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Honors Thesis

Is Vegetarianism a Diet? Implicit Associations of Vegetarians and Omnivores on a Vegetarian
Campus

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April 1

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Primary Advisor Signature: _____

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Abstract

This study examines the differences in implicit attitudes toward meat and vegetables in religious vegetarians and omnivores on a religious, vegetarian campus. Response times and error rates from the Implicit Association Task (IAT) were used to examine whether external diet commitments consistently affect internal attitudes. We found a significant main effect of diet on IAT responses, but no significant interaction of diet with a self-control depleting task. Thus, participants' explicit responses were by far the strongest predictor of their implicit attitudes, demonstrating that, unlike short-term dietary choices, long-term dietary choices are robust in the face of self-control depletion.

Implicit Associations of Vegetarians and Omnivores Toward Meat and Vegetables on a
Predominantly Vegetarian Campus

Diet. Obesity rates in the United States have risen to a staggering 32.2% among adult males and 35.5% for adult females (Flegal, Carroll, Ogden & Curtin, 2010). This has led to both an increase in interest and money spent on dieting and fitness products. Paradoxically, restricting food intake can increase the likelihood of overeating (Adams & Leary, 2007). Herman and Mack (1975) were the first to observe this “counter regulation.” In their study normal weight female students on restrained or unrestrained diets were required to drink either zero, one or two milkshakes, and then were allowed to eat as much ice cream as they wanted in a simulated taste test. Unrestrained eaters ate until satiated; if they drank more milkshakes they ate less ice cream. However the opposite pattern emerged for the restrained eaters; the more milkshakes they consumed the more ice cream they ate (Herman & Mack, 1975). It is unclear what similarities may exist between these often-temporary diets and more permanent lifestyle diets like vegetarianism and veganism.

Vegetarianism. In recent years, vegetarianism has become an increasingly attractive and acceptable dietary choice. The World Health Organization (1990) recommends an increase in fruits and vegetables and a decrease in meat consumption as part of a healthy diet, and vegetarians tend to have lower body weights, cholesterol and mortality (White & Frank, 2003). Previous research has shown that for many people, meat has negative representations (Allen & Ng, 2003), becomes moralized (Rozin, Markwith, Stoess, 1997), and that food choices are another arena for expressing one’s life philosophy (Lindeman & Sirelius, 2001). Reasons for becoming vegetarian also differ across generations (Pribis, Pencak & Grajes, 2010), often with

more motivations being recruited the longer the diet is sustained (Fox & Ward, 2007). These studies demonstrate that people have differing opinions towards meat and are persuaded to begin and maintain a long-term vegetarian lifestyle for different reasons.

Self Control. Diet maintenance relies on automatic attitudes, dietary restraint standards, and self-regulatory resources on eating behavior (Hofmann, Rauch, & Gawronski, 2007). Automatic attitudes are spontaneous evaluations that predispose a person to approach or avoid a stimulus (Strack & Deutsch, 2004), dietary restraint standards are self-imposed eating restrictions, and self-regulatory resources refer to self-control availability. Often consumer decisions, including dietary decisions, depend on the conflict between self-control and desire (Baumeister, 2002). Self-control has been linked to blood glucose levels, lending credence to the theory that self-control is a limited resource that is capable of being depleted (Gailliot et al, 2007). Hoffman, Rauch and Gawronski (2007) found a relationship between short-term diets and ego depletion, while studies focusing on long-term dietary habits such as vegetarianism have not looked at the effects of depletion.

Implicit Associations. The most common method for studying the eating habits and diet attitudes of vegetarians has historically been to collect participant questionnaires or to conduct focus groups and interviews (Pribis, Pencak & Grajales, 2010; Lindeman & Sirelius, 2001; McDonald, 2000; Larsson, Rönnlund, Johansson, & Dahlgren, 2003). While useful, these methods do not reveal anything about the implicit associations that participant may have, only their explicit associations, responses controlled by higher thought processes which may be depleted. Implicit associations are those attitudes and behaviors that are under the control of automatically activated evaluation. One major way that implicit attitudes are measured is by

