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Food Cues and the Desire to Eat in Dieters and Non-Dieters

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The effects of external stimuli, on women who diet and do not diet was examined using an experimental group that was exposed to a list of 73 written food cues, and a control group that was not exposed to the food cues. There was a mean increase in desire to eat for both the dieters and non-dieters who received the food cues, however no statistical significance in difference between the groups. There was a mean increase in desire to eat for the non-dieters in the control group, but a mean decrease in desire to eat for dieters in the control group. The results discussed below demonstrate the patterns that occurred based on external and internal stimuli.

Herman and Mack (as cited by Cole, 2008) completed a study using dieting and non-dieting women as their participants. They argued that not only do people who are overweight consume food or have increased motivation to eat based on the presence of external stimuli, but also people who are on diets. Furthermore, they determined that non-dieters who eat ad-lib, consume food based on internal stimuli. Their study entailed dividing the non-dieters and the dieters into three groups; one where the participants drank no milkshakes, another where participants drank one milkshake and the last where participants drank two milkshakes. All participants were then left alone with ice cream they were told to taste test. Using their results based on grams of ice cream consumed, Herman and Mack (as cited by Cole, 2008) concluded that all women on diets, including women who were at a normal weight consumed more grams of ice cream. In particular, the amount of ice cream consumed increased with the number of milkshakes they drank. Additionally, the more milkshakes the non-dieters ate prior to the study, the less grams of
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ice cream they consumed during the experiment. The results demonstrate that going on a diet changes peoples’ relationship with food and that dieters ate based on the situation, coupled with external stimuli. Non-dieters complied with the study and ate the number of milkshakes given to them and taste tested the ice cream; but due to satiation, internal stimuli, they only ate enough to complete the requirements and did not just eat because of the presence of the ice cream.

Oakes and Slotterback (2000) completed a study with college students, both men and women. In the experiment they presented the participants with a list of food cues, that included foods they would often be exposed to on a daily basis. Participants were then asked to rate their hunger levels, desire to consume food, what foods they desired and how satiated they felt. Their results demonstrated that after being exposed to list of written food cues the participants felt increasingly hungry, increased motivation to consume food, and increase in amount of foods they were hungry for as well as a decrease in satiation. One interesting finding was that participants who had an increase in amount of foods they were hungry for, were hungry for lower fat foods.

In a more recent study by Oakes and Slotterback (2001), they completed a similar study using both males and females; however, they were looking for the effects of food cues on dieters and non-dieters. There were a total of 161 participants, 42% claimed to be on a diet, 76% of the dieters being female and 24% being male. Participants in the experimental group were given a food cue list and then asked to fill out a survey on how nutritious they thought certain foods were for them which was done to have the participants pay attention to the food cues. After completing this task, they had to rate their hunger level, desire to consume food, what foods they were hungry for and how
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The control group had the participants fill out the same questionnaire without exposure to the food cue list. Results demonstrated that female dieters were less hungry than non-dieters and there was no significant difference between hunger rates for male dieters and non-dieters. There was also a significant difference between male and female dieters, where males were hungrier than females; however, between male and female non-dieters there was no significant difference in hunger.

The present study was designed to measure the effects of food cues on dieting and non-dieting women. The study had an experimental group who was exposed to a list of 73 written food cues and a control group who were not exposed to the food cues. The participants in the experimental group were asked to fill out a questionnaire prior to exposure of the food cues, and after. This was done with the intention of demonstrating a significant effect regarding the food cues by measuring the difference in hunger levels before and after exposure. The dependent variable in this study is the desire to eat and the independent variable is the list of written food cues. Measuring results between dieting and non-dieting women was executed to see if Herman and Mack's (as cited by Cole, 2008) argument of the tendency of dieters to eat based on external stimuli and the tendency of non-dieters to eat based on internal stimuli was in fact correct.

Method

Participants

Twenty women ranging from ages 18-22 and all participants recruited had various ethnic backgrounds. There were eight dieters and 13 non-dieters. All women, excluding two who were current students at the University of Western Ontario. These women had different body types and different weight. All women had no prior information about the
study given to them, except for a consent form informing them that they were completing a study based on food cues and desire to eat.

