrictive control so that suppressed eating behaviour is disinhibited and excessive food intake occurs.

Psychosomatic theory emphasizes internal instigation of eating and externality theory, focuses on external instigation of eating. Both theories contend that dieting results from overeating and weight gain, whereas according to the theory of restrained eating, dieting may lead to overeating and weight gain. As these theories differ in assumptions why individuals overeat, it is difficult to determine how overeating or overweight can be adequately treated. Thus, the principal aim of this study was to test a number of hypotheses evoking from these theories. This was done by reviewing the literature on these theories (Part I of this dissertation) and subsequently by carrying out a series of psychometric studies on the relationships between the three types of eating behaviour central to these theories (emotional, external and restrained eating behaviour) and variables, such as personality traits and body mass (Part II of this dissertation).

Part I. literature review

The processes described by each of the three theories, and the principles of weight management as advocated by these theories have been reviewed. However, no conclusion could be drawn concerning the validity of these theories because the whole range of hypotheses derived from each theory has as yet not been confirmed by empirical studies. Most clinical studies give support to the psychosomatic theory, in that most individuals overeat when feeling emotionally

upset, but these findings could not be replicated in controlled laboratory studies. However, with the introduction of the distinction between the concepts of clearly labelled and diffuse emotions, overweight individuals were shown to overeat in response to certain types of stressors in controlled studies. Also, overeating has been shown to exert an anxiety-reducing function.

The distinction between internal and external cues in externality theory was found to be too simple an explanation of the difference in eating behaviour between normal and obese subjects because individuals who are hyperresponsive to external stimuli or unresponsive to internal stimuli are found in all weight categories. The discovery of normal weight individuals with obese eating patterns, referred to as "latent obese", and the observation that body weight is influenced by physiological variables, offers additional support to the fact that the relationship between external responsiveness and food intake and body weight is mediated by cognitive and physiological variables.

The theory of restrained eating was corraborated in studies on restrained non-obese individuals, but not in studies on restrained obese individuals. This ambiguity in findings may have resulted from difficulties in measuring cognitive restraint but may also reflect inconsistencies in the theory of restrained eating.

Part II. Psychometric studies

A number of psychometric studies was carried out to assess the relationships between the three types of eating behaviour and variables such as personality traits and body mass. As no satisfactory scales were available, the Dutch Eating Behaviour Questionnaire (DEBQ) comprising scales for each of the three types of eating behaviour was developed. Each scale was shown to have high internal consistency, factorial validity and dimensional stability. The scales for restrained and external eating were found to be unidimensional. The scale for emotional eating contained two dimensions, one dealing with eating in response to clearly labelled emotions and the other with eating in response to diffuse emotions. This two-dimensional scale was used in the general assessment of emotional eating, but separate scales were also constructed for clearly labelled and diffuse emotions (Chapter 8).

When tested on a population of women, the Restrained eating scale of the DEBQ was found to have moderate to good predictive validity for restriction of food intake. High negative relationships were observed between scores on the scale and intake of fat and sugar. The relationship between restrained eating scores and magnitude of the deviation from energy requirement (an indirect

measure of discrepancy between actual and desired intake of energy), was also high (Chapter 9).

The validity of the three psychological theories of overeating was investigated in a sample of women by examining the relationships between the three eating behaviour scales, personality scales and body mass index (BMI; weight/height^2). To ascertain which personality traits were related to successful weight loss, differences in eating behaviour and personality were investigated between overweight women, and women of normal weight who had previously been overweight: "obese" and "latent obese" women (Chapter 10).

No significant relationship was found between the scale for restrained eating, and that for emotional or that for external eating behaviour. These findings do not occur with the theory of restrained eating, which suggests that dieting is a causal agent of emotional and external eating behaviour, that is "obese" eating patterns. In contrast, indications were found that "obese" eating patterns precede restrained eating behaviour, because no difference was found in the degree of emotional or external eating behaviour between the obese and the latent obese women. This finding is in line with both psychosomatic and externality theory. However, on the basis of the pattern of relationships between the scales for emotional and external eating behaviour the author is inclined to stress the importance of emotional eating as a causal factor in the genesis of overweight: no significant relationships were found between the scale for external eating and personality scales reflecting aspects of externality or emotionality in this study. Such findings are not in accordance with the contention of externality theory that sensitivity to food cues is only a manifestation of externality as a general personality trait. Results support instead psychosomatic theory, that intrapsychic conflicts induce the eating patterns of emotional eaters, because significant relationships were found between emotional eating and a number of personality scales reflecting aspects of emotional instability.