using the Implicit Association Test or IAT (Greenwald, McGhee & Schwartz, 1998; Bargh, Chaiken, Govender, & Pratto, 1992; Fazio, 1993), in which reaction times are measured as pictures are sorted. By measuring the speed of automatic evaluation, the Implicit Association Test (IAT) can measure an individual's individual preferences, or the implicit associations between two categorization schemes. The task involves a series of trials with sets of words or pictures that the participants sorts into two categories. The first set of stimuli in, for example, a IAT measuring attitudes towards race, might be pictures of black or white faces. In this example, the second set of stimuli would be positive and negative words. Each stimulus set would be sorted separately (by pressing a key with the right hand or left hand depending on category) during consecutive practice blocks. In the third block, the two sorting tasks would be combined (e.g. white faces and positive words sorted with one response, and black faces and negative words sorted with the other response). Two more practice blocks would occur with the stimuli separated, followed by a second combined block, but with the categorization for one set of stimuli reversed (e.g. black faces with positive words, white faces with negative words).

When the category groupings conflict with participants' implicit attitudes, the responses should be much slower and the rate of mistakes much higher. *D* scores tell us the magnitude of the interference between two variables in the case of conflict (Greenwald, Nosek & Banaji, 2003). The logic of *D* scores is similar to measures of effect size (e.g. Cohen's *d*) Test block means are divided by the standard deviation of the latencies for the two test blocks, yielding a standardized magnitude of interference. The closer the number to zero, the less interference, while higher numbers indicate more interference. The sign on the *D* score indicates which block caused greater interference.

Vegetarians' implicit attitudes have been studied in foreign populations, but less frequently in American populations. Moreover, within the United States, Seventh-day Adventists are a unique group to study because they feature a wide range of motivations for vegetarianism: religious, health and moral, and because Adventist institutions provide a rare environment in the United States in which vegetarian diet options are more prevalent than omnivores. While only a fraction of Adventists are consistently vegetarian, food served in Adventist settings is unfailingly vegetarian (Bull & Lockhart, 1989). In other studies, religiously motivated individuals have been explicitly excluded (Rozin, Markwith & Stoess, 1997), so we know very little about those who change their diet for a religion. By becoming vegetarian, one makes an explicit commitment to a new diet, but if their implicit associations are not in line with their new behavior (i.e., if they still think of meat very positively) then they are likely to fail. Thus, only those who have changed their implicit associations will be able to maintain long-term dietary change.

Method

Participants. A total of 73 students (48 Females, 25 males) enrolled in introductory behavioral sciences courses at Andrews University participated in the study for class credit. 70 students identified themselves as Seventh-day Adventists. 22 students identified themselves as either vegetarians or vegans and 51 were either non-vegetarians or pesco-vegetarians.

White Bear Task. Participants in the experimental condition participated in the white bear task (Wegner, Schneider, Carter & White, 1987), a thought suppression task intended as an ego depletion manipulation. Specifically, before completing the IAT, subjects completed a stream of consciousness writing task for 10 minutes during which they were told not to think about the

“white bear.” If they did think about the white bear they were told to write the thought down, cross it out and continue. Thought suppression has been shown to have a paradoxical effect on thought control (Wegner et al, 1987) and has been used as a means of depleting self-control. Self-control is defined as the ability to alter one’s own responses, especially to bring them in line with what is deemed socially appropriate (Baumeister, Vohs & Tice, 2007). Even brief acts of self-control have been found to have a noticeable effect on subsequent unrelated behaviors (Baumeister, et al, 2007). Using a self-control task before the implicit association task therefore should decrease subjects’ ability to control their responses, yielding a more accurate measure of their implicit associations and indicating whether long-term dietary choices are amenable to depletion.

Implicit Associations Task. Stimuli of positive and negative images for the IAT were drawn from the International Affective Picture System (IAPS; Lang, Bradley & Cuthbert, 2008). Vegetable and meat stimuli were chosen from the Internet as representative of typical foods consumed by college students. This IAT consisted of six trial blocks, four practice and two combined. The combined blocks were split in half for the purpose of analysis as in (Greenwald, Nosek & Banaji, 2003). In the Vegetable-Positive block participants pressed the first key for positive images or vegetable images and the second key for negative images or meat images. After two more practice trials they completed the Meat-Positive block, pressing the first key for positive images and meat images and the second key for negative images and vegetables. We then calculated the *D* scores (Greenwald, Nosek & Banaji, 2003) of the two tasks and compared the differences between vegetarians and omnivores.