Materials

The women who agreed to participate in the study were given a consent form that follows the structure of the 4th year thesis research project consent form from the Department of Psychology at Huron University College. After the participants signed, the first questionnaire the participants were asked to fill out was the Subject Present State Questionnaire, this was designed to determine if the participant was currently on a food restrictive diet, if they participated in a regular form of exercise, how hungry they were, when they last ate, their desire to eat and what foods the desired. Hunger rate and desire to eat was measured on a scale from 1-10, one being the least hungry/desired and ten being extremely hungry or having extreme desire to eat. This questionnaire can be found in appendix one. The questionnaire was used to place the participants in the category of either a dieter, based on if they are on a food restrictive diet, or eat in a healthy fashion to maintain a healthy weight. The other option was to place the participants in the category of a non-dieter, based on them not being on a food-restrictive diet and not eating in a healthy manner to maintain a healthy weight.

After completing the questionnaire the participants who were in the experimental group were given a list of 73 different types of food cues (Oakes and Slotterback, 2000). This can be found in appendix two. Of the 73 different food cues, 38 of the foods were considered higher fat foods, meaning the nutrition value of the food had a higher or equal percentage of daily recommended fat per serving than the percentage of calories per serving. Of the 73 different types of food cues, 35 of the food cues were lower fat foods,
meaning they have a higher percentage of calories than percentage of daily recommended fat per serving. Participants were asked to read this list twice and when they finished reading, the researcher took the list back in order to remove the list from their vision.

When the participants had completed reading the list twice, they were then given a third questionnaire which was a revised version of the Subject Present State Questionnaire. The revised version only measured the participant's current hunger rate, their desire to eat, and the foods they desired.

Procedure

All participants that were recruited in this study were either friends of the researcher or were approached in public at Brescia College, Huron College and the University Centre on Western University Campus. The first ten participants were part of the experimental group and given the food cue list. The last ten participants were part of the control group and were not given the food cue list. When approaching the participant, the researcher asked if they would participate in a psychology study that would not take very long, if they agreed they were then told they needed to read a consent form and after reading they needed to sign that they agreed to participate.

After they signed, they were told the experiment would now begin, first with a questionnaire, and they were given a blue pen by the researcher. This was done to ensure the results would stay anonymous. After completing the first questionnaire the experimental group was then given the food cue list, and told to read the list twice. The control group was given a piece of blank paper and told to write their name, including first and last. To ensure the answers remained anonymous the sheet they were told to write their name on was not taken by the researcher, the participant held on to it through
out and after the study, however, the food cue list from the experimental group was taken back by the researcher after they completed reading it twice.

When both groups were completed with the task given, they were given the third questionnaire, and told to fill it out, using the same blue pen. When completed filling out the third questionnaire, both questionnaires they completed were paper clipped together and placed in a folder and were not viewed until all 20 participants had completed the study and the researcher went to calculate the results. This ensured that the results remained anonymous because no one viewed the results until the study was completed and the researcher would not be able to recall who completed what questionnaire based on handwriting and color of pen.

Following the study the participants were given a feedback form just to debrief the participant on what the research was being used for.

All participants were recruited throughout any part of the day and completed the study when they were only in the presence of the researcher and they were given as much time as needed to complete the study.

Results

Scores from both the Subject Present State Questionnaires were evaluated to determine the desire to eat. The score on desire to eat that was given on the first questionnaire was subtracted from the score on desire to eat that was given on the second questionnaire. This was done to get an absolute value of desire to eat, a positive number indicated there was an increase in desire, and a negative number indicated there was a decrease.
A 2 x 2 Analysis of Variance (ANOVA), was used to analyze the data (see Appendix four for complete data). As figure 1 demonstrates there were no significant main effects or interaction between dieters and non-dieters in the experimental group. The variability of scores ranged from 0-1 for both groups and they both had a mean of 0.4.

As figure 2 demonstrates there were also no significant main effects or interaction between dieters and non-dieters in the control groups. The variability of the scores from the dieters ranged from -2-1, with a mean of -0.7. The variability of the scores from the non-dieters ranged from -3-3, with a mean of 0.3.