Inspection of personality differences between the "latent obese" and the "obese" in Chapter 10 indicated that some traits were related to a high degree of restrained eating and successful weight loss. As compared with the "obese". "latent obese" women functioned more effectively in social situations, were more outgoing in attitude, had higher self-esteem, a higher degree of masculinity, less fear of failure and more internal control. Higher masculinity, less fear of failure and higher internal control indicate a better cognitive and affective functioning of the "latent obese", and this may be an important causal factor for successful dieting and weight loss. Alternatively, better

psychic functioning may also have been the result of successful weight loss, because of the anticipation of a more positive evaluation of their appearance by others. A third possibility is a continuous interaction of weight loss, and psychological and social functioning.

Psychic functioning was found to be the central factor in the development of eating disorders in Chapter 11. In two independent subsamples of women, positive relationships were found between emotional and external eating behaviour, and female stereotype traits. This could be attributed mainly to anxiety and negative self-esteem associated with female stereotypical traits. Specific learning experiences early in life with regard to food, dependency, lack of assertiveness and passivity (in female stereotypes) and associated anxiety and negative self-concept may result in the development of eating disorders as an "organismic" response to the perception of having no control over events.

A longitudinal study on effects of negative life events on change in body mass index in men and women classified as low or high emotional eater is reported in Chapter 12. In men, high emotional eaters were found to gain more weight, and low emotional eaters to gain less weight after experiencing negative life events that those who had not experienced such events. This is in line with the clinical observation that some individuals, referred to as emotional eaters, respond to stress with excessive intake of food, while most individuals respond to such circumstances with loss of appetite and subsequent weight loss. Similar results were not found in women: In long-term high emotional eaters gained more weight after experiencing negative life events than those who had not experienced such events, but low emotional eaters did not show the "normal" response of less weight gain after stressful life events. A possible explanation may be that the emotional eating scale has been less successful in classifying women as low or high emotional eaters. As is shown in Chapter 13, there are indications in the female participants in the longitudinal study of the response sets, acquiescence and social desirability. Intensive contact between subject and investigator, and also sensitization of subjects to the questionnaires as a result of repeated measurement may have led to increased willingness to co-operate and as a consequence, to social acquiescence in the women of normal weight. However, increased concern for self-presentation and thus social desirability as a response set may have been more prevalent in obese women. Thus, the validity of results obtained with a particular measurement instrument may have been reduced, and this may have been the case with the results of the female participants of this longitudinal study in Chapter 12.

In the general discussion of the results of the studies, it is concluded that psychosomatic theory seems to be the most promising theory regarding the maintenance and the development of human obesity. However, because of the possible prevalence of response sets in the female participants in the longitudinal study this can only be a tentative conclusion. Implications of the research findings for future research and for clinical practice are discussed. The structure of an individual's eating behaviour can in principle be assessed with the DEBQ, and therefore this questionnaire may be useful in determining which particular weight reduction programme would be most appropriate.

SAMENVATTING

Centraal in dit proefschrift staan drie psychologische theorieën over het ontstaan en het handhaven van overgewicht: de psychosomatische theorie, de externaliteitstheorie en de theorie van lijngerichtheid. Elk van deze theorieën verschilt op fundamentele punten van de andere en ook de behandelingsstrategie is binnen elk theoretisch uitgangspunt weer anders. Doel van dit onderzoek was derhalve na te gaan welke van de theorieën het meest geldig lijkt. Dit gebeurde op twee wijzen: a. literatuurstudie (Deel I van dit proefschrift), b. het uitvoeren van een reeks psychometrische studies naar verbanden tussen de eetgedragingen die het meest kenmerkend zijn voor elk van de drie theorieën (emotioneel eten, "extern" eten en lijngericht eten) en persoonlijkheidskenmerken, mate van overgewicht en dergelijke (Deel II van dit proefschrift).