Results

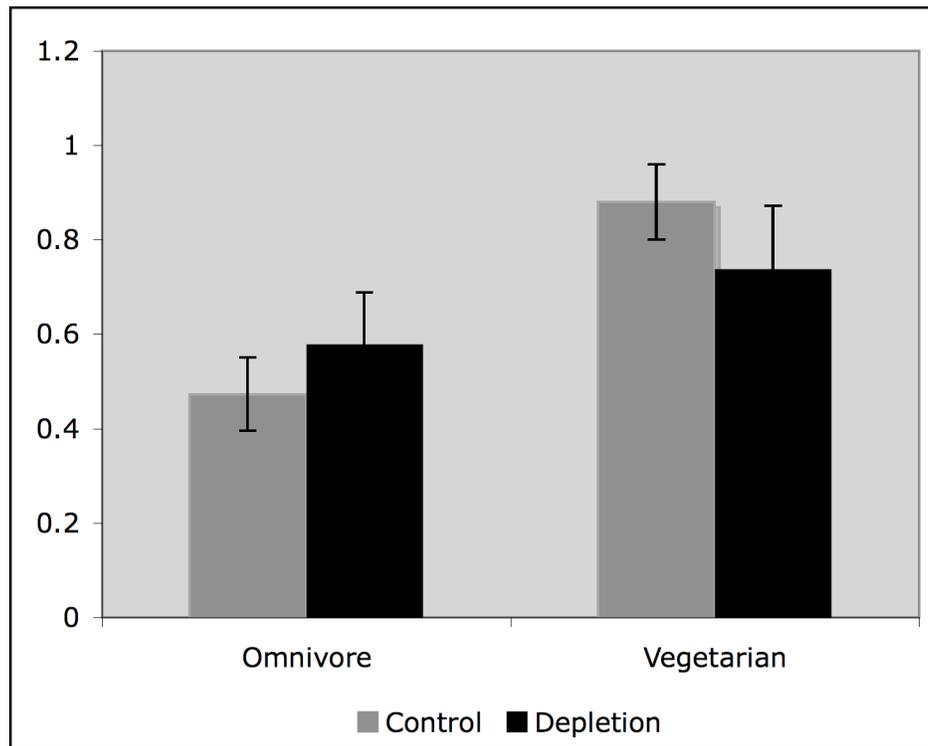


Figure 1. Mean IAT *D* scores for vegetarians and omnivores in depletion and control conditions. A higher number indicates a greater vegetable positive/meat negative association.

IAT. In accordance with the improved scoring algorithm of Greenwald, Nosek, and Banaji (2003), IAT scores were analyzed to calculate *D* scores with more positive scores indicating a preference for vegetables over meat. *D* scores were then analyzed using an ANOVA. There was a significant difference between vegetarians and omnivores ($F=7.592$, $p<.05$), and despite a trend, no significant interaction between diet and task ($F=.228$, $p=.234$). Depletion did not have a significant impact on implicit associations.

Discussion

We replicated previous studies (De Houwer & De Bruycker, 2007; Barnes-Holmes, Murtagh, Barnes-Holmes & Stewart, 2010), demonstrating that vegetarians and omnivores differ

not only on explicit measures but also on their implicit associations. For the first time we have also shown that the trend holds when the dominant population is reversed and vegetarians are in the majority. Our inability to find a significant interaction could be due to the need for a more effective depletion task, or, more likely given converging evidence (Hofmann, Rauch & Gawronski, 2007; McDonald, 2000; Lindeman & Sirelius, 2001; Rozin, Markwith & Stoess, 1997) may provide evidence for the robustness of diet in the face of depletion. Our results support the need for changing implicit associations as well as explicit attitudes if lasting dietary change is to occur.

While temporary changes in diet are susceptible to the effects of ego depletion, long-term commitments to an omnivorous diet or vegetarianism remain stable even after self-control has been depleted. When someone makes a commitment to follow a vegetarian lifestyle, often their omnivore friends and family will view their decision negatively (Povey, Wellens & Conner, 2001) and try to entice them with foods they used to eat, but this strategy would only be successful for short-term diets that rely on self-control. This study lends credence to the theory that vegetarianism is more than simply a dietary choice (Allen & Ng, 2003; Allen, Wilson, Ng & Dunne, 2000). How exactly long term dietary choices differ from short-term dietary restrictions remains unclear.

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