AN INVESTIGATION OF THE LOCUS OF PERCEPTUAL CONTROL IN RELATION TO BODY WEIGHT

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PREFACE

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CHAPTER I

THE PROBLEM

Obesity today presents a major health problem in the United States. The mortality rate from heart disease is 40% higher among the moderately overweight and 65% higher among the markedly overweight individuals than it is for normal weight people (Wilson, 1969). Across all types of disorders the death rate for the moderately overweight has been found to be 142% greater than for normals and underweights and 179% greater for the markedly overweight (Marks, 1960). Skin disorders, digestive difficulties, gall bladder diseases, heart and circulatory diseases, and other health problems are repeatedly associated with obesity (U.S. Public Health Service, 1966). Unfortunately, obesity is a relatively widespread problem with estimates of its extent ranging from 25 to 36% of the adult U.S. population (Wilson, 1969). An understanding of factors contributing to the establishment and maintenance of obesity might lead to a possible solution to the problem.

A recent line of research has suggested that there may be differences between obese and normal weight individuals in the importance of internal and external cues for eating (Schachter, 1971). Stanley Schachter and his associates have shown that obese rats and obese humans seem relatively insensitive to internal, physiological cues for eating. Instead they seem to rely on external, and in the case of humans, social cues. The sight of food, others eating, and talking about food appear to be potent cues for eating in obese individuals, even though a point of physiological satiation may have been attained. This research on internal - external locus of stimulus control differences may have broader implications aside from eating behavior. Schachter (1971) tentatively reported some data supporting the possibility of broad perceptual differences between obese and normal weight subjects.

The present study has investigated obese and normal weight subjects in an attempt to examine the hypothesized perceptual differences along with cognitive differences, and social differences. This has been done by comparing an obese group with a group of normal weight subjects on selected measures related to stimulus control.

Obesity and overweight are two terms used to denote an individual who is carrying more weight than is medically or

acturially considered normal for his height and age. Typically obesity is considered the more serious label in that the connotation is one of extreme overweight, corpulency as Webster's Seventh New College Dictionary (1967) suggests. There is really no objective way to decide in a general sense when the individual has gone beyond the state of overweight and has entered a state of obesity (U. S. Public Health Service, 1966). In the present study the two terms are used in a basically synonomous fashion. Individuals at least 20% over the normal weight (average of normal weight range) for their height will be considered "obese" and those less than 20% overweight will be considered "normal weight" individuals. Not all studies cited below will conform to this scheme, however the format is usually quite similar.

CHAPTER II

REVIEW OF THE LITERATURE

The review of relevant literature will be divided into four sections as follows (1) cognition and the experience of hunger, (2) cognitive style, (3) perceived locus of control of reinforcement, and finally (4) social influence. The review will be followed by a summary and a statement of hypotheses.

Cognition and the Experience of Hunger

While there are many suggestions as to how physiological hunger occurs (Grossman, 1967) the present investigation is more concerned with the interpretation of the physiological manifestations of need for food and the phenomenological experience of hunger as it relates to eating behavior. Physiological hunger is presumed to be experienced by the individual, which leads to the phenomenological experience of hunger, which leads, in turn, to eating to satisfy the need. Is this an invariant relationship or are there conditions under which eating behavior is not regulated by strictly physiological variables?

Although there may be some question as to the relative importance of various physiological mechanisms in the hunger consumption process, there is no question that various physiological mechanisms are involved (Grossman, 1967). Many investigators have implicated peripheral, gastric motility as a primary, physiological mechanism for the manifestation of hunger (Darwin, 1801; Carlson, 1916; Cannon, 1934). Others, based mainly on denervation studies (Longet, 1868; Ewald, 1893; Mortan and Morgan, 1940), have shown that gastric motility does not effect regulation of food intake, and that central theories seem more important in such regulation. In other words, it has not been firmly established that stomach contractions and such do not contribute to the regulation of feeding behavior in the intact organism. Beaumont (1833) was the first to systematically note the correspondence of reports of hunger and stomach contractions. He did so via observation of a patient with a gastric fistula. Cannon and Washburn (1912) reported similar observation and there seems little doubt that the occurence of gastric motility correlates highly with the experience of hunger (Maschan and Quigley, 1938).

Stunkard and Koch (1964) have not found this correlation when investigating the experience of hunger among the obese. While normal weight subjects (Ss) did show the

expected correspondence obese Ss were as likely to say they weren't hungry in the presence of gastric motility as they were to say they were hungry. Griggs and Stunkard (1964) have demonstrated that the obese can learn to recognize gastric contractions and presumably suffer no visceral sensory deficit. These findings suggest that there is not a simple one-to-one correspondence between certain physiological signs of hunger and the phenomenological experience of hunger in obese persons.

Schachter (1962a, 1964a, 1964b) has shown that an interaction exists between physiological and cognitive processes as determinates of conscious experience. His basic premise is that individuals learn to label various physiological processes and that these labels are the basis for subsequent behavior. Schachter and Singer (1962a) supported the above contention in an experiment showing that physiological arousal, as defined by epinephrine injection, could be interpreted as either anger or joy, depending upon environmental manipulation provided by a social model, Ss would then act in an angry or euphorically happy manner on the basis of their own interpretation. Generalizing from this work, there may be several ways in which internal states can be interpreted and labeling may enable Ss to make determinations as to what state one's body is in at any one time.

Schachter (1971) has suggested that the Stunkard and Koch results may have been due to differences in manner of interpreting internal states. Presumably normal weight Ss have learned that gastric motility is typically satisfied by eating and have hence labeled such discomfort as "hunger". Obese Ss on the other hand, seem not to have learned this direct label to gastric motility. The experience of hunger and associated eating behavior in the obese may well be related to some mechanism other than direct physiological signs of food needs. Several studies have been conducted to investigate this hypothesis.

Schachter, Goldman, and Gordon (1968) reasoned that if gastric motility and other internal states typically associated with hunger were manipulated, the feeling of hunger in normal Ss would be correspondingly manipulated. Such would not be the case with obese Ss since they presumably aren't moved to hunger by such internal cues. Bodily state was related to 1) stomach state, either full or empty, and 2) fear, with some Ss badly frightened and others calm prior to the experimental situation. Carlson (1916) and Cannon (1915) have both shown that fear inhibits gastric motility and presumably feelings of hunger and eating behavior. Just as the experimenters reasoned normal Ss ate significantly less with a full stomach than they did with an empty stomach

They also ate less when frightened than when calm. Obese Ss ate the same under all four conditions. It would begin to seem more sure that the cues Ss label "hunger" would differ for obese and normal Ss. Physiological cues seem to be important for the normal weight S. What cues are important for obese Ss if physiological ones appear not to be?

In Hashim and Van Itallie's (1965) work with the obese a bland Metracal-like liquid was fed to Ss on an ad libidum basis. The situation in which food was available was devoid of any typical, ritualistic aspects of mealtime. Under these conditions food consumption for obese Ss plummeted drastically. Normal Ss however, maintained a typical, pre-experimental calorie intake. Schachter (1968) interprets this as showing a possible external basis of hunger in the obese. Normal Ss eat in accord with internal, bodily cues. Obese Ss may eat under the control of external cues. For example, the obese S passes a pastry shop, looks in and is assailed by visual and olfactory cues. Presumably he may feel hungry enough to buy something even though he may have recently eaten. However, should all the external trappings of eating, smell, attractive arrangements on the plate, social chatter, etc., be withdrawn, as was the case in the Hashim and Van Itallie study, the cues for eating would be greatly reduced as would be eating, which was the result.

In a field study Ross, Pliner, Nessbett, and Schachter (1969) analyzed the two week eating diaries of 76 students. They found greater variance within S and within group variability for obese Ss than for normals with respect to suppertimes, supper consumption, and total daily consumption. This would be consistent with the assumption that external or environmental factors on eating are more variable than internal, nutritional influences with obese Ss being more influenced by the former.

Thus there is evidence for an external locus of eating behavior regulation for obese Ss. A number of further studies have attempted to establish in greater detail the parameters of such external control of eating.

Nesbett (1968a) suggested that eating behavior in obese Ss could be manipulated by varying the number of external food cues. Such was hypothesized not to be true for normal weight Ss. After a four hour food deprivation period S was seated at a table upon which either one or three sandwiches had been placed. The S was told that he could eat as many sandwiches as he wished and that more were located in a refrigerator in the same room. When one sandwich was presented obese Ss ate significantly more than did normals. However, as hypothesized, when three sandwiches were presented obese Ss ate significantly more than did

normal Ss. Normal Ss ate the same amount in either condition, as would be expected should they be relying on internal cues to regulate eating.

Nesbett's study adds another weight condition about which little has been said. Underweight Ss ate the fewest sandwiches in either condition. The underweight S is presumed to be operating under the same control normals are except that they might best be considered hypersensitive to internal cues. Carlson (1916) has shown that gastric contractions cease rapidly, after only a small amount of food has reached the stomach. If underweight Ss are indeed more sensitive to these internal stimuli they might cease eating very shortly after the cessation of internal hunger cues. This would, of course, mean ingestion of less food, fewer calories, and low weight gain potential.

Schachter and Gross (1968) investigated another external variable hypothesized to affect eating behavior, time. "Everyone 'knows' that four to six hours after eating his last meal he should eat his next one. Everyone 'knows' that within narrow limits there are set times to eat regular meals (Schachter, 1967, p. 137)." The Es used doctored clocks, one set to run at ½ normal speed and the other set at twice normal speed. The S was seated in a windowless room and told that his autonomic reactivity would be

monitored. E left the room for a true 30 minutes. When E returned he removed the S's electrodes, dropped off a box of crackers, and asked S to fill out a personality questionnaire. Before leaving again E mentioned that S could help himself to the crackers. Since normal Ss are presumed to be under internal control the fact that the doctored clock could be reading either 5:20 or 6:05 P.M. should have nothing to do with the number of crackers consumed. Obese Ss should, however, be more aware of the approaching time for eating and eat more at 6:05, by the fast clock, than at 5:20, by the slowed clock. Indeed, the hypotheses were confirmed.

In a field study also examining this time variable Goldman, et al, (1968) found that overweight pilots tended to experience less discomfort due to long distance, transatlantic flights which involve time zone changes than did normal or underweight pilots. The discomfort stemmed from the fact that flights often land at times other than local meal times and pilots had missed meals in transit. In the absence of food cues in the airliner's cockpit overweight Ss should not feel particularly hungry while normal or underweight Ss, operating on an internal hunger cue basis, should experience stronger feelings of hunger.

Nesbett (1968b) investigated the effects of taste on eating behavior. He included a group of underweight Ss, to examine the hypothesis that degree of importance of external vs internal control is a dimension directly related to degree of overweight. Presumably taste should have the most effect on overweight Ss and the least on underweight Ss. To test this hypothesis Nesbett used a rich, vanilla ice cream and a cheaper concoction called vanilla bitters, made of cheap vanilla ice cream and quinine. As predicted obese Ss ate the most when they rated the ice cream as "very good" or "excellent". When Ss rated their portion as "terrible" underweight Ss ate the most, normals next, with obese Ss eating the least. In a very similar study Decke (1971) corroborates Nesbett's findings.

As interesting supporting evidence Goldman, et al (1968), in a field study, used dormitory food, which is probably rated on a par with vanilla bitters by most students. As might be expected, obese college freshmen were significantly more likely to drop their dormitory food contracts than were normal weight Ss.

Does the external control the data indicates always lead to obesity? Schachter (1967) suggests that such would be the case only if food cues were abundant and the individual fully aware of them. Schachter has pointed out

an extreme example of the effects of lessened awareness. Anorexia Nervosa, a state of emaciation brought about by failure to eat, seems to be related to conditions leading to a lessening in awareness of external cues.

> For example, 11 of 21 case studies in Bliss and Branch's (1965) book on anorexia nervosa were at some point in their lives obese. In 8 of these 11 cases, anorexia was preceded and accompanied by marked withdrawal or by intense depression. In contrast, intense attacks of anxiety or nervousness (states that Schachter, Goldman, and Gordon, 1968, would suggest inhibit eating in normal Ss) seem to characterize the development of anorexia among most of the cases who were originally normal size (Schachter, 1967, p. 141).

Goldman, Jaffa, and Schachter (1968) investigated lessened eating in the obese under another set of circumstances, fasting. Several authors (Brown and Pulsifier, 1965, and Duncan, Jinson, and Christori, 1962) have noted the apparent ease with which considerably overweight Ss can do without food. Goldman, et al, reasoned that obese Jews would be more likely to fast on the Holy Fast Day of Yom Kippur than would normal weight Jews because food relevant cues at the synagogue are particularly scarce. For normal Ss this should mean little, since they are attending to internal cues. As predicted, more obese Ss fasted than did normal weight Ss.

Since there does seem to be evidence for external control of eating behavior in overweight Ss why do the

overweight tend to eat fewer meals (Schachter, 1971)? One possibility may be related to cue prominence, or as Schachter puts it "... the difference between a hot dog stand two blocks away and a hot dog under your nose, savory with mustard and steaming with sauerkraut." Some evidence for the matter of cue prominence was previously mentioned when anorexia nervosa was discussed. Ross (1969) directly examined the effect of cue prominence by manipulating the lighting conditions of an experimental situation. Under one condition, high cue prominence, a tin of nuts was illuminated by an unshaded lamp with a regular, 40 watt bulb. In the low cue prominence condition the nuts were illuminated by a shaded lamp with a 7½ watt, red bulb. Normal Ss ate the same amount of nuts under either condition. Overweight Ss ate significantly more in the high cue prominence condition.

Given a certain threshold level overweight Ss seem to respond strongly to external food stimuli. Normal weight Ss seem to respond more on the basis of internal cues, with at least some evidence suggesting that underweight Ss may be hypersensitive to internal cues. Rodin, Herman, and Schachter (1971) have extended the internal - external differences to nonfood-relevant cues. Obese Ss recall more objects from a slide presented for five seconds than

do normal weight Ss. Given a disjunctive reaction time task obese Ss respond more rapidly and make fewer errors. Such was not the case for simple reaction time. Schachter has interpreted this data to indicate a greater stimulus processing efficiency for the obese. Rodin (1970), however, has shown that as the degree of a distracting stimulus increases the performance of obese Ss on a proof reading task deteriorates while the performance of normal weight Ss remains stable. This suggests that external control can result in breakdowns in efficiency, as well.

Cognitive Style and External Control

The suggestion that external control of eating behavior is operating in the obese may be investigated through several avenues. One of these is concerned with a typology derived from Herman Witkin's (1954) construct cognitive style. The term was initially used by Witkin (1954) to describe his concept of psychological differentiation as it relates to self-consistencies in personality structure. In many respects his investigations were quite similar to the perceptual defense studies of about the same period (Bruner & Postman, 1947a; 1947b). Witkin's original work in the late 40's and early 50's was designed to investigate personality influences on performance of what were considered to be purely perceptual tasks.

The current instruments used to measure psychological differentiation remain perceptual in nature. The Body Adjustment Test (Witkin, 1954), for example, involves perception of the body in space. The S is seated in a chair which may be tilted either right or left. The chair is within a specially constructed room which may also be tilted, independently of the chair. The apparatus gives a measure of a S's ability to perceive his body via internal cues, apart from external, visual cues. The S's task is to arrange the chair so that he is sitting in a true upright position. Some Ss adjust the chair in relation to the tilted room while others are able to ignore the distorted visual cues provided by the room and align to the upright on the basis of internal, bodily cues.

The initial conception of cognitive style was based on the performance of Ss on these tasks. Those Ss who aligned themselves with the room were considered to be field dependent (FD), exhibiting a poor ability to differentiate self from environment. Those Ss who were able to ignore the cues from the room and were able to approximate the true upright were considered field independent, (FI), exhibiting an immediate sense of apartness from the environment. FD Ss seemed to frequently ignore or be unable to recognize internal cues, relying heavily on external,

environmental cues for direction. FI Ss tended to be perceptive of and operate on the basis of internal, bodily cues.

The cognitive style dimension is considered to be continuous, with most individuals grouped midway between extreme FD and FI. The basic perceptual tasks used to evaluate cognitive style have been visual in nature, however, a wide variety of other tasks have been investigated including other sense modalities, for example, touch (Axelrod and Cohen, 1961). Ss tend to operate in the same manner across all of the tasks.

As Witkin's work expanded more into personality and intellectual variables a much broader picture of FD-FI emerged. On figure drawing tasks FD Ss are likely to display a poor body image, with fewer characteristics of masculinity or feminity. FD Ss display a greater social interest, favoring occupations involving social contact and they are, in turn, seen as being more cooperative and externally oriented. In contrast FI's typically show an opposite picture, illustrating a more internal locus of behavior. Since there was a strong tendency for Ss (FD or FI) to display a consistent style across both perceptual and intellectual tasks the broad term cognitive style was given to the dimension (Witkins, et al, 1962).

> "At one extreme there is a consistent tendency for experiences to be global and diffuse. The organization of the field as a whole dictates the manner in which its parts are experienced. At the other extreme there is a tendency for experience to be delineated and structured. Parts of a field are experienced as discrete and the field as a whole organized (Witkin, 1965, p. 319)."

The development of cognitive style has been shown to be related to experiences in the family as a child grows (Witkin, et al, 1962). Learning seems to play an important role in this development yet Witkin (1965) has suggested that perceptual FD might be under some degree of genetic control. One's cognitive style seems to become extremely stable with age and resistant to direct efforts to alter it (Bauman, 1951; Karp, 1963; Karp, et al, 1965b; and Pollack, et al, 1960). Both Gruen (1955) and Witkin (1948) made attempts to significantly change performance on tests measuring cognitive style and failed. Goldstein and Chotlos (1966) did have some success after 8-10 weeks training Ss.

Among the behaviors that develop and stabilize with cognitive style seem to be characteristic modes of psychological defense. Bartini (1961) found that FI Ss are more likely to use isolation, a specialized defense, because their capacity to separate elements from a field seems also to allow them to separate an idea from its emotional content. Minard (1965) confirmed these results in a

perceptual defense study showing that FDs exhibit considerable perceptual defense, while FI Ss were consistently able to react neutrally, separating percept and feeling. The FD Ss were presumably using much less specific defenses, denial and repression.

Forgetting dreams is frequently used as an example of an unspecific defense, namely repression. Eagle (1965), Linton and Schonbar (1965), and Goodenough, et al, (1965) have all reported a strong tendency for FDs to forget dreams, in comparison with FI Ss.

At a level involving problems of a more serious nature FD people seem to develop difficulties of identity which frequently result in chaotic functioning, passivity, and helplessness. Janucci (1964), for example, has demonstrated that catatonic individuals are FD. Gordon (1953) has shown that ulcer patients are markedly FD. Fishbein (1958) has shown the same for asthmatic children. Zukman (1957) found that "inadequate personalities" are typically FD. Taylor (1956) reported that psychotics who are delusional are predominantly FI. Presumably delusions are attempts to deal with a reality separate from oneself and yet maintain an identity, even though distorted, within that reality. Hallucinations, on the other hand, seem to bind the person to the unreal just as strongly as the real

to the point that the individual doesn't know who or where he is. Powell (1964) has confirmed Taylor's data.

This is not to say that FD individuals are pathological creatures doomed to a Diogenes-like search for identity. The point is that when a FD person develops pathology there remains a stylistic trend even to the direction the pathological behavior takes. Bertini, Lewis, and Witkin (1964) have shown that tendencies for hallucinatory behavior exist to a greater degree in normal FD Ss than in normal FI Ss. Using halved table tennis balls over the eyes and an even white noise to create a homogeneous visual and auditory field it was found that imagery was facilitatedfor all Ss, FD and FI, as might be expected from sensory deprivation research (Heron, 1961). However, FD Ss reacted differently to the images, reporting more often that the images seemed real as opposed to seeming imagined. Presumable the FD Ss were less able to separate themselves from the imagery while FI Ss were better able to keep themselves independent from the imaginery events. And so it may be seen that even normal Ss maintain these stylistic tendencies, although they may be of no apparent pathological consequence.

Nor is Witkin suggesting that FI Ss automatically lead a life which is trouble free. Adjustment may be seen

as being based on effective integration. Even with greater differentiation within a system poor integration may have pathological effects. What Witkin does say is that, again, a stylistic trend may be observed through the forms of pathology FI people develop. Powell (1964) has shown that paranoids tend to be FI, which is consistent with Taylor (1956) in that paranoids have tight delusional systems with little hallucination. Janucci (1964) and Witkin, et al, (1954) have reported similar observations. Zukman (1957) reports that obsessive-compulsive characters exhibit a FI cognitive style as do neurotics with well organized symptom pictures and "ambulatory schizophrenics" with well developed defenses (Korchin, in Witkin, 1965).

> "Turning to the kinds of pathology encountered among differentiated persons, when they breakdown, we find that they tend to show delusions, expansive and euphoric ideas of grandeur, outward direction of aggression, over ideation, and continuing struggle for the maintenance of identity, however bizarre the attempt" (Witkin, 1965, pp. 325-328).

Specialized defenses, such as the projection of paranoids, are typically used by FI individuals.

At another level of pathology, alcoholism has been found to be highly related to the FD cognitive style by many authors (Baily, et al, 1961; Karp, et al, 1963; Karp, et al, 1965a and b; and Witkin, et al, 1959). This is consistent with the previously mentioned observation that

FD individuals tend to choose a nonspecialized defense mechanism to deal with anxiety and tension. Alcoholism affords one the opportunity to simply blot out all organized thoughts leading to tension.

Closely aligned dynamically with alcoholism, although not necessarily considered a psychopathological or diagnostic category, is obesity, included in the general problem of weight control. Traditionally overeating is also viewed as a nonspecialized defense mechanism (Kaplan and Kaplan, 1957).

> "As a technique of defense for dealing with anxiety, eating is a nonspecialized defense. It is applied indiscriminatively in a wide range of stressful situations, and it does not act in a specific, directed fashion upon the source of stress. In particular kinds of persons, it may suffuse the organism with an animal pleasure which blurs anxiety" (Witkin, 1965, p. 326).

It is not surprising then to find that in a study by Karp and Pardes (1965) obese females were found to be FD. In an attempt to replicate this work with males Pliner and Kay (1971) found no significant differences in terms of cognitive style between normal and obese Ss. Several major differences in the studies may account for Pliner and Kay's failure to replicate. First, the Karp and Pardes Ss were older by 22.3 years, on the average. Secondly, the Karp and Pardes Ss tended to be heavier with a range of 24% to 134% and a mean of 48% overweight as compared to the Pliner

and Kay Ss, range 20.7% to 86.4% with a mean of 40.7% overweight. More than likely the major problem was that Pliner and Kay used a different form of the embedded figures test (EFT) than did Karp and Pardes. The EFT is a visual test frequently used to investigate cognitive style. Karp and Pardes used two other measures, one of which, the Rod and Frame Test, corroberated the EFT results. The form of the EFT used by Pliner and Kay was more complex and was reported by Witkin to correlate poorly with the form used by Karp and Pardes.

One does not, however, have to use a dynamic, defense mechanism concept to find some support for the notion of cognitive style being associated with weight control. In the previously cited Schachter, Goldman and Gordon (1968) study there is some convincing evidence suggesting that emotional disturbance may not be the cue for overeating. In the high fear condition of their study obese Ss did not eat significantly more than normal weight Ss. For obese Ss there was an insignificant, low positive (.13) correlation between self-ratings of fear and the amount of food eaten. Presumably eating could "...suffuse the organism with an animal pleasure which blurs anxiety." However, the study shows that both normal and obese Ss report less fear as the study went on, with no significant difference in the

degree fear was lessened between the two groups. A field study by Schachter, and Nesbett (in Schachter and Goldman, 1968) gave no indication of weight gain among obese Columbia University students during semester examination periods.

The behavior of a FD S on the Body Adjustment Test measure of cognitive style suggest a strong similarity to Schachter's findings of a seeming lack of concern for internal hunger cues shown by obese Ss. Bruch (1961) has hypothesized that the strong, overprotecting, overnurturent mother could disrupt the learning involved in establishing internal cue-eating behavior bonds. With this parent pushing food at the child frequently, all situations, fright, anger, curiosity, potentially any emotional state, could become a cue for eating. Just as easily, because of such inconsistency, no internal state might become associated with eating. The sight of food and the residue of a "come on honey, eat for mama" attitude might be all that was needed for the kind of behavior Schachter has observed. Appropriately, Witkin, et al, (1962) have shown that this overprotective, inconsistent type of parent is associated with the development of FD in children. Dependency is typically fostered in this type of environment.

There has not, however, been research investigating the relationship between FI and weight control. Nesbett's

(1968a; 1968b) work done, however, strongly imply that a similar relationship is possible, with underweight Ss being highly sensitive to gastric motility, Witkin, et al, (1962) has shown a very different parent-child relationship connected with the development of FI. The FI child is typically not pushed toward parental goals and is usually given a much freer hand. He is typically more independent.

Other, independent, research provides further support for a cognitive style weight control relationship. William Sheldon's (1940 and 1942) work in constitutional psychology is an example. His descriptions of the components of temperament, hypothesized variously related to particular body types, read surprisingly like Witkin's description of FD and FI Ss. Cerebrotonia, a component of temperament, was highly correlated with ectomorphy, the thin body type. Cerebrotonia is characterized by restraint, inhibition, desire for concealment, and a preference for solitude. Visceretonia, another component of temperament, was highly correlated with endomorphy, the obese body type. Visceretonia, is characterized by sociability, even temper, tolerance, and ease of interaction. Sugarman and Haroniam (1964) found that endomorphs tend to FD. Kretchmer's (1925) typology shows a similar extraversion-introversion differentiation based on physique. The concern for

external versus internal cues is evident in these descriptions. It must be kept in mind that constitutional psychology ahd Sheldon's research was heavily critized and important methodological deficiencies discovered.

Perceived Locus of Control of Reinforcement

In addition to a perceptual measure of internal vs external control investigation of the cognitive construct perceived locus of control of reinforcement was considered an important additional area. Perceived locus of control of reinforcement is a cognitive component of Rotter's (1954, 1955, and 1960) social learning theory.

> "When a reinforcement is perceived by the subject as following some action of his own but not being entirely contingent upon his action, then, in our culture it is typically perceived as the result of luck, chance, fate, as under the control of powerful others, or as unpredictable because of the great complexity of the forces surrounding him. When the event is interpreted this way by an individual, we have labeled this a belief in <u>external control</u>. If the person perceives that the event is contingent upon his own behavior or his own relatively permanent characteristics, we have termed this a belief in <u>internal control</u>" (Rotter, 1966, p. 1).

The behavior of internal control (IC) <u>S</u>s differs from that of external control (EC) <u>S</u>s. The difference seems to be in terms of effort. IC <u>S</u>s consider their behavior important to their securing reinforcement. EC <u>S</u>s are neither

as hard at work on the task at hand, nor as interested in skillful completion of the task, as it will "probably" have nothing to do with one's rewards (Rotter, 1960). A number of studies (Phares, 1957; James & Rotter, 1958; Rotter, Liverant & Crowne, 1961) have confirmed Rotter's hypothesized differences in performance between IC and EC Ss. Lefcourt and Ladwig (1965) found significant differences between blacks and whites in mean IE scores, with social class and intelligence controlled. The authors felt that because rewards and roles have been externally limited for American blacks over the last several hundred years, they would probably manifest as a group an EC outlook. This was, indeed, the direction of the obtained difference.

Prior to the current study there was no data relating overweight to the IE dimension, although Rotter (1966) has mentioned the possibility of a relationship between IE and cognitive style. Ostensibly overweight Ss should be FD and perceive an external locus of reinforcement.

In the obese S EC may be presumed to operate in such a way as to prevent sincere attempts at weight loss and also to provide cognitive support for impulsive eating in response to external stimulation. Afterall, if one's obesity was destined to be what's one more jelly doughnut?

Rotter and his associates (Rotter, 1966) have devised the IE scale as a measure of this expectancy construct. Fiske & Pearson (1970) have noted it to be an exceptional instrument.

Social Influence

The final measure of internal vs. external control that this study has used involves conformity and suggestibility. While the prognosis for weight loss among overweight individuals is notoriously poor (Stunkard & McLaren-Hume, 1959, and Feinstein, 1960) a few programs do seem relatively successful. They all seem to involve components of this conformity and suggestibility dimension.

As Wilson (1969) has mentioned, given an authoritative proponent any fad diet technique is tried by literally hundreds of thousands of overweight people. Personal support from the author of the diet is, of course, virtually impossible and the diety typically fails. However Wilson (1969) and Craddock (1969) have noted that if personal support and/or exhortation follows through the diet period weight loss can occur and may be maintained. Adherence to the diet under these conditions may be seen as social conformity. In particular, both Wilson and Craddock point out the success of TOPS and Weight Watchers. The former (Take

Off Pounds Sensibly) holds group meetings with weighing-in a major feature. One's success or failure is immediately obvious to the entire group, a congregation whose sole purpose is success in weight control. For success there are immediate rewards, provided through group interaction, as well as delayed rewards related to "most weight lost", "most weight lost this month," etc., which involve trophies and vacation trips. Thus weight control becomes embedded within a social norm context of a much more purposeful nature than that of the general society. Weight Watchers is similar in providing a group norm framework and these and programs of similar content seem to have a particularly coersive effect on their members.

Social psychology principles suggest that "scare" tactics frequently used in promoting weight loss should not work, as has often been noted (Wilson, 1969). Group norms have been shown to be powerful influences in determining behavior (Asch, 1956; Sherif, Harvey, White, Hood, & Schif, 1961, and many others). Many competing attitudes toward food seem to be of greater import in determining behavior. It may be hypothesized that group reducing programs involve a direct manipulation of norms strengthening the tendency for individual group members to adhere to the groups reducing program. By such conforming behavior

members avoid negative group sanctions. Currently one could not say whether the obese seem to profit from group dieting programs because such group manipulation techniques are inherently effective with producing change for many issues, weight aside, or if the obese are more sensitive to such external communication, as might be expected if obese Ss tend to act more on the basis of external information. The latter possibility has been examined by exposing obese and normal weight Ss to an ambiguous social judgment situation and presenting them with a set of artifically produced "group norms". If the obese are differentially sensitive to such an influence process it should be apparent in their judgments being closer to the "group norms". An Asch-type social judgment task (1956) has been used to assess the possibility of differential sensitivity.

Summary and Hypotheses

1. There does seem to be a complex of physiological signs associated with the need for food.

2. Such internal physiological signs do seem to be important cues for eating behavior in the normal weight individual.

3. These internal cues do not seem important in the regulation of eating behavior in obese individuals.

4. Other cues, essentially external to the body, seem particularly potent in determining eating behavior of the obese.

5. There are a number of different ways to investigate the perceptual locus of control.

6. One of these, cognitive styles, relates to characteristic modes of interaction with and perception of the environment.

7. Another, perceived locus of control of reinforcement, involves the degree of control one believes he has over his ability to reach his goals.

8. The final measure considered in this study was social influence, the degree to which an individual will conform to group norms.

9. The present study is an investigation of hypothesized differences in the perceptual locus of control for obese and normal weight Ss. The literature suggests that a consistent pattern of differences between obese and normal Ss should be obtained on measures of cognitive style, perceived locus of control of reinforcement, and social influence.

It is therefore hypothesized that:

a) obese Ss will be more field dependent than normal weight Ss.

b) obese Ss will perceive a more external locus of control of reinforcement than normal weight Ss.

c) obese Ss will be more influenceable than normal weight Ss.

Should internal-external perceptual control differences be mainly related to eating behavior, as opposed to behavior in general, scores for normal and obese Ss on the previously mentioned variables should not differ.

CHAPTER III

METHODS

Subjects

Sixty Ss were recruited from undergraduates enrolled in Introduction to Psychology classes at State College of Arkansas. After Ss had volunteered for the research project they were told that this study was investigating weight control. They were then weighed and measured for height. After it was determined that the S would fit into either the normal weight or overweight group he was again asked if he still wished to participate. Volunteers of all weights were continually recruited until all groups had been filled.

Weight Classification

As mentioned previously there is no standard definition of obesity. The U.S. Public Health Service (1966) has stated that figures of as little as 10% overweight have been used as standards of obesity. In order to minimize problems due to daily fluctuations in weight of both obese

and normal weight Ss a figure of 20% overweight was arbitrarily chosen as the minimum weight for inclusion within the obese groups. There were 30 Ss in the overweight group and 30 in the normal weight group.

Normal weight was determined for each S via the 1960 Metropolitan Life Insurance Company Desirable Weight Tables. Since the "desirable" weight is given as a range of weights the mean of the range given was chosen as normal weight and 20% over that began the obese range. All obese Ss were asked if they knew of any medical reason for their overweight. One female who had recently given birth was thus dropped from the study. Varsity athletes were also excluded from the study as their "overweight" is not relevant to this study.

Past research has shown that of the three measures used two were sensitive to differences due to the sex of the S involved. Females have repeatedly demonstrated greater FD than males both within the United States (Witkin, 1949) and cross culturally (Newbigging, 1952, 1954; Witt, 1953; and Andrieux, 1955). Janis and Field (1959) and King (1959) have indicated that females seem to be more persuasible than males. Rotter (1966) states that sex differences in the IE test performance are minimal but since one of his validation samples did show such a difference

the possibility remains an open question. In order to take possible differential performance due to sex into account each weight classification, normal and overweight, was divided into a male and female group. This gave the final structure of the study, four groups of 15 each: OW-Male, OW-Female; NW-Male; and NW-Female.

Materials

Cognitive Style

Cognitive style was determined via the Group Embedded Figures Test (GEFT). The GEFT is an adaptation of the individually administered Embedded Figures Test (EFT). The EFT is a reliable (split-half r's ranging from .90 - .95 and test-retest r of .89 after a three year interval) instrument frequently used in evaluating cognitive style (Witkin, et al, 1962). The GEFT exhibits a parallel form reliability coefficient of .82 for both males and females. Witkin and his associates (1971) feel that the GEFT can be a useful substitute for the EFT when individual testing may be too time consuming and impractical.

Perceived Locus of Control of Reinforcement

Perceived locus of control of reinforcement was determined via the IE scale (Liverast, Rotter & Crowne, 1966).

Ss were placed in a private room and allowed as much time as necessary to complete the scale.

On a variety of populations reliability coefficients ranging from .69 to .79 have been obtained fro the IE Scale. An extensive effort was made to keep the correlation of the IE Scale scores with social desirability scale (Crowne & Marlowe, 1964) scores low and correlation coefficients range from -.07 to -.35.

Social Influence

The length-of-line judging task originally used by Asch (1956) was used in this study. Five students, four psychology student accomplices and the S, sat in a row before a blackboard (Figure 1). Two 6" x 17" cards were presented to the group. The card on the left had a single line, the standard, drawn on it. The card on the right had three lines drawn on it, one of which was the same length as the standard. The task for each student was to choose the line on the right that was the same length as the standard on the left. There were 18 trials. On 12 trials the accomplices were instructed to make an incorrect choice. The order of trials and choices is given in Table I. The students were always seated with the accomplices all to the left of the S. E always asked for the

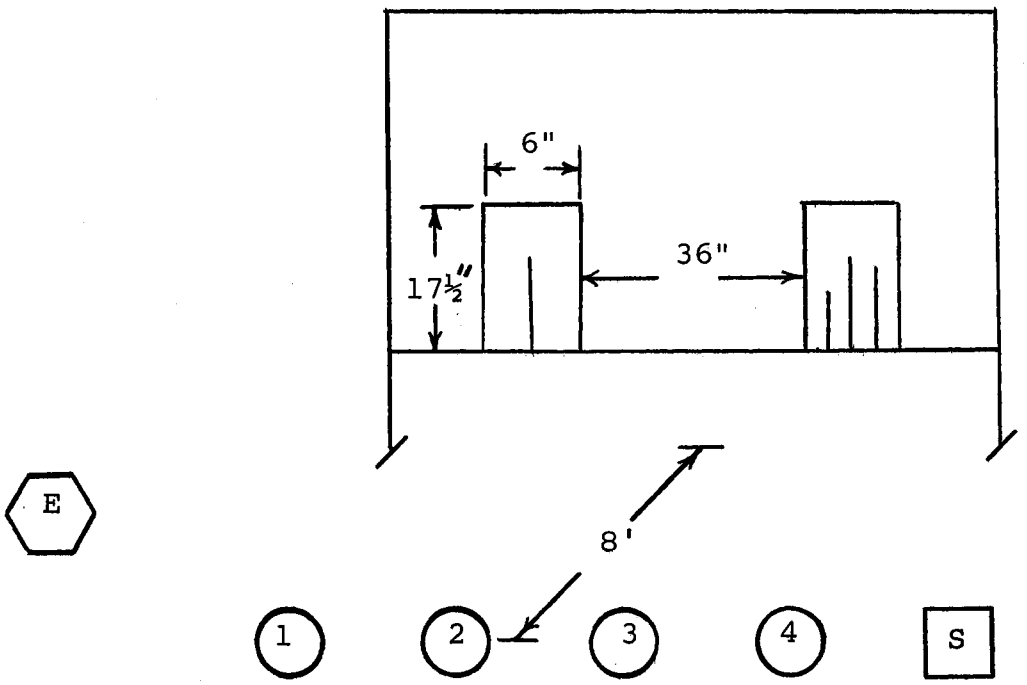

Figure 1. Physical dimensions of social judgment apparatus and arrangement of accomplices and experimental subject. The circled numbers designate the accomplices and the order in which they announce their estimates. S designates the experimental subject.

TABLE I

ACCOMPLICES RESPONSES TO STANDARD AND COMPARISON LINES ON SUCCESSIVE TRIALS

Trial	Length of Standard (in inches)	Length of Comparison Lines (in inches)			Accomplices Error (in inches)
a*	10	8 3/4	10	8	0
b	2	2	1	1 1/2	0
1	3	3 3/4	4 1/4	3	+3/4
2	5	5	4	6 1/2	-1
c	4	3	5	4	0
3	3	3 3/4	4 1/4	3	+1 1/4
4	8	6 1/4	8	6 3/4	-1 1/4
5	5	5	4	6 1/2	+1 1/2
6	8	6 1/4	8	6 3/4	-1 3/4
d	10	8 3/4	10	8	0
e	2	2	1	1 1/2	0
7	3	3 3/4	4 1/4	3	+3/4
8	5	5	4	6 1/2	-1
f	4	3	5	4	0
9	3	3 3/4	4 1/4	3	+1 1/4
10	8	6 1/4	8	6 3/4	-1 1/4
11	5	5	4	6 1/2	+1 1/2
12	8	6 1/4	8	6 3/4	-1 3/4

*Letters of the first column designate "neutral" trials, or trials to which accomplices responded correctly. The numbered trials were "critical", ie., the accomplices responded incorrectly. Underlined figures represent accomplices incorrect responses. Trials d to 12 are identical to trials a to 6; they followed each other without pause.

judgments starting on the left. Social influence was demonstrated by the number of incorrect choices made by each S after hearing the "group consensus" before him. In Asch's original work 7 accomplices were used. Further research has shown that a minimum of 3 accomplices may be used without disrupting the group norm effect (Asch, 1956; and Sherif & Sherif, 1969).

Procedure

Volunteer Ss came to the designated office and were weighed on a floor-standing balance scale. Height was also measured. Frame size was subjectively rated by E. As a reliability check, as assistant rated frame size simultaneously. There was 86% agreement between E and the assistant. Ss were told that the object of the study was to understand eating behavior. They were then asked if they wished to continue. Those Ss who did chose a time to come back for the testing periods.

Ss came in for the Group Embedded Figures Test (GEFT) and the IE Scale at the same time. They came in groups of 3-8 Ss. They took the GEFT first and then the IE Scale. Afterwards they signed an appointment list for the Social Influence task, which was billed as a "perceptual judgment task". For this final measure Ss came individually.

CHAPTER IV

RESULTS

The major statistical analysis was via three 2 x 2 factorial analyses of variance (Anova). In each Anova the first factor was weight, with two levels, obese and normal weight. The second factor was sex, with two levels, male and female. In the first analysis the dependent variable was cognitive style, in the second, I-E scale scores, and in the third, social influence scores. The means and standard deviations for performance on each of the three measures are given in Table II.

The mean performance for Ss on the cognitive style variables is graphically presented in Figure 2. Mean performance on the I-E scale is presented in Figure 3 and mean performance on the social influence task is presented in Figure 4. Table III presents the results of an Anova for cognitive style. Analyzing differences in cognitive style, the F for sex was significant beyond the .05 level. None of the other Fs reached significance. Table IV presents the results of an Anova for I-E test performance while

TABLE II

MEAN PERFORMANCE ON DEPENDENT MEASURES

Cognitive Style

		Obese	Normal Weight
Male	Mean	12.33	10.66
	SD	4.91	4.95
Female	Mean	9.93	8.07
	SD	4.59	4.12

I-E Test

		Obese	Normal Weight
Male	Mean	8.80	9.93
	SD	4.63	3.79
Female	Mean	6.53	9.60
	SD	4.26	4.96

Social Influence

		Obese	Normal Weight
Male	Mean	4.06	3.20
	SD	3.35	3.54
Female	Mean	2.53	3.13
	SD	2.67	3.44

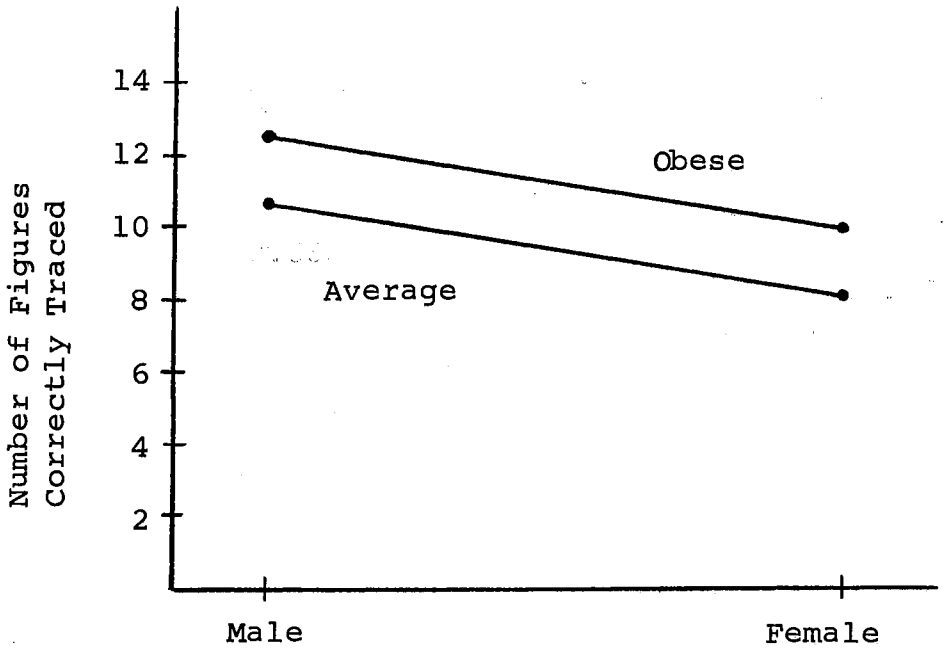

Figure 2. Mean performance for obese and average subjects on cognitive style measure.

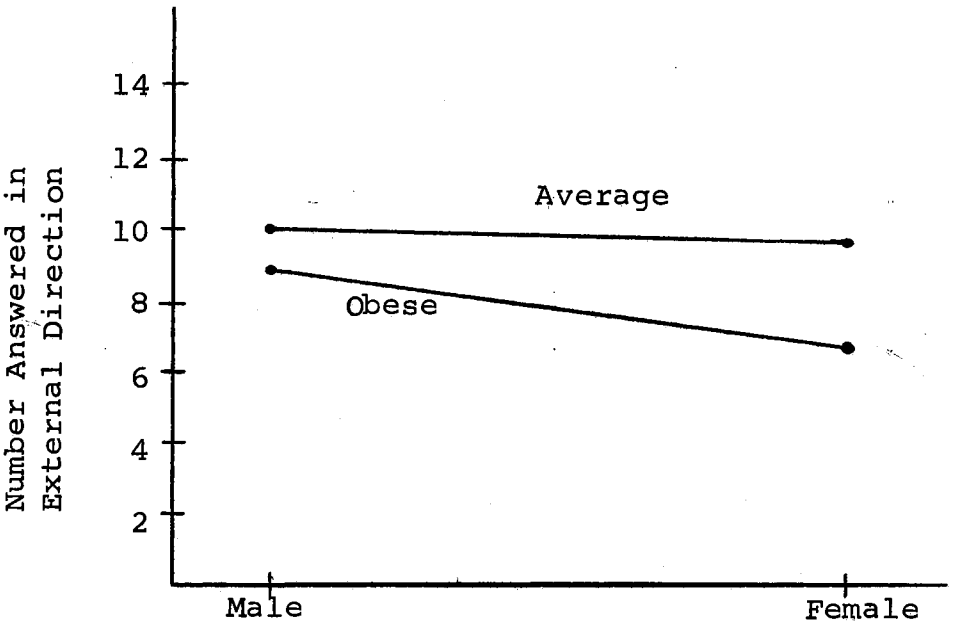

Figure 3. Mean performance for obese and average subjects on I-E measure.

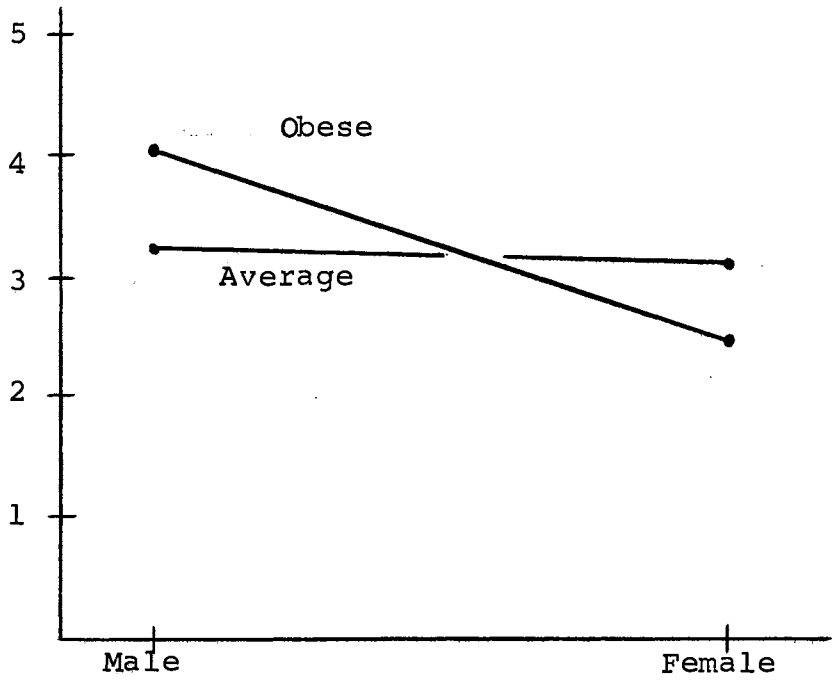

Figure 4. Mean performance for obese and average subjects on social influence measure.

TABLE III

ANOVA FOR COGNITIVE STYLE

Source	SS	df	MS	F	
Between Sex	120.42	1	120.42	4.94	$p<.05$
Between Weight	66.15	1	66.15	2.71	$p>.05$
Sex X Weight	2.80	1	2.80	.11	$p>.05$
Within (Error)	1365.22	56	24.37		
TOTAL	1554.59	59			

TABLE IV

ANOVA FOR I-E TEST DATA

Source	SS	df	MS	F	
Between Sex	25.35	1	25.35	1.24	$p>.05$
Between Weight	66.15	1	66.15	3.24	$p>.05$
Sex X Weight	14.01	1	14.01	.68	$p>.05$
Within (Error)	1142.68	56	20.40		
TOTAL	1248.19	59			

TABLE V

ANOVA FOR SOCIAL INFLUENCES

Source	SS	df	MS	F	
Between Sex	6.01	1	6.01	.55	$p>.05$
Between Weight	.01	1	.01	.00	$p>.05$
Sex X Weight	4.81	1	4.81	.44	$p>.05$
Within (Error)	606.82	56	10.83		
TOTAL	617.65	59			

Table V presents the results of an Anova for social influence performance. In the latter 2 Anova's no F ratio reached significance at .05 level or beyond.

CHAPTER V

DISCUSSION

Statistical analyses of the results reveal that none of the three major hypotheses were supported. Obese Ss did not appear to be significantly more externally oriented than normal weight Ss. Task scores of obese Ss were not significantly different than scores of normal weight Ss on the three measures used (GEFT, I-E Scale, Social Influence Task). On a perceptual level obese Ss did not differ from normals in their ability to recognize a figure within an embedding context. On a cognitive level obese Ss were not significantly different in their internal-external orientation towards source of reinforcement. On a social level obese Ss were not significantly different in their tendency to be influenced by group pressure.

The only significant finding was a sex difference in terms of cognitive style. Females were significantly more externally oriented (FD) than males regardless of weight. This is in keeping with past research on cognitive style.

These data offer no support for Schachter's contention of a broad external perceptual locus of control in

obese Ss. Some reasons may be postulated. Perhaps Schachter's hypotheses might have been better examined via more physically oriented measures. For example, many studies reported in the literature suggest kinesthetic insensitivity on the part of obese Ss.

Bruch (1964) found that obese Ss were less able than normal weight Ss to estimate the amount of liquid formula poured into the stomach through a feeding tube. The present study did not deal with this variable. Another physical measure that might have been used is Witkin's (1948) Body Adjustment Test (BAT). The BAT calls for both visual and kinesthetic perception via the righting mechanism. The righting mechanism, which is dependent on kinesthetic and vestibular cues, is somewhat similar to the sensation of hunger in that both seem based on subcortical processes (Grossman, 1967). Thus the BAT may more closely approximate the conditions of stimulation for which the obese may be most sensitive. However, correlations among all of the measures Witkin uses to assess cognitive style including the GEFT are relatively high, suggesting that performance of any of these tasks should produce similar results.

An even more important reason for not using narrower measures of internal-external control is that Schachter is suggesting a general external orientation for obese

individuals. If this general orientation is present, it should be possible to find the proposed externality without using measures closely tied to physical sensitivity. Therefore, the GEFT, I-E Scale, and Social Influence Task should have shown such internal-external differences. Actually, only the data for the GEFT did so. While not significant, the GEFT results are at least in the predicted direction.

The Social Influence Task data are more challenging to interpret. Obese males tended to agree more frequently with the inaccurate judgments of the accomplices than did normal weight males. However, obese females tended to agree less frequently with the accomplices than did normal weight males. This interactional trend between weight, sex, and persuasibility was not predicted and merits some discussion. If obese individuals are generally more externally oriented, as Schachter states, then they should be more greatly influenced by social cues (external) than normal weight Ss. In the Asch Social Judgment Task, therefore, obese Ss should be more influenced by the accomplices than normal weight Ss. This tendency was found only in the obese female group, with the opposite noted in the obese female group. The reasons for this rather interesting discrepancy may lie either in the task used or in the obese female subject population.

In the social judgment task used in the present study it was assumed that the only cue utilized by the S was the artifically established group norm. Upon closer examination, it may be seen, however, that another external cue is rather prominently "displayed," i.e. the lines that are to be judged. It may be that the S is placed in somewhat of a conflict in terms of which cue he is to give the most attention to in the process of making his judgment. Even in Asch's (1956) original work only about 1/3 of his Ss went along with the accomplices' incorrect judgment, that is ignoring visual cues for social ones. The interactional trend suggested by the present data for the Social Influence Task may indicate differential responses to the two sets of external cues by obese and normal weight females.

Obesity may represent a more difficult life situation for females than for males. Since culturally females are judged to a very high degree on appearance and conformity to "thin" beauty standards. It may be that they develop strong defense mechanisms in opposition to social pressures to make them "thin" and therefore mask their sensitivity to social influence cues. They would thus resolve a cue conflict along visual lines where other Ss, including the obese males, might resolve such conflict by attending to social cues.

One of the studies used by Schachter (Rodin, 1970) to show the generality of his notions of external control in the obese provides some support for the possibility of cue conflict. Rodin found that as a distracting stimulus was made louder, obese Ss made more and more errors at a proof reading task. Normals decreased, although only slightly. Schachter suggests that a factor of cue prominence (or conflict) is operating to enhance the distraction effect. Above a given threshold value obese Ss make considerably more and more errors, showing conflict resolution by choice of the more prominent cue. Presumably the loud distraction overcame the value of the reading material. The notion of a hierarchy of cues and cue conflict resolution probably deserves further study.

The data for I-E Scale performance is in direct opposition to Schachter's hypothesis, and hence must be interpreted with considerable care. Items on the I-E Scale are paired along a self controlled- fate controlled dichotomy. If obese Ss were particularly sensitive to external cues, or defensive toward them, they might tend to respond to such choices in the direction of more internal control than might have been expected.

Although there were few statistically significant results found in the present study, and this lack suggests

rejection of Schachter's contention of a general external orientation for obese Ss, an analysis of the discrepancies among the instruments used suggest a number of future investigations. Such areas as cue hierarchies among normal and obese Ss; cue conflict and its resolution; individual differences among obese Ss present challenges for future investigators. Certainly further studies of this nature will be necessary for psychologists to understand the problem of obesity and it's relationship to loci of perceptual control.

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