Figure 3 is displaying that over all dieters had a higher desire to eat than did non-dieters. Even though there was no significant difference of desire to eat based on the presence of external stimuli, dieters scored higher on the desire to eat scale than non-dieters did.

Discussion

The goal of this experiment was to present the participants with a written list of food cues, in hopes that dieters would have a significant increase in desire to eat, and that non-dieters would not have a significant increase in desire to eat. This was based on the assumption that dieters tend to eat or have desire to eat based on external stimuli and that non-dieters tend to eat or have desire to eat based on internal stimuli. The most striking finding was the effects of food cues in dieters as shown in Figure 1. The results demonstrate that there was an increase in mean of desire to eat for both dieters and non-dieters. However, the increase is not significant and there is no statistical significance in difference between the two groups. These results are striking because they demonstrate
Figure 1. Difference in desire to eat for experimental groups between dieters and non-dieters. With a mean of 0.4 for both groups.
Figure 2. Difference in desire to eat for control groups between dieters and non-dieters. With a mean of -0.7 for dieters and 0.4 for non-dieters.
Figure 3. Total desire to eat in dieters and non-dieters. Score of one being extremely full and score of ten being extremely hungry.
confirm the expectation of non-dieters reporting feeling no significant increase in the desire to eat based on external stimuli.

The dieters may not have been sensitive to the list of written food cues because they encounter subtle food cues everyday, namely in commercials on television and in ads on billboards promoting restaurants and the fast food industry, etc. With coming into contact with these food cues daily, they may have built up a tolerance and had a way to resist the temptations so that they are not sensitive to them anymore. Also, the list contained 73 items that did not change based on the participant. Therefore, the effects of the food cues are very subjective depending on what types of food the participant likes and dislikes. If there are more foods on the list that the participant does not like that could counteract with the effect of the foods they do like and maybe have the opposite effect of decreasing their desire to eat.

With the control groups there is also no statistical significance between the two groups, non-dieters did have an increase in the mean of desire to eat, but again this was not significant. Surprisingly, again the dieters had shocking results, with a decrease in desire to eat. However, with the participants being recruited randomly it can not be guaranteed that the experiment will have a close ratio of dieters and non-dieters, in this case the ratio was very large, seven non-dieters and three dieters. If there were more dieters in the control group, the results could be very different.

As Figure 3 demonstrates, dieters did have a higher desire to eat than do non-dieters. Dieters tend to restrain themselves from eating certain foods, where as non-dieters do not have extreme food-restrictive eating habits. As a result, when they desire foods, they do not feel so opposed to satisfying their cravings. Dieters may desire to eat
more because they limit their daily caloric intake and because they restrict themselves from eating certain foods they do not eat desired foods as often, and thus they have a higher desire for them. With these results, the experiment might have been more significant if the participants were not only given a food cue list, but presented with certain foods and given the chance to consume the food. Olfaction would have been a major external stimulus that could be even more stimulating than visualizing the actual food. As well, with visualizing the food and having prior experience with it, the participant can remember what the food tastes like, which is also another external stimulus. With the participants just being given a food cue list, they might not be so inclined to consume the foods, because they are not being given the chance to eat it and they only have one external stimulus which is visualizing the word. Therefore, with presenting the participants with food and allowing them to consume the food ad lib, the researcher can measure the actual amount of food in take, getting an accurate measure. With presenting food as the external stimulus, a greater significance in desire to eat is more likely to be shown because desire to eat is not being measured based on what the participant says, it is being measured based on the participant’s actions and how much food they actually consume.

Many reasons can be discussed as to why the results were not significant in the experimental group, in order to see a greater significance with more prominent results; more participants would have had to be recruited.
References


