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The Relationship of Children's Attitudes About Weight to Cognitive Development

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ABSTRACT

The Relationship of Children's Attitudes About Weight to Cognitive Development

Linda Rhodes

The purpose of this study was to test specific hypotheses about the relationship between cognitive-developmental level and children's ideas about overweight peers.

Forty-two 4 to 8 year old subjects were selected from a sample of 177 children to whom the Concept Assessment Kit-Conservation (Goldschmid & Bentler, 1968) had been administered. Twenty-one subjects, 11 males and 10 females, with the highest conservation scores were selected, and 21 children of similar ages with the lowest conservation scores were selected. Salience of weight as a categorization dimension, preference for normal weight and aversion for overweight, the incidence of weight-based affiliation-preferences, and weight-based trait attribution patterns were assessed. The trait attribution measure was administered under free choice and forced choice conditions.

Low conservers found weight a more salient matching dimension, demonstrated less preference for the normal weight figure and assigned more negative traits to the overweight and positive traits to the normal weight figure. There seemed to be no differences in the rate of allocating traits to both figures by sex or conservation level. In addition, girls chose either the normal or underweight over the overweight figure, and made more weight-based affiliation-preferences

than boys. These results suggest that conservation level, or perhaps cognitive-developmental level, plays a major role in weight salience, preference and trait attribution, and that sex influences weight-based aversions and affiliation-preferences in 4 to 8 year olds. They also suggest that Martin & Halverson's (1981) theory of attitude development may apply to weight as well as gender attitudes.

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Overview

The purpose of the present study was to investigate the relationship between cognitive developmental level and children's ideas about overweight peers. Specifically, the research focussed on whether young children's ability to conserve properties such as length, weight or volume of physical stimuli was related to their development of social schemata, preferences/aversions, affiliative-preferences or weight-based trait attributions.

A number of studies have attempted to investigate children's awareness of overweight, preferences for normal weight or aversions for overweight, and trait attributions to overweight peers and adults. These studies have shown that children as young as 3 or 4 years of age are aware of weight and use the dimension to categorize or match (White, Mauro & Spindler, in press); that children as young as 5 years of age express a slight preference for normal weight or an aversion to overweight figures (Lerner & Gellert, 1969; Lerner & Schroeder, 1971a; Lerner & Korn, 1972; Lerner, Karabenick & Meisels, 1975; Young & Avdzej, 1979); and that children 6 years of age and older tend to attribute positive traits to normal weight and negative traits to overweight or underweight peers (Staffieri, 1967; Staffieri, 1972; Lerner, 1969; Lerner & Korn, 1972; Lerner & Schroeder, 1971b; Young & Avdzej, 1979; Caskey & Felker, 1971; Kirkpatrick & Sanders, 1978).

It has recently been suggested that cognitive-developmental theory may provide a framework for understanding the processes by which children develop social schemata, preferences and stereotypes (e.g. Martin & Halverson, 1981). This theory has its root in Piaget's stage

theory of child development. He suggested that children are active participants in the learning process, and that development consists of gradual progression through an invariant sequence of hierarchical stages. In each stage, the child's cognitive organization is qualitatively different from the other stages. As the child develops, his level of thinking becomes more complex, differentiated and integrated.

Research attempting to relate cognitive stages to social attitude and stereotype development has been based upon two types of findings. First, there are developmental changes in how others are perceived, with the age of 7 or 8 years found to be a critical transition point (Livesley & Bromley, 1973; Peevers & Secord, 1973). Since this age is also the transition point from preoperational to concrete operational thinking in Piaget's cognitive theory, it has been suggested that cognitive level affects the acquisition and endorsement of social attitudes. Secondly, some studies have shown that cognitive developmental changes are correlated with social attitude changes (Marcus & Overton, 1978; Coker, 1984).

Hetherington & Parke (1979), among others, have noted the parallel development of cognition and person perception. They suggested that the critical eighth year transition point marks the decline of the preoperational tendencies to focus on single often perceptual, dimensions of a stimulus (Centration) and see stimuli solely from one's own perspective (Egocentrism). Concurrently, the child acquires the ability to classify objects hierarchically and conserve properties of a stimulus despite perceptual transformations (Conservation).

The purpose of the present study was to compare social schemata of body weight, weight-based preferences, aversions affiliation-preferences, and trait attributions to overweight and normal weight peers in children of comparable ages who are preoperational versus concrete operational thinkers. Cognitive level was measured by conservation. This variable was selected for its importance in the transition from preoperational to concrete operational thought, its proven relevance to social attitude development (Marcus & Overton, 1978; Coker, 1984) and the availability of a standardized measure (Goldschmid & Bentler, 1968).

Although recent thinking emphasizes the role of cognitive variables in attitude development, other factors may be equally influential. Many authors have indicated that there is greater pressure on females in our society to maintain a low body weight; girls as young as 8 years of age restrain their appetites (Davis, Best & Hawkins, 1981), and the incidence of eating disorders such as bulimia is higher in females (Halmi, Falk & Schwartz, 1981). Therefore, differential socialization of attitudes about overweight might be expected for males and females. A secondary goal of the study, then, was to explore the role of sex in social attitudes about overweight.

Background

The review of the literature is divided into two major sections. The first section deals with a critical evaluation of research on weight awareness, preference, aversion and attributions to overweight versus normal weight by children and adults. Of particular interest is whether developmental changes in such attitudes seem to occur at the

preoperational to concrete operational transition point of 8 years, and whether there are sex differences in these aspects of weight attitudes.

The second section reviews cognitive-developmental theory and its relationship to social attitude development. Examples from the literature on the relationship of cognitive development and gender attitudes are reviewed as, to date, the theory has not been related to attitudes about overweight. This section is intended to provide the basis for hypothesizing specific relationships between conservation of physical properties and several aspects of weight attitudes.

Weight Attitudes

Categorizing by weight: schema development. Early studies on attitudes about weight utilized Sheldon's (1942) definitions of body type rather than directly assessing attitudes to overweight. These body types were never intended to be synonyms for underweight, normal weight and overweight; in actual fact, Sheldon's (1942) labels were meant to be applied following an analysis of muscle tone and bone structure, not solely on the basis of weight. For instance, one could be normal weight and not possess the muscle tone required to be considered a mesomorph. Unfortunately, some early researchers, such as Lerner and his colleagues, used these labels to describe underweight, normal weight and overweight figures. The absence of this distinction between weight and body type makes interpretation of the literature and application of previous findings to the present study difficult. For the sake of consistency, the terms used by each author will be used when discussing previous research, but only weight will be discussed in the present study.

Initially, these studies attempted to demonstrate that young children were aware of body type differences by showing that they could correctly identify their own body or weight types. Several studies failed to support the idea that most kindergarten and elementary school children can identify their own weight or body type, but did find body type or weight-based preferences and aversions (Lerner & Schroeder, 1971a; Lerner & Korn, 1972; Lerner, Karabenick & Meisels, 1975; Young & Avdzej, 1979). Since one must be aware of weight in order to possess such preferences and aversions, it seemed that own weight or body type category identification was not an accurate measure of weight awareness. Identifying one's own weight or body type may be a distinct and more complex process than awareness of others' weight or body type.

Recent evidence that children can distinguish differences in weight type was supplied by White et al (in press). Instead of asking children to identify their own weight category, they gave 3 to 11 year old children the opportunity to match drawings of peers on the basis of weight, activity or no known dimension. They found that even 3 year old children made 37% of their matches by weight; therefore, they must have been aware of the weight dimension. Furthermore, this choice to match by weight rather than activity declined with increasing age, and was independent of the subject's sex. The 3 and 4 year olds matched by weight significantly more than all the others, and the 10 and 11 year olds matched by weight significantly less than the others.

The finding that 3 to 4 year old children can match drawings on the basis of weight when a competing dimension was available suggests that they must possess a rudimentary schema for weight. They must have such

a structure in order to differentiate the drawings by weight, which in turn allows them to match by that dimension. The trend toward less matching on the perceptual (weight) basis suggests a relationship between matching and conservation. Weight is intuitively more perceptual than activity; it refers to the actual physical characteristics of the person, not their function or capacity. The ability to conserve, or understand physical invariance despite perceptual transformations, also requires that the child focus less on perceptual cues. This change in weight salience seems to take place sometime between 5 and 10 years of age, which encompasses the transition from preoperational to concrete operational time period. Therefore, while there is no evidence of sex differences in weight salience, there is some suggestion that the transition to concrete operational thought may play a role in less matching by weight over activity. This conclusion gives rise to the first hypothesis of the present study; that is, that preoperational children would match on the basis of weight more than concrete operational children of similar ages.

Preference and aversion. Although early researchers had difficulty demonstrating that children were aware of weight or body type, they did find weight-based preferences and aversions. However, these studies were plagued with methodological problems, particularly in the measurement of preference and aversion. Most of these early studies measured preference and aversion in relation to a desire to "look like" fat, thin or average weight stimuli. In some sense, they did not directly reflect social preferences or aversions and may have been confounded by the child's own body type. Nonetheless, as these studies

provide most of the available data regarding preference, they are reviewed together with studies directly measuring social choices.

Staffieri (1967) conducted one of the first studies in this area. He asked 90 boys from grades 1 through 5 (ages 6 to 10) to choose which drawing of an endomorph, mesomorph and ectomorph peer they would like to look like. He found a clear preference for the mesomorph in subjects 7 years of age and older. In a subsequent study, Staffieri (1972) asked the same question of 60 girls in grades 2 through 6 (ages 7 to 11). Again, the preference was for the mesomorph, but there were no age effects.

In a similar study, Lerner and Gellert (1969) showed 45 male and female kindergarten pupils black and white photographs of an endomorph, mesomorph and ectomorph peer of the same sex. They were asked to point to the one they "most want to look like" and "don't want to look like". Each subject performed each task twice. They found that the endomorph figure was chosen as the one they did not want to look like significantly more than the other two body types. In addition, female subjects had a significantly greater preference for the non-overweight body types. The authors concluded that by 5 years of age, children possessed an aversion to the endomorph figure. Lerner & Schroeder (1971a) subsequently replicated this study and confirmed the earlier findings.

Subsequent researchers examined these effects developmentally with slightly modified procedures. Lerner & Korn (1972) studied sixty 5-6, 14-15, and 19-20 year old males. They were shown same sex drawings of an endomorph, mesomorph and ectomorph peer, asked to point to the one

they "want to look like" and then asked to explain why. Significant age differences were found between the 5-6 year old subjects and the two older groups. Preference for the mesomorph figure was exhibited by the youngest subjects, and this preference increased with age; preference for looking like the ectomorph decreased. The endomorph was not preferred across all age groups. All subjects explained their preferences in terms of physical appearance. The authors concluded that the preference for the mesomorph body type had been supported.

Lerner, Karabenick & Meisels (1975) examined children's body type preferences and aversions using a social distance paradigm. Their subjects were 202 male and female kindergarten grade 1, 2 and 3 pupils. After being trained on the task, these subjects were twice asked to indicate "how close" they wished to be to drawings of a male and female endomorph, mesomorph and ectomorph. All subjects placed the figure representing themselves farthest away from the endomorph figure. The tendency to leave the most space between the self and the endomorph figures increased significantly between grades 1 and 2; similarly, the space allotted by the kindergarten and grade 1 subjects was significantly less than that allotted by the grade 2 and 3 subjects. There were no main effects by sex of subject. The authors concluded that their results confirmed the previous findings on the importance of body type in social behavior and suggested that these evaluative judgements increased with age.

Finally, two studies addressed how specific conditions affected preference or aversion. Young & Avdzej (1979) assessed the relative importance of behavior and weight in the expression of peer preferences

and aversions. Their subjects were 108 male and female children in grades 3 through 5. They showed each subject two videotapes of an adult and child interacting. Some of the videotapes featured an obese boy, while others featured a normal weight boy. In addition, he was depicted as obedient or disobedient. Afterwards, subjects were shown photos of these boys and asked to point to the one they "wanted to play with". They found that when the behavior of the boys was equal, the normal weight boy was selected as a playmate more often than the obese boy. However, when an obedient obese boy and a disobedient normal weight boy were compared, the obese boy was preferred. These findings were independent of the subjects' age and sex. The authors concluded that the preference for normal weight peers exists, but may be lessened if they are behaviorally deviant.

Recently, White et al (in press) studied the relative importance of an attractive prop and weight in children's affiliative-preferences. They asked 3 to 11 year old children to choose with whom they wished to do a particular activity. In each case, they chose between an overweight peer with the activity-related prop and a normal weight peer with no prop. The results supported Young & Avdzej's (1979) finding that aversion for overweight may be modified by other factors. They found that prop-based responses were made three to four times more often at all ages. However, they also found that girls, regardless of age, made more weight-based responses than boys. Girls chose to play with the propless normal weight, same-sexed peer more often than boys.

The previous studies on preference and aversion suggest that there is a slight preference for the mesomorph, or perhaps non-endomorph,

figure and that this preference is present by the age of 7. In addition, they strongly suggest there is an aversion toward the endomorph present by the age of 5. No data clearly establishes the age of onset for social preferences, though Lerner et al (1975) show that aversion to overweight peers as measured by social distance occurs by grades 2-3, and is present to a lesser extent in kindergarten-grade 1 children.

