

Perceptions and Attitudes towards  
Eating Behaviors and Body Image among  
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## Abstract

This study presents the results of a first study on perceptions and responses of adolescent females to eating behaviors and body image. Mind-Genomics was used to create an experimental design with systematically varied messages about perceptions of eating behaviors and body image. A small representative sample of 102 adolescent females evaluated these messages testing perceptions dictated by an experimental design. Findings show that among the homogeneous experiment group, there were three distinct perception segments with respect to eating behaviors and body image. The three radically different mindset segments were: The known need of control (33%), self-condemnation and shame (46%) and feeling ugly, panicky, and a victim (24%). Findings are discussed suggesting the development of communication interventions to prevent body perception related eating problems in adolescent females.

## Introduction

The National Association of Anorexia Nervosa and Associated Disorders [1] states that 95% of those with eating disorders are between the ages of 12 and 25 years old. The National Eating Disorders Association states that 40% of newly identified cases of anorexia are in females (15-19 years old). Eating Disorders are considered a mental illness and have the highest mortality rate across the entire spectrum of mental illnesses [1].

Epidemiologists point to the increasing prevalence and seriousness of negative body perception as a cause of eating disorders. Consequently, there is an increase in costs of prevention and health promotion that are invested in coping with this growing 'epidemic in high income countries [2].

This study expands upon previous studies [3-6]. These studies explored trends in a broad array of weight-related variables in adolescent females. Over the past decade there has been increased attention on eating disorders in the scientific community and the popular media [7,8]. Adolescents were found to be exposed to different media with messages about obesity, cultural ideals of thinness, and both healthy and unhealthy weight management strategies [9].

Unhealthy weight control behaviors often result from weight misperceptions, principally overestimating body weight. Weight misperception is partly due to unrealistic media portrayals and the resulting dissatisfaction with weight associated with low self-esteem, depression, and eating disorders [10,11]. The vulnerability of adolescents to media messages about weight may be due to the central role of body image during this life stage.

The growing literature on psychology of body weight focuses on the negative feelings engendered by eating disorders. Urgesi, Fornasari, Perini, et al. [12] found that the tendency of adolescents to routinely explore their body parts is a consequence of their obsessive worries about body appearance. Dissatisfaction of adolescent females with their body image was found to be an antecedent of eating disorders through unhealthy weight-control behaviors such as fasting, vomiting, or laxative abuse [13]. Disturbance of body perception were found to be a central aspect of eating behaviors.

Body perception is important, both for health and for self-esteem. Recent findings in both healthy volunteers and in clinical populations highlight the robust relationship between a person's sense of ownership over a body part, cortical processing of tactile input from that body part, and its physiological regulation. This relationship plays an important role in maintaining homeostatic control over the body leading to severe eating disturbances [14].

Recent findings relate eating disorders to some biological and environmental risk factors [15-17]. Other studies relate eating disorders to behaviors [18,19] and to intermediate neurocognitive phenotypes [20,21].

Many of the above studies relied upon questionnaires to identify which groups of adolescent females suffer from negative feelings regarding their body image. These studies identified the rate of eating disorders in the population and the composition of subgroup who suffer from eating disorders and negative body image.

This study adds to the existing literature using Mind-Genomics. This study maps the perceptions of adolescent females with eating disorders revealing deeper processes that take place, using the respondent herself to help this identification. This study identifies feelings, perceptions and behaviors regarding eating behaviors and body perception among adolescent females and communication messages that can make a difference.

**Method**

In recent years methods to understand perception of a person have emerged under the rubric of Mind Genomics [22], a method that might be called ‘cartography of the mind’. The premise of Mind Genomics is that one can understand a person’s values and the way the person perceives a certain phenomenon from understanding the way a person responds to communication messages. Mind-Genomics reveals the perception while inhibiting social desirability of respondents or their desire to be politically correct as often occurring in surveys.

Mind Genomics has been used to understand perceptions in the health context. Perceptions were studied regarding loss of health [23], perceptions and responses of teenagers at the hospital [24], perceptions of patients with colon cancer [25]. These authors adopt the framework of Mind Genomics to understand the mind of adolescent females regarding eating behaviors and body image.