Subject Present State Questionnaire

1. Are you currently on a form of food restrictive diet?: Yes / No

2. If no, would you say you try to eat in a healthy way to maintain a healthy weight?: Yes / No

3. Do you participate in a regular form of exercise?: Yes / No

4. If yes, what form of exercise and how often (please list)?:

5. On a scale of one to ten, how hungry are you right now (please circle)?:

   1  2  3  4  5  6  7  8  9  10

6. How long ago did you last eat (please circle one)?:

   Less than an hour ago   1-3 hours   More than 3 hours

7. On a scale of one to ten, how would you rate your desire to eat right now (please circle one)?:

   1  2  3  4  5  6  7  8  9  10

8. What food(s) are you most hungry for right now (please list)?:
### List of Food Items Used as Written Cues

<table>
<thead>
<tr>
<th>Item</th>
<th>Item</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Powdered donuts</td>
<td>Jell-O pudding snack</td>
<td>Pop Tarts</td>
</tr>
<tr>
<td>Raisins</td>
<td>Caramel rice cakes</td>
<td>Ore Ida french fries</td>
</tr>
<tr>
<td>Tater tots</td>
<td>Egg McMuffin</td>
<td>McDonald’s hamburger</td>
</tr>
<tr>
<td>Kraft macaroni and cheese</td>
<td>Vanilla ice cream</td>
<td>Oscar Mayer bologna</td>
</tr>
<tr>
<td>Nonfat brownies</td>
<td>Plain rice cakes</td>
<td>Oscar Mayer hot dog</td>
</tr>
<tr>
<td>Peanut M&amp;Ms</td>
<td>Pasta</td>
<td>Big Mac</td>
</tr>
<tr>
<td>Apple</td>
<td>Planter’s peanuts</td>
<td>Spaghetti and sauce</td>
</tr>
<tr>
<td>Snickers bar</td>
<td>Captain Crunch and milk</td>
<td>Wheat Thins</td>
</tr>
<tr>
<td>Nonfat blueberry muffins</td>
<td>Microwave butter</td>
<td>Ramen noodles</td>
</tr>
<tr>
<td>Tombstone supreme pizza</td>
<td>popcorn</td>
<td>Fig Newtons</td>
</tr>
<tr>
<td>Carrots</td>
<td>Peaches and cream</td>
<td>Unbuttered popcorn</td>
</tr>
<tr>
<td>Chocolate chip granola bars</td>
<td>instant oatmeal</td>
<td>Saltines</td>
</tr>
<tr>
<td>Beef jerky</td>
<td>Doritos</td>
<td>Fruit Roll-Ups</td>
</tr>
<tr>
<td>Slim Jims</td>
<td>Nutri-Grain cereal bars</td>
<td>Iceberg lettuce</td>
</tr>
<tr>
<td>Honey Nut Cheerios and milk</td>
<td>Lay’s potato chips</td>
<td>Peanut butter</td>
</tr>
<tr>
<td>McDonald’s sundae</td>
<td>Cheerios and skim milk</td>
<td>Tastycake Jelly Krimpets</td>
</tr>
<tr>
<td>Sara Lee apple pie</td>
<td>Tostitos</td>
<td>Cream cheese jalapeno sticks</td>
</tr>
<tr>
<td>Frozen yogurt</td>
<td>Pretzels</td>
<td>Grapes</td>
</tr>
<tr>
<td>Fish sticks</td>
<td>Cheese curls</td>
<td>Rice Krispies treats</td>
</tr>
<tr>
<td>Onion bagel</td>
<td>Beef and bean burrito</td>
<td>Yodels</td>
</tr>
<tr>
<td>Individual fruit pie</td>
<td>Oreo</td>
<td>Wise baked potato chips</td>
</tr>
<tr>
<td>Spaghetti-Os</td>
<td>Bagel bites</td>
<td>Chicken nuggets</td>
</tr>
<tr>
<td>Raspberry Zingers</td>
<td>Cheddar cheese</td>
<td>LaChoy egg rolls</td>
</tr>
<tr>
<td>Campbell’s tomato soup</td>
<td>Dannon yogurt</td>
<td>Banquet egg rolls</td>
</tr>
<tr>
<td></td>
<td>Chocolate-covered raisins</td>
<td>Caramel apple</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hot wings</td>
</tr>
</tbody>
</table>
Subject Present State Questionnaire

1. On a scale of one to ten, how hungry are you right now (please circle one)?:

1 2 3 4 5 6 7 8 9 10

2. How long ago did you last eat (please circle one)?:

Less than an hour ago 1-3 hours More than 3 hours

3. On a scale of one to ten, how would you rate your desire to eat right now (please circle one)?:

1 2 3 4 5 6 7 8 9 10

4. What food(s) are you most hungry for right now (please list)?: