

Intervening to Influence Fast-Food Choices: Assessing Response Generalization in
Nutrition-Related Behavior

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Abstract

A large-scale intervention, designed to increase healthier fast-food consumption, was evaluated at a national fast-food chain. Participants included fast-food consumers at three separate restaurant locations in southwestern Virginia. Each restaurant received three phases, consisting of fourteen days each. Two of the restaurants were exposed to two conditions, A (Baseline) and B (Intervention), while the other restaurant served as a control. Restaurant 1 received the following phases, with each phase lasting two weeks: A--B--A. Restaurant 2 received A--A--B, and Restaurant 3 received A--A--A. Research assistants distributed discount coupons on a new healthy sandwich to consumers during Condition B in Restaurants 2 & 3. This sandwich was available in a healthy combo including salad and water, and a regular combo including soda and fries. At all 3 locations, research assistants collected receipts showing all total menu item sales every day during the six-week intervention. Analyses of variance revealed consumers purchased the healthy sandwich significantly more during the incentive conditions, and also purchased the regular combo more frequently than the healthier combo during the intervention condition. Implications for the social validity of using incentives to motivate nutrition-related behaviors are discussed.

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Intervening to Educate Fast-Food Consumers: Measuring Response Generalization in Nutrition-Related Behavior

In 2003, the American Psychological Association defined 2000-2010 as the “Decade of Behavior” (APA, 2003). This suggests a period of time when psychologists begin to produce beneficial behavior change in society. This is neither a new concept nor phenomenon. For several decades, large-scale behavior-based interventions have been affecting several problematic areas of society, from safety promotion to environmental preservation (Geller, 2001; Geller, Winett, & Everett, 1982). These same principles are also capable of affecting public and personal health concerns. One significant and growing public health concern is the physical health and weight of the global population, especially among Americans.

Successful interventions can have greater social validity if they influence more than one behavior. Behavioral maintenance is becoming a common focus of research designed to measure increased intervention effects, but the phenomenon of response generalization is beginning to be explored as well (Boyce & Geller, 2001; Ludwig & Geller, 2000). In contrast to the positive effects of response generalization on an intervention, risk compensation is a concept which has been defined as the choice of an individual to perform a behavior contradictory to the behavior reinforced in an attempt to maintain one’s previous level of risk and reward (Wilde, 1982).

This introduction discusses the problem of obesity in America, as well as prior attempts by researchers to decrease obesity from a behavior-change perspective. Then a large-scale intervention designed to increase healthier fast-food consumption is evaluated consistent with the “Decade of Behavior.”

The Problem

A 2001 study found that 61% of Americans were overweight, meaning their body mass index was greater than 25 kg/m² (Phelan, 2001). It is also estimated that 6 million Americans are at least 100 pounds overweight or “super obese” (Miller, 2001). The negative ramifications of being overweight or obese include physical discomfort, social discrimination, and lowered-self esteem. Perhaps even more pressing are the severe medical problems that can arise from obesity.

Obesity and related problems are now the second-leading cause of death in the United States, resulting in an estimated 280,000 fatalities every year (Miller, 2001). People suffering from obesity are at a greater risk for various medical problems, such as diabetes and hypertension (Phelan, 2001). Overweight people are also at a heightened risk of suffering from coronary heart disease, osteoarthritis, and some forms of cancer (Tietzen & Mason, 2002).

Obesity also has a tremendous economic impact on our country. It is estimated that Americans spend in excess of \$33 billion on dietary methods to lose the weight they have gained (Miller, 2001). Moreover, \$117 billion were spent on “obesity-related problems, primarily healthcare” in 2000 (Tietzen & Mason, 2002).

While many factors influence the overall prevalence of obesity, most agree that unhealthy food consumption behaviors are significantly problematic. This problem is on the rise, as research has shown that Americans consumed, on average, 200 more calories per day in the mid-1990s compared to the 1970s (Tietzen & Mason, 2002). The problem is especially growing among children and teenagers. Forty-five percent of children eat high caloric and high fat foods twice a day (Bar-Or, et al., 1998). The amount of teenagers, ages 12 to 19, who were suffering from obesity nearly tripled from 1980 to 1999, growing from 5% to 14%. Studies have shown that 84% of American adolescents are currently consuming too much fat in their foods, with 91% consuming excessive levels of saturated fat (Tietzen & Mason, 2002).

Past Research and Findings

Understanding how to combat obesity and the increased intake of calories and fat has been a focus of intervention research during the past few decades. Researchers often target younger populations, as obesity occurs at early ages and increases the risk of remaining obese throughout one’s life. Research also suggests that approximately 70% of people who are obese during adolescence also suffer from obesity as adults. Thus, combating obesity at an early age by decreasing unhealthy food consumption has been the target of research strategies (Bar-Or, Foreyt, Bouchard, Brownell et al., 1998).

The most prevalent and effective method of obesity prevention lies in combining physical activity with consuming a healthier diet (Blair, 1993). Both of these components have been addressed in an attempt to reduce obesity. Cognitive-behavioral

interventions have been effective in increasing physical activity (Dubbert, 2002). It also appears that increasing exercise leads to healthier attitudes and behaviors, such as making healthy food choices (Brownell, 1995). When comparing home-based and group-based exercise interventions, researchers found that participants in both groups significantly reduced their intake of foods high in fat regardless of the type of exercise they performed (Perri, et al., 1997).

As researchers have achieved success at increasing the frequency of fitness behaviors, subsequent studies have been conducted to target behaviors related to nutrition directly. Changing eating behaviors is proposed to be an effective way to encourage positive changes in health (Kern, et al., 2002). Researchers have found evidence suggesting that interventions focusing on weight instead of physical exercise result in significantly less consumption of fatty foods. They also found that more participants maintained their low-fat eating habits (Leermakers, et al., 1999). A problem that often occurs in research focusing on decreasing intake of unhealthy foods lies in the difficulty of measuring those behaviors. This difficulty often forces researchers to collect data measuring weight, since actual observations of eating behaviors are difficult or inconvenient to perform (Wing, 2000).

Research involving evaluating the impact of prompting specific behaviors has been effective in producing desired change in health-related behaviors as well (Kazdin, 1989). Research has shown that the most effective prompts are those that are noticeable, polite, clear, specific with regard to the behavior, and occur close to the time and location where the behavior will be performed (Geller, Winett, & Everett, 1982). A multimedia intervention known as the Nutrition for a Lifetime Systems (NLS) has been effective in using visual media prompting to increase the consumption of healthier foods and decrease the consumption of fat (Winett, et al., 1997).

Telephone prompting has also been effective at increasing health-related behaviors, and is a much less expensive method of behavioral intervention. Lombard, Lombard, and Winett found that increasing the amount of telephone prompting for exercise behaviors among women resulted in higher levels of behavioral maintenance of the exercise behaviors (Lombard, Lombard & Winett, 1995). Email is another inexpensive prompting method successful in initiating behavioral weight loss programs

(Tate, Wing, & Winett, 2001). An additional study involving sign and flyer prompts demonstrated the effectiveness of using prompts to increase the consumption of salads in college, fast-food settings (Wagner & Winett, 1998).

Fast-Food Consumption as the Target

Fast-food is often very high in both calories and fat, and its intake is on the rise. Also, the amount of money spent on fast-food has dramatically increased, from \$6 billion in 1970 to \$110 billion in 2000 (Miller, 2001). Most research suggests that environmental factors, such as increased amounts and prevalence of high-calorie foods, are significant in the development of obesity (Tietzen & Mason, 2002). A 1996 study found that fast-food was responsible for 32% of total calories consumed, as opposed to 18% of total calories consumed in 1978 (Guthrie, Lin, & Frazao, 2002). Studies have also shown that people who consume large amounts of fast-food generally report greater levels of physical discomfort (Gondola & Tuckman, 1984).

Fast-food often presents a problem beyond its nutritional value because it is consumed in excessive amounts per meal. Fast-food meal sizes have been increasing over time, yet only 38% of Americans realize that portion sizes of fast-food meals have significantly increased over the last decade. McDonald's Big Mac weighs 7.6 ounces today, compared to the 3.7 ounce size of their original hamburger (Richard, 1997). Fast-food chains often market their meals as "value" or "super" sized, and this increase in size can lead to an increase of as much as 1,500 calories (Tietzen & Mason, 2002).

Fast-food is a significant problem for people of all ages, but has become increasingly prevalent for teenagers and college students. In a recent nine-month period, Chick-Fil-A sold more than \$1 million worth of fast-food to students at Virginia Tech, resulting in the campus-community Chick-Fil-A being the second-most successful location for that particular fast-food chain (Allen, 2002). Americans report an overall concern with both a lack of time and means for preparing food as reasons for consuming fast food (Tietzen & Mason, 2002). Fast-food restaurants market their product to the consumers' needs for convenience and some on-campus fast-food chains even allow students to charge the meal on their accounts, increasing efficiency and convenience (Miller, 2001).

Fast-food may be convenient and easily accessible for college students, but many fast-food options contain an overall level of calories and fat much higher than foods prepared at home (Guthrie, Lin, & Frazao, 2002). The recommended caloric intake is 2,000 a day for women, and 2,800 a day for males. It is also recommended that people consume less than 60 grams of total fat per day, and one meal at a fast-food restaurant can come close to or even exceed the entire recommended rate for daily consumption of both calories and fat.

A Popular Burger combo from Burger King has 1250 calories and 70 grams of fat (Allen, 2002). A Big Bacon Classic Value Meal from Wendy's (consisting of a sandwich, fries, and soft-drink) contains 1250 calories and 48 grams of fat (www.wendys.com, 2002). The highly-marketed Flatbread Chicken Sandwich combo from Long John Silver's contains 1430 calories and 71 grams of fat (www.ljsilvers.com/nutrition/nutritionprint.htm, 2002).

The large amount of fast-food meals that are high in fat content often overshadows the fact that there are healthier fast-food options available. Subway markets seven subs that contain less than six grams of fat, and approximately 300 calories (Subway Nutritional & Dietary Guide, 2003). Chick-Fil-A also has several options that have less than seven grams of fat, including a line of Char-grilled chicken sandwiches and wrapped sandwiches (Chick-Fil-A Nutrition Guide, 2002).

Nutritional Education as the Target

The problem is not necessarily a lack of healthier fast-food options, but a lack of knowledge regarding these options. The availability of the nutritional details is problematic, as is the confusion that often surrounds the information. Access to the nutritional guides often requires the customer to ask for them in the store or to look them up on-line. Even on-line nutrition guides are confusing and sometimes misleading. Consider the following example. When comparing the internet nutritional guides for Pizza Hut and Domino's Pizza, the amount of saturated fat listed for a serving of hand-tossed cheese pizza is five grams, compared to six grams of saturated fat listed for a serving of hand-tossed cheese pizza at Domino's. The pizzas seem highly comparable, until closer inspection of the listed serving size reveals that a serving at Domino's is two slices, compared to a serving of one slice at Pizza Hut. The same pizza at Pizza Hut

contains twice as much saturated fat per serving than at Domino's, though one could not tell by just glancing at the nutritional guides.

Adding to the confusion are misleading labels and slogans that have actual definitions which are much different than what might be perceived. The label "light or lite" can simply refer to being paler in color, fluffier in texture, or lower in sodium taste, and can have nothing to do with the nutritional content of a food. The phrase 75% lean, which is often used to describe hamburgers, simply means the food contains one-quarter of fat by weight, which is still a significant amount of fat (Bolt, 1992).

Current health experts list confusion and lack of knowledge with regard to nutrition as a problem that needs to be addressed (Susman & Reiter, 2002). Interventions developed by such agencies as the National Cholesterol Education Program and Project LEAN (Low-fat Eating for America Now) have successfully increased awareness concerning which foods are higher in fat and introduced ways to effectively change dietary habits (Elder, Geller, Hovell, & Mayer, 1994). Health programs are also planning educational seminars to provide people with specific details about fast-food content (CommonHealth, 2003). Research involving eating in front of a mirror has shown that making people aware of how much and what they are eating actually leads to decreased food consumption (Pliner & Iuppa, 2002). It is hypothesized that a similar effect might occur when using nutritional guides to inform customers about exactly what they are eating in a fast-food environment.

Response Maintenance and Generalization

Research has shown that applied psychological interventions are effective in influencing behavior and producing positive behavior change. Since the goal of an intervention is often to produce the greatest amount of beneficial behavior change, steps are being taken to increase the scope of behavioral influence. Now, many behavior-change researchers are concerned with behavioral maintenance, or the continuation of the desired behavior after the intervention is removed.

Behavioral maintenance involves generalization across time and setting. If you get people to buckle up today while in their cars, getting them to buckle up tonight in their cars involves generalizing the behavior to a different setting and context (night time). You also hope that maintaining the behavior involves generalizing across different

vehicles. This type of generalization certainly expands the positive aspects of the intervention, but still only results in the occurrence of the targeted behavior (Geller, 2001).

Another avenue of increasing the impact of an intervention is response generalization. Response generalization most often occurs to a response not directly targeted by the intervention (Boyce & Geller, 2001). As opposed to stimulus generalization, where the same response occurs to different stimuli, response generalization occurs when the presentation of one stimulus impacts different behaviors. Ludwig and Geller (1997) targeted intersection stopping and studied response generalization by measuring two other driving behaviors of the same response class, turn signal use and safety-belt use (Ludwig, 2001). A response class is defined as “one behavior (consisting of many movements) or as an assortment of behaviors required for a contingency outcome” (Ludwig, 2001). Response generalization seeks to reinforce the class of responses by targeting one particular segment (Ludwig, 2001).

To intervene successfully upon a behavior, researchers need to recognize and understand the socially and naturally linked behaviors in the response class in question. Complete intersection stopping, buckling a safety-belt, and using a vehicle turn-signal fall under the response set of safe driving. Purchasing a healthier sandwich at a restaurant and purchasing a healthier side item both fall under the response set of healthy eating behaviors.

Once the response set has been defined, it may be beneficial to develop an intervention where additional behaviors are examined as well as the target behavior. For example, if the goal of the intervention was to encourage consumers to eat healthy by purchasing a healthy sandwich, the behavior of purchasing a healthy side item could also be measured. Directing the information in a way that naturally links the target behavior and other related behaviors might increase response generalization, without necessarily teaching the related behaviors. The generalized behavior must not have been taught with the target behavior; otherwise we are not measuring generalization (Houchins & Boyce, 2001).

Programming for response generalization refers to linking the target behavior to the desired generalized behaviors, such that they occur together in a natural setting or

environment. Programming the link allows it to be combined in an intervention and allows for response generalization to occur more easily and naturally (Boyce & Geller, 2001). In an intervention measuring healthy decisions by consumers at a fast-food restaurant, response generalization would be defined as healthy decisions made by consumers in addition to the target behavior.

Incentive Approach

Providing an incentive for purchasing a healthier fast-food menu item may be effective in increasing healthy consumer decisions. While incentives have been shown to be effective in motivating behavior change, care must be taken to ensure the incentive is not too large. Festinger and Carlsmith (1996) demonstrated that giving participants a large incentive provides an excuse for the behavior. If an incentive is too large, people will attribute their behavior to being motivated by the incentive and not because they actually wanted to perform the behavior. The study found that offering a smaller incentive resulted in participants accepting responsibility for the behavior, and attributing it to their own beliefs and attitudes (Aronson, 1999).

For this and other practical reasons, one should not offer a “Free Sandwich” coupon. By offering a minimal discount, consumers are likely to feel motivated by the incentive, but still feel they are acting out of the healthy attitudes they possess. This concept of self-persuasion (Aronson, 1999) supports the ultimate goal of the current intervention. If people come to believe they are healthy because they engage in healthy behaviors for minimal reward, they are likely to maintain those behaviors to remain consistent with their attitudes and self-concept (Bem, 1972). Keeping the monetary incentive relatively small will also be more beneficial to the fast-food business, and their support of an incentive intervention is crucial to its long-term and large-scale success.

Present Intervention Approach

With all the research conducted on health-related interventions, and the growing need for nutritional information about fast-food, an intervention located at fast-food restaurants designed to increase healthy fast-food purchases using education and incentives is likely to be effective in reducing the consumption of unhealthy fast-food. Creating an intervention with effective aspects of past research might produce the needed change to increase sales of healthier fast-food items (Geller, 2001).

It also may result in response generalization (Ludwig, Biggs, Wagner, & Geller, 2001); and a health-related intervention would prove be much more socially valid if increasing one healthy decision could impact future decisions of consumers. Measuring the impact of the intervention on a target sandwich as well as other healthier items sold will not assess the reach of the intervention. It is also likely to provide greater social validity for the intervention if findings suggest that many healthier consumer purchases are occurring as a result of targeting only one sandwich.

At a time where fast-food companies are being sued and scrutinized for their unhealthy options, fast-food restaurants will most likely benefit (both financially and reputably) by supporting an intervention designed to improve the health of its consumers. The change agents should also listen to the concerns of the restaurant's management and encourage them to be involved in the decision-making process. This is likely to provide them with a sense of ownership, pride, responsibility, and commitment to the project (Smith, 2000).

Locating an Intervention Site

After designing the current intervention, the district manager of a national fast-food chain in Montgomery Co., VA -- a small rural community in southwestern VA -- was approached and informed of the current intervention. He was given a summary of the objectives and benefits of the intervention (Appendix A), and was introduced to theories behind the intervention. Upon discussion of the intervention, he agreed to allow the author and his research assistants to implement and evaluate the current intervention at his chain of local fast-food restaurants.

He also revealed that the restaurant chain would begin marketing new, healthier sandwiches in the fall of 2003. These sandwiches, which will be referred to as Target Sandwiches, contained only five grams of fat and were offered in two separate meal combos -- the regular combo containing fries and a soda and a healthier combo containing water and a salad (See Appendix B for nutritional information). He agreed to allow researchers access to the total number of sandwiches sold, as well as the total number of each sandwich combo sold.

The option of choosing a healthier combo instead of a regular one enabled a measure of response generalization. The number of sales per each combo provided

information on whether consumers continued to make a healthier eating decision once they had chosen to purchase the healthy sandwich. The fast-food chain's best-selling hamburger, which will be referred to as Popular Burger, was chosen as a comparative sandwich, as it is was the chain's most successful sandwich, and contains higher levels of fat and calories (See Appendix B for nutritional information).

By studying the possibility of response generalization in healthy eating choices, this intervention attempted to follow the suggestion that the potential for "generalization should be programmed, rather than expected or lamented" (Baer, Wolf, & Risley, 1968). The primary objective of the present intervention was to compare the effectiveness of increasing the purchase of the Target Sandwich, and to assess whether response generalization occurred in the context of the intervention.

Hypotheses

Hypothesis 1

Based on the research demonstrating the effectiveness of incentives, it was hypothesized that sales for the Target Sandwich would reach their peak during the incentive phase of the intervention.

Hypothesis 2

sales for the Target Sandwich combos were hypothesized to be significantly lower than sales for the Popular Burger combos in both baseline measurements. sales for the Target Sandwich combos were expected to be significantly higher than the Popular Burger combo sales in the incentive phase, when the incentive is introduced to encourage sales of the healthier Target Sandwich.

Hypothesis 3

During baseline, more response generalization was hypothesized to occur. An interaction was predicted between sandwich combo type and condition, where sales of the regular combo for the Target Sandwich would increase significantly more than the healthy combo for the Target Sandwich during the incentive phase, when consumers influenced mostly by the coupon would purchase the regular combo, being influenced primarily by the incentive, and less so by the decision to eat healthier.

Method

Participants and Setting

Participants included fast-food consumers at three separate locations of a national fast-food chain in Blacksburg and Christiansburg, VA. Restaurant 1 was located on the campus of Virginia Tech and Restaurant 2 was located across the street from the main campus of Virginia Tech. Restaurant 3 was located approximately five miles from the Virginia Tech campus in Christiansburg, VA.

Apparatus

Instruments used in the intervention consisted of coupons, including the name, nutritional content, and combo options for the Target Sandwich being promoted. See Appendix C for the coupon advertising that the consumer could save \$.75 on the Target Sandwich by presenting the coupon to the cashier.

Research Design

Each restaurant received three phases, with each phase consisting of either an A or B condition, with condition A referring to Baseline and condition B reflecting the Intervention condition. Restaurant 1 received the following phases: A--B--A. Restaurant 2 received an A--A--B order of conditions, and Restaurant 3 received A--A--A. Each phase lasted two weeks.

Dependent Measures

Data were collected and analyzed using each store's total daily sales summary receipts. Each location printed a summary of the total number of sales for each individual menu item at the end of every day. These receipts were used to track and record the number of sandwiches sold, the number of each combo sold, as well as a number of other purchase options. The receipts provided accurate and objective data on the dependent variables, as opposed to self-report or bystander observations.

The total daily sales summary receipts were used to record and analyze the dependent measures in the study, which included: (a) Sandwich Type (Target Sandwich vs. Popular Burger), and (b) Target Sandwich combo Type (Regular vs. Healthy).

By comparing the sales of the fast-food chain's most popular sandwich combos (Popular Burger) to sales of the Target Sandwich combos, we could determine the relative effectiveness of an intervention designed to increase the sales of the Target

Sandwich combos. Comparing the number of healthy combos sold with the number of regular combos sold for the Target Sandwich allowed researchers to determine if response generalization was occurring, and assess if consumers made healthy decisions in addition to purchasing the healthier sandwich. This analysis will also demonstrate how the variables of restaurant, day, and condition impact this index of response generalization.

There were as many as three different types of Target Sandwiches offered at each restaurant, depending upon the time and location of the restaurant. The difference in the type of Target Sandwich was the sauce and vegetables on the sandwich. However, because every Target Sandwich was not offered at each restaurant at the same time, all Target Sandwich combos were aggregated into a total Target Sandwich combo sales category.

Procedure

Research assistants collected total daily sales summary receipts for the previous day as each restaurant opened the following day at each restaurant during each phase of the intervention. During the Intervention condition (B), a team of two research assistants administered coupons (Appendix C) to customers entering the restaurant from 11:30 AM to 1:30 PM and 5 PM to 7 PM. Research assistants were located at the entrance to the restaurant, and approached all individuals approaching the counter. The selected time periods were chosen because the majority of restaurant sales occurred during these times.

Results

Sandwich Type

Table 1 displays the mean number of Target Sandwich combos and Popular Burger combos sold at each restaurant during each phase. The effect on the dependent variable of Sandwich Type (Target Sandwich vs. Popular Burger) sales was analyzed using a 3 Restaurant X 3 Phase X 2 Sandwich repeated measures analysis of variance (ANOVA). The results of the ANOVA revealed a significant main effect for Sandwich Type, $F(1, 120) = 224.92, p < .001$, a significant Sandwich Type X Restaurant interaction, $F(2, 120) = 87.67, p < .001$, a significant Sandwich Type X Phase interaction, $F(2, 120) = 4.98, p < .01$, and a significant Sandwich Type X Restaurant X

Phase interaction, $F(4, 120) = 11.68, p < .001$. Figure 1 shows the interaction between Sandwich Type, Restaurant, and Phase.

After a significant Sandwich Type X Restaurant X Phase interaction was found, each restaurant was analyzed individually to explore the effects on the dependent variables of Target Sandwich combo sales and Popular Burger combo sales at each location. At Restaurant 1, a 3 Phase X 2 Sandwich Type repeated measures ANOVA revealed a significant Phase X Sandwich Type interaction, $F(2, 40) = 13.30, p < .001$. Figure 2 shows the daily sales of Target Sandwich combos and Popular Burger combos across all phases at Restaurant 1. Bonferroni tests showed that the mean number of Target Sandwich combos sold daily during the Intervention condition ($M = 82.1$) was significantly higher than both Baseline 1 ($M = 35.4$) and Baseline 2 ($M = 48.7$). Bonferroni tests additionally showed that the mean number of Popular Burger combos sold daily during Baseline 1 ($M = 48.1$), Intervention ($M = 48.9$), and Baseline 2 ($M = 49.7$) were not significantly different from each other.

At Restaurant 2, a 3 Phase X 2 Sandwich Type repeated measures ANOVA showed a significant main effect for Sandwich Type, $F(1, 40) = 224.33, p < .001$, and a significant Phase X Sandwich Type interaction, $F(2, 40) = 7.88, p \leq .001$. Figure 3 depicts the daily sales of Target Sandwich combos and Popular Burger combos across all phases at Restaurant 2. Bonferroni tests revealed that the mean number of Target Sandwich combos sold daily during the Intervention condition ($M = 31.4$) was significantly higher than both Baseline 1 ($M = 17.7$) and Baseline 2 ($M = 20.9$). Bonferroni tests also showed that the mean number of Popular Burger combos sold daily during Baseline 1 ($M = 66.0$), Baseline 2 ($M = 72.7$) and Intervention ($M = 57.8$) were not significantly different from each other.

At Restaurant 3, a 3 Phase X 2 Sandwich Type repeated measures ANOVA revealed a significant main effect for Sandwich Type, $F(1, 40) = 376.78, p < .001$, but no interaction between Phase and Sandwich Type, $p > .10$. Figure 4 shows the daily sales of Target Sandwich combos and Popular Burger combos across all phases at Restaurant 3. Bonferroni tests revealed that the mean number of Popular Burger combos sold daily during Baseline 1 ($M = 61.8$), Baseline 2 ($M = 63.9$) and Baseline 3 ($M = 63.4$) were not significantly different from each other. Bonferroni tests also revealed that the mean

number of Target Sandwich combos sold daily during Baseline 1 ($M = 21.9$), Baseline 2 ($M = 20.9$), and Baseline 3 ($M = 17.9$) were not significantly different than each other.

Table 2 displays the mean number and percentages of regular combos for the Target Sandwich and healthy combos for the Target Sandwich sold at each restaurant during each phase. The effect on the dependent variable of type of Target Sandwich combos sold was analyzed using a 3 Restaurant X 3 Phase X 2 combo Type (Regular vs. Healthy) repeated measures analysis of variance (ANOVA). The results of the ANOVA revealed a significant main effect for combo Type, $F(1, 120) = 222.20, p < .001$, a significant combo Type X Restaurant interaction, $F(2, 120) = 20.55, p < .001$, a significant combo Type X Phase interaction, $F(2, 120) = 10.23, p < .001$, and a significant combo Type X Restaurant X Phase interaction, $F(4, 120) = 7.90, p < .001$.

Once a significant combo Type X Restaurant X Phase interaction was found for the variable of type of Target Sandwich combo purchased, each restaurant was analyzed individually to explore the effects on the dependent variable at each location. At Restaurant 1, a 3 Phase X 2 combo Type repeated measures ANOVA showed a significant main effect for combo Type, $F(1, 40) = 73.47, p < .001$, and a significant Phase X combo Type interaction, $F(2, 40) = 8.80, p \leq .001$. Figure 6 shows the daily sales of healthy combos and regular combos for the Target Sandwich across all phases at Restaurant 1. As shown in Table 2, the percentage of regular combos sold during the Intervention (79.7 %) was significantly higher than Baseline 1 (70.3 %) and Baseline 2 (70.3 %). The increase in mean number of regular combos for the Target Sandwich sold during the Intervention was greater than the increase of healthy combos for the Target Sandwich sold during the Intervention.

At Restaurant 2, a 3 Phase X 2 combo Type repeated measures ANOVA showed a significant main effect for combo Type, $F(1, 40) = 145.21, p < .001$, and a significant Phase X combo Type interaction, $F(2, 40) = 12.80, p < .001$. Figure 7 shows the daily sales of healthy combos and regular combos for the Target Sandwich across all phases at Restaurant 2. As shown in Table 2, the percentage of regular combos sold during the Intervention (79.2 %) was significantly higher than the percentage of regular combos sold during Baseline 1 (66.7 %) and Baseline 2 (72.8 %). The increase in mean number of regular combos for the Target Sandwich sold during the Intervention was significantly

greater than the increase of healthy combos for the Target Sandwich sold during the Intervention.

At Restaurant 3, a 3 Phase X 2 combo Type repeated measures ANOVA revealed a significant main effect for combo Type, $F(1, 40) = 249.71, p < .001$, and no interaction between Phase and combo Type, $p > .10$. Figure 8 shows the daily sales of healthy combos and regular combos for the Target Sandwich across all phases at Restaurant 3. As shown in Table 2, the percentages of regular combos sold during Baseline 1 (75.0%), Baseline 2 (78.3%), and Baseline 3 (80.5%) were not significantly different from each other. There was no significant increase in the mean number of regular combos sold or healthy combos for the Target Sandwich sold across all 3 Baseline conditions at Restaurant 3.

Discussion

The results of the present experiment provided support for several of the hypotheses. Using a multiple baseline design at different locations allowed for comparisons among conditions at each location, as well as across locations. Support was found for the hypotheses of this research at all 3 locations.

Hypothesis 1 stated that sales for the Target Sandwich combos would peak during the Intervention phase at Restaurant 1. The incentive was effective in doubling the average daily sales at Restaurant 1 from Baseline ($M = 35.4$) to the Intervention condition ($M = 82.1$). Additionally, sales of the Target Sandwich combos decreased upon removal of the incentive in the return-to-Baseline condition ($M = 48.7$), though not to the original Baseline level. This appears to suggest that some behavioral maintenance occurred for at least some consumers, though the incentive was clearly responsible for such a drastic increase in sales.

It should be noted, however, that only the first day of the return-to-baseline condition was near Intervention-level sales for the Target Sandwich combos. It is highly likely that many consumers used a coupon they received the day before to purchase this sandwich on the first day of the return-to-baseline condition, resulting in an elevated mean for that condition. When the first day of the return-to-baseline condition was removed, the mean number of Target Sandwich combo sales decreased from 48.7 to 40.4.

This adjusted mean is still slightly higher than the original Baseline condition and is still suggestive of some behavioral maintenance.

The incentive was also effective at increasing Target Sandwich combo sales from Baseline 1 ($M = 17.7$) and Baseline 2 ($M = 20.9$) to Intervention ($M = 31.4$) at Restaurant 2. Having four weeks of Baseline at Restaurant 2 revealed a consistent level of sales of the Target Sandwich combos, which increased dramatically during the Intervention condition. As the Intervention Condition for Restaurant 2 occurred two weeks after the Intervention at Restaurant 1, the possibility that factors other than the presence of the intervention increased sales can be eliminated.

There were no significant changes at Restaurant 3 during the six-week study. All six weeks at this location were baseline conditions, and the means for Baseline 1 ($M = 61.8$), Baseline 2 ($M = 63.9$), and Baseline 3 ($M = 63.4$) were strikingly similar to each other. This lack of change in Target Sandwich combo sales at Restaurant 3 adds further evidence that the intervention increased the sale of Target Sandwich combos at Restaurants 1 and 2 during the Intervention condition.

The sales of the Target Sandwich combos were compared to sales of the Popular Burger combos to determine the relative effectiveness of the intervention. It was hypothesized that Popular Burger combo sales would surpass those of the Target Sandwich combos in baseline conditions, but Target Sandwich combos would outsell the Popular Burger combos during the incentive condition. At Restaurant 1, Popular Burger combos outsold the Target Sandwich combos in both Baseline 1 and Baseline 2, as hypothesized. During the intervention, Target Sandwich combo sales ($M = 82.1$) largely outsold Popular Burger combo sales ($M = 48.9$), as was also hypothesized. The incentive was so effective that the Target Sandwich combos surpassed the sales of the fast-food chain's most successful combo.

At Restaurant 2, the mean for Target Sandwich combo sales during the Intervention condition ($M = 31.4$) did not surpass the mean for Popular Burger combo sales ($M = 57.8$), but it increased significantly and came close to reaching Popular Burger combo sales. A possible explanation for this could be the absence of coupon distribution at the drive-thru window at Restaurant 2.

Due to the understandable concerns of the restaurant's management, research assistants did not administer coupons to customers purchasing their food through the drive-thru windows at Restaurant 2. Management was concerned that giving out coupons at the drive-thru would back up service and deter customers. A large portion of sales at Restaurant 2 come from the restaurant's drive-thru window, and the absence of coupons there may have resulted in the smaller increase in Target Sandwich combo sales at Restaurant 2, though the increase from the Baseline to Intervention phase was still significant. Restaurant 1 had no drive-thru window, therefore research assistants were able to distribute coupons to all consumers at that location.

Popular Burger combos consistently outsold Target Sandwich combos at Restaurant 3 (the control site), and there was no significant change in the sales of either combo during any of the six weeks of the study.

Hypothesis 3 predicted that the healthy combos for the Target Sandwich would exceed sales of the regular combos for the Target Sandwich during baseline conditions, as individuals who purchased the healthy sandwich of their own volition were expected to maintain their healthy eating pattern and purchase the healthy combo as well. Evidence did not support this hypothesis at any location.

It is possible that the lower appeal of fast-food salads influenced the overall lower sales of the healthier combos for the Target Sandwich. Salads were defined as the healthier option in the healthy combo, and the nutritional values of the salads were indeed healthier than French fries, the side in the regular combo. Salads sold at fast-food restaurants may have a reputation of being less nutritional and less tasty, however, and consumers may have chosen not to purchase the healthier combo due to their perceptions of the salad's taste or nutritional value.

Hypothesis 3 stated that sales of the regular combos for the Target Sandwich would increase during the Intervention conditions, showing less response generalization among consumers. Customers who purchased the Target Sandwich during the intervention condition were hypothesized to be more influenced by the incentive rather than the decision to eat healthy, thus purchasing the regular combos more frequently than the healthy combos. This hypothesis was supported across all restaurant locations.

At Restaurant 1, the percentage of regular combos for the Target Sandwich purchased significantly rose to 79.7% during the Intervention condition ($p < .05$). The mean number of healthy combos for the Target Sandwich purchased rose from 11.8 in Baseline 1 to only 20.1 during the Intervention condition, while the mean number of regular combos for the Target Sandwich purchased rose from 23.6 in Baseline 1 to 62.0 during the Intervention condition. Consumers motivated by the coupon demonstrated less response generalization by purchasing the regular combo.

The same phenomenon occurred at Restaurant 2 as well. The percentage of regular combos for the Target Sandwich purchased significantly increased to 79.2% during the Intervention condition, $p < .05$. The mean number of healthy combos for the Target Sandwich purchased increased from 5.9 in Baseline 1 and 5.4 in Baseline 2 to only 6.9 in the Intervention condition. The mean number of regular combos for the Target Sandwich purchased increased from 11.9 in Baseline 1 and 15.5 in Baseline 2 to 24.4 in the Intervention condition. Again, when consumers were receiving an incentive to purchase a Target Sandwich combo, the sales of the regular combo increased dramatically, while sales of the healthy combo increased only slightly.

There were no significant changes in the percentages of regular combos versus healthy combos for the Target Sandwich sales at Restaurant 3. Again, the purchases at this control location suggest the significant increase in regular combo sales was unique to the presence of the intervention, and not a function of time or another potential variable.

It appears that most consumers who purchased the healthy combos for the Target Sandwich by their own choice, with no coupon or incentive to do so, were significantly more likely to get the regular combo, than the healthy combo. One potential explanation for the lack of response generalization during the intervention conditions in the current study is the concept of risk compensation, and the theory of risk homeostasis.

Risk compensation was first defined by Peltzman, in terms of driving-related behaviors (Stetzer & Hofmann, 1996). According to Peltzman, drivers who used safety measures, and therefore had lower perceived risks, could be predicted to engage in riskier driving behaviors (Peltzman, 1975). Peltzman's concept of risk compensation was given a psychological and theoretical base by Wilde (1982). Wilde detailed what he defined as Risk Homeostasis Theory, stating that risk remains constant in an individual, regardless

of steps taken to reduce that risk. According to this theory, a target level of risk is present, and individuals behave in a way to keep this target level consistent.

Based on the results of this study, an argument for the theory of risk homeostasis could be made. It appears that individuals will maintain their desired level of nutrition-related risk by eating less healthy items when motivated to eat healthier only by an incentive. Consumers who purchased the Target Sandwich combos during the intervention did not change their eating patterns and beliefs; they were simply motivated by a coupon incentive. Their desired level of risk homeostasis as it relates to nutrition did not change as a result of the incentive, and they continued to perform a less healthy nutrition-related behavior by purchasing fries and a soda with their meal. Again, this could be a result of the lower appeal of fast-food salads as healthy, tasteful options.

Post-hoc analyses were conducted to determine exactly who were purchasing the Target Sandwich combos during the intervention conditions. A 3 Restaurant x 3 Phase x 2 Item Sales (Target Sandwich vs. Total Items) was conducted to determine if sales of other items significantly changed in any way. The aggregation of total items failed to decrease or increase significantly during the intervention condition, and no significant interactions were found, all p 's $> .1$. There were increases and decreases in total menu item sales, but no obvious conditional trends were visible. At Restaurant 1, the total menu item sales continually increased across all three phases, regardless of condition. At Restaurant 2, the peak total item sales occurred during Phase 2, which was the 2nd Baseline condition for that location. During the Intervention condition at Restaurant 2, total item sales were lower than both baseline conditions. This suggests that the inclusion of coupons and subsequent increase in Target Sandwich combos did not impact the rest of the menu item sales in any interpretable way. The data suggests that total item sales changed as a function of week, and not by the presence or absence of our intervention.

The intervention was successful in increasing sales of the Target Sandwich combos, but did not increase total item sales. This suggests that new consumers were not drawn to the fast-food restaurant because of the coupon incentive. A possible explanation is that consumers who intended to purchase other items were motivated to purchase the Target Sandwich combo instead. However, other menu items such as the Popular Burger, other chicken sandwiches, other burgers, and fish sandwiches were all

analyzed to determine if they significantly decreased during the intervention. None of the other menu items analyzed decreased significantly during the intervention, all p 's $> .1$. It is still possible, however, that a sufficient number of consumers who intended to purchase other items were swayed to purchase the Target Sandwich combos, but that change was distributed across the variety of choices. Therefore, no other menu items showed a significant decrease. Again, this is difficult to interpret from the data on other menu items, due to its inconsistent fluctuation in any clear pattern.

Limitations

One potential limitation of the present study can be found in the non-equivalent field locations. Three different locations of the same fast-food chain were used to account for history and time effects, however, the populations that frequent these restaurants were unique. The intervention condition only occurred at Restaurants 1 and 2. These restaurants are located on or adjacent to the campus of Virginia Tech. Restaurant 1 is frequented by mostly college students, while Restaurant 2 sees a mix of customers both from Virginia Tech students and the Blacksburg community as a whole. Restaurant 3 is located in the neighboring town of Christiansburg, and caters to an entirely different population of customers altogether. It is unlikely these differences affected the results of Restaurant 1 and Restaurant 2 due to the highly significant results, but Restaurant 3 was not a representative control.

An additional potential limitation related to the uniqueness of each restaurant was the start date for the sales of each new Target Sandwich combo. There were three different varieties of this sandwich present, and each restaurant began selling each sandwich at different dates.

Perhaps the most relevant limitation of this research is that data were collected in summary receipts for the entire day. Individual choices could not be matched up, thus there was no way to determine if people who purchased the Target Sandwich combo purchased other sides, such as desserts, resulting in further risk compensation. This does not impact the current study, as only combo choice was being assessed, but could prove useful in determining individual choices in future studies and the degree to which risk compensation actually occurred per consumer.

It is also unclear as to how the restaurants themselves profited from the intervention. Their overall monetary profit was analyzed across conditions using a 3 Restaurant x 3 Phase ANOVA. Each location's profit failed to increase significantly during the Intervention condition, all p 's $> .1$. This suggests that restaurants may profit more from improving their image with regard to healthy menu items than from any potential monetary gain. Again, it appears that the intervention did not have the optimal outcome for either the restaurant or the consumers, though each arguably benefited in some ways.

Implications

The results of the present study show that coupon incentives are effective at motivating healthier eating behaviors. Coupons offering 75 cents off the price of a healthy sandwich combo significantly increased sales of the combo, even surpassing the sales of the restaurant's biggest combo when all customers can be approached. Change agents seeking to increase healthier eating behaviors may seek to use coupons and similar intervention to influence behavior. However, the results of this study should caution them in their approach.

This study was unique in that we could measure the sales of the Target Sandwich, and additionally analyze other menu items. This allowed us to determine how increasing a healthier choice impacted other decisions made by consumers. The strength of this study is the objectiveness of the data, which clearly demonstrated the desired increase in Target Sandwich combo sales. The lack of self-report data, however, may have limited the amount of information gained regarding individual's choices and decisions. The data on other menu item sales did not change significantly in any of the post-hoc analyses conducted, and provided little insight into what other eating behaviors may have changed as a result of the intervention, if any.

If the process of the intervention itself produces an undesired effect on the participant or environmental setting, then the desired change increased by the intervention may be overshadowed by the undesired effects. For example, if flyers were effective in encouraging people to recycle in an environmental intervention, this could be viewed as an effective intervention. However, if a large amount of the flyers themselves were subsequently littered after their use, then the intervention would not be high on

socially validity. Social validity refers to the implications of the intervention in a real-world setting (Ludwig & Geller, 1991).

An intervention is only socially valid if the desired changes it produces are not offset by subsequent undesirable behaviors. For an intervention aimed at increasing the healthy nutrition-related behaviors of fast-food consumers, it is highly beneficial to examine the social validity of the intervention, and determining whether response generalization or risk compensation is present. It was hypothesized that using an incentive to increase the sales of the Target Sandwich combos would result in less response generalization, where the sales of the regular combos including fries would significantly increase more than the healthy combos including salads. This hypothesis was confirmed and the decision to eat fries with their healthy sandwich resulted in consumers performing less effective healthy eating behaviors.

The intervention was most likely socially valid, however, as the undesired increase in regular combos for the Target Sandwich did not overshadow the benefits of purchasing the Target Sandwich itself. Consumers still engaged in a healthy eating behavior significantly more during the intervention conditions, regardless of the side item they also consumed. No solid evidence was found to suggest an increase in other menu items, as a result of the intervention, and it is therefore unlikely that most consumers purchased the Target Sandwich in addition to another sandwich or dessert. Eating a Target Sandwich with fries is still healthier than eating a hamburger with fries. Many consumers reduced their fat and caloric content for one meal, and the results suggest that some behavioral maintenance occurred. The incentive was sufficient in getting consumers to try the Target Sandwich, and it is possible that several customers continued to purchase this healthier sandwich after the withdrawal of the incentive. The intervention may have resulted in some customers learning about a new healthy sandwich, enjoying it, and continuing to buy it, thereby improving the healthiness of their fast-food eating behaviors.

The phenomenon of response generalization needs further systematic study in many areas and fields, but especially in the area of health and nutrition. This research has shown that giving consumers a monetary incentive to eat healthier is effective at increasing healthy, nutrition-related decisions. Steps must be taken, however, to

determine why subsequent undesired nutrition-related behaviors may occur, and health researchers should search for ways to prevent potential risk compensatory behaviors from occurring. By exploring these concepts further, perhaps we can develop interventions that are not only effective at increasing healthy target behaviors, but lead to high levels of behavioral maintenance as well.

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Table 1.

Mean Number of Popular Burger and Target Sandwich Combos Sold Daily in Each Phase at Each Restaurant

Restaurant	Phase	Sandwich Combo Type	
		Popular Burger Combos	Target Sandwich Combos
Restaurant 1	Baseline 1	48.1	35.4
	Intervention	48.9	82.17*
	Baseline 2	49.7	48.7
Restaurant 2	Baseline 1	66.0	17.7
	Baseline 2	72.7	20.9
	Intervention	57.8	31.4***
Restaurant 3	Baseline 1	61.8	21.9
	Baseline 2	63.9	20.9
	Baseline 3	63.4	17.9

* $p < .05$

*** $p < .001$

Table 2.

Mean Numbers and Percentages of Healthy and Regular Combos for the Target Sandwich Sold Daily during Each Phase at Each Restaurant

Restaurant	Phase	Healthy Combos		Regular Combos	
		Mean	%	Mean	%
Restaurant 1	Baseline 1	11.8	29.7 %	23.6	70.3 %
	Intervention	20.1*	20.4 %*	62.0*	79.7 %*
	Baseline 2	12.8	29.8 %	35.9	70.3 %
Restaurant 2	Baseline 1	5.9	33.3 %	11.9	66.7 %
	Baseline 2	5.4	27.2 %	15.5	72.8 %
	Intervention	6.9	21.8 %*	24.4*	79.2 %*
Restaurant 3	Baseline 1	5.6	25.0 %	16.4	75.0 %
	Baseline 2	4.6	21.7 %	16.3	78.3 %
	Baseline 3	3.7	19.5 %	14.20	80.5 %

* $p < .05$

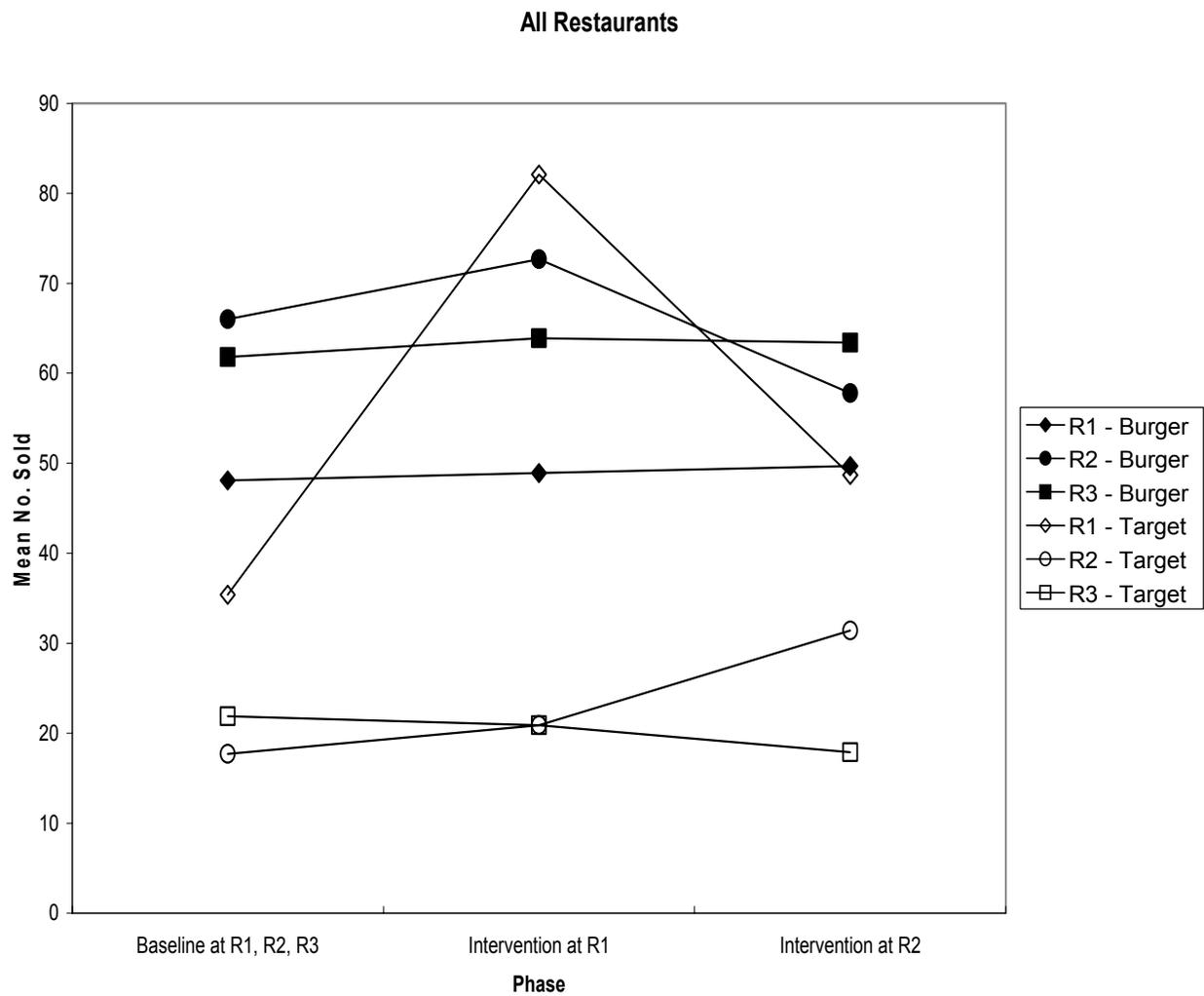


Figure 1. Mean sales of Popular Burger combos and Target Sandwich combos at all Restaurants throughout all three phases.

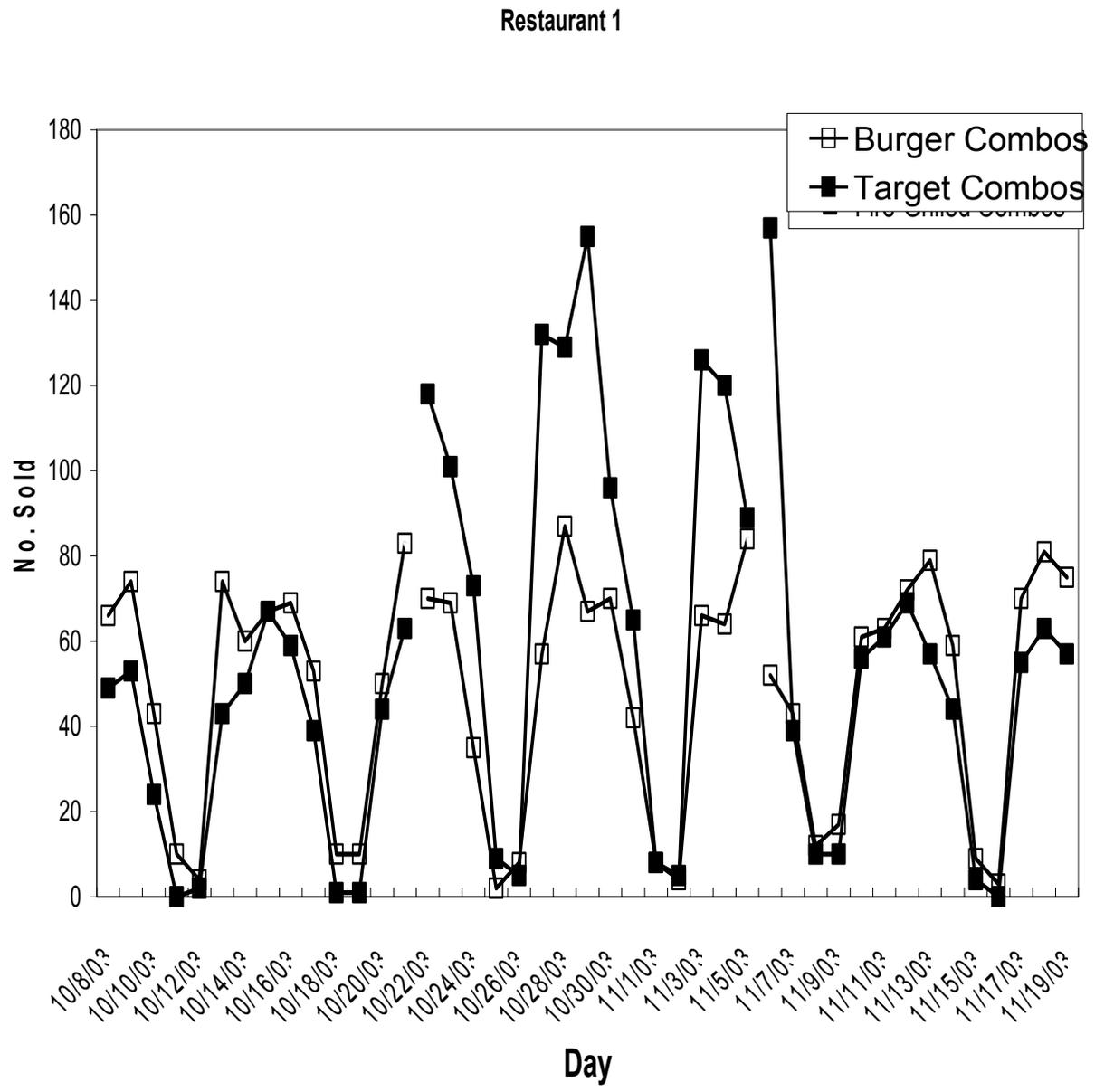


Figure 2. Total daily sales of Popular Burger combos and Target Sandwich combos at Restaurant 1 throughout all three phases.

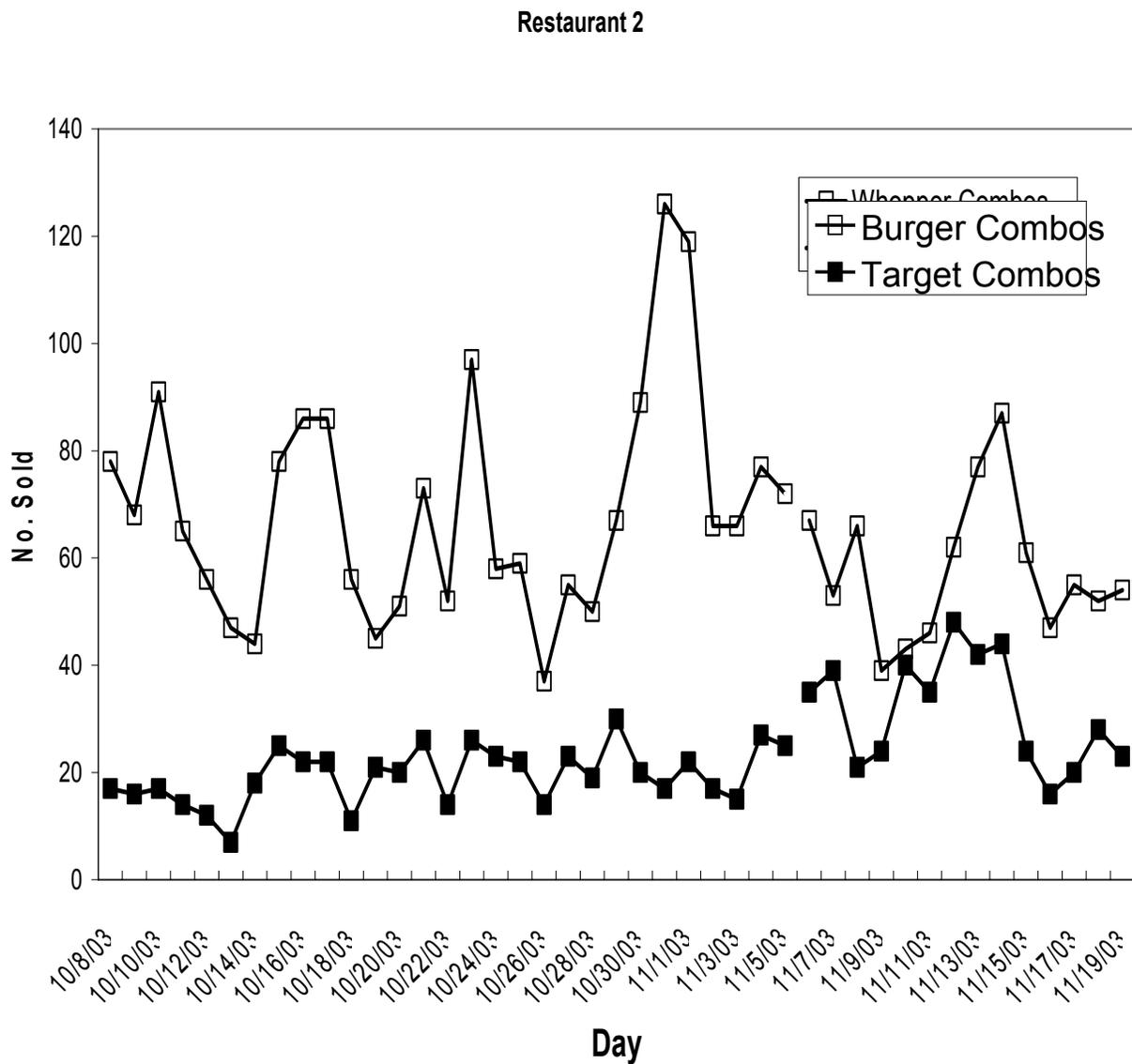


Figure 3. Total daily sales of Popular Burger combos and Target Sandwich combos at Restaurant 2 throughout all three phases.

Restaurant 3

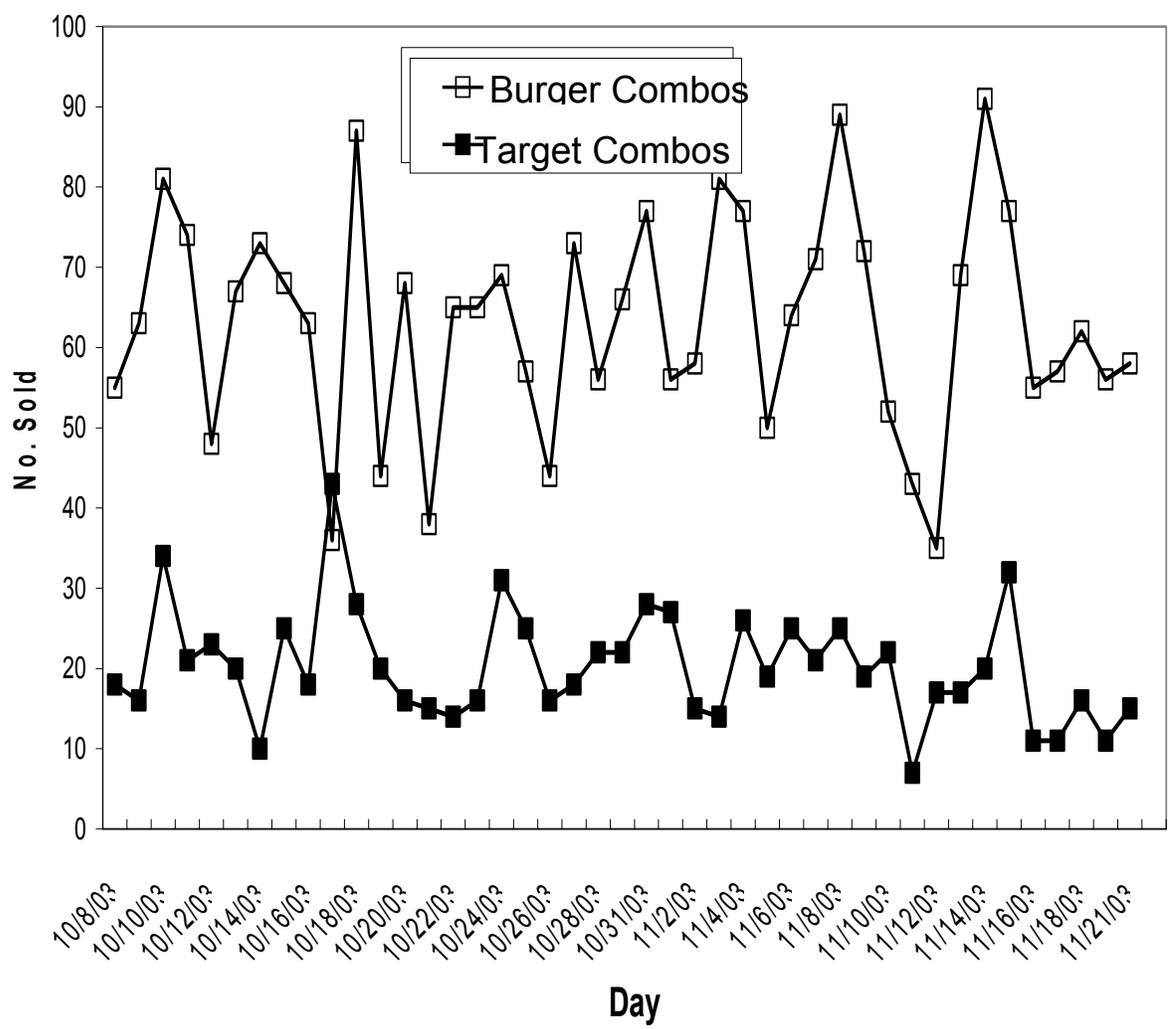


Figure 4. Total daily sales of Popular Burger combos and Target Sandwich combos at Restaurant 3 throughout all three phases.

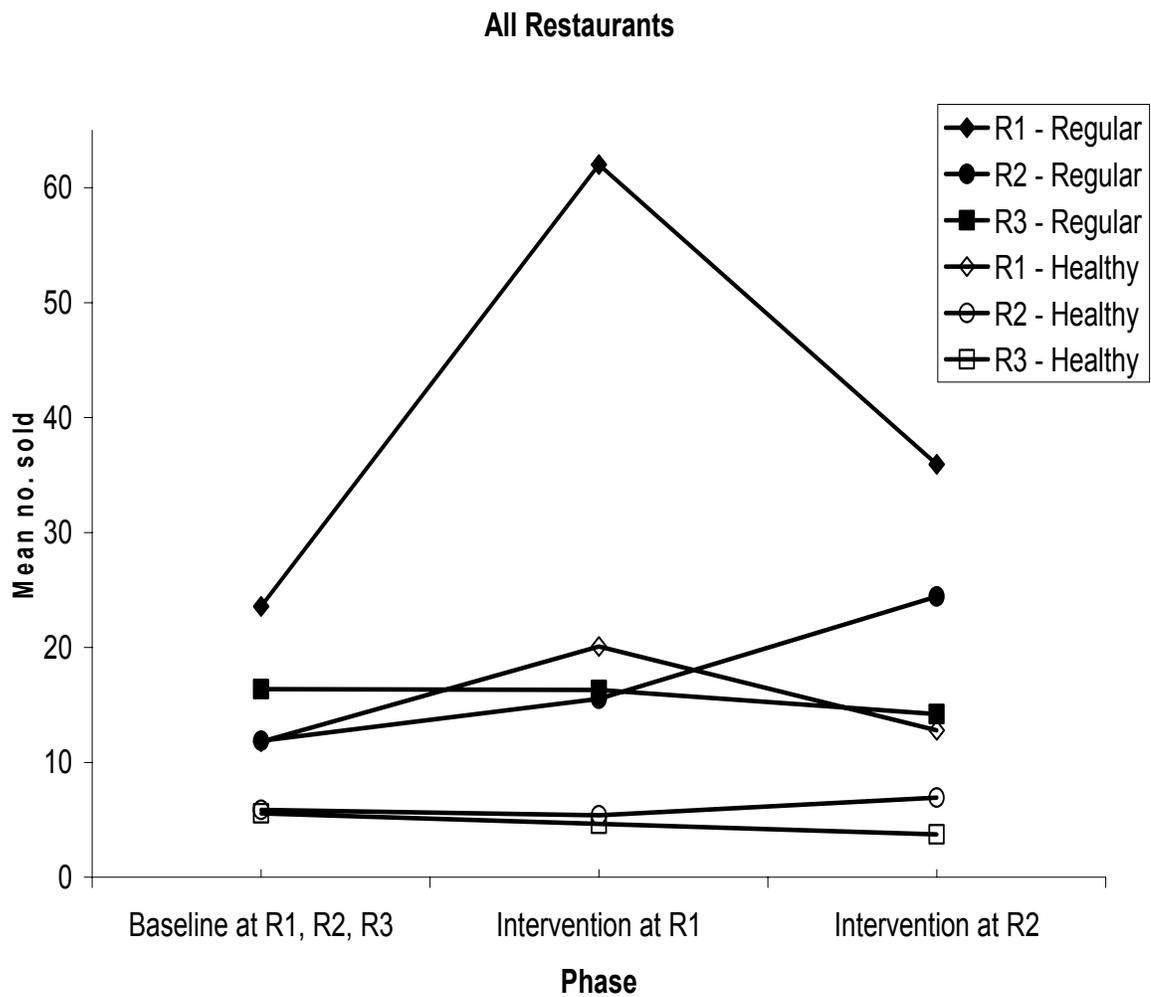


Figure 5. Mean sales of regular and healthy combos for the Target Sandwich at all Restaurants throughout all three phases.

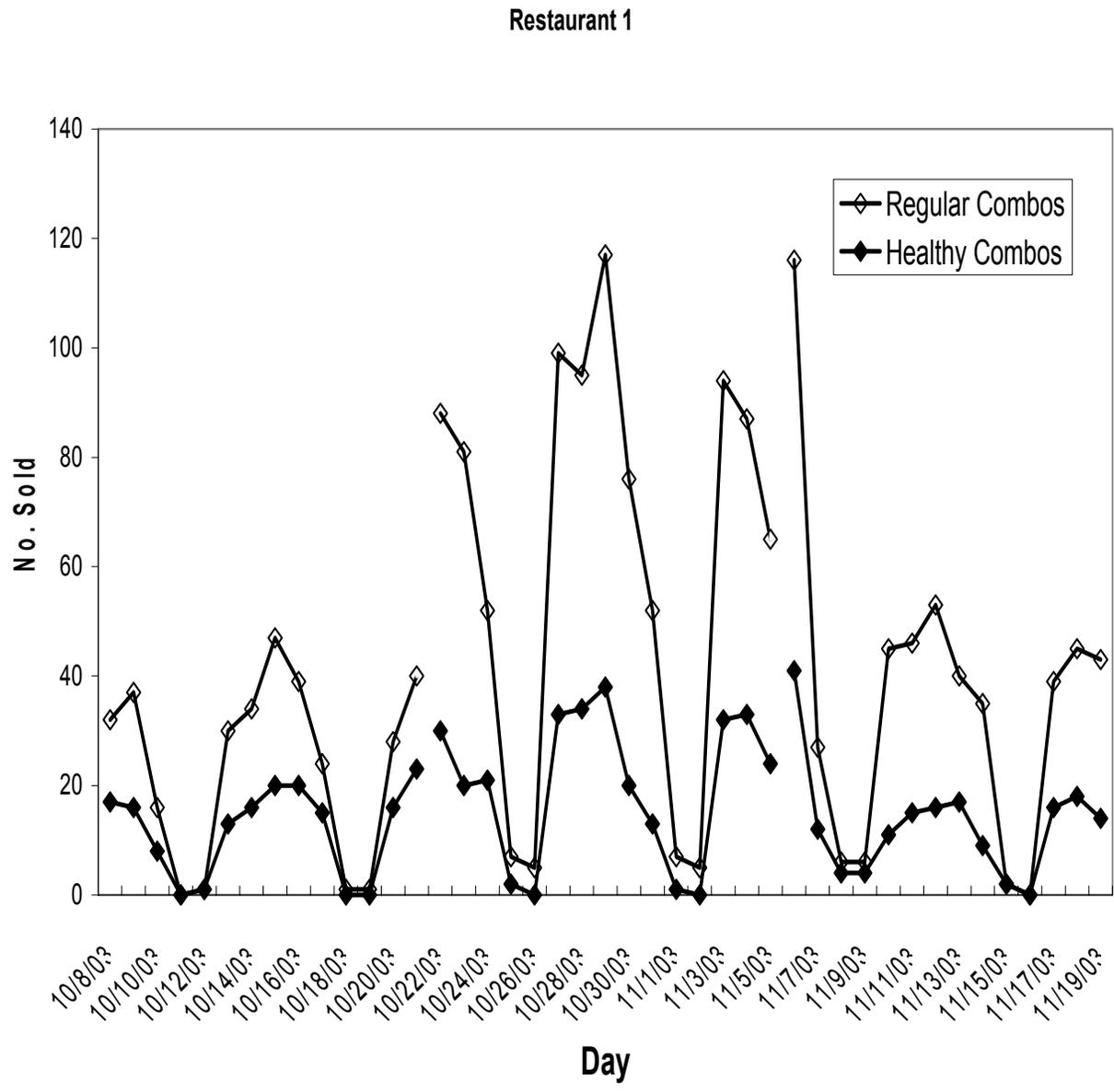


Figure 6. Total daily sales of regular and healthy combos for the Target Sandwich at Restaurant 1 throughout all three phases.

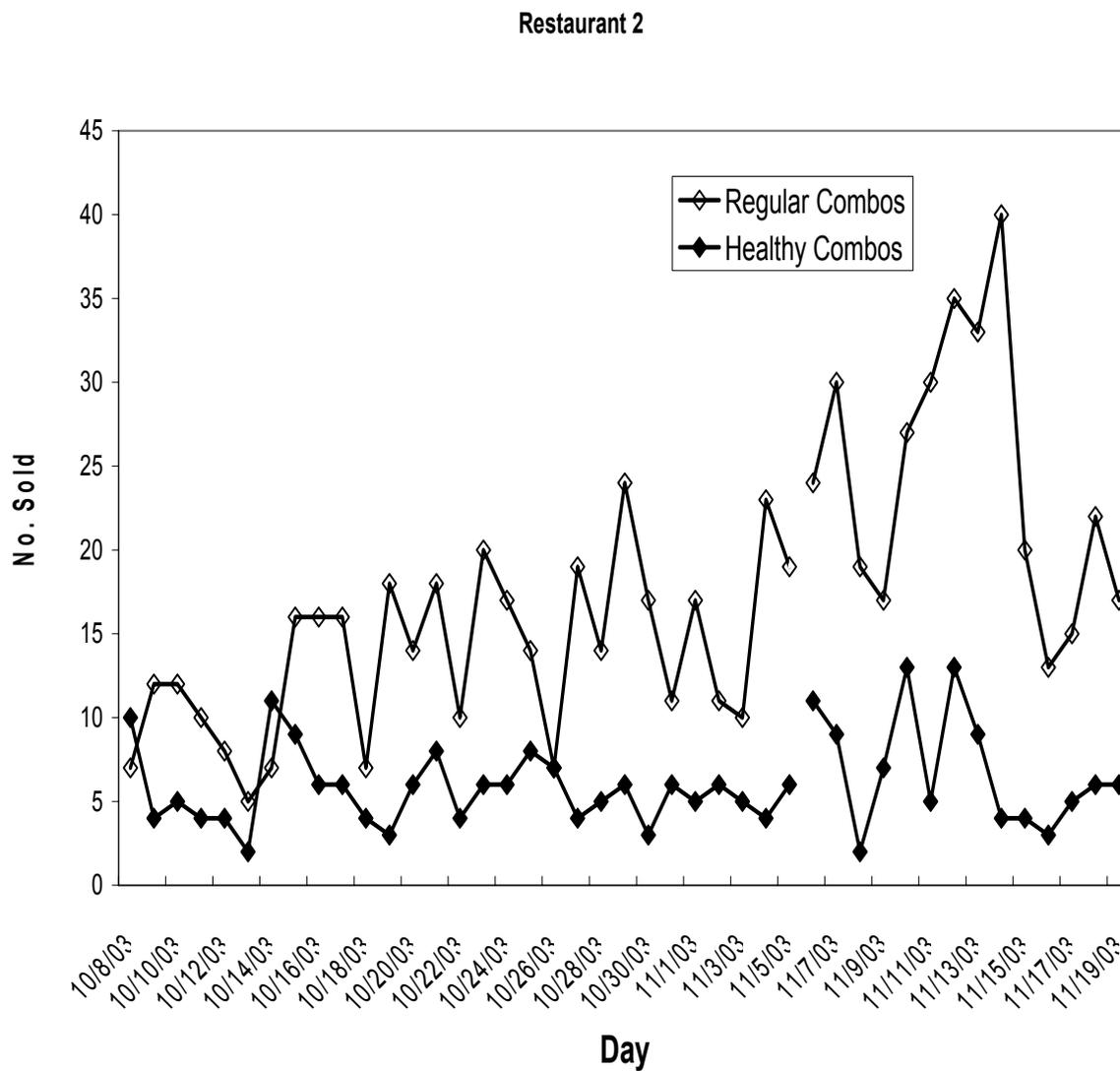


Figure 7. Total daily sales of regular and healthy combos for the Target Sandwich at Restaurant 2 throughout all three phases.

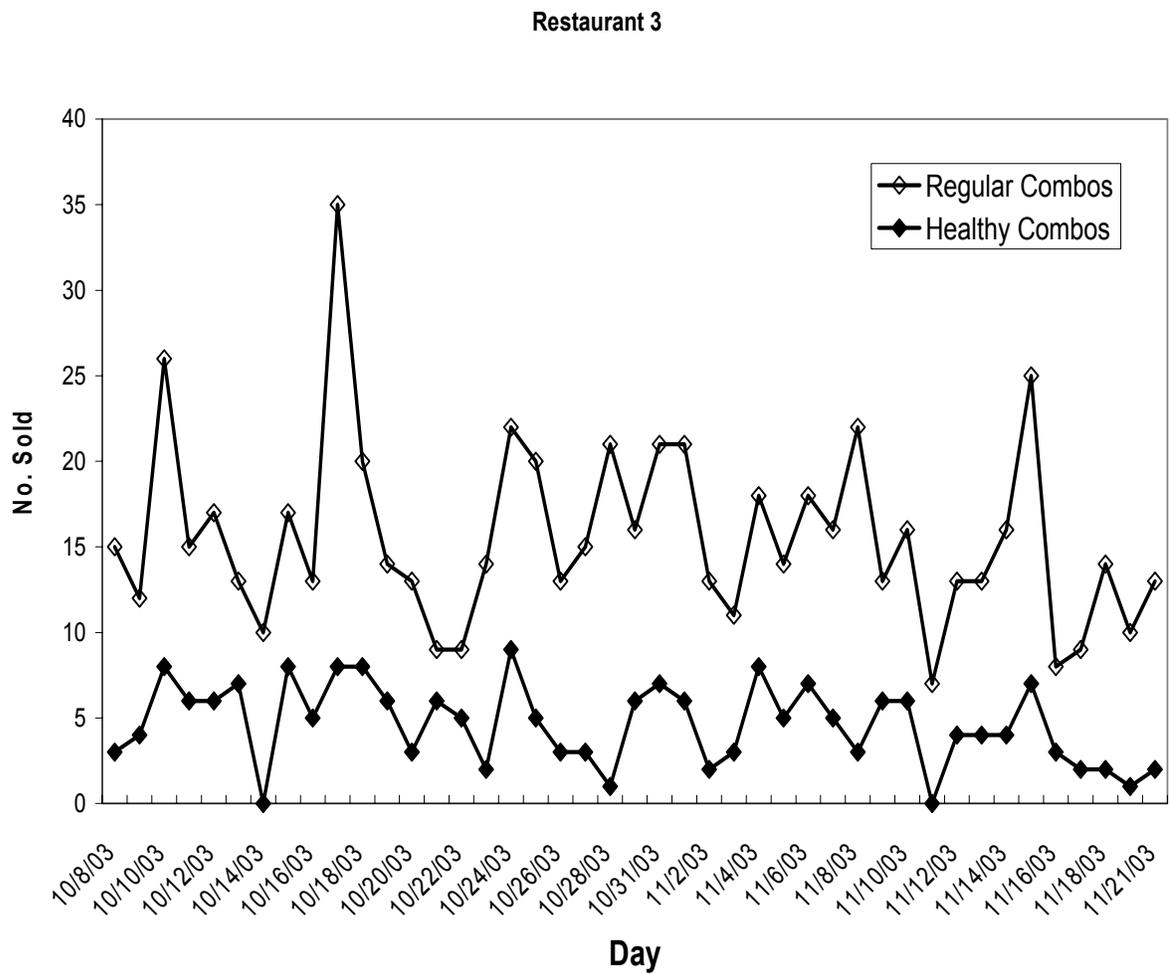
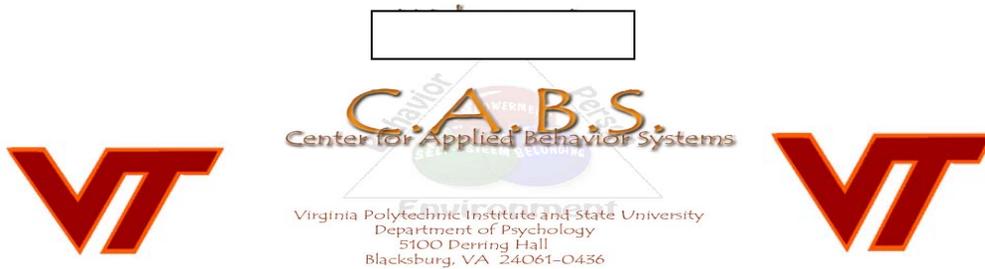


Figure 8. Total daily sales of regular and healthy combos for the Target Sandwich at Restaurant 3 throughout all three phases.

Appendix A:
Fast-Food Proposal Form



C.A.B.S.'s mission is to...

1. teach community-based research and intervention techniques and approaches
2. improve quality of life in the community
3. give students the opportunity to participate in leading edge professional activities
4. teach and demonstrates the value of "actively caring."
5. give students real-world, hands-on research experience, from designing methodology and data analysis strategies to documenting findings in professional publications
6. help students, undergraduate and graduate, learn how to conduct research that combines the technology of applied behavior analysis with theories from experimental, social, and applied psychology

Fast-Food Project

Most of us eat fast-food, and are aware of all the negative attention on fast-food restaurants by the media. There are plenty of ways to make eating fast-food a healthier experience, but we don't always know how. But that's changing.....

Some fast food restaurants are taking steps to educate those interested about the healthier options they do have on their menus. We are currently designing and preparing to implement an intervention designed to increase the purchase of healthier options at a local fast-food restaurant. The goal of the intervention is to educate consumers about which menu items contain less fat, and provide them the opportunity to choose these healthier options.