In addition to identifying the age of onset for preferences and aversions, the present study requires an analysis of age related changes, particularly those between 5 and 8 years. Unfortunately, none of the four studies of simple preference-aversion provide data relevant to this transition period. Staffieri's (1967;1972) youngest subjects were 6 or 7 years of age, and many may have been concrete operational. Lerner & Gellert (1969) studied only 5 year olds. Lerner & Korn (1972) compared 5-6 year olds, 14-15 year olds and 19-20 year olds. While they found developmental differences, it is not possible to relate the changes to the transition from preoperational to concrete operational thought. Finally, the one study which provides relevant data with regard to age utilized a social distance paradigm rather than the look-like paradigm. Lerner et al (1975) did find an increase in aversion to overweight between kindergarten-grade 1 children and children in grades 2-3. Therefore, it is not possible to hypothesize a cognitive-developmental basis for weight-based preferences and aversions at this time.

In addition to reliance on a "look like" measure, and lack of data relevant to the 5-8 year old range, other methodological problems in

these studies make conclusions about both age of onset and developmental patterns difficult to interpret. The tasks raise questions about the reliability of subjects' responses. Although this is always an issue in studies using child subjects, it is particularly pertinent here for two reasons. First, the subjects were exceptionally young; more studies used a kindergarten age group than any other single group. Second, the tasks consisted of only one or two preference or aversion choices. Two of the three studies which had subjects repeat the task reported the reliability of responses. Lerner et al (1975) found their subjects, particularly the older ones, were generally reliable, while Lerner & Schroeder (1971a) found only 50% of their subjects were reliable. Even those studies which repeated the task, did so with the same stimuli. Thus, while short term reliability may have been adequate, the extent to which idiosyncratic characteristics of the stimuli elicited the responses can not be assessed. As a result, the generalizability of the results is questionable.

In addition, the nature of the task may have forced the subjects to be unnaturally rigid or oversimplify a more complex value system. In all of the studies, subjects were asked to choose only one of two or three body types. This procedure allowed the experimenters to identify only the most preferred and most aversive figures; the possibility that which figures were paired might affect which figure was preferred or found aversive was not explored. Similarly, preference for normal weight and aversion for overweight were discussed as if they were opposite points on a continuum. The possibility that one might not be the converse of the other was not explored.

The present study attempted to correct some of these methodological problems. First, the preference task utilized in the present study required subjects to choose a playmate from two drawings of peers of different weights rather than to choose the figure that they would prefer to look like. This change was made in order to study early social preference rather than a preferred self-body type. Only Lerner et al (1975) utilized a measure related to social aversion. These investigators did find a significant developmental increase in aversion to overweight between 5-7 year olds and 8-10 year olds. However, this single finding was not regarded as sufficient basis for a hypothesis relating social preferences and cognitive development.

The present study also used a paired comparison measure of preference and aversion. Children were asked to make several (nine) comparisons, stimuli varied from trial to trial, and each weight category was contrasted with the other two weight categories three times. Thus, preference for normal weight was clearly specified as over underweight and overweight, and aversion for overweight as the tendency to choose the normal and underweight figures over the overweight figures.

In addition, the present study utilized an affiliative-preference measure (White et al, in press) in order to assess the relative importance of a child's possessions/activity and the child's weight condition. This task required subjects to choose between an overweight peer with an attractive prop and a normal weight peer with no prop four times. It was hoped these measures would provide more valid assessment of weight-based preferences, aversions and affiliative-preferences.

Finally, the studies of preference and aversion were also examined for sex differences. Three of the studies analyzed for sex differences. Lerner & Gellert (1969) found females had a stronger preference for non-endomorph figures than did males. White et al (in press) reported that females tended to express affiliative-preferences based upon body type more often than males. Only Young & Avdzej (1979) reported no sex differences in aversion to overweight. This may have been due to the fact that they utilized male stimuli for all subjects, whereas the other two studies utilized same-sexed stimuli. Aversion for overweight may be more strongly expressed toward female stimuli.

Although there is only weak empirical evidence for sex differences, this suggestion complements the literature on sex differences in societal pressure to be thin. Millman (1980) interviewed overweight men and women from the United States. One of her conclusions was that overweight was a strikingly different experience for men and women. While the women felt it had seriously limited their social and occupational opportunities, the men felt that being overweight had had a limited effect on the course of their lives. The prevalence of restraint-related eating disorders also reflects this sex difference. Halmi et al (1981) found that 87% of the bulimics in a college population were female. There is also evidence that this pressure affects children as well as adults. Woody & Costanzo (1981) found that parents encouraged only their overweight female children to exercise eating restraint. In addition, Davis et al (1981) found that girls as young as 8 years of age were exercising restraint in eating. Thus, it seems likely that attitudes about weight would develop differently in

males and females. This conclusion gave rise to the second hypothesis of the present study; that is, that girls would exhibit a greater preference than boys for normal weight figures or aversion for overweight with age held constant.

Body type attributions in adulthood. The third general component of weight attitudes is trait attribution. Adult weight-based trait attribution patterns were examined in order to determine whether adults possessed a stereotype which could be socially transmitted to children. True stereotypes should be manifested in specific sets of both positive and negative traits consistently attributed to each of the three basic body types. However, the results of studies on adult trait attribution do not support this contention. Instead, there seems to be simply a general "negativity" towards non-mesomorphs; negative traits are assigned to endomorphs and ectomorphs, while positive traits are assigned to the mesomorph.

One of the earliest studies of specific trait attributions was conducted by Wells & Siegel (1961). They chose 120 male and female adults from several social classes and age groups as subjects. These subjects were asked to rate adult male endomorph, mesomorph and ectomorph silhouettes on 24 bipolar scales. They found that the endomorph was judged fatter, older, shorter, more old-fashioned, lazier, weaker, less good looking, more talkative, more sympathetic, more good-natured, more dependent and more trusting. In contrast, the mesomorph was rated stronger, more masculine, better looking, more adventurous, younger, more mature and more independent. Finally, the ectomorph was rated thinner, taller, more ambitious, more suspicious, more tense, less

masculine, more stubborn, more pessimistic and quieter.

Dibiase & Hjelle (1968) used a similar procedure with 51 male undergraduates. Once again, the three body types were rated significantly differently on some of their 21 bipolar scales. When endomorph and mesomorph ratings were compared, the mesomorph was rated more active, energetic, dominant and efficient, while the endomorph was rated more shy, withdrawn, and dependent. Similarly, when the mesomorph was compared to the ectomorph, the mesomorph was rated more active, energetic and dominant, while the ectomorph was rated more anxious, shy, withdrawn and dependent. Finally, when the endomorph and ectomorph were compared, the ectomorph was rated more anxious. As can be seen by reviewing the specific discriminating traits in these two studies, few of the same adjectives were used. Furthermore, in this study only one adjective (anxious) differentiated ectomorphs from endomorphs. It seems that the results from both studies can best be summarized as a tendency to attribute positive adjectives to the mesomorph and negative traits to the endomorph and ectomorph.

This tendency to assign negative traits to both non-mesomorph figures is consistent with Lerner's (1960) findings. He asked 90 female undergraduates to assign 30 traits to photographs of adult males with the three body types. He found that many traits were assigned to one body type significantly more than the others. All the traits attributed to the endomorph and ectomorph were negative, while only 2 of the 10 attributed to the mesomorph were negative. While he found many traits differentiated endomorphs and ectomorphs, five negative traits were assigned to both the endomorph and ectomorph more frequently than

mesomorphs.

Similarly, Roberts & Herman (1980) sampled 288 visitors to the Ontario Science Center. They read descriptions of endomorph, mesomorph, average and ectomorph males and females of various heights. They were then asked to rate these "job applicants" on 12 bipolar scales. The endomorph applicants were rated less attractive, less self-controlled, less self-confident, less outgoing, less fashionable and more good-humoured than the others. In addition, the endomorph females and mesomorph females were judged significantly less productive than all the others.

In a recent study on adults, Spigelman & Schultz (1980) reported on general negativity about body types. They asked 798 visitors to a fair from 16 to 80 years of age for their impressions of silhouettes of varying body types. The subjects were asked to rate the three male and three female figures on five bipolar scales. Although the results were not reported in detail, the authors found that the endomorphs were rated most negatively, followed by the ectomorphs and then the mesomorphs.

The methodology used in these studies is very similar; four out of the five studies had subjects view similar figures and rate them on bipolar scales. This facilitates between-study comparisons of the results. However, other methodological factors make it difficult to determine the existence of a specific stereotype consisting of specific positive and negative traits. First, almost all of the traits or characteristics used in these studies were only studied once. Without more replications, the existence of a true stereotype can not be assessed. Secondly, the samples were poorly defined, and probably

heterogeneous in all cases. Given the likelihood of socio-cultural factors in the maintenance of social stereotypes, differences by age, socio-economic status, race and lifestyle must be expected. Therefore, the non-significant results for many of the traits used may have been due to combining the responses of vastly different subjects for group analyses. Thirdly, four of the studies used bipolar scales which probably had a neutral midpoint. This suggests the possibility that social desirability factors caused subjects to "suspend judgement" on a variety of scales. Even if the subjects had deviated from the mid-point, the true extent to which they assigned the adjectives to the body types is unknown. All four of the studies using scales reported their results in terms of more or less of a trait being attributed; in actual fact, it is possible that no traits were strongly attributed to any of the figures.

Although the existence and nature of body type stereotypes can not be assessed, negativity towards body types can be determined by designating traits as either positive or negative. These results suggest several conclusions. First, they confirm that there is a trend towards characterizing the endomorph negatively. However, the ectomorph is characterized almost equally as negatively, and the traits assigned to either endomorphs and mesomorphs, or endomorphs and ectomorphs are also negative. Thus, it seems that the mesomorph is characterized positively, while all other body types are seen negatively. This is consistent with the results of some of the previously mentioned studies. However, most chose to emphasize the negativity to the endomorph in their discussion of the results, and consider this negativity equivalent

to stereotyping. Collapsing across studies, it appears that the trait attribution patterns are more accurately conceptualized as negativity towards non-mesomorphs than stereotyping of the endomorph.

Once again, a secondary purpose of this review was to assess the existence of sex differences. Unfortunately, only Spigelman & Schultz (1980) analysed their results by sex of subject, and they did not fully report their findings. Therefore, no conclusions about the existence of sex differences in adult trait attribution patterns can be drawn from these studies.

In conclusion, it seems that specific positive and negative traits have not been consistently attributed to figures by weight or body type by adults. In contrast, a general pattern of negative trait attribution to non-mesomorphs has been observed. There is also no evidence for the existence of sex differences. Therefore, if children were to acquire any attitudes about weight from the adults in their environment, it would likely be this general negativity toward non-mesomorphs and not a specific stereotype.

Body type attributions in childhood. A similar review of the results of child "stereotyping" studies was undertaken. Once again, early research focussed upon trait attributions and attempted to show that a specific stereotype existed for each body type (e.g. Staffieri, 1967;1972). However, as the number of studies in this area increased, and as authors tried to investigate developmental changes, it became difficult to summarize results in terms of specific traits. Of 123 traits used in five studies, only 34 were studied more than three times. While there is some consistency in the attribution of these repeated

traits across studies, there is not sufficient empirical support for concluding that specific stereotypes exist for the three body types. Too few adjectives have been repeated. Also, the forced choice methodology used in these studies might invalidate such a conclusion. Rather, some investigators found it reasonable to summarize their results in terms of negativity. All of the studies support the finding that negative traits are assigned to the endomorph and ectomorph figures and positive traits are assigned to the mesomorph figures (Caskey & Felker, 1971; Lawson, 1980; Lerner, 1969; Lerner & Korn, 1972; Kirkpatrick & Sanders, 1978; Young & Avdzej, 1979).

In the following review, an attempt is made to analyze sex and age related differences in negativity toward endomorphs and ectomorphs. Only Staffieri's (1967; 1972) data are presented in terms of specific traits in order to familiarize the reader with the type of adjectives studied and the complexity of such results.

Staffieri (1967) conducted the first study in this area with 90 boys from grades 1 through 5. He read them 39 adjectives and asked the boys to choose between silhouettes resembling adult and child endomorphs, mesomorphs and ectomorphs. He failed to specify the sex of the silhouette. His results are presented in Table 1. Not all the traits were assigned to one body type more than the others; some were also assigned to two body types significantly more than the third. The word "remembers" was most often assigned to the mesomorph and the ectomorph. "Fights","nervous", "sick" and "tired" were associated with the endomorph and ectomorph more than the mesomorph. No age differences were obtained. Staffieri (1967) concluded that a clear stereotype had

Table 1

Staffieri's (1967;1972) Significant Trait Attributions

	Endomorph	Mesomorph	Ectomorph
Boys (1967)	Cheats	Strong	Quiet
	Argues	Best friend	Worries
	Gets teased	Clean	Lonely
	Forgets	Many friends	Sneaky
	Lazy	Happy	Afraid
	Lies	Helps others	Sad
	Sloppy	Polite	Weak
	Naughty	Healthy	
	Mean	Honest	
	Ugly	Brave	
	Dirty	Good looking	
	Stupid	Smart	
		Neat	
Girls (1972)	Fights	Best friend	Quiet
	Cheats	Many friends	Weak
	Worrier	Happy	
	Argues	Helps others	
	Gets teased	Polite	
	Lonely	Remembers	
	Lazy	Healthy	
	Lies	Brave	
	Sloppy	Good looking	
	Naughty	Smart	
	Mean	Neat	
	Ugly		
	Sad		
	Stupid		

been obtained for the three body types.

Staffieri (1972) went on to replicate this experiment with 60 girls in grades 2 through 6. The procedure was similar, with the 38 adjectives being assigned to female silhouettes of unspecified age. Once again, many traits were assigned to one body type more than the others (See Table 1). Several traits were also assigned equally to more than one body type. "Kind" and "clean" were assigned to mesomorph and ectomorph more than the endomorph. The endomorph and ectomorph were associated with "afraid" and "tired" more than the mesomorph. As in boys, no age differences were found. Staffieri (1972) concluded that a clear stereotype had been obtained for the three body types by the age of 6.

Three studies confirm and extend Staffieri's (1967; 1972) findings with respect to age. Caskey and Felker (1971) studied 90 girls from grades 1 through 5 as subjects. They used Staffieri's (1967) adjectives (with three exceptions) and had them attributed to three female silhouettes. Once again, many of these traits were assigned to one body type than the others, with the trait attributions becoming less random after grade 1. They concluded that stereotyping of the ectomorph and endomorph body types begins after grade 2.

Using a different set of 30 adjectives, Lerner (1969) studied body type attitudes in 10, 14 and 17 year old boys. He asked these 50 boys to attribute traits to photographs of adult males of the three body types. Similarly, all the traits attributed to the endomorph and ectomorph were negative while only 2 of the 10 attributed to the mesomorph were negative. Once again, no age differences were reported.

Lerner (1969) reported that the sterotypes found by Staffieri (1967) extended through adolescence.

Lerner and Korn (1972) studied 60 boys, including 5-6 year olds, 14-15 year olds, and 19-20 year olds. The boys were asked to assign 28 bipolar traits to drawings of male peers. The authors reported that all subjects attributed negative traits to the endomorph and positive traits to the mesomorph. No age effects were found.

These studies seem to indicate that body stereotypes are held by children from 7-8 years of age through adolescence, with no developmental changes. However, two other studies did report age changes, at least with respect to attitudes toward mesomorphs. Lawson (1980) studied age trends in Australian migrant children. She asked 84 male and female children in grades 2,4 and 6 to assign the 28 bipolar Verbal Checklist items. The stimulus figures were same sex drawings of the three body types. She reported that the endomorph was perceived equally unfavorably by all age groups. The mesomorph became more positively perceived, and the ectomorph became less positively perceived between the ages of 8 and 9.

Kirkpatrick and Sanders (1978) asked 300 male and female 6 to 18 year olds to assign Staffieri's (1967) adjectives to three silhouettes. They found that the traits assigned to the body types differed by the age of the subject. They supported Lawson's (1980) findings that the endomorph was perceived negatively at all ages. However, in contrast to Lawson, they found that the mesomorph was suddenly perceived less positively at the age of 13, and the ectomorph was perceived consistently moderately.

By and large, these studies do not present data which is helpful to a study of cognition and stereotypic development for several reasons. The most obvious deficiency is the failure to focus upon the 5 to 8 year transition period. Most of these attributional studies utilized methods appropriate to older, not younger, children. Before turning to a critique of some of the methodological problems and to some later research which clarifies age and sex differences, it is necessary to briefly summarize the results of these studies with respect to sex.

Once again, sex differences seem likely, but the data are too weak to identify them. Only one of these studies, Kirkpatrick & Sanders (1978), directly analyzed their results for sex differences. They found differences in how the traits "fights", "kind", "polite", "remembers", "mean" and "tired" were attributed. However, they discussed these effects as negligible compared to those generated by age, and failed to describe the differing attribution patterns. Although he did not compare male and female subjects within one study, Staffieri (1972) compared the results he obtained from two seperate studies of male and female children. He found that the boys rated the ectomorph more negatively than the girls. Unfortunately, this comparison is confounded with age; the girls were older than the boys. Clearly, the study of sex differences in weight category attributions has been haphazard.

In addition to the lack of research which systematically analyzes sex differences and age changes, several issues are raised by these studies. One is the validity of the forced choice paradigm. It may be that this factor accounts for the ambiguity in the findings on age

trends in attribution patterns. It is possible that forcing the child to attribute each trait to one and only one figure results in an unnaturally rigid attribution pattern, more reflective of knowledge of social convention. On the other hand, children could refuse to attribute traits honestly, out of fear of disapproval, if they had a free choice like adults were given. Lerner and Schroeder (1971a) found that results similar to those obtained on the attribution task were obtained when children were asked to describe body types in their own words; however, only 5 year olds did this task, and not the older children who would be more likely to feel social pressure. Therefore, some exploration of free versus forced choice paradigms would be valuable.

A recent study by White & Rhodes (1984) elucidated the equivocal age and sex difference results by taking some of the criticisms of the forced choice paradigm into account. They studied 274 male and female children in three age groups; 3-5 years, 6-8 years and 9-11 years. Each subject sorted 20 traits to overweight, normal weight or both normal weight and overweight figures (free choice) and then to the normal weight or overweight figure (forced choice). The extent to which each child attributed positive traits to the normal weight figure and negative traits to the overweight figure ("negativity") was calculated under both forced and free choice conditions. The number of traits attributed to both figures ("flexibility") was also calculated. The results indicated that only preschool girls were negative to overweight, and by 6-8 years of age, both sexes sorted negatively under forced choice conditions, but not as consistently under free choice conditions.

Flexibility gradually increased with age for both sexes and by 9-11 years of age, both sexes acknowledged that traits could be shared by both weight types.

Several conclusions can be drawn from these results. First, there seems to be a distinction between free and forced choice trait attributions, and the flexibility score also provides unique information. Secondly, the results suggested that the onset of negative attribution patterns varies between the sexes, and that negativity varies with age under both free and forced choice conditions. The fact that this variation is not parallel in males and females, however, suggests that it may not be age alone which mediates changes in attitudes. Thirdly, the trends suggest a peak in negativity at 6-8 years.

Thus, research alleviating some of the methodological difficulties of earlier studies supports the theory that negative trait attribution patterns may be mediated by cognitive development. The faster development of girls' cognitive abilities is well-documented (e.g. Hetherington & Parke, 1979). Therefore, this could explain the age by sex interaction in attribution patterns. In addition, the peak in negativity towards overweight occurs at 6-8 years, which roughly corresponds to the transition from preoperational and concrete operational thinking in Piagetian theory.

Piagetian stage theory does not apply to trait attribution specifically enough to warrent forming hypotheses on this basis. He did, however, discuss the tendency to view one's own group more favorably than another unfamiliar group (Campbell, 1976). In addition,

a recent theory of gender attitude development (Martin & Halverson, 1981) suggested that forced choice attribution patterns developed into "like me/not like me" schemata with development. In weight terms, such a schema would result in what has been referred to here as negativity; positive traits being attributed to the normal weight figure ("like me") and negative traits being attributed to the overweight figure ("not like me") by normal weight children. This theory and White & Rhodes' (1984) results gave rise to the third hypothesis of the present study; that is, that concrete operational children, who would have already learned such a schema, would assign traits more negatively than preoperational children. In contrast, the finding that flexibility increased with age is consistent with Piagetian theory on increased use of multiple categorization after the transition from preoperational to concrete operational thought. This conclusion gives rise to the fourth hypothesis of the present study; that is, that concrete operational children would tend to attribute more traits to both normal weight and overweight figures more than preoperational children.

Cognitive-Developmental Theory

There are several possible explanations for the existence of such negative attitudes in young children. Veridical category-behavior relationships, social transmission and cognitive-developmental factors have all been implicated in the development of social stereotypes, and may all be operating in the development of attitudes about weight. Cognitive-developmental factors have often been ignored, though the literature on weight attitudes implicates their involvement. As a result, this study focusses on their role in weight attitudes.

Perhaps the simplest attitude development theory is that children develop their attitudes through experience; in other words, people with specific body types actually behave as prevailing attitudes suggest. This theory, first proposed by Sheldon (1942), has received limited support. While some characteristics have been associated with particular weight categories (Kagan, 1966; Stewart, 1982), the studies were poorly controlled and the results were not as robust as Sheldon (1942) would have predicted.

A better-supported theory is that children acquire attitudes through social transmission. That is, they might be directly taught or simply adopt the prevailing ideas in a culture. Traditionally, parents have been assumed to be the most influential models for children (Allport, 1954). Indeed, there is some evidence that children share a number of their parents' general attitudes, e.g. ethnocentrism, (Gardner, Taylor & Feenstra, 1970), and that parental behavior is correlated with children's attitudes (e.g. Serbin, 1980). No such studies have been conducted on the transmission of weight-related attitudes. However, the fact that adults also possess negativity towards non-mesomorphs suggests that some of children's weight-related attitudes are socially transmitted.

Both these theories may be valid; children may develop weight attitudes by exposure to individuals of varying weights and the prevailing cultural norms. As the child's learning has become viewed as an active process, the role of cognitive-developmental factors has also been implicated. Although previous researchers have adopted a multivariate model of attitude formation they have neglected cognitive-

developmental variables until recently.

Piagetian theory. Cognitive-developmental theory has its origins in Piaget's stage theory of child development. Therefore, a review and attempt at integrating Piagetian concepts with weight attitudes will be attempted first. This theory incorporates the contribution of the "subject" or child who processes, and the "object", or information, as well as allowing for experiential and social learning effects. Piaget's view is that the child actively constructs an individual understanding of the world during the course of development. Such construction implies an interaction between the child and the physical and social world. The child's knowledge develops from experience and pre-existing mental structures (Furth, 1970). As new information is encountered, the existing structures are modified in a process referred to as accommodation. Over time, the child moves from a prelogical state to a logical/operational one through this process.

All aspects of Piaget's theory have not been implicated in social attitude development. Therefore, this review will focus only on the transition from the preoperational stage to the concrete operational stage. In Piagetian theory, such transitions are made when a stage becomes inadequate for processing experiences. As a result, there are wide variations in the age at which transitions are made (Ginsburg & Opper, 1979; Singer & Reveson, 1978). This particular transition is usually thought to take place between 5 and 8 years of age (Turner, 1984). During this time, children lose their simple, egocentric response to the world, which is primarily in terms of actions and images, and acquire a response which includes the ability to symbolize,

to use internal cognitive mediators and, to reflect upon relations between general symbols. Piaget believed that the development of concrete operations marked a critical qualitative shift in the thinking of children in that they moved from the intuitive world of preoperational intelligence, to the period of concrete operations. At this time, their thinking becomes governed by operations or internalized actions which are reversible and governed by laws (Turner, 1984). These cognitive changes are reflected in behavioral changes; S. White (1965) found changes in 21 non-social behaviors in children between 5 and 7 years of age.

Piaget and his followers have documented the development of specific forms of understanding such as classification, seriation, number, conservation, perception, memory, and language. Three of these areas serve as a basis for relating knowledge about physical reality to children's development of social attitudes. The areas of perception, classification, and conservation intuitively seem to be the most pertinent to the weight awareness matching task and trait attribution.

With respect to perception, the preoperational child is thought to focus on perceptual aspects of stimuli (Singer & Reveson, 1978). For example, when asked how a quarter and a dime are alike, he or she is likely to respond that they are both round or silver. In contrast, the concrete operational child is more likely to respond that they are both money and can be used to buy things. Thus, the transition to concrete operational thought seems to be marked by a reduction in the perceptual focus.

As can be seen in the above example, perception also frequently

provides the basis for classification in the preoperational stage. The classification systems of these children have also been described as mere collections of objects, rather than true classes (Turner, 1984). Furthermore, the preoperational child is said to focus on only one aspect or dimension of a stimulus. This centration results in the preoperational child being unable to appreciate the fact that one object can be a member of more than one class, or see relationships between classes. In contrast, by about 7 years of age, children were found to have developed systems of classification and relationship which enabled them to see that objects could belong to more than one class (Turner, 1984; Ginsburg & Opper, 1979). Thus, the child also seems to gain understanding of relationships between objects during this time.

Both perception and classification are related to the concept of conservation. According to Ginsburg & Opper (1979), it is the diminished importance of perceptual cues and focus on one aspect of a stimulus ("Centration") which allows the child to conserve. "Conservation means the understanding that certain attributes such as number, substance, weight, volume, and identity of objects or people will remain invariant, i.e., be conserved, despite apparent, often perceptual, changes which have no bearing on the attribute in question" (Turner, 1984,p.83). Many authors consider the acquisition of this concept to be the primary boundary between preoperational and concrete operational thought (Turner, 1984; Singer & Reveson, 1978).

Cognitive-developmental theory and social attitudes. Although Piagetian stage theory has been widely applied to the study of logical thought about objects, it has only been recently that researchers have

begun to explore the relationship of cognitive stage theory to person perception and social attitudes. One way in which investigators have attempted to link Piagetian theory to social development has been noting that changes in thinking about objects and people occur at similar ages (e.g. Hetherington & Parke, 1979). For example, Peevers & Secord (1973) studied changes in children's perceptions of others with age. They interviewed 80 subjects from kindergarten, grade 3, grade 7, high school and university. They found that their descriptions of acquaintances became more differentiated with age. Although no post hoc tests were conducted on these data, there was a large increase in the use of differentiating descriptors between the kindergarten and older subjects.

Similarly, Livesley & Bromley (1973) collected descriptions of others from hundreds of children over several years, and subjected them to qualitative analyses. They found that children did not consistently try to classify others until the age of 7 or 8, and there was a corresponding increase in the number of personal qualities attributed to them. From 7 to 9 years, children still tended to focus on how these qualities affected them personally. After the age of 9, this egocentrism decreased and they also became able to take situational variables and other factors into account. Thus, they concluded that since decentering and the loss of egocentricity occur at approximately the same time, they could explain these changes in how people are perceived.

Although such findings are provocative, they do not strongly support or elucidate the relationship of cognitive and social attitude development. More specific hypotheses, directly related to cognitive

theory and tested in a fashion which controls for the effects of age, is required. Such attempts to link cognitive development and social perception have been made. For example, Connor & Serbin (1977) implied a relationship between a typically cognitive process and children's gender attitudes when they correlated boys' and girls' verbal intelligence to preference for sex appropriate activities, and boys' visual spatial ability in activity preferences.

Other researchers have related more specific cognitive abilities to gender concepts. Marcus and Overton (1978) studied the relationship between conservation and gender preference and constancy. They tested 96 male and female children in kindergarten, grade 1 and grade 2. Both equivalence conservation (the comparison between two simultaneously presented views of one object) and identity conservation (the comparison of an earlier and a transformed view of one object) were tested with two Piagetian tasks. The subjects' gender preference was determined through a series of open-ended questions about their friends, activities and goals. In addition, their understanding of gender constancy was measured with a task that involved altering the hair, clothes, play or motives of the stimulus person and asking the child what sex the person was after each transformation. The stimulus person was presented as either the self or another person, and in either drawn or live form. There were no sex differences in the results. They found gender constancy increased with age, both with the use of the self as the stimulus person, and, for younger subjects, the use of drawn stimuli. There were no differences between the equivalence and identity forms of the conservation tasks; both scores also increased with age.

Controlling for age, non-conservers had significantly lower gender constancy scores than other subjects. Guttman scaling revealed seven stages in the acquisition of all of these concepts, with one type of gender constancy preceding conservation, and another following it. No effects were found for gender preference. The authors concluded that gender constancy and physical conservation develop concurrently. They also suggested that, while gender constancy was cognitively determined, gender preferences were socially determined.

Similarly, Coker (1984) attempted to sequence the development of gender concepts and conservation in sixty 3 to 6 year old males and females. Although she used many measures, only the results for the cognitive measures, item memory and conservation, and their relationship to gender concepts, are presented here. Despite little variability in the conservation scores, some significant correlations were obtained. For girls, conservation was positively correlated with age, recall memory, stereotypic knowledge (attributes and objects) and sex categorization. For boys, conservation was negatively correlated with sterotypic knowledge for attributes. Recall memory and conservation contributed little to a stepwise regression with the effects of age partialled out. The author concluded that more sensitive cognitive measures were required to truly assess the relationship between cognitive and gender concept development.

These studies used subjects of differing ages, different measures and different designs. Therefore, it is not surprising that their results do not lead to a precise theory of gender attitude development. However, one common finding in these studies was that cognitive measures

were related to some gender concept measures when age was held constant. While this finding is too general to greatly alter current knowledge, it does suggest that developmental trends in children's perceptions of others may be the result of cognitive growth. In addition, Coker's (1984) results tentatively suggest that there may be sex differences in the relationship between cognitive development and social attitudes.

The above studies give rise to a link between cognition and social attitudes, but contribute little to understanding the processes involved. Other gender attitude researchers have addressed this question by hypothesizing cognitive structures for social attitudes or stereotypes. One of the earliest, Vinacke (1957), believed that people possessed "concept systems" which included personality traits and identifying characteristics. He suggested that these characteristics might be based on experience or social learning.

More recent theorists de-emphasize the possibility that some content is veridical, and suggest that the self-concept interacts with social influences to produce social schemas. These theorists suggest that the gender schema either results from the development of the self-concept (Bem, 1981) or is first applied to the self-concept and then to the world (Lewis & Weintraub, 1979). Their models involve the realization of one's own gender label, acquiring knowledge about appropriate behaviors, and finally, the application of this knowledge to others' behavior.

Martin and Halverson (1981) provide the most operational model of such processes. They emphasize social modeling as the source of gender schemas, and suggest that gender is such a common dichotomy in society

that children automatically incorporate it into their manner of thinking. However, they conceptualize the resultant categories as representing "like me" and "not like me" as opposed to "male" and "female". Thus, they too suggest that the self plays a primary role in the development of gender schemas. The sex typing process is described as an object becoming salient through self-relevance, being categorized as masculine or feminine, and being re-labelled "like me" or "not like me". Then a decision is made about the appropriateness of using the object. A second schema, containing specific information for the child's own sex, then allows the child to manipulate the object appropriately.

While these theories about the origin of cognitive structures for gender are not identical, they are more alike than they are discrepant. They all conceptualize the development of schemas as an interaction between self concept development and socio-cultural influences. The advantage of Martin & Halverson's (1981) theory over the others is that they have described the nature of the categories generally enough that they can be applied to other types of attitudes.

Cognitive-developmental theory and weight attitudes. The studies relating cognitive development to gender attitudes justify testing the effects of cognition on other social attitudes in a design controlling for age and assessing the effect of sex differences. However, the methodology of these studies could be improved. First, the determination of cognitive levels seems questionable; Marcus & Overton's (1978) conservation measure was very narrow in focus, and the limited range of scores on Coker's (1984) test made their use for correlational

analyses suspect. Second, in both cases cognitive level was confounded with age, necessitating statistically partialling out its effects.

The present study attempted to correct these methodological problems. One of the primary issues in this study is the means of differentiating subjects of varying cognitive levels. Conservation was selected over an intelligence test for several reasons. First, previous researchers on gender attitudes have found stronger relationships between conservation and attitudes (Marcus & Overton, 1978; Coker, 1984) than betweeen IQ and attitudes (Connor & Serbin, 1977). Second, conservation has a critical role in cognitive-developmental theory, the basis for the present studies' hypotheses. According to the theory, the acquisition of conservation implies specific shifts in the quality of thought. As such, the use of a conservation measure permitted generation of specific hypotheses based on cognitive-developmental level. In contrast, a low or high IQ score would not have communicated any information about qualitative shifts in thinking. Third, an IQ score is derived from age norms. As a result, the use of such a measure would not permit complete controlling for the effects of age. Therefore, while conservation and IQ have been found to be moderately correlated (Goldschmid & Bentler,1968), there are advantages to using a conservation measure rather than a traditional IQ test to distinguish subjects of varying cognitive levels.

In order to assess only differences in cognitive functioning, the effects of age were also controlled in the present study. Subjects between the ages of 4 and 8 were studied in order to ensure a suitably wide range of conservation scores. Their ages were then controlled by

selecting subjects of similar ages for the high and low conserving groups.

The literature on cognitive-developmental theory and its relation to social attitudes also suggests some of the present study's specific hypotheses. Piagetian theory serves as the basis for predictions about the relationship between categorizing by weight and cognitive development. According to Piaget and his followers, the transition to concrete operational thought is marked by a reduced focus on perceptual cues (Singer & Reveson, 1978). Weight intuitively seems to be a more visual or perceptual characteristic than activity. Therefore, choosing to match less on the basis of weight in favor of activity seems congruent with a diminished perceptual focus. Thus, it would be expected that preoperational children would match on the basis of weight more often than concrete operational children.

Children's trait attribution patterns can also be hypothesized from cognitive-developmental theory. Since adults possess negativity about overweight, the same type of differential sorting by children can also be predicted on the basis of social transmission. However, Martin & Halverson's (1981) schema theory suggests the process by which this pattern emerges. With regard to weight, these normal weight subjects would see the normal weight figure as "like me" and the overweight figure as "not like me". Martin & Halverson (1981) suggest that this categorization system develops with age in 2 to 5 year olds. As a result, children at higher cognitive levels might have learned to systematically process information using this better than children at lower cognitive levels. Since categorizing by weight likely develops

later than categorizing by sex, it might be predicted that concrete operational children would assign more negative traits to the overweight and positive traits to the normal weight figure. Although this theory is only based on a forced choice paradigm, there is no reason to believe the negative attribution patterns would differ for free choice sorts; as a result, this pattern would be expected under both conditions.

Children's acknowledgement that traits could describe both figures (flexibility) can be predicted from Piagetian theory. Turner (1984), among others, notes that higher stages of cognitive development are more complete, differentiated and integrated. In addition, concrete operational children are described as more able to see that objects could belong to more than one class. The attribution of traits to more than one figure is clearly the social equivalent of multiple categorization. Therefore, it would be expected that concrete operational children would tend to attribute more traits to both figures than preoperational children.

In contrast, cognitive-developmental theory does not seem to clearly suggest predictions about preference, aversion and affiliation-preference. While Piaget suggested that children prefer their own group to others (Campbell, 1976), this hypothesis was not really related to his stage theory. In addition, only Coker (1984) studied the relationship between conservation and gender preference and she found no correlation in boys or girls. There is, however, a growing literature on the differential socialization of girls and boys with regard to weight. Adult women and young girls seem forced to be much more weight conscious than males. While this sort of social pressure is unlikely to

have much effect on the more cognitive matching or sorting tasks, it may be reflected in children's preferences, aversions and affiliation-preferences. As a result, it would be predicted that girls would exhibit a greater preference for normal weight, aversion for overweight and make more weight-based affiliation-preferences than boys.

Statement of the Problem

As indicated by the literature review, cognitive and social development are thought to show parallel age courses in children (Hetherington & Parke, 1979), and to be correlated (Marcus & Overton, 1978; Coker, 1984). However, to date, few studies have developed specific hypotheses about cognitive-social relationships or utilized a methodology which controlled for the effects of age. The purpose of the present study was to attempt an initial integration of Piagetian theory and social attitudes about overweight, to develop specific hypotheses about the relation of cognitive level and social attitudes, and to test these hypotheses in a paradigm which controls for age effects and allows the examination of sex differences. It was suggested that while cognitive theory predicts some aspects of social attitude development, sex may also be an important subject variable in the acquisition of attitudes about weight.

In order to differentiate the cognitive level of 4 to 8 year old subjects, a measure of conservation was administered. This measure was used to differentiate preoperational and concrete operational level children. As conservation level and age are moderately correlated (Goldschmid & Bentler, 1968), and age has also been related to weight attitudes (Kirkpatrick & Sanders, 1978; Lawson, 1980), groups of high

and low conserving subjects were of similar ages.

Three sets of variables measuring social attitudes were selected: weight awareness or matching by weight; preference, aversion and affiliation-preference; and weight-based trait attributions. With respect to body weight as a matching dimension, it was predicted that preoperational children, who are apt to focus on a single, perceptual stimulus aspect, would find body weight a more salient matching dimension than children at the concrete operational level. Empirical evidence is consistent with such a prediction and indicates that matching on the basis of weight declines significantly after 8 years of age (White et al, in press). The first hypothesis of the study was that children who scored low on the conservation measure would make more weight matches on White et al's (in press) Body Salience measure than children who scored high on the conservation measure.

In contrast, cognitive-developmental theory does not provide the basis for predictions about preferences. Although one study by Lerner et al (1975) supports an increase in aversion to overweight between the ages of 5-7 and 8-10, lack of confirmation in other studies and methodological problems make it impossible to hypothesize a link between social preferences and cognitive development. Previous work on body type preferences, however, has found that girls possess a stronger preference for the normal weight figure (Lerner & Gellert, 1969). White et al (in press) reported that females tended to express affiliative-preferences based upon weight more often than males. In addition, there seems to be differential pressure to be thin on male and female children (Woody & Costanzo, 1981). Therefore, the second hypothesis was that

girls would choose the normal weight figure more and the overweight figure less on the Preference task, and make more weight-based affiliation preferences than boys.

With respect to trait attribution, children in this study were asked to attribute twenty traits or behaviors to normal weight, overweight, or "both" normal weight and overweight stimuli in free and forced choice sorts. This was intended to measure the subject's actual endorsement of negative attitudes towards overweight. Knowledge of prevailing attitudes was assessed by having subjects sort the same traits to only a normal weight figure or overweight figure. Empirical studies provide conflicting data regarding the development of trait attributions. Several studies found no age related changes (Caskey & Felker, 1971; Lerner, 1969; Lerner & Korn, 1972; Staffieri, 1967,1972); others found conflicting developmental patterns (Kirkpatrick & Sanders, 1978; Lawson, 1980; White & Rhodes, 1984). In view of these conflicting results, the hypothesis relating cognition and trait attribution was obtained from theoretical rather than empirical grounds. The third hypothesis was based on Martin & Halverson's (1981) extension of cognitive theory to gender role learning. They suggested that once the gender dichotomy was incorporated into children's thinking, "like me" and "not like me" categories result. Therefore, they would predict that children at moderate cognitive levels would be more apt to clearly differentiate positive and negative traits on a like me/not like me dimension, while children at lower cognitive levels would sort in a more random, less differentiated manner.