Mind Genomics begins with the basic topic of eating habits. We presented the respondent with 48 different combinations of messages. For each communication message combination, a so-called vignette, the respondent reads the combination as a whole and rates it. From the respondent’s point of view the task is very simple. It is easy to rate the vignette on two questions, the first dealing with the degree to which the vignette describes the respondent, and the second dealing with the emotion that the respondent feels upon reading the vignette. The requirement to read and rate the entire vignette is critical. It prevents the respondent from assigning answers that are political or socially ‘correct,’ or answers that are expected. Rather, the respondent is instructed to evaluate the entire vignette.

**Sample**

The sample comprised of 102 adolescent females from the greater New York area. Respondents self-defined themselves as having an eating or a weight problem. Each of 102 adolescent female respondents (ages 13-19) participated in the web-administered questionnaire. The study did not require medical (HIPPA) clearance because it focused on attitudes rather than on clinical interventions.

**Measures**

The study begins with the collection of relevant elements, and their categorization into categories. Table 1 shows the elements. The elements were developed from previously used scales measuring these categories.

**Table 1:** Elements by Categories.

<b>Category A: Body Dissatisfaction</b>	
A1	You think that society places a great importance on being thin
A2	Your friends are all really skinny, and you feel like the fat person in your group of friends
A3	You feel a lot of pressure from your friends and family to be thin
A4	You think if you were thinner, people would like you better, and you would be more popular
A5	You wish that you could look more like the actresses you see in movies
A6	If you were thinner you would be happier
<b>Category B: Unhealthy and extreme weight control behaviors</b>	
B1	You make sure to eat three balanced meals a day
B2	You don't have the time or patience to make healthy meals so you often rely on fast food
B3	You skip breakfast in the mornings
B4	You eat till you are full and don't pay attention to portion sizes
B5	If you feel like you ate a lot one day, you will starve yourself the next day to compensate for it
B6	You have erratic eating habits
<b>Category C: Family Eating Habits</b>	
C1	Your family has a history of health-related problems as the result of unhealthy eating lifestyles
C2	Your mother or caregiver would cook, or does cook healthy, balanced meals for your family
C3	Your immediate family members make an effort to keep in shape
C4	As a child your parent(s) or caregiver(s) encouraged you to be physically active
C5	Many of your immediate and extended family members are overweight
C6	You were born with big bones or a big frame
<b>Category D: Self Esteem</b>	
D1	You feel incompetent when compared to a lot of your friends
D2	You don't get along with your family because you think they are too controlling
D3	You are a perfectionist, and do not tolerate failure
D4	You get extremely frustrated when things don't go your way
D5	You are very organized and hate surprises or spontaneity
D6	Sometimes you feel like your life is spinning out of control
<b>Category E: Attitudes towards Food- Binge Eating</b>	
E1	When you feel frustrated or sad, eating sweets makes you feel better
E2	You sometimes eat a lot and then feel really guilty and wish you hadn't
E3	You view eating as a social activity and like to eat out with friends
E4	You live to eat rather than eat to live
E5	You only eat when you are hungry
E6	You frequently feel the need to go on a diet
<b>Category F: Self Image</b>	
F1	You feel self-conscious about your appearance
F2	You feel ugly in comparison to your friends
F3	You weigh yourself every morning and get upset at yourself if you gain weight
F4	When you go shopping, you buy clothes a size smaller than you really are, hoping you will soon lose weight and they will fit you
F5	Going on the scale depresses you
F6	You think people judge you based on how you look

### Perceived weight status

Was assessed with the question: “At this time do you feel that you are ....

### Body dissatisfaction

Was assessed with a modified version of the Body Shape Satisfaction Scale [26].

### Unhealthy and extreme weight control behaviors

Behaviors categorized as unhealthy included: fasted, ate very little food, used a food substitute (powder or a special drink) and skipped meals [27].

### Binge eating

Was assessed with questions such as: You eat so much food that you feel embarrassed if others saw you”[27].

### Self-weighing

Was assessed by asking adolescents to indicate how strongly they agreed with the statement, “I weigh myself often” (strongly disagree, disagree, agree, strongly agree) (Test-retest agreement [agree versus disagree] = 85%).

### Socio-demographic characteristics

Ethnicity/race was assessed with the question: “Do you think of yourself as...? (1) White, (2) Black or African American, (3) Hispanic or Latino, (4) Asian American, (5) Native Hawaiian or Pacific Islander, (6) American Indian or Native American, or (7) Other” (Test-retest agreement = 98-100%). Since very few adolescents reported “Hawaiian or Pacific Islander” or did not report their ethnicity/race, they were coded as “mixed/other”.