Deel I. literatuurstudie

De psychosomatische theorie. Een "normale" reactie op negatieve emoties of stress is vermindering van eetlust: stress roept dezelfde verzadigingsverschijnselen op als opneming van voedsel; de samentrekkingen van de maag houden op en het bloedsuikergehalte gaat omhoog. Er zijn echter mensen die na stresservaringen juist reageren met het eten van voedsel. Deze, zogenaamde emotionele eters, hebben volgens de psychosomatische theorie niet leren discrimineren tussen hongerprikkels en fysiologische prikkels bij emoties als angst, boosheid of vrees, onder andere ten gevolge van de wijze van opvoeden door de moeder die het kind ook te eten gaf wanneer het om andere redenen dan honger huilde. Veelvuldig emotioneel eten kan leiden tot gewichtstoeneming en uiteindelijk tot overgewicht. Volgens deze theorieën functioneren personen met een dergelijk eetgedrag psychisch niet goed en bevinden zij zich dikwijls in een situatie van stress.

De externaliteitstheorie. De externaliteitstheorie heeft met de psychosomatische theorie gemeen dat overeten kan ontstaan door het onjuist interpreteren van sensaties van honger en verzadiging. In tegenstelling tot de psychosomatische theorie, schrijft de externaliteitstheorie overeten niet toe aan een gebrek aan onderscheidend vermogen tussen fysiologische symptomen bij emoties en fysiologische symptomen bij honger en verzadiging, maar aan een algemene gevoeligheid voor externe prikkels, waarvan de gevoeligheid voor voedselprikkels, zoals geur en smaak van voedsel, slechts een onderdeel is. Er wordt vanuit gegaan dat externaliteit een persoonlijkheidskenmerk is.

De theorie van lijngericht eetgedrag. Volgens de theorie van lijngericht eetgedrag heeft ieder persoon een eigen "natuurlijk gewicht", een vast gewicht dat door het lichaam in een homeostatische regelkring in stand wordt gehouden. Op pogingen tot verlaging van dit "natuurlijke gewicht" door lijnen reageert het lichaam met fysiologische defensiemechanismen, bijvoorbeeld honger. Er is dan sprake van een conflict tussen eetlust en voedselonthouding, tussen de wil om te eten en de wil om af te vallen. Wordt de cognitieve contrôle over het eetgedrag doorbroken door bijvoorbeeld het eten van "verboden" voedsel, dan geven lijners veelal aan hun eetlust toe en komt het bij sommige lijners voor dat ze geweldige hoeveelheden voedsel consumeren (counter-regulatie). Naast "verboden" voedsel kunnen ook negatieve emoties en externe voedselprikkels de cognitieve contrôle op het eetgedrag bij lijners doorbreken. Het voortdurend negeren van gevoelens van honger kan bovendien leiden tot een blijvend onvermogen om interne fysiologische sensaties van honger en verzadiging op de juiste wijze te interpreteren. Volgens de theorie van lijngericht eetgedrag is lijnen een mogelijk oorzakelijke factor van emotioneel en extern eten - ook wel "obees" eetgedrag genoemd. In dit opzicht verschilt de theorie van lijngericht eetgedrag van zowel de psychosomatische als de externaliteitstheorie; deze theorieën zien lijngedrag als een mogelijk antwoord op overgewicht dat op zijn beurt door "obees" eetgedrag is veroorzaakt.

Omdat de drie theorieën elk een eigen zienswijze hebben op het ontstaan van overeten en overgewicht, is ook de behandelingsstrategie binnen elk theoretisch uitgangspunt weer anders. In de visie van de psychosomatische theorie zal het emotionele eten pas verdwijnen als onderliggende emotionele problemen zijn opgelost (in psychotherapie). In de behandeling volgens de externaliteitstheorie staat een gedragstherapeutische benadering gericht op stimulus-contrôle centraal. In de benadering volgens de theorie van lijngericht eetgedrag ligt het accent op het (opnieuw) aanleren van sensaties van honger en verzadiging, en het leren accepteren van het eigen "natuurlijke" gewicht.

De uitkomsten van de belangrijkste onderzoeken op het gebied van de drie theorieën geven geen uitsluitsel welke van de theorieën het meest ondersteund wordt. Geen der hypothesen voortkomend uit deze drie theorieën werd in onderzoek op consistente wijze bevestigd. Bevestiging voor de psychosomatische theorie werd wel gevonden in klinisch psychologisch onderzoek - de meeste personen rapporteerden veel te eten als zij in een toestand van negatieve emoties verkeerden - maar een dergelijk eetgedrag kon niet altijd worden aangetoond in experimentele studies. Nog maar sinds kort, na de invoering van het onderscheid tussen de begrippen "duidelijk omschreven" en "diffuse" emoties, bleek ook in

laboratorium-situaties dat dikke mensen veel eten in stress-situaties waarin diffuse emoties opgewekt werden en dat dit eetgedrag een angst-reducerende functie heeft.

Ook de dichotomie interne versus externe oriëntatie in de externaliteits-theorie bleek te simpel voor het verklaren van verschillen in eetgedrag van personen met een normaal gewicht tegenover dat van personen met overgewicht; in elke gewichtsklasse bleken sommige personen overgevoelig voor externe prikkels en ongevoelig voor interne prikkels te zijn. Er bleken ook personen te bestaan met een normaal lichaamsgewicht die wél "obees" eetgedrag vertoonden. Deze personen worden "latent obesen" genoemd. Deze bevinding èn het inzicht dat iemands uiteindelijke lichaamsgewicht ook wordt bepaald door fysiologische factoren, heeft duidelijk gemaakt dat er geen rechtstreeks verband bestaat tussen mate van externaliteit enerzijds en de consumptie van voedsel en lichaamsgewicht anderzijds. Deze relatie wordt mede bepaald door cognitieve factoren (b.v. het besluit te lijnen) en fysiologische factoren.

De theorie van lijngericht eetgedrag, tenslotte, werd wel bevestigd in studies met lijnende proefpersonen met een normaal lichaamsgewicht, maar niet in studies met lijnende proefpersonen met overgewicht. Er zijn aanwijzingen dat deze tegenstrijdigheid in resultaten toegeschreven moet worden aan problemen met het meetinstrument voor het bepalen van lijngerichtheid, de "Restraint Scale". Daarnaast is het mogelijk dat de theorie van lijngericht eetgedrag slechts van toepassing is voor een bepaalde soort van personen.

Deel II. Eigen empirisch onderzoek

Het tweede deel van dit proefschrift bevat zes psychometrische studies naar emotioneel, extern en lijngericht eetgedrag. Allereerst moest er een meetinstrument voor deze eetgedragingen worden ontwikkeld, aangezien een bevredigend instrument niet beschikbaar was bij het begin van dit onderzoek. Hoofdstuk 8 beschrijft de constructie van dit instrument, de Dutch Eating Behaviour Questionnaire (DEBQ) ofwel de Nederlandse Vragenlijst voor Eetgedrag (NVE) met schalen voor emotioneel, extern en lijngericht eetgedrag. Het bleek dat deze schalen een hoge mate van interne consistentie, factoriële validiteit en dimensionele stabiliteit vertoonden. Verder bleken de schalen voor lijngericht en extern eetgedrag uni-dimensioneel, maar de schaal voor emotioneel eten bi-dimensioneel te zijn. De eerste dimensie had betrekking op eten bij duidelijk omschreven emoties en de tweede vooral op eten bij diffuse emoties. Hoewel er ook aparte schalen zijn geconstrueerd voor het meten van elk van deze twee

dimensies, is in dit proefschrift de twee-dimensionele schaal gebruikt voor het meten van het eten bij negatieve emoties.

Hoofdstuk 9 bevat een studie over de predictieve validiteit van de schaal voor lijngericht eetgedrag in een steekproef van vrouwen. Het bleek dat deze schaal een redelijke tot goede predictieve validiteit heeft voor het meten van beperking van voedselinneming: er werden hoge verbanden gevonden tussen scores op deze schaal en de gerapporteerde consumptie van vetten en suikers. Daarnaast was ook het verband tussen scores op deze schaal en mate van deviatie van energiebehoefte goed. Dit is een indirecte maat voor lijngerichtheid, d.w.z. de mate waarin iemand minder eet dan hij of zij wel zou willen eten.

Kern van dit proefschrift is Hoofdstuk 10. Dit bevat een onderzoek in een steekproef van vrouwen naar de geldigheid van de drie psychologische theorieën van overeten en overgewicht. Tevens werd in dit onderzoek nagegaan welke persoonlijkheidskenmerken samenhangen met succesvol gewichtsverlies. Dit gebeurde door een analyse van de verbanden tussen de drie eetgedragingen, persoonlijkheidskenmerken en mate van overgewicht (body mass index (BMI); gewicht/lengte^2) en daarnaast door na te gaan op welke punten (eetgedrag en persoonlijkheidskenmerken) dikke vrouwen verschillen van vrouwen die ooit te dik zijn geweest maar op het moment van het onderzoek een normaal lichaamsgewicht hadden door succesvol lijngedrag: "obese" en "latent obese" vrouwen.

Het bleek dat scores op de schaal voor lijngericht eetgedrag niet samenhingen met die op de schalen voor emotioneel en extern eetgedrag. Dit resultaat komt niet overeen met de theorie van lijngericht eetgedrag, waarin lijngedrag gezien wordt als mogelijke oorzaak voor emotioneel- en extern-, "obees", eetgedrag. Wél waren er aanwijzingen dat "obees" eetgedrag vooraf gaat aan lijnen, aangezien "obese" en "latent obese" vrouwen in ongeveer gelijke mate een geneigdheid tot emotioneel en "extern" eten bleken te rapporteren. Dit resultaat is in overeenstemming met zowel de psychosomatische als de externaliteitstheorie. Echter, het patroon van verbanden tussen de schalen voor emotioneel en extern eten enerzijds en verschillende persoonlijkheidsschalen anderzijds doet vermoeden dat het eten bij negatieve emoties wel eens de belangrijkste oorzakelijke factor voor overgewicht zou kunnen zijn. Dit vermoeden is gestoeld op het feit dat er in dit onderzoek geen verbanden werden gevonden tussen de schaal voor extern eetgedrag en persoonlijkheidsschalen voor mate van externaliteit en emotionaliteit. Deze bevinding is in tegenspraak met de zienswijze binnen de externaliteitstheorie dat een gevoeligheid voor externe voedselprikkels slechts één van de uitingen is van een algemene gevoeligheid voor externe prikkels, van externaliteit als persoonlijkheidskenmerk dus. Daaren-

tegen waren de resultaten wel in overeenstemming met het gezichtspunt van de psychosomatische theorie dat een slecht psychisch functioneren een centraal element is bij het tot stand komen van het specifieke eetgedrag van emotionele eters, aangezien er significante verbanden waren tussen de schaal voor emotioneel eetgedrag en persoonlijkheidsschalen voor emotionele instabiliteit, angst en negatief zelfbeeld.

De verschillen in persoonlijkheidsstructuren tussen "obese" en "latent obese" vrouwen in het onderzoek in Hoofdstuk 10, geven enkele aanwijzingen omtrent de soort van persoonlijkheidskenmerken die samenhangen met een hoge mate van lijngerichtheid en succesvol gewichtsverlies. Het bleek dat in vergelijking met "obese" vrouwen "latent obese" vrouwen beter functioneren in sociale situaties, sociaal actiever zijn, een hoger gevoel van eigenwaarde hebben, en een meer masculine instelling, een hogere mate van interne contrôle en een lagere mate van faalangst vertonen. De hogere mate van masculiniteit, de lagere faalangst en de hogere mate van interne contrôle wijzen op een beter cognitief en affectief functioneren van "latent obese" vrouwen. Mogelijk zijn dit belangrijke oorzakelijke factoren voor succesvol lijngedrag en gewichtsverlies. Het kan echter niet uitgesloten worden dat beter psychisch functioneren een gevolg is van succesvol gewichtsverlies, aangezien iemand na gewichtsverlies in mindere mate dan voorheen negatieve opmerkingen van anderen over het uiterlijk moet ondergaan. Tenslotte is ook een wisselwerking tussen gewichtsverlies en psychisch en sociaal functioneren mogelijk.

Ook resultaten in Hoofdstuk 11 wijzen op het belang van het psychisch functioneren bij problemen met eetgedrag. In twee onafhankelijke steekproeven van vrouwen werd er een positief verband gevonden tussen enerzijds emotioneel en extern eten en anderzijds vrouwelijke stereotype eigenschappen. Verder kwam naar voren dat dit verband vooral toegeschreven moet worden aan angst en negatief zelfbeeld in het vrouwelijke sexe-stereotiep. Deze gegevens wijzen erop dat, gegeven bepaalde leerervaringen in de vroege jeugd, eetproblemen mogelijk ontstaan als "organische reactie" op het gevoel de eigen situatie niet in de hand te hebben, door gebrek aan onafhankelijk en assertief gedrag, angst en een negatief zelfbeeld.

Hoofdstuk 12 beschrijft resultaten van een longitudinaal onderzoek naar effecten van negatieve levensgebeurtenissen op verandering in lichaamsgewicht bij mannen en vrouwen die als lage of als hoge emotionele eter waren geclassificeerd. Bij mannen werd gevonden dat hoge emotionele eters meer en lage emotionele eters minder in gewicht toenamen nadat zij negatieve gebeurtenissen hadden meegemaakt, dan wanneer zij dergelijke gebeurtenissen niet hadden meegemaakt.

Dit resultaat is in overeenstemming met de observatie in de klinische praktijk dat sommige mensen, de emotionele eters, op stress reageren met excessief eetgedrag, terwijl vermindering van eetlust (en gewichtsverlies) de "normale" reactie op zo'n situatie is. Bij vrouwen werden dergelijke resultaten evenwel niet gevonden: op lange termijn bleken hoge emotionele eters wel zwaarder te worden als zij negatieve gebeurtenissen hadden meegemaakt, maar bij lage emotionele eters werd de "normale" reactie van gewichtsverlies na negatieve gebeurtenissen niet aangetroffen bij vrouwen. Een mogelijke verklaring voor dit resultaat is, dat de schaal voor emotioneel eten op minder succesvolle wijze vrouwen als lage of hoge emotionele eter heeft gekenmerkt. In Hoofdstuk 13 komt naar voren dat het antwoordgedrag van de vrouwen in de longitudinale studie mogelijk voor een belangrijk deel bepaald is door de antwoordtendenties "acquiescence" ("ja"-zeg tendentie) en sociale wenselijkheid. Het intensieve contact tussen onderzoeker en onderzochte en de grotere mate van test-ervaring van de proefpersonen in het longitudinale onderzoek door de herhaalde metingen, heeft mogelijk bij de vrouwen van normaal gewicht geleid tot een verhoogde bereidwilligheid bij het onderzoek behulpzaam te zijn en daarmee een verhoogde "ja"-zeg tendentie (social acquiescence). Daarentegen waren vrouwen met overgewicht er waarschijnlijk meer op gericht goed voor de dag te komen en eerder geneigd sociaal wenselijke antwoorden te geven. Uiteraard wordt de validiteit van de resultaten met een bepaald meetinstrument door deze antwoordtendenties verlaagd. Mogelijk is dit het geval geweest bij de resultaten bij vrouwen in het longitudinale onderzoek in Hoofdstuk 12 (bij mannen zijn dergelijke antwoordtendenties niet aangetroffen).

Het onderzoeksgedeelte werd afgesloten met een algemene discussie van de zes studies. Geconcludeerd wordt, dat de psychosomatische theorie de meeste steun verdient, maar hierbij dient benadrukt te worden dat deze conclusie slechts voorlopig kan zijn vanwege de mogelijke aanwezigheid van antwoordtendenties in het antwoordgedrag van de vrouwen uit het longitudinale onderzoek (de onderzoeken in Hoofdstuk 8, 11 en 12). Voor een definitieve conclusie is meer onderzoek vereist en enkele suggesties voor verder onderzoek worden gegeven. Tenslotte wordt aandacht besteed aan mogelijke consequenties van de resultaten van dit onderzoek voor de klinische praktijk: de Nederlandse Vragenlijst voor Eetgedrag maakt het vaststellen van iemands eetpatroon mogelijk en dit vormt een goede basis voor het bepalen van de meest geschikte behandelingsvorm van een specifiek eetprobleem.

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CURRICULUM VITAE

De schrijfster van dit proefschrift werd op 12 september 1954 te Groningen geboren. In 1973 behaalde zij het diploma Gymnasium-Bèta aan het Willem Lodewijk Gymnasium te Groningen. In datzelfde jaar ving zij aan met haar studie psychologie aan de Rijksuniversiteit te Groningen en in augustus 1980 behaalde zij het doctoraalexamen. Van september 1980 tot september 1982 was zij als wetenschappelijk medewerkster verbonden aan de vakgroep Persoonlijkheidspsycholgie en Psychodiagnostiek van de Rijksuniversiteit te Leiden. In september 1982 werd zij als wetenschappelijk ambtenaar aangesteld bij de vakgroep Humane Voeding, waar zij, met financiële steun van het Praeventiefonds, tot september 1985 het in dit proefschrift beschreven onderzoek verrichtte. Op dit moment is zij als docent vrouwenstudies verbonden aan de Vakgroep Klinische Psychologie van de Katholieke Universiteit Nijmegen.