The use of the "both" category in the free choice sort was designed

to measure flexibility, or the recognition that a trait could belong to more than one category. Piagetian theory related to the transition from preoperational to concrete operational stages provided the basis for the fourth hypothesis. This transition is marked by the diminished importance of perceptual cues, and later stages are described as more complete, differentiated and integrated (Hetherington & Parke, 1979). Therefore, the concrete operational thinker should be generally less influenced by weight, and less rigid in his or her attributions. Since the preoperational child does not appreciate the fact that an object can be a member of more than one class, it was predicted that children who scored low on the conservation task would make less use of the "both" category than children who scored high on the conservation task. This prediction is supported by the increasing flexibility in trait attributions under free choice conditions with age found by White & Rhodes (1984).

Method

Subjects

Forty-two subjects were chosen from a larger sample of 177 male and female subjects between the ages of 42 and 125 months (3.6 and 10.6 years). These subjects attended one of four preschool and elementary schools located in lower-middle to upper-middle class socio-economic areas in Montreal. All subjects met three criteria: their parents had given permission for them to participate, they possessed an adequate familiarity with the English language, and they themselves agreed to participate.

Subjects were selected for this study on the basis of their scores on the Concept Assessment Kit - Conservation Test (Goldschmid & Bentler, 1968). An analysis of these scores for the total sample revealed a range of scores from 0 to 24. The male and female subjects with the most extreme scores were selected; this resulted in low conservation scores being defined as 0 to 10, and high conservation scores being defined as 18 to 24. The resultant sample consisted of 10 high conserver and 10 low conserver females, and 11 high conserver and 11 low conserver males. An attempt was also made to minimize age differences between the four groups.

The mean ages and conservation scores for all four groups are presented in Table 2. At the initial session, the subjects ranged in age from 53 to 99 months (4.6 to 8 years), and the mean age for the sample was 77.55 months (6.46 years). An analysis of variance on subjects' ages revealed no significant differences by conservation level, $F(1,38) = .15$, $p = .70$, sex, $F(1,38) = .18$, $p = .67$, or

Table 2

Mean Age and Conservation Scores by Group

Group	Age in months (standard deviation)	Conservation score (standard deviation)
Male low conservers (n=11)	77.45 (11.77)	4.91 (3.36)
Male high conservers (n=11)	79.09 (9.78)	19.45 (1.51)
Female low conservers (n=10)	76.20 (12.79)	4.80 (3.29)
Female high conservers (n=10)	77.30 (11.93)	20.05 (1.90)

their interaction, $F(1,38) = .01$, $p = .94$. Subjects' conservation scores also varied as intended; high and low conservers were significantly different, $F(1,38) = 342.61$, $p = .0000$, but males and females were not different, $F(1,38) = .33$, $p = .57$, and the interaction was not significant, $F(1,38) = .50$, $p = .48$.

Measures

Body salience. White et al's (in press) Body Salience Test was used to assess the extent to which weight was a salient categorization dimension for each child. This measure is a series of 14 matching items. Each item consists of four simple line-drawings of male or female children engaged in some activity. An item by item description can be found in Appendix A.

Aside from their weights, all of the pictured children had been pre-judged to be equally attractive. They are pictured participating in socially acceptable, unacceptable or neutral activities.

The drawings are in black ink on white paper 10 by 15 cm in size. Each is attached to a black background, and covered by a sheet of plastic. The drawings for each item are displayed on the back of the preceding page and the facing page of the stimulus binder. For each item, the child is asked to match a standard to one of three other drawings. The standard drawing is presented on one page, while the remaining three drawings are equally spaced below.

The 14 standards vary in sex, weight status, and activity. The corresponding three drawings are the same sex as the standard. For each item, one of these three drawings matches the standard in terms of weight, one matches the standard in terms of activity, and one does not

match the standard on any known dimension. The stimuli were designed such that the potential for matching on the basis of incidental cues, such as dress or stance, is minimal. The relative position of the types of matches on the page also varies.

The reliability of this measure was assessed in a pilot study conducted by White et al (in press) on 96 children from 3 to 9 years of age. The split half coefficient obtained at this time was .716. The validity of this measure has yet to be assessed.

Three scores may be obtained from this measure. The body, activity and random responses scores are obtained by summing the total number of each type of response. Each of these scores can range from 0 to 14.

Preference. Preference was measured using nine pairs of line-drawn children. The two drawings for each item are placed 2 to 3 cm apart on one page of the stimulus binder. These drawings are similar to the Body Salience drawings in simplicity, color, and size. The pictured figures are once again equally attractive children of varying weights. These differ from the Body Salience drawings in that they are the same sex as the subject, and are always presented standing inactive.

For this measure, both drawings of an item are presented with no prop, and the subject is asked to identify the child he/she would most like to play with. The drawings are of either an overweight, normal weight or underweight child. All possible combinations of two body types are presented three times, with the position of each on the page varying.

A preference for normal weight score is obtained for each subject by summing the total number of normal weight choices made out of six.

An aversion for overweight score is obtained by summing the total number of times out of six that subjects chose the normal weight or underweight figure over the overweight figure.

Affiliation-preference. White et al's (in press) Affiliation-Preference Test was used to measure the relative salience of prop and weight in children's affiliation preferences. These four items resemble the Preference test items in appearance and mode of presentation. They differ from the Preference test items in that only overweight and normal weight pairs of drawings are presented. In addition, the overweight figure is always pictured with an attractive prop such as a ball, sled, guitar or skates. Once again, the position of each body type on the page varies. The question asked of the child also varies with each item; for the first item, he/she is asked with whom he/she would like to play, but for the remaining items, the child is asked with whom he/she would like to participate in the specific prop-related activity. For example, when the overweight child is pictured with skates, the child is asked with whom he/she would like to skate.

Affiliation-Preference scores can be obtained for each subject by summing the total number of weight-based and prop-based choices made in the final four items. These two scores range from 0 to 4.

Trait attributions. White & Rhodes' (1984) Weight Stereotyping measure was used to assess the manner in which children attribute characteristics to overweight and normal weight figures under both forced and free choice conditions. This measure is a pictorial version of measures used by previous researchers to assess stereotyping. It consists of a series of 20 pictures. Presentation of each picture is

followed by a standardized verbal explanation. These remarks describe the picture, name the trait, and ask the child to identify who is being described. Each item is described in Appendix B. The pictures are simple, colored drawings on white, 10 by 15.5 cm cards encased in plastic. An attempt was made to avoid displaying children in the pictures, as it seemed to confuse the pilot subjects. When this was unavoidable, the pictured child was the same sex as the subject and only the faces were pictured. There is a pre-determined random order of presentation for the pictures.

Each picture reflects a concrete behavior associated with the particular trait. Twelve of the pictures represent a positive or neutral trait (smart, clean, polite, neat, jolly, strong, affectionate, generous, likes to play, watches tv, quiet, likes music), and eight represent negative traits (mean, sad, gets teased, lazy, teases, sneaky, naughty, afraid).

These stimuli are accompanied by three, silver and white, 16 cm square cardboard boxes. Each box has a clip for attaching one or two figures. One box displays an overweight silhouette, one a normal weight silhouette, and one both normal and overweight silhouettes. The silhouettes are black, 18 cm high, cut-out figures the same sex as the subject. The relative positions of the silhouettes is varied when the test is administered.

White & Rhodes (1984) assessed the internal reliability of this measure separately for 104 preschool and 167 elementary school subjects. Cronbach's alpha was .85 in the preschool sample and .86 in the elementary school subjects for forced choice responses. For free choice

responses, Cronbach's alpha was .80 in the preschool sample and .76 in the elementary school subjects. The alpha for preschool children's use of the both response was .74, while the alpha for elementary school children's use of the both response equalled .78.

Three scores can be calculated from this measure. A negativity score can be calculated under both free and forced choice conditions. This score is obtained by assigning a value of +1 each time either a positive or neutral trait is attributed to the normal weight figure or a negative trait is attributed to the overweight figure, and assigning a value of -1 each time the reverse occurs. Thus, this score can range from -20 to 20. The total number of attributions to both body types under free choice conditions will also be calculated (flexibility score). This scores ranges from 0 to 20.

Conservation. Goldschmid & Bentler's (1968) Concept Assessment Kit - Conservation test (form B) was used to assess the level of conservation each child had achieved. This measure was developed for use with male and female children between 4 and 7.5 years of age. It is a series of six conservation tests: conservation of two dimensional space, number, substance, continuous quantity, weight and discontinuous quantity. The kit contains many items which must be manipulated by the experimenter and the child. The stimuli are described in detail in Appendix C.

The present 6 tasks were chosen from the original 10 piloted by Goldschmid (1967). Although this form was internally reliable and seemed to measure one global construct, Goldschmid & Bentler (1968) created two parallel forms to decrease the administration time and allow

subjects to be retested. A subsequent analysis demonstrated that scores on the two forms were highly correlated (.95).

Goldschmid & Bentler's (1968) normative tables and scoring system were judged inappropriate for the present study's sample. Although they provide norms for male and female children from 4 to 7.5 years of age, their normative sample was predominantly composed of lower-middle class children. The scoring system was rejected as it seemed to excessively penalize children with lesser verbal skills by requiring a relatively sophisticated verbal explanation for the child to obtain any explanation points.

The revised scoring system still yielded three scores. Each correct answer (behavior) to the six conservation questions resulted in 2 points being added to the total behavior score. However, in contrast to the original 0 or 2 scoring system, the child's explanation was awarded 0, 1, or 2 points. Each fully explained correct explanation resulted in another 2 points being added to the total score. To receive 2 points the child must have given a response containing invariant quality (for example, "You didn't add or subtract anything"), compensation ("The glass is taller, but also thinner") or reversibility ("If we put this back in a ball it would be the same"). Answers which implied one of the above rationales, but failed to fully explain the process were queried, and if no further elaboration resulted, were given scores of 1. An example of such an answer would be "you just moved them around, it's still the same". Totally inappropriate answers or responses of "I don't know" were given scores of 0. The behavior and explanation scores are then summed to create a total conservation score

for the child. This score can range from 0 to 24. This revised scoring system was piloted using the responses of 106 subjects between the ages of 3 and 10 years of age. The two independent raters agreed on 97.3% of the responses.

Procedure

Data collection was designed to minimize the disruption of school programs, and maximize subject performance. As a result, general procedures differed for the preschool and elementary school subjects. However, the actual administration of the four measures was consistent across populations.

Preschool subjects. Each subject was tested individually in three separate sessions by one of two female testers. Prior to the onset of testing, both testers spent two full days in the preschool, so that the children became familiar with them. The experimenters approached subjects during free play time. Subjects were invited to "play the game" and asked to go to the part of the room where the stimulus materials were located. Children who refused were told a little about the "games" and asked if they wished to observe another child; if this failed, they were told the experimenter would come back when they were not so busy.

Due to the subjects' short attention span, the sessions were between 10 and 20 minutes in duration. The experimenter responded enthusiastically to all answers given by the child, and attempted to minimize distractions by other children in the room. Children who asked to leave before the end of the session were allowed to do so. That child was then approached on each following day until he or she agreed

to complete the session. The sessions were typically 3 weeks apart. The preschool subjects did the Body Salience, Preference and Affiliation-Preference measures in session 1, the Weight Attributions measure in session 2, and the Concept Assessment Kit - Conservation test in session 3.

Elementary school subjects. As participants in a larger study, these subjects were given a variety of social attitude-related measures and tested on five separate occasions. Each was tested individually by one of four female experimenters. Subjects were called out of class at times deemed appropriate by the teacher. They were reminded that the experimenters were conducting a study of "how kids think", and that their parents had given permission for them to participate. They were tested in a separate room and returned to their classroom 20 to 35 minutes later. The sessions were typically 3 weeks apart. Although the order of administration of the measures varied between schools, the Concept Assessment Kit - Conservation test always followed the other three body measures.

Body salience, preference and affiliation-preference. These measures were given in one session. The experimenter introduced the task, saying "Here is a book full of pictures. I'd like to play a game with you and ask you some questions about the pictures." If the child asked about right or wrong answers, the experimenter then said, "These are special kinds of questions; they don't have a right and wrong answer. Kids answer many different ways to these questions, and all the answers are ok. I just want to find out what your answers are." Then the child was shown each item in turn and told, "Look carefully at

the picture on top. Now, which one of the children down here (experimenter pointed to each one in turn) goes best with this one up here (experimenter pointed to the standard)?"

After the matching items had been completed, the experimenter said "Now we will do something a bit different. Look at these two people and pretend that you had to choose one of them to play with. Which one would you choose?" After the preference items have been completed, the experimenter turned to the sex-appropriate affiliation items and asked the question on the scoring sheet for each item.

Trait attributions. In the training phase, each child was shown the two cut-outs, one of an overweight and one of a normal weight same-sexed peer. For example, girls were told, "Here are cut-outs of two girls. Can you tell me what's different about these two?" If the child did not know, the experimenter pointed out that one is fatter than the other. Regardless of her response to this question, each child was asked the same question about the other two cut-outs. Then the experimenter said, "Watch what I'm going to do with the cut-outs. I'll put the overweight girl here - with this box. And the normal weight girl here - with this box. And on this box, I'll put cut-outs of both. Then the experimenter said, "Now we are going to sort some pictures into the boxes. I'm going to show you some pictures of things kids do. I want you to tell me who would usually do these things." The experimenter then presented each picture in turn, asking the appropriate question. These questions are listed in Appendix B. After each question, the experimenter pointed to each box, in a random order, and said, "Would this girl, would this girl, or would both girls

(adjective)?" When the child had sorted all the adjectives, the experimenter said, "Now I'm going to take these cards out, and take the both box away, and I want you to tell me who would do these things more often; the overweight or the normal weight boy/girl." Once again, the question associated with the trait was asked, and the experimenter pointed to each box, before recording in which box the picture was placed.

Conservation. The task was introduced to the child by saying, "I have lots of games for you to play here. I'm going to show you some things and then ask you some questions". Then she proceeded with the exact verbal instructions and manipulations specified on the record form (See Appendix C). In each case, the experimenter directed the child to identify two equal quantities, then to watch her transform them, and then asked the child if the two were the same or if one had more.

Results

Body Salience

Three scores were calculated from this measure: the mean numbers of random, activity and body responses. The mean number of random responses is used to eliminate unreliable subjects from the sample. Since no subjects had more than three random responses, none were judged to be unreliable enough to be eliminated. In order to determine the appropriateness of analyzing both remaining scores, a Pearson correlation coefficient between the mean number of activity and body responses was calculated. It revealed a correlation of $-.9852$, $p=.001$. This finding, plus the lesser importance of the activity response score to the hypotheses of the study led to its being elimated from further analyses.

The mean number of body responses by group are presented in Table 3. Bartlett's homogeneity of variance test, to test the appropriateness of an analysis of variance, revealed that the variances of the number of body responses between the four groups were not significantly different, $F = .2299$, $p = .8756$. As a result, a 2 X 2 (Sex by Conservation Level) analysis of variance was performed on the mean number of body responses.

As predicted in Hypothesis 1, there was a significant main effect of conservation level for subjects' total number of body responses on this task, $F(1,38) = 5.44$, $p<.05$. Low conservers made more matches on the basis of weight ($x = 6.524$) than high conservers ($x = 3.429$) (See Table 3). The strength of this effect (ω^2) was .0975; therefore, 9.75% of the variability in body response scores was explained by conservation level. Neither the main effect of sex, $F(1,38) = .07$, $p>.05$,

Table 3

Mean Number of Body Responses By Group

Group	Mean	Standard deviation
Male low conservers (n=11)	7.00	4.17
Male high conservers (n=11)	2.63	2.87
Female low conservers (n=10)	6.00	4.94
Female high conservers (n=10)	4.30	4.67

$F(1,38) = .07$, $p>.05$, nor the sex by conservation level interaction, $F(1,38) = 1.05$, $p>.05$, were significant. The analysis of variance summary table for these effects can be found in Appendix D.

Preference

Two scores were calculated from this measure: the mean number of times the normal weight figure was chosen over the overweight or underweight figures (preference for normal weight) and the mean number of times the normal or underweight figure was chosen over the overweight figure (aversion for overweight). The group means for these two scores are presented in Table 4.

In order to determine the appropriate statistical procedure for studying these variables, Pearson correlation and Bartlett's homogeneity of variance tests were carried out. These preliminary analyses revealed a non-significant correlation between the two scores, $r = .2387$, $p>.05$, and no significant differences between groups in the variances of preference for normal weight, $F = .31$, $p>.05$, and aversion for overweight scores, $F = 1.18$, $p>.05$. As a result, two seperate 2 X 2 analyses of variance were carried out on these scores.

Contrary to Hypothesis 2, there was a significant main effect of conservation level for preference for normal weight scores, $F(1,38) = 5.25$, $p<.03$. High conservers chose the normal weight playmate more ($\bar{x} = 4.26$) than low conservers ($\bar{x} = 3.425$) (See Table 4). The strength of this effect was found to be .0894. There were no significant effects by sex, $F(1,38) = 1.15$, $p>.05$, or the sex by conservation level interaction, $F(1,38) = 2.24$, $p>.05$. These anovas are summarized in Appendix E.

Table 4

Mean Preference for Normal Weight(P-NW) and Aversion for Overweight(A-OW) Scores By Group

Group	Mean scores (standard deviation)	
	P-NW	A-OW
Male low conservers (n=11)	3.55 (.93)	2.64 (1.81)
Male high conservers (n=11)	3.82 (1.17)	3.55 (2.02)
Female low conservers (n=10)	3.40 (1.27)	4.10 (1.85)
Female high conservers (n=10)	4.70 (1.06)	4.40 (1.08)

As predicted in Hypothesis 2, the sex effect was significant, $F(1,38) = 4.67$, $p<.05$, for aversion for overweight. Girls chose the non-overweight figure more often ($\bar{x} = 4.25$), than boys ($\bar{x} = 3.95$) (See Table 4). The strength of this effect was found to be .0810. The effect of conservation level and the sex by conservation level interaction were not significant, $F(1,38) = 1.27$, $p>.05$, $F(1,38) = .32$, $p>.05$.

Affiliation-Preference

Once again, two scores were calculated from this measure: the mean number of prop-based (overweight figure with prop chosen) and weight-based (normal weight figure with no prop chosen) responses. The linear dependency between these two variables was confirmed by calculating a Pearson correlation coefficient; these scores were perfectly correlated ($r = -1.00$, $p = .001$). As this finding necessitated eliminating one score from further analyses (Tabachnick & Fidell, 1983), only the mean number of weight-based responses were analyzed. These means are presented in Table 5.

Bartlett's homogeneity of variance test demonstrated that the variances of these scores did not vary significantly between the four groups, $F = .9352$, $p = .422$; this led to a 2 X 2 analysis of variance being performed.

As predicted in Hypothesis 2, there was a significant main effect of sex on the number of weight-based responses, $F(1,38) = 8.36$, $p<.01$. Girls chose the normal weight figure with no prop more often ($\bar{x} = 1.80$) than boys ($\bar{x} = .68$) (See Table 5). The strength of this effect was found to be .1417. This finding also confirms the second hypothesis of the present study. Neither the main effect of conservation level,

Table 5

Mean Weight-Based Affiliation-Preference Scores By Group

Group	Mean	Standard deviation
Male low conservers (n=11)	.36	.92
Male high conservers (n=11)	1.00	1.18
Female low conservers (n=10)	1.70	1.49
Female high conservers (n=10)	1.90	1.52

$F(1,38) = .86$, $p > .05$, nor the sex by conservation level interaction, $F(1,38) = .18$, $p > .05$ were significant. The analysis of variance summary table for these results may be found in Appendix F.

Trait Attributions

Three scores were calculated from this measure. A negativity score was calculated for both free and forced choice conditions. This score was calculated by assigning a value of +1 each time a positive or neutral trait was assigned to the normal weight figure, or a negative trait was assigned to the overweight figure. In addition, a value of -1 was assigned each time the converse occurred. The sum of the two scores was the negativity score. A flexibility score (number of traits assigned to both figures under free choice conditions) was also calculated.

In order to determine the appropriate statistical procedure for analyzing these scores, Pearson correlation coefficients were calculated. Significant correlations were obtained between the two negativity scores, $r = .86$, $p < .01$, and the free choice negativity and flexibility scores, $r = -.38$, $p < .01$. In addition, the forced choice negativity and flexibility scores were marginally correlated, $r = -.24$, $p = .07$. Since a less than perfect correlation indicates a lack of linear dependency and the three scores have previously provided unique information (White & Rhodes, 1984), all three scores were retained for further analyses (Tabachnick & Fidell, 1983).

Three tests were carried out to determine the appropriateness of using a multivariate analysis of variance on these scores. Bartlett's test of sphericity revealed that the three scores were inter-related

enough for a multivariate analysis, $F = 52.51$, $p<.001$. Box's M, a multivariate test of homogeneity of variance, revealed that the variances of the two scores were similar across all four groups, $F = 1.21$, $p = .24$. In addition, the determinant of the pooled within cell correlation matrix was sufficiently different from zero (.23), indicating no significant multicollinearity or singularity (Tabachnick & Fidell, 1983). Therefore, a multivariate analysis of variance (with sex and conservation level as independent variables) was carried out on these three scores.

The mean free and forced choice negativity and flexibility scores are presented in Table 6. Pillai's criterion was selected for significance testing due to the relatively small sample size and the unequal cell sizes in the design (Tabachnick & Fidell, 1983). As predicted in Hypothesis 3, there was a significant main effect of conservation level on the free and forced choice negativity and flexibility scores, $F(3,36) = 4.42$, $p<.01$. The strength of this effect can not be calculated using Pillai's criterion. Neither the multivariate sex effect, nor the sex by conservation level interaction were significant, $F(3,36) = .73$, $p>.05$, $F(3,36) = .10$, $p>.05$.

Correlations between the three scores increases the risk of type 1 errors in univariate analyses, and hence make their interpretation suspect (Tabachnick & Fidell, 1983). However, the lack of any theoretical basis for ordering the three scores in importance suggested a stepdown analysis was inappropriate. As a result, the univariate analysis for the conservation level effect will be reported and cautiously interpreted. The conservation level effect was significant

Table 6

Mean Free and Forced Choice Negativity and Flexibility Scores By Group

Group	Means (standard deviations)		
	Free choice	Forced choice	Flexibility
Male low conservers (n=11)	4.00 (3.87)	4.18 (4.94)	6.36 (9.44)
Male high conservers (n=11)	7.27 (4.52)	9.82 (4.94)	6.46 (8.94)
Female low conservers (n=10)	2.90 (3.67)	3.80 (4.37)	4.80 (8.57)
Female high conservers (n=10)	4.70 (4.99)	7.40 (4.90)	7.20 (9.80)

for forced choice negativity, $F(1,38) = 10.46$, $p<.01$, marginally significant for free choice negativity, $F(1,38) = 3.77$, $p = .06$, and not significant for flexibility, $F(1,38) = .27$, $p>.05$. Since correlations between variables increase the risk of Type 1 errors, only the highly significant effect for forced choice negativity will be described. High conservers ($\bar{x} = 8.61$) assigned more traits negatively than low conservers ($\bar{x} = 3.99$).

Discussion

The purpose of this study was to investigate the relationship between cognitive-developmental level and children's ideas about their overweight peers. To this end, male and female preoperational and concrete operational level children were given several weight attitude measures. The aspects of weight attitudes assessed were: weight as a categorization dimension, preference for normal weight, aversion for overweight, and weight-based affiliation-preferences and trait attributions.

In general, the results of the present study support a relationship between cognitive-developmental level and some aspects of weight attitude development. Attainment of the concrete operational level of development seems to be associated with a reduced tendency to categorize by weight, and increased preference for normal weight and negativity about overweight.

The fact that children at both cognitive levels used weight as a matching dimension suggests that children between the ages of 4 and 8 possess a rudimentary schema for weight. Clearly, they could not match on that dimension without such a structure. It must be present in order for them to differentiate the drawings by weight, and then match on that basis.

The finding that 4 to 8 year old children match on the basis of weight is inconsistent with earlier studies of weight awareness (e.g. Lerner & Schroeder, 1971a). These researchers used identification of own body type as their measure of weight awareness, and failed to find that children betweeen the ages of 5 and 11 could identify their body

types. It seems likely that identification of own body type is a more complex response than simple weight awareness. It can be concluded that the matching task provides a good measure of early weight schema development.

As predicted, preoperational children chose to match on the basis of weight more than concrete operational children. Therefore, it appears that the child's level of understanding affects how salient weight is as a categorization dimension. This finding is consistent with the Piagetian notion that reliance on perceptual cues decreases with cognitive development. Early Piagetian work focussed on demonstrating the change from single, perceptual cues to more abstract, logical cues as the basis for making judgements about physical reality. Singer & Reveson (1978) have documented these children's tendency to focus on perceptual aspects of non-social stimuli more than concrete operational children. The present study's finding suggests that the preoperational child may also be apt to focus on perceptual aspects of people more than the concrete operational child.

In addition, concrete operational children assign traits more negatively than preoperational children under forced choice conditions, as predicted. In other words, concrete operational children tend to characterize the overweight figure more negatively and the normal weight figure more positively. This finding is consistent with increased negative trait attribution between the ages of 5 and 8 years. By and large, previous studies did not find such a developmental change for several reasons. First, many of these studies simply did not include young (3 to 6 year old) children (Lawson, 1980; Lerner, 1969; Staffieri,

1967, 1972; Young & Avdzej, 1979). Secondly, those studies which did include 5 and 6 year olds (Caskey & Felker, 1971; Kirkpatrick & Sanders, 1978; Lerner & Korn, 1972) utilized adjective checklists which were less reliable with younger children.

One study (White & Rhodes, 1984) which used the same pictorial trait measure as the present work, did find a significant increase in forced and free choice negativity between 3 to 5 years and 6 to 11 years. However, this result was modified by a significant age by sex interaction. Girls between the ages of 3 and 5 made more negative attributions than boys of similar ages. The findings of the present study suggest that this apparent sex difference may be confounded by cognitive-developmental level. Young girls in the White & Rhodes (1984) sample may have been more concrete operational than young boys. There is some support for such an idea in that some studies have found that girls develop the ability to conserve earlier than boys (Goldschmid & Bentler, 1968). Further work is needed to determine if negative trait attribution of young girls is a function of sex or advanced cognitive level.

Not only does the relationship of cognitive level and negative attributions to overweight expand the understanding of empirical findings, it is consistent with cognitive-developmental theory. Martin & Halverson's (1981) theory suggests that children at higher cognitive levels might master the "like me/not like me" categorization system faster than their peers. However, future research must confirm that this result actually reflects the existence of such a schema. Although the current findings offer tentative support, future research must

demonstrate the relationship more directly. One way to do so might be to modify the measure such that both self-attributions and weight-based attributions can be assessed. If Martin & Halverson (1981) are correct, then negativity to overweight should be positively correlated with a positive self-concept. If this is the case, it raises the question of overweight children's attitudes about themselves, and how they relate to their attitudes about overweight.

In summary, the results of the present study support two hypotheses about weight attitudes based upon Piagetian theory. Concrete operational thought was associated with reduced perceptual matching by weight and increased negativity toward overweight. As well, concrete operational children chose the normal weight figure as a playmate more than preoperational children. Such a finding was not predicted by Piagetian theory. Furthermore, the lack of consistent empirical findings made such a result difficult to predict. This dilemma was due to widely discrepant methodology, and the lack of studies breaking subjects down into relevant age groups. As a result, the finding that preference for normal weight differed by cognitive level was not predicted.

More perplexing is the lack of a cognitive-developmental explanation for this effect. It may be that in this case the cognitive level effect simply reflects intelligence differences in the two groups. Many researchers (e.g. Goldschmid & Bentler, 1968) have noted the positive correlation between IQ and conservation. As a result, it is almost certain that concrete operational children are brighter than preoperational children of similar ages, as well as possessing the

discussed differences in quality of thought. Therefore, it may be that these children simply acquire a preference similar to that of older children and adults at an earlier chronological age. Future research on the developmental progression of preference for normal weight is necessary to substantiate this explanation.

The introduction of this explanation for the preference for normal weight cognitive level effect suggests that perhaps all the cognitive level effects are simply due to intelligence interacting with social learning. This does not seem to be the case. It is difficult to conceive of a child learning to categorize peers by activity rather than weight through social transmission. The intelligence-social learning theory seems to apply more logically to negativity. Previous research (e.g. Roberts & Herman, 1984) suggests that North American adults do possess a negative attitude about overweight. Consequently, it could be argued that children learn this attitude from the adults in their environment, and that the brighter concrete operational children simply acquire the prevalent negativity at an earlier chronological age.

However, the bi-polar scale paradigm employed in the study of adult trait attribution renders the results questionable. Subjects' ratings were not analyzed to reflect flexibility in assigning traits to more than one figure. Instead, these researchers assessed evaluative differences in the traits assigned to each figure. Therefore, the results of bi-polar scale studies may exaggerate the differences in trait attribution between body types, and hence, exaggerate the extent to which negativity is present in adults. Thus, the child may not be able to learn negativity from the adults in his/her environment.

Not all the predicted aspects of weight attitudes could be explained by cognitive-developmental factors. Since conclusions regarding the trait attribution results must be cautious, it must be concluded that concrete operational children did not assign traits more negatively than preoperational children under free choice conditions. This is contrary to the third hypothesis of the present study, but not surprising. While there was no theoretical basis for postulating differences between the two conditions, it may simply reflect the concrete operational child's earlier development of social sensitivity. This sensitivity would result in the observed greater reduction in the negativity scores of concrete operational children, which makes their scores more similar to those of preoperational children.

Similarly, the predicted greater flexibility of concrete operational children was also not supported. This finding is inconsistent with White & Rhodes' (1984) results. They found that flexibility increased in their 3 to 12 year old subjects, with young children making few flexible responses. Generally speaking, 4 to 8 year olds were not very flexible in the present study. This suggests that either they did not really understand the task, or that they had not yet fully developed the necessary cognitive abilities. This flexibility result initially seems inconsistent with cognitive-developmental theory. Piagetian theory suggests that concrete operational children are better able to appreciate that an object can belong to more than one class. However, the multiple categorization aspect of concrete operational thought was not actually measured in the present study. While conservation is a generally good indicator of the attainment of concrete

operations, it does not necessarily imply the achievement of multiple categorization. Therefore, it may be that the failure to differentiate high and low conservers on flexibility reflects the absence of this ability in these children.

The fact that the role of cognitive-developmental factors has been supported does not preclude the role of other social and non-social variables in the development of weight attitudes. Social factors do seem to influence the development of other aspects of weight attitudes more than cognitive factors. Two variables, aversion for overweight and weight-based affiliation-preferences, seem related to sex.

Aversion for overweight and weight-based affiliation- preferences did not differ by subjects' cognitive level; instead, sex explained subjects' scores on these variables. As predicted, girls chose the non-overweight figure more often than boys. Therefore, it appears that girls possess a stronger aversion for overweight, as suggested by Lerner & Gellert's (1969) results. In addition, girls chose the normal weight figure with no prop over the overweight with a prop more than boys. In other words, girls based their affiliation-preferences on weight more frequently than boys.

The affiliation-preference results are consistent with White et al's (in press) findings from the only study of affiliation-preference prior to the present study. They found that 3 to 11 year old children maintained a low level of weight-based affiliation-preferences, but that girls made more weight-based affiliation-preferences than boys. Both of these findings were replicated in the present study. While 4 to 8 year old children seem capable of making weight-based affiliation choices,

the rate was low; on the average 1.3 out of every 4 choices was based on weight.

Both the aversion for overweight and affiliation-preference results are consistent with a social transmission theory of weight attitude development. There is considerable evidence in the clinical literature that boys and girls are differentially socialized with regard to weight (e.g. Woody & Costanzo, 1981). Therefore, it may be that an aversion for overweight and increased tendency to make weight-based affiliation-preferences may be the result of the increased pressure on females to be thin. Since the male and female subjects did not differ in their preference for normal weight, it seems that all female children are learning is an aversion for overweight, not a preference for normal weight. In fact, the possibility that societal pressures suggest underweight is to be preferred should be explored in the future.

The present study has clearly related cognitive level and sex to the development of weight attitudes. However, there are some difficulties with this study which require discussion. First, it is difficult to conclude what bearing these results might have on children's real-life behavior toward overweight peers, since none of the measures involved direct observation. It is particularly difficult to guess the result of an increased tendency to match by weight and weight-based attribution patterns. One might hypothesize that these attitudes would influence children's playmate choices. The Preference measure actually involves asking subjects with whom they would like to play. However, in the real world weight is not likely to be the only variable considered when evaluating a peer, as it is in all of these measures.

The Affiliation-Preference measure was intended to assess the impact of weight on playmate choices more accurately. The addition of this measure is clearly beneficial; it allows exploration of the role of situational factors on weight preference and facilitates generalizations to children's real-life playmate choices better than the Preference measure. However, the implications of even these findings for children's real-life interactions are not clear. The task is still a vastly over-simplified version of real playmate choices. Factors such as personality, facial attractiveness, skill and intelligence are also probably influential.

The fact that Young & Avdzej's (1979) findings with videotaped behavioral deviance parallel these with an attractive prop, suggests some tentative generalizations are appropriate. Both sets of results suggest that clinical reports of frequent social exclusion on the basis of weight (e.g. Millman, 1980) may be over-simplified. As White et al (in press) suggest, these occurrences seem rare in young children, and might be eliminated by increasing the attractiveness of the overweight child on some other dimension. Future researchers should determine if these tasks accurately reflect real-life playmate choices, and which competing factors are most effective at reducing weight-based affiliation-preferences.

A second minor difficulty with the present study is some mild mechanical interdependence between some of the scores. For example, the preference for normal weight and aversion for overweight scores are based on some common items. In addition, all three trait attribution scores are related; the free negativity items are subsumed by forced

negativity, and those items not used to derive free negativity are used to calculate flexibility. While statistical analyses suggest that the relationships are not strong enough to invalidate the results, totally independent measures are always preferable (Tabachnick & Fidell, 1983). Therefore, future reasearchers should devise ways of calculating these scores such that they still represent the same concepts, but are mechanically independent of each other. For instance, the free and forced negativity scores could easily be individualized by having subjects completely re-sort the traits under forced choice conditions, rather than simply re-sorting those assigned to both figures.

The present study's results have implications for understanding weight attitude development. It appears that both cognitive and social variables play roles in the development of these attitudes. It also seems likely that the schema or categorization system might make children more susceptible to processing information on the basis of weight. The child may also be primed to develop a "like me/not like me" schema, which readily interprets social transmissions about the overweight "not like me" person negatively. In other words, the development of negative weight attitudes might be part of normal cognitive development.

This conceptualization of the process is in contrast to the commonly held belief that such attitudes are the result of abnormal or primitive thought processes. However, it does not imply that negative attitudes about overweight are indomitable. While negativity seems pre-programmed, White & Rhodes' (1984) results would suggest that flexibility is as well. Therefore, the normal process of weight

attitude development may be a period of negativity, followed by flexibility at a more advanced stage.

This theory suggests that the persistence of negative attitudes about overweight into adolescence and adulthood may be the result of "faulty" cognitive development. This suggestion is in contrast to the results of previous studies on adult trait attribution patterns (e.g. Roberts & Herman, 1980). As previously mentioned, however, there is reason to believe that these studies exaggerated the extent to which adults characterize non-mesomorphs negatively.

The process by which negativity fades and flexibility emerges is a fascinating one. The results of White & Rhodes' (1984) trait attribution study suggest that children come to realize that their overweight peers can be good. However, Martin & Halverson's (1981) schema theory might suggest the opposite. If sorting traits is truly the outcome of self-concept development, then it may be that what children are really learning to accept is that they themselves can be bad. Finally, Piaget suggested that both might occur (Campbell, 1976). Clearly, the relationship between self-concept and weight attitude development should be explored further.

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Appendix A

White et al's (in press) Body Salience Measure Items

Appendix A

White et al's (in press) Body Salience Measure Items

Item(Sex)	Standard	Choice 1	Choice 2	Choice 3
1(M)	Overweight Fighting	Overweight Standing	Normal Fighting	Normal Combing
2(F)	Normal Vacuuming	Normal Swimsuit	Overweight Standing	Overweight Cleaning
3(F)	Overweight Stealing	Normal TV	Overweight Cleaning	Normal Stealing
4(F)	Underweight Wagon	Overweight Skateboard	Overweight Standing	Underweight Camera
5(M)	Normal Standing	Normal Standing	Overweight Standing	Overweight Reading
6(F)	Normal Party	Underweight Swimsuit	Normal Shopping	Underweight Party
7(M)	Underweight Wagon	Overweight Bicycle	Underweight Swimsuit	Overweight Reading
8(M)	Overweight Raking	Overweight Ball	Underweight Reading	Underweight Pruning
9(F)	Overweight Combing	Normal Combing	Normal Eating	Overweight Standing
10(M)	Overweight Snowman	Normal Snow house	Overweight Standing	Normal Swimsuit
11(F)	Normal Standing	Overweight Guitar	Normal Swimsuit	Overweight Standing
12(M)	Normal Reading	Overweight Reading	Overweight Guitar	Normal Chess
13(F)	Overweight Mud	Overweight Groceries	Underweight Mud	Underweight Tennis
14(M)	Overweight Weights	Normal Combing	Normal Exercising	Overweight TV

M = Male
F = Female

Top = Weight Type
Bottom = Activity/Prop

Appendix B

White & Rhodes' (1984) Weight Attributions Measure Items

Appendix B

White & Rhodes' (1984) Trait Attributions Measure Items

Item	Picture	Question
1	A test with an "A" and a star on it	Someone always does well on tests in school. Would this boy/girl, this boy/girl, or both boys/girls do well on tests in school?
2	A boy/girl crying (Full body)	Someone teased this boy/girl. Who probably teased him/her: this boy/girl, both boys/girls or this boy/girl?
3	A collection of non-sex-specific toys	Who would like to play with these toys? Would it be this boy/girl, this boy/girl, or both?
4	A boy/girl crying and reaching out (Full body)	Someone took his/her toy away. Who was mean and took the toy: was it both boys/girls, this boy/girl or this boy/girl?
5	A smiling boy/girl with rosey cheeks (Face only)	This boy/girl likes to joke and laugh a lot. Who is jolly? Is it this boy/girl, this boy/girl, or both?
6	Males: A tool bench covered in tools	Males: Somebody's been touching Daddy's tools, and he won't like it. Who was sneaky: is it both boys, this boy or this boy?
	Females: A vanity table covered in toiletries	Females: Somebody's been playing with Mom's cosmetics, and she won't like it. Who's been sneaky: was it both girls this girl or this girl?
7	A desk and a book case	This is a nice quiet place to go. Who would probably like to go to this quiet place: this boy/girl, this boy/girl, or both?

8	A frowning boy/girl crying (Face only)	This boy/girl is unhappy. Who would be sad: would it be both boys/girls, this boy/girl or this boy/girl?
9	A large shopping bag full to the top	Who could lift this heavy bag? Who is strong: is it this boy/girl, both boys/girls, or this boy/girl?
10	A neat bedroom	Someone always keeps their room very neat. Whose neat room is this: is it both boys/girls, this boy/girl's, or this boy/girl's?
11	A couch and TV	Someone likes to watch TV. Is it this boy/girl, this boy/girl or both?
12	A boy/girl pointing and laughing (Full body)	This boy/girl is teasing someone. Who is being teased: is it this boy/girl, both boys/girls or this boy/girl?
13	A baby lying on a blanket	Who would like to hold and cuddle this baby? Who's affectionate: this boy/girl, this boy/girl or both?
14	A hand holding a box of crayons	Who would say 'thank you' when given the crayons? Who's polite: is it this boy/girl, this boy/girl or both?
15	A woman shaking her finger and frowning (Full body)	Mother is angry. Who was naughty and made mother angry? Was it this boy/girl, both boys/girls or this boy/girl?
16	A collection of musical instruments	Who would like to play with these musical instruments: this boy/girl, this boy/girl or both boys/girls?
17	A room with toys scattered around	Some boys/girls are lazy and never help clean up. Would it be both boys/girls, this boy/girl, or this boy/girl?

18	A large gift-wrapped box	Who likes to give presents? Is it this boy/girl, both boys/girls or this boy/girl?
19	A sink with soap and water	Some boys/girls like to keep clean. Who is clean: is it this boy/girl, this boy/girl, or both boys/girls?
20	A theater with a wolf on the screen	Some kids are afraid of scary movies like this one. Who would probably be afraid: Would it be this boy/girl, this boy/girl or both?

Appendix C

Goldschmid & Bentler's (1968) Concept Assessment Kit-Conservation

Record Form

Appendix C

Goldschmid & Bentler's (1968) Concept Assessment

Kit-Conservation Record Form

SCORES			
Task	Behavior	Explanation	Total
A			
B			
C			
D			
E			
F			
Total			

NAME _____ DATE _____

DATE OF BIRTH _____ AGE _____ SEX _____

SCHOOL _____ GRADE _____

EXAMINER _____

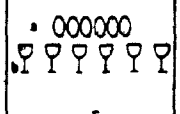
COMMENTS _____

(A) TWO-DIMENSIONAL SPACE

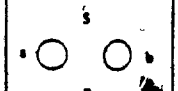
ITEM	DIRECTIONS	VERBAL INSTRUCTIONS	RESPONSE	SCORE
I 2 equal rectangles S a b E	*Build 2 rectangles, each with 8 blocks of wood, saying:* *When finished, ask.* *If the subject says they are both the same, say and go on to (II).* *If he says they are not the same, say* *Demonstrate to subject by pointing that they are the same, then, when S agrees, go on to (II).*	Watch what I do. Is there as much wood here* as there, or does one have more? Yes, they are both the same. Look. This one is just as big as that one. See, they are both the same.		
II. 2 unequal rectangles S a b E	*Take 2 additional blocks, saying:* *Then, say* *Record. Then ask:* *Record, and say*	Look. I am putting these blocks here. Now tell me. Is there as much wood here as there, or does one have more? Why? O.K. Let's do something else.	Same ☐ a has more ☐ b has more ☐	
III. 2 equal squares S a b E	*Build 2 squares with 16 blocks of wood each, saying:* *When finished, ask.* *If the subject says they are the same, continue with (IV).* *If the subject says they are not the same, say:* *Demonstrate to subject by pointing that they are the same, then, go on to (IV).*	Watch what I do. Is there as much wood here as there, or does one have more? Look. This one is just as big as that one. See, they are both the same.		
IV square vs. single line S a b E	*Then, take the blocks from the right square and build a single line with all 16 blocks, saying:* *When finished, ask:* *Record, then ask.* *Record.*	Watch what I do. Now, is there as much wood in this one as in that one, or does one have more? Why?	Same ☐ a has more ☐ b has more ☐	

*When saying the first underlined word, point to (a); when saying the second underlined word, point to (b). Follow this procedure for all underlined words.

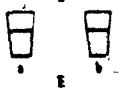
(B) NUMBER

ITEM	DIRECTIONS	VERBAL INSTRUCTIONS	RESPONSE	SCORE
I Parallel egg-cups & eggs  	*Place 6 egg cups in a straight line about 4 inches apart. Parallel to these, stand 6 eggs in corresponding position, also in a straight line, saying:* *When finished, say* *Remove eggs from cups.*	Watch what I do. Now, I want you to put each one of these eggs into the egg cup next to it.		
II eggs vs. egg-cups  	*Remove the two lines of eggs and cups, but spread out cups (6 inches apart) and move eggs closer together (2 inches apart), saying* *Then, ask* *Record, then ask* *Record*	Watch what I do. Now, are there as many eggs as egg cups or are there more of one kind? Why?	Same ☐ a has more ☐ b has more ☐	——

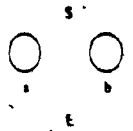
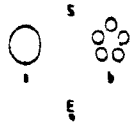
(C) SUBSTANCE

I 2 equal balls  	*Make two equal balls of play doh (each 3gm.), saying* *If the subject says they are both the same, go on to (II).* *If the subject says one ball is larger, say* *Continue to adjust the two balls until the subject says they are the same.*	Here are two balls of play doh. There is the same amount of play doh in each ball. They are both alike. Is there as much play doh in this ball as in that one, or does one have more? Let's make them the same. I am taking a little bit away from this one and adding it to that one. Now, is there as much play doh in this one as in that one?		
II ball vs. pancake  	*Flatten one ball into a pancake (4 inches in diameter – use ruler), saying:* *When finished, ask* *Record, and say* *Record.*	Watch what I do. See, I am making this ball into a pancake. Now, is there as much play doh in this one as in that one, or does one have more? Why?	Same ☐ a has more ☐ b has more ☐	——

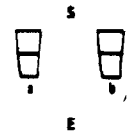
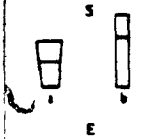
(D) CONTINUOUS QUANTITY

ITEM	DIRECTIONS	VERBAL INSTRUCTIONS	RESPONSE	SCORE
I. 2 large glasses 	*Place the two large glasses filled with an equal amount of water (150 ml) before the child, saying:* *Then, ask:* *If the subject says they both have the same amount, go on to (II).* *If the subject says one has more, adjust the water level, saying:* *Then, ask:* *Continue to adjust the water in the two glasses until he says that they both have the same.*	See, here are two glasses both filled with the same amount of water. Is there as much water in this glass as in that one, or does one have more? Let's make them the same. See, I am pouring a little from this glass into that one. Now, is there as much water in this one as in that one or does one have more?		
II. 2 unequal glasses 	*Pour 25 ml of water from an extra glass into large glass at right, remove the extra glass, but leave it on the table, saying:* *Then, ask:* *Record, and ask:* *Record.*	Watch what I do. See, I am pouring a little water from this glass into that one. Now, is there as much water in this glass as in that one, or does one have more? Why?	Same ☐ a has more ☐ b has more ☐	
III. large glass vs. 5 small glasses 	*Pour water from the large glass (which has more water) into the five little glasses, saying:* *When finished, ask:* *Record, and ask:* *Record.*	Watch what I do. Now, does this glass have as much water as these glasses together, or does one side have more? Why?	Same ☐ a has more ☐ b has more ☐	
IV. 2 equal large glasses 	*Place the two large glasses filled with an equal amount of water (150 ml) before the subject, saying:* *Then, ask:* *If the subject says they both have the same amount, go on to (V).* *If the subject says one has more, adjust the water level, saying:* *Then, ask:* *Continue to adjust the water in the two glasses until he says they both have the same.*	See, here are two glasses both filled with the same amount of water. Is there as much water in this glass as in that one, or does one have more? Let's make them the same. See, I am pouring a little from this glass into that one. Now, is there as much water in this glass as in that one, or does one have more?		
V. large glass vs. 5 small glasses 	*Pour the water from the large glass into the five small glasses, saying:* *Remove empty glass, but leave it on the table, and ask:* *Record, and ask:* *Record.*	Watch what I do. Is there as much water in this glass as in all these together, or does one side have more? Why?	Same ☐ a has more ☐ b has more ☐	___
				___

(E) WEIGHT

ITEM	DIRECTIONS	VERBAL INSTRUCTIONS	RESPONSE	SCORE
I 2 equal balls 	*Make two equal balls of play dough (each 3 oz.), saying*	Here are two balls of play dough. One ball is as heavy as the other ball.		
	Give the balls to the child, and say (*Be sure that the subject picks up the balls and weighs them in his hands.*)	Is one ball as heavy as the other, or is one ball heavier than the other?		
	If the child says they weigh the same, go on to (II).			
	If the subject says one weighs more, say	Let's make them the same. I am taking a little bit away from this one, and adding it to that one.		
	Give ball back to subject and ask	Now are they the same, is one ball as heavy as the other?		
	Continue to adjust the two balls until he says they weigh the same.			
II ball vs. 5 little balls 	*Make the right ball into 5 little balls of approximately the same size and arrange them in a circle, saying*	Watch what I am doing. I am going to make little balls out of this ball.		
	When finished, ask (*Do not allow the subject to pick up the balls.*)	Now is this ball as heavy as all these balls together or is one side heavier?	Same ☐ a has more ☐ b has more ☐	___
	Record and ask.	Why?		
	Record.			

(F) DISCONTINUOUS QUANTITY

I 2 equal large glasses 	*Place the two glasses, filled with an equal amount of corn (150 ml) in front of the child, saying* (*Level the surface on both glasses.*)	See, here are two glasses both filled with the same amount of corn. Is there as much corn in this glass as in that one, or does one have more in it?		
	If the subject says they both have the same, go on to (II).			
	If the subject says one has more, say	Let's make them the same. See, I am pouring some corn from this glass into that one. Now, is there as much corn in this one as in that one or does one have more?		
	Continue to adjust the corn in the two glasses until he says they both have the same amount, before going on to (II).			
II large glass vs. tall glass 	*Pour the corn from the large glass into the tall glass, saying*	Watch what I do. See, I am pouring the corn from this glass into that one.		
	When finished, say	Now, is there as much corn in this one as in that one, or does one have more?	Same ☐ a has more ☐ b has more ☐	___
	Record, and ask	Why?		
	Record.			

Appendix D

Anova Summary Table for Mean Body Responses

Appendix D

Anova Summary Table for Mean Body Responses

Effect	SS	MS	F	df	p
Sex (S)	1.15	1.15	.07	1,38	.80
Conservation (C)	96.30	96.30	5.44	1,38	.03
S x C	18.58	18.58	1.05	1,38	.31
Error	672.64	17.70			
Total	788.67				

Appendix E

Anova Summary Table for Preference-Normal Weight (P-NW) and Aversion-Overweight (A-OW)

Appendix E

Anova Summary Table for Preference-Normal Weight (P-NW) and Aversion-Overweight (A-OW)

Preference-Normal Weight:

Effects	SS	MS	F	df	p
Sex (S)	1.42	1.42	1.15	1,38	.290
Conservation (C)	6.48	6.48	5.25	1,38	.028
S x C	2.76	2.76	2.24	1,38	.143
Error	46.86	1.23			
Total	57.52				

Aversion-Overweight:

Effects	SS	MS	F	df	p
Sex (S)	14.07	14.07	4.67	1,38	.037
Conservation (C)	3.83	3.83	1.27	1,38	.267
S X C	.97	.97	.32	1,38	.574
Error	114.57	3.02			
Total	133.44				

Appendix F

Anova Summary Table for Mean Weight-Based Affiliation-Preference

Appendix F

Anova Summary Table for Mean Weight-Based Affiliation-Preferences

Effect	SS	MS	F	df	p
Sex (S)	13.10	13.10	7.83	1,38	.008
Conservation (C)	1.83	1.83	1.10	1,38	.30
S x C	.50	.50	.30	1,38	.59
Error	63.55	1.67			
Total	78.98				

Appendix G

Manova Summary Table for

Free and Forced Negativity and Flexibility Scores

Appendix G

Manova Summary Table for Free (FrNeg) and Forced Negativity (FoNeg) and Flexibility (Flex) Scores

Effect	Value	SS	MS	F	df	p
Sex (S):						
All	.058	---	---	.73	3,36	.54
FrNeg	---	35.33	35.33	1.92	1,38	.17
FoNeg	---	16.49	16.49	.70	1,38	.41
Flex	---	3.77	3.77	.36	1,38	.55
Conservation (C):						
All	.269	---	---	4.42	3,36	.01
FrNeg	---	69.43	69.43	3.77	1,38	.06
FoNeg	---	247.71	247.71	10.46	1,38	.003
Flex	---	2.88	2.88	.27	1,38	.61
S X C:						
All	.009	---	---	.11	3,36	.96
FrNeg	---	5.68	5.68	.31	1,38	.58
FoNeg	---	7.01	7.01	.30	1,38	.59
Flex	---	.73	.73	.07	1,38	.79
Constant:						
All	.894	---	---	--	--	--
FrNeg	---	952.38	952.38	--	--	--
FoNeg	---	1974.86	1974.86	--	--	--
Flex	---	1405.93	1405.93	--	--	--