### Socioeconomic status (SES)

Was determined primarily using the higher education level of either parent and secondarily using family eligibility for public assistance, eligibility for free or reduced-cost school meals, and parental employment status [28,29]. 1 presents elements by categories.

### Procedure

Although it was a web-based experiment, in technical terms, it is administered as a survey. What differentiates Mind Genomics from a regular survey is the experimental design in back, wherein the elements or messages are systematically varied. The foregoing elements are combined into short, easy to ready vignettes, the test concepts. The test concepts are set up so that the text is centered. No effort is made to connect the elements. However, the experimental design is set up so that mutually contradictory elements cannot appear together in the same vignette.

The experimental design itself comprises the 36 elements, in 48 combinations. Every respondent evaluated a unique, different set of 48 combinations, with each respondent testing every element several times in the 48 combinations. The structure of the combinations is such that very rapidly the respondent’s true feelings must emerge because the study simply cannot be ‘gamed,’ nor are there any clear right or wrong answers.

### Analysis

Each respondent rated each vignette on an anchored 1-9 scale, with 1 representing the fact that the vignette does not describe the respondent, and 9 representing the fact that the vignette exactly describes the respondent. The 48 vignettes comprise a stand-alone experimental design, wherein each of the 36 elements is statistically independent of the other 35 elements, and where there are more observations or cases than there are independent variables, i.e., predictor variables. Setting up the vignettes according to an individual-level experimental design enables the use of OLS, ordinary least-squares regression, a well-respected, widely-used method for modeling [30].

For each respondent, OLS related the presence/absence of the 36 elements to the binary rating. To avoid possible collinearity because of the binary, restricted nature of the dependent variable (0,100), we added a small positive number ( $<10^{-5}$ ) to every binary value before estimating the parameters of the model. For the OLS analysis the independent variables are the 36 elements, coded 0 or 1. The dependent variable is coded 0 or 100, depending upon the respondent rated the vignette. OLS returned with a simple linear model of the form:

$$\text{Dependent Variable} = k_0 + k_1 (\text{Element A1}) + k_2 (\text{Element A2}) \dots k_{36} (\text{Element F6})$$

The foregoing model or equation can be read as the dependent variable, the binary response, 0 or 100, is the combination of an additive constant ( $k_0$ ) and individual contributions of the 36 elements,  $k_1 \dots k_{36}$ .

The additive constant is a baseline providing a sense of the rating (‘fits me’) in the absence of elements. All vignettes comprised 3-4 elements by design, so the additive constant is an estimated parameter. Despite being simply an estimated parameter, the additive constant gives us a sense of how likely it is for a person to say ‘yes, the vignette describes me.’ A value of 10, for example, means that in the absence of elements, the probability or percent of respondents saying ‘the vignette describes me’ is 10%. The higher the additive constant, the less work the separate elements in the combination have to do for the vignette to get a high score.

In turn, the individual coefficients or impact values,  $k_1 \dots k_{36}$ , show the driving power of the elements. A positive number of +10, for example, means that when the particular element is incorporated into the vignette, an additional 10% of the respondents are likely, on average, to say that the ‘vignette describes me.’ There are positive coefficients meaning that the element describes the respondent, and there are high negative elements meaning that that element does not describe the respondent.

The corresponding parameters of the OLS model are averaged to estimate the mean of the additive constant and the 36 means of the 36 elements, each element generating its own coefficient. The basic analysis looked at the average across all 102 respondents. This analysis generates the total panel. The analysis of all the respondents generates a single estimate, in turn, for the additive constant, and then for the 36 elements, or a total of 37 averages.

In a separate questionnaire, after the evaluation of the 48 vignettes, each respondent described himself or herself by a set of descriptive

questions. This separate questionnaire is not an experiment, but a real 'questionnaire,' in the sense of survey research.

## Uncovering Mind-Sets in Mind Genomics Experiments

People differ in their attitudes, perceptions, their needs and their wants, respectively. A person-to-person variation does not necessarily depend upon who the person is, nor in fact may not depend upon what a person 'believes' for a specific situation. One's perceptions and values, are not clearly determined, necessarily, by who a person is, nor the person's background, nor in fact by general values.

To discover Mind-Set segments in the population a second analysis is required. The second analysis is done on the array of the 36 coefficients with each respondent contributes his or her own set of 36 coefficients. The second analysis uses conventional k-means clustering methods to identify groups of individuals whose pattern of coefficients of the 36 elements appear to be 'similar' to each other.

The similarity is only with respect to the pattern of coefficients, and has nothing to do with who the respondents are. Creating an individual model for each respondent allows clustering methods to put the set of 102 respondents into groups, such that respondents in the same group showing similar pattern of elements which identify them revealing their perceptions.

These authors looked at the two-segment solution (two groups), the three-segment solution, and then the four-segment solution. The selection of the number of segments is subjective, using two criteria:

1. The groups had to be interpretable, to make sense, to tell a simple story
2. The number of groups had to be small, i.e., the solution had to be parsimonious.

## Results

Table (4) presents the attributes of the sample. Mind-Genomics study reveals patterns which emerge. The straightforward understanding comes from the fact that the study deals with a specific, limited topic, in this case one's response patterns to vignettes dealing with attitudes towards one's eating behaviors and one's body image related to those eating habits. Thus, instead of a diffuse focus on the many different aspects of food, this Mind Genomics study concentrated on one's attempted control of food intake, and one's perceptions of oneself, and one's perception of the reaction of others, towards this attempted control.

The full data appear in Table (2) for total panel and the three Mind-Set segments. The elements are sorted by coefficient, or impact value for the total panel. The very strong performing positive elements ('fit me') and negative elements (don't describe me) are operationally defined as generating a coefficient of +8 (describe me) or -8 (doesn't describe me), respectively.

In the first phase the analysis focuses on the total sample to identify see general patterns. In the second phase of the analysis segments are identified and analyzed. To get a sense of what the segment means, the commonality of the elements is mapped. The commonality showed high positive contributions, i.e., of elements which drive respondents to say that the vignette describes them.

The additive constant in Table (2) is a baseline value. It shows the estimated value of the dependent variable when all the independent variables are 0, or in our case when all the independent variables are absent from the vignette. This corresponds to a null vignette, a vignette with no elements. In this study no such vignette existed.

The two strongest elements for the Total Panel, i.e., elements generating a positive coefficient or +8 or higher were:

*You eat till you are full and don't pay attention to portion sizes*

*You have erratic eating habits*

These elements reflect erratic eating habits. .

## The three mind-sets

The data suggest that there are at least three different mind-sets in this seemingly homogeneous groups, or at least homogeneous with respect to standard demographics. Do these groups differ in ways beyond the response patterns to the elements, such as geo-demographics (who they are), attitudes (how they feel), and body state (both physical and psychological)? Although 102 is a comparatively small base-size, we see some remarkable segment to segment differences, variations across segments which are larger than we find in other studies.

Table (2) shows the coefficients from the total panel and from the Mind-Set segments. It shows clearly that some elements are winners and some elements are losers, as defined by the value of the impact or coefficient. It will become easier to understand the data when we look at the strongest positive elements. Furthermore, rather than looking at just the elements which climb to the top, we will look only at those elements for each Mind-Set which pass the reasonably stringent criterion of +8 or higher for 'winners,' and -8 or lower for 'losers.' Setting this type of criterion for a winner or a loser is best, because it eliminates the mediocre performers, allowing the underlying patterns to emerge.

Table 3 focuses on the strong positive and negative performing elements for total panel and for the three Mind-Set segments. When these authors divide the respondents by the pattern of coefficients or utilities we see radical differences across the segment. What one segment feels 'describes them' another segment may feel it is not relevant to them at all, and clearly does not describe them. Furthermore, the coefficients for the mind-set segments end being much higher, suggesting that the results from the total panel hides the underlying 'stories' by averaging dramatically different groups with different ways of thinking about themselves. It's not that the total panel data fails to be true, i.e., that most elements are just irrelevant, and do not fit. Rather, it's that there are dramatically different groups of people or rather mind-sets in the population, with different points of view. Averaging these groups ends up suggesting, incorrectly, that nothing is really extraordinarily descriptive. Rather, much is, but to different groups.

Table 3 suggests that Segment 1 might be called independent and perfectionist. They want to run things their way. They are a little less than 1/3 of the sample, 32 out of 102 respondents. They show the highest constant (likelihood to attribute something to themselves, even without anything mentioned, additive constant = 24). It's really about control, and little else. They seem to want control from within,

**Table 2:** Coefficients for the 36 elements. Strong performing elements, both positive and negative, exhibit absolute values of 8 or higher.

		Total	Seg 1 Independent perfectionist	Seg 2 Self condemnatory and ashamed	Seg 3 – Feel ugly, panicky, and a victim
	Base-size	102	32	46	24
	Additive constant	16	24	22	-3
B4	You eat till you are full and don't pay attention to portion sizes	9	7	8	12
B6	You have erratic eating habits	8	-2	12	12
B3	You skip breakfast in the mornings	6	7	3	10
A6	If you were thinner you would be happier	6	-7	17	2
D5	You are very organized and hate surprises or spontaneity	5	7	7	0
E4	You live to eat rather than eat to live	4	2	8	-1
B5	If you feel like you ate a lot one day, you will starve yourself the next day to compensate for it	4	8	1	3
F1	You feel self-conscious about your appearance	4	-6	0	25
C1	Your family has a history of health-related problems as the result of unhealthy eating lifestyles	3	-6	3	17
C2	Your mother or caregiver would cook, or does cook healthy, balanced meals for your family	3	-10	3	20
E6	You frequently feel the need to go on a diet	3	0	4	5
E3	You view eating as a social activity and like to eat out with friends	2	-1	4	4
C4	As a child your parent(s) or caregiver(s) encouraged you to be physically active	2	-11	4	15
F6	You think people judge you based on how you look	2	-3	-1	12
B1	You make sure to eat three balanced meals a day	1	1	3	-2
D4	You get extremely frustrated when things don't go your way	1	9	-3	0
F2	You feel ugly in comparison to your friends	1	1	-9	22
A1	You think that society places a great importance on being thin	1	-11	10	-1
C6	You were born with big bones or a big frame	1	-13	2	17
C3	Your immediate family members make an effort to keep in shape	1	-11	5	7
B2	You don't have the time or patience to make healthy meals so you often rely on fast food	0	-1	0	3
E1	When you feel frustrated or sad, eating sweets makes you feel better	0	-1	1	1
E2	You sometimes eat a lot and then feel really guilty and wish you hadn't	0	1	3	-6
A2	Your friends are all really skinny, and you feel like the fat person in your group of friends	0	-3	3	-2
A5	You wish that you could look more like the actresses you see in movies	0	-7	6	-2
D3	You are a perfectionist, and do not tolerate failure	0	10	-7	0
F5	Going on the scale depresses you	0	9	-9	3
A4	You think if you were thinner, people would like you better, and you would be more popular	0	-8	3	3
A3	You feel a lot of pressure from your friends and family to be thin	-1	-4	4	-4
D6	Sometimes you feel like your life is spinning out of control	-1	-1	-1	0
C5	Many of your immediate and extended family members are overweight	-1	-7	-4	14
D1	You feel incompetent when compared to a lot of your friends	-1	3	-4	-2
E5	You only eat when you are hungry	-2	-1	5	-14
D2	You don't get along with your family because you think they are too controlling	-3	11	-9	-11
F3	You weigh yourself every morning and get upset at yourself if you gain weight	-4	-7	-11	15
F4	When you go shopping, you buy clothes a size smaller than you really are, hoping you will soon lose weight and they will fit you	-7	-14	-15	19

**Table 3:** Strong performing elements for the total panel and for the three segments.

Total Panel		
	Base-size =102, Additive Constant = 16	
B4	You eat till you are full and don't pay attention to portion sizes	9
Seg 1 - Independent perfectionist		
	Base-size =32, Additive Constant = 24	
D2	You don't get along with your family because you think they are too controlling	11
D3	You are a perfectionist, and do not tolerate failure	10
C2	Your mother or caregiver would cook, or does cook healthy, balanced meals for your family	-10
C4	As a child your parent(s) or caregiver(s) encouraged you to be physically active	-11
A1	You think that society places a great importance on being thin	-11
C3	Your immediate family members make an effort to keep in shape	-11
C6	You were born with big bones or a big frame	-13
F4	When you go shopping, you buy clothes a size smaller than you really are, hoping you will soon lose weight and they will fit you	-14
Seg 2 - Self condemnatory and ashamed		
	Base-size = 46, Additive Constant = 22	
A6	If you were thinner you would be happier	17
B6	You have erratic eating habits	12
A1	You think that society places a great importance on being thin	10
F2	You feel ugly in comparison to your friends	-9
F3	You weigh yourself every morning and get upset at yourself if you gain weight	-11
F4	When you go shopping, you buy clothes a size smaller than you really are, hoping you will soon lose weight and they will fit you	-15
Seg 3 - Feel ugly, panicky, and a victim		
	Base-size = 24, Additive Constant = -3	
F1	You feel self-conscious about your appearance	25
F2	You feel ugly in comparison to your friends	22
C2	Your mother or caregiver would cook, or does cook healthy, balanced meals for your family	20
F4	When you go shopping, you buy clothes a size smaller than you really are, hoping you will soon lose weight and they will fit you	19
C6	You were born with big bones or a big frame	17
C1	Your family has a history of health-related problems as the result of unhealthy eating lifestyles	17
F3	You weigh yourself every morning and get upset at yourself if you gain weight	15
C4	As a child your parent(s) or caregiver(s) encouraged you to be physically active	15
C5	Many of your immediate and extended family members are overweight	14
F6	You think people judge you based on how you look	12
B4	You eat till you are full and don't pay attention to portion sizes	12
B6	You have erratic eating habits	12
B3	You skip breakfast in the mornings	10
D2	You don't get along with your family because you think they are too controlling	-11
E5	You only eat when you are hungry	-14

not from society at large, not from one's guidance growing up. They feel these phrases describe them very well:

*You don't get along with your family because you think they are too controlling*

*You are a perfectionist, and do not tolerate failure*

Segment 2 seems to be a group of respondents who condemn

themselves, and are ashamed. They are almost half of the population (46 out of 102). Their additive constant is 22, so like Segment 1, they have a modest, not a high likelihood of say that something 'describes them,' in the absence of specific information. They feel that the following phrases describe them very well:

*If you were thinner you would be happier*

**Table 4:** Total panel and segments distributions.

	Total	Seg 1 (Independent perfectionist) Seg1	Seg 2 – Self condemnatory and ashamed Seg2	Seg 3 – Feel ugly, panicky, and a victim Seg3
Base-size	102	32	46	24
	%	%	%	%
1. For demographic purposes only, which of the following BEST describes your ethnicity?				
White/ Caucasian	71	78	72	58
Black/ African American	14	6	13	25
Hispanic/Latino	7	6	9	4
Asian	5	6	4	4
Middle Eastern	3	0	2	8
Other	1	3	0	0
American Indian/Alaska Native	0	0	0	0
2. Which of the following best describes the neighborhood where you live?				
Suburban area outside a city	56	53	61	50
Urban/big city	20	22	13	29
Small city	11	16	4	17
Rural area	7	3	11	4
Small town or village	7	6	11	0
3. What grade of school Middle School/ High School have you just completed?				
7 grade	2	3	2	0
8 grade	15	22	11	13
9 grade	11	9	13	8
10 grade	20	16	24	17
11 grade	19	13	15	33
12 grade	15	22	11	13
post HS	20	16	24	17
4. How many children currently live in your household?				
0 children	7	6	9	4
1 child	23	25	24	17
2 children	38	38	39	38
3 children	17	16	17	17
4 or more children	16	16	11	25
5. How much do you weight?				
80-99lb	4	9	2	0
100-119lb	37	34	33	50
120-139lb	19	16	22	17
140-159lb	16	25	11	13
160-179lb	5	3	9	0
180-199lb	7	6	7	8
200lb or more	13	6	17	13

6. What dress/ pant size do you wear?				
Size 0-2	20	25	13	25
Size 4-6	26	19	28	33
Size 8-10	17	22	17	8
Size 12-14	20	16	24	17
Size 16-18	9	13	7	8
Size 20-22	3	3	2	4
Size 22 & over	6	3	9	4
7. How many hours of TV/ Movies do you watch per week?				
0-4 hrs TV	22	19	15	<b>38</b>
5-9 hrs TV	32	28	39	25
10-14 hrs TV	25	31	20	25
15-19 hrs TV	5	3	4	8
20-24 hrs TV	8	9	11	0
25 hrs TV or more	9	9	11	4
8. How would you classify yourself?				
Underweight	6	13	4	0
Average weight	61	50	59	<b>79</b>
Overweight	33	<b>38</b>	<b>37</b>	21
9. Have you ever being diagnosed with an eating disorder?				
Yes	0	0	0	0
No	100	100	100	100
10. Has anyone in your immediate family ever been diagnosed with an eating disorder?				
Yes	4	0	4	8
No	96	100	96	92
11. Do you have a family history of obesity-related health problems?				
Yes	25	25	20	33
No	75	75	80	<b>67</b>

*You have erratic eating habits*

*You think that society places a great importance on being thin*

Segment 3, the smallest group, with 24 respondents, appears to be a group who feels ugly, panicky, and a victim of external circumstances beyond their control. Their additive constant is -3, so that they rely completely on the elements to drive their feelings of 'describe me.' In a qualitative sense, this very low additive constant may signal a strong sense of external control rather than internal control. That is, they use the opinion of others to judge themselves. They feel that many of the elements that describe them very well are:

*You feel self-conscious about your appearance*

*You feel ugly in comparison to your friends*

*Your mother or caregiver would cook, or does cook healthy, balanced meals for your family*

*When you go shopping, you buy clothes a size smaller than you really are, hoping you will soon lose weight and they will fit you*

*You were born with big bones or a big frame*

*Your family has a history of health-related problems as the result of unhealthy eating lifestyles*

*You weigh yourself every morning and get upset at yourself if you gain weight*

#### Attributes by Perception Segment

Mind-Set segmentation relies upon the pattern of coefficients



generated from the experiment. There is no consideration of 'who' the respondent happens to be, but only the way the respondent considers the individual elements in the particular study when assigning a rating. Thus, there is no a priori reason for the Mind-Set segments to comprise homogeneous groups, i.e., groups which comprise individuals who are similar to each other in ways other than the patterns of their responses to these particular elements.

The distribution of the Mind-Sets into different groups as presented in Table 4 shows how the total panel distributes, and how the three segments distribute. The base-sizes are small, so that there is a great deal of error around the percentages. Nonetheless, there are a few seemingly departures from the pattern set by the Total Panel.

1. Ethnicity. Most of the respondents are either Caucasian or African American. Segment 3 seems to comprise more African Americans. Segment 3 feels ugly, panicky, and a victim
2. Neighborhood where the respondent lives. Segment 2, self-condemnatory and ashamed seems comprise more respondents who live in the suburbs.
3. Grade in school. The patterns are unclear
4. Children in the house. Segment 3 appears to be over-represented in large families.

## Discussion

A key benefit of Mind Genomics is its imposed structure. Mind-Genomics quantifies the different aspects of the problem, in terms of the elements. The elements add 'richness' to the information, giving a sense of what the respondent is experiencing and doing. In a sense Mind Genomics bridges the gap between the clinical and/or epidemiological description of a phenomenon and the subjective description of one's experience, an experience often best captured by a writer or in psychotherapy. This study mapped perceptions of adolescent females on eating behaviors and body image.

Given the high prevalence of overweight adolescent females engaging in disordered eating behaviors and the potentially harmful consequences associated with these behaviors, it is crucial to develop communication that prevents and reduces disordered eating among adolescent females [29]. Such communication may protect overweight adolescent females from engaging in binge eating or in extreme weight control behaviors.

The importance of weight was also related to greater prevalence of disordered and is congruent with previous studies on eating in females [31]. For the first segment of adolescent females disordered eating was part of a cluster of behaviors aimed at weight control (33% of the sample). These adolescent females placed a high level of importance on their weight. Interventions with overweight adolescent females with these perceptions should prevent an unhealthy preoccupation with weight. Interventions through communication messages for this mind-set segment should focus on enhancing knowledge on more healthful eating behaviors, providing a higher sense of control though discussing their feelings about their weight and body image.

The largest mindset segment was comprised of adolescents with low self-esteem and poor body image which were more related to eating disturbances among adolescent females [31]. For adolescent females who are ashamed of their body (46% of the sample),

communication messages are to focus on self-efficacy, higher self-esteem, empowerment and caring relationships. Interventions for the third mind-set segment (24% of the sample), adolescent females who feel ugly and are panicking, are to learn about healthy ways of eating and dangers of unhealthy weight control behaviors to provide a sense of order. Findings suggest that communication messages should encourage overweight adolescent females in this mindset segment to adopt more healthful eating behaviors and have better psychosocial well-being.

## Conclusion

Strengths and limitations of the current study are that many of the measures assessing predictor and outcome variables were brief and were based on self-report of the respondents and only one source of data.

In conclusion, while an important public health is to prevent eating disorders, it is crucial to prevent the use of disordered eating behaviors which predict eating disorders in overweight adolescent females. The right communication messages and interventions should be targeted by perceptions: Promote a positive psychological well-being; avoid unhealthy weight; provide a sense of order and control; and engage in regular eating patterns.

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