Benefits

- **Positive publicity in a time where fast-food chains are coming under fire**
- **In-depth analysis of sales, including menu options, timeframes, and other effects on consumer purchasing**
- **Potential increase in sales**
- **Documentation of involvement in a project aimed at improving consumer health**
- **Partnership with Virginia Tech and increased student affiliation**

Contact Information

Wes Keene, B. A.
 Center for Applied Behavior Systems at Virginia Tech
 231-8145
wekeene@vt.edu

Appendix B:
Nutritional Information for Menu Items

MENU ITEM/INGREDIENTS	Weight (g)	Calories	Calories from fat	Total fat (g)	Saturated fat (g)	Trans fat (g)	Cholesterol (mg)	Sodium (mg)	Total Carbs. (g)	Dietary fiber (g)	Total sugars (g)	Protein (g)
Target Sandwich 1	233	380	35	4	1.5	0	45	1350	56	4	7	31
<input checked="" type="checkbox"/> Bread		240	10	1.5	0	0	0	530	49	2	4	9
<input checked="" type="checkbox"/> Chicken Filet		110	20	2.5	0.5	0	45	600	< 1	0	0	21
<input checked="" type="checkbox"/> Sauce		10	0	0	0	-	0	130	2	0	< 1	0
<input checked="" type="checkbox"/> Peppers and Onions		25	0	0	0	-	0	100	4	2	2	< 1

Nutritional information for the Target Sandwich.

Identifying information and pictures have been removed.

MENU ITEM/INGREDIENTS	Weight (g)	Calories	Calories from fat	Total fat (g)	Saturated fat (g)	Trans fat (g)	Cholesterol (mg)	Sodium (mg)	Total Carbs. (g)	Dietary fiber (g)	Total sugars (g)	Protein (g)
POPULAR BURGER with cheese	316	800	440	49	18	1.5	110	1450	53	4	9	35
Bread		250	35	4	1	0	0	430	45	3	4	8
Beef Patty		260	180	20	9	1	75	85	0	0	0	21
Cheese		90	70	8	5	0	20	430	1	0	< 1	5
Pickles		0	0	0	0	0	0	200	0	-	-	0
Ketchup		15	0	0	0	-	0	180	4	0	3	0
Onions		5	0	0	0	-	0	0	1	0	< 1	0
Tomatoes		5	0	0	0	-	0	0	1	0	< 1	0
Lettuce		0	0	0	0	-	0	0	0	0	0	0
Mayonnaise		160	160	18	2.5	0	10	125	0	0	0	0

Nutritional content of the Popular Burger, including nutritional information for all potentially added items.

Identifying information and pictures have been removed.

Selected Item Summary

MENU ITEM/INGREDIENTS	Weight (g)	Calories	Calories from fat	Total fat (g)	Saturated fat (g)	Trans fat (g)	Cholesterol (mg)	Sodium (mg)	Total Carbs. (g)	Dietary fiber (g)	Total sugars (g)	Protein (g)
Side Garden Salad	333	580	370	41	6	0	15	2040	50	3	25	5
Lettuce		10	0	0	0	-	0	10	2	1	2	1
Tomatoes		5	0	0	0	-	0	0	1	0	< 1	0
Cabbage		0	0	0	0	0	0	0	< 1	0	0	0
Carrots		0	0	0	0	-	0	0	< 1	0	0	0
Catalina Salad Dressing (2 oz.)		160	90	10	1.5	-	0	690	16	0	15	0
Creamy Caesar Salad Dressing (1 oz.)		90	80	9	1.5	-	5	230	2	0	1	< 1
Fat Free Ranch Salad Dressing (1 oz.)		40	0	0	0	-	0	290	9	0	2	0
Ranch Salad Dressing (1 oz.)		140	140	15	2.5	-	10	270	1	0	1	0
Light Italian Salad Dressing (1 oz.)		35	25	3	0.5	-	0	240	2	0	2	0
Croutons		90	25	3	0	-	0	300	14	0	< 1	2

Nutritional content of side salads in the healthy combos for the Target Sandwich, including nutritional information for all possible additions to the salad. Identifying information and pictures have been removed.

MENU ITEM/INGREDIENTS	Weight (g)	Calories	Calories from fat	Total fat (g)	Saturated fat (g)	Trans fat (g)	Cholesterol (mg)	Sodium (mg)	Total Carbs. (g)	Dietary fiber (g)	Total sugars (g)	Protein (g)
French Fries (Medium)	117	360	160	18	5	4.5	0	640	46	4	< 1	4
Fries		360	160	18	5	4.5	0	380	46	4	< 1	4
Salt		0	-	-	-	-	-	270	-	-	-	-

MENU ITEM/INGREDIENTS	Weight (g)	Calories	Calories from fat	Total fat (g)	Saturated fat (g)	Trans fat (g)	Cholesterol (mg)	Sodium (mg)	Total Carbs. (g)	Dietary fiber (g)	Total sugars (g)	Protein (g)
French Fries (Large)	160	500	220	25	7	6	0	880	63	5	< 1	6
Fries		500	220	25	7	6	0	510	63	5	< 1	6
Salt		0	-	-	-	-	-	370	-	-	-	-

MENU ITEM/INGREDIENTS	Weight (g)	Calories	Calories from fat	Total fat (g)	Saturated fat (g)	Trans fat (g)	Cholesterol (mg)	Sodium (mg)	Total Carbs. (g)	Dietary fiber (g)	Total sugars (g)	Protein (g)
French Fries (Large)	160	500	220	25	7	6	0	880	63	5	< 1	6
Fries		500	220	25	7	6	0	510	63	5	< 1	6
Salt		0	-	-	-	-	-	370	-	-	-	-

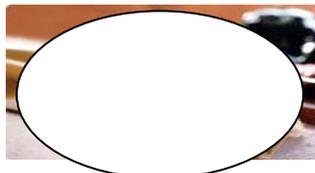
Nutritional content of all fry sizes available in all combos.
 Identifying information and pictures have been removed.

Appendix C:
Intervention Coupon

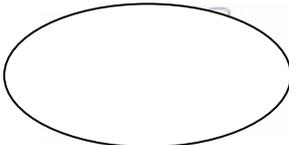
SLOGAN!
TRY A TARGET SANDWICH
ONLY 5 GRAMS OF FAT!

\$.75 OFF!

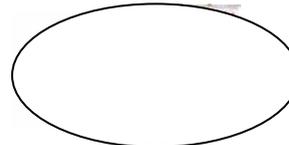
One of the Target Sandwich Combos:



Get it with a salad and water



With fries and a soda



OR

*Identifying information and pictures have been removed.

Appendix D:
Curriculum Vitae

Vita

Wesley Ryan Keene

810 University City Blvd. Apt. 6
 Blacksburg, VA 24060
 (540) 641-2517
 wekeene@vt.edu

EDUCATION:

- | | |
|------------------|---|
| B. A. (May 2002) | Psychology
<u>Averett University</u>
Psych GPA: 3.81
Cumulative GPA: 3.74 |
| M. S. (May 2004) | Clinical Psychology
<u>Virginia Polytechnic Ins. and State Univ.</u>
Cumulative GPA: 3.71 |

PROFESSIONAL EXPERIENCE:

- Graduate Research Assistant** for Center for Applied Behavior Systems (CABS), Virginia Polytechnic Institute and State University, Blacksburg, VA. Duties include: Research planning, writing research protocols, organizing data collection and entry, data analysis, and leading undergraduate research assistants. August 2002 to present (Contact person: Dr. E. Scott Geller).
- Graduate Research Assistant** for Center for Applied Behavior Systems (CABS), Virginia Polytechnic Institute and State University, Blacksburg, VA. Duties include: Research planning, writing research protocols, organizing data collection, entry, and verification, data analysis, and leading undergraduate research assistants. August 2000 to present (Contact person: Dr. E. Scott Geller).
- Graduate Teaching Assistant** for Psychological Services Center, Virginia Polytechnic Institute and State University, Blacksburg, VA. Duties include: conducting intellectual assessments through administration of psychological tests and clinical interviewing, writing comprehensive psychological reports, providing assessment feedback to clients, assisting fellow graduate students through assessment processes. August 2003 to present (Contact person: Dr. Lee D. Cooper).
- Graduate Teaching Assistant** for Department of Psychology, Virginia Polytechnic Institute and State University, Blacksburg, VA. Duties

include: instructing Introductory Psychology students in a recitation section with tasks such as creating and grading assignments, lecturing, and facilitating discussion on material. August 2002 to May 2003 (Contact person: Dr. Jack W. Finney).

Graduate Clinician for Psychological Services Center, Virginia Polytechnic Institute and State University, Blacksburg, VA. Duties include evaluation, assessment, and treatment of adults and children in the community, as well as facilitation and discussion of additional cases seen by team members. Assessment includes administering and interpreting intellectual and personality measures and diagnostic measures as well as comprehensive report writing. August 2002 to present (Contact person: Dr. Lee D. Cooper).

Research Project Leader for Department of Psychology, Averett University, Danville, VA. Duties included: research design planning, writing research protocols, data collection, creating databases, analyzing data, and preparing a professional paper and presentation for a post 9/11/01 study on the effects of television media on prejudiced beliefs. August 2001 to May 2002 (Contact person: Dr. Bobby M. Carlsen).

President of Averett University Psychological Association, Danville, VA. Duties include: organizing and conducting weekly meetings, organizing psychological as well as philanthropic events, tutelage of undergraduate researchers. August 2001 to May 2002. (Contact person: Dr. Anna Hatten).

Research Project Leader for Department of Psychology, Averett University, Danville, VA. Duties included: research design planning, writing research protocols, data collection, creating databases, analyzing data, and preparing a professional paper and presentation for a study on the effects of music videos on emotional states. August 2000 to May 2001 (Contact person: Dr. Bobby M. Carlsen).

Research Assistant for Department of Psychology, Averett University, Danville, VA. Duties included: data collection, database creation, data analysis, and preparation of a professional paper for a study on the operant conditioning of a three-link chain of behavior in a long-evans hooded rat. August 2000 to May 2001 (Contact person: Dr. Anna Hatten).

Field Study Intern for Martinsville Memorial Hospital, Psychiatric Division, Martinsville, VA. Duties included: shadowed a licensed clinical social worker during individual and group therapy sessions, worked with and observed hospital staff in daily care, evaluation, and treatment of hospitalized psychiatric patients. June 2000 to August 2000 (Contact person: Julia Hall, LCSW).

PROFESSIONAL MEMBERSHIPS:

American Psychological Association
 Alpha Chi National College Honor Scholarship Society
 Applied Behavior Analysts
 Eastern Psychological Association
 Psi Chi
 Virginia Academy of Applied Psychologists
 Virginia Psychological Association

PUBLICATIONS:

Keene, W. R. (2003). Introduction to health and stress. Introductory Psychology Recitation Reader. McGraw Hill: Boston, 251-252

PUBLISHED ABSTRACTS:

Keene, W. R., Geller, E. S., Hirota, T., Andrews, R., Harmon, H., & Esson, P. (2004). Intervening to increase healthier fast-food consumption: Assessing response generalization in fast-food menu item selection. A paper to be presented to Eastern Psychological Association, Washington, DC.

PROFESSIONAL PAPERS AND PRESENTATIONS:

Keene, W. R., Stuart, M.L., Wiegand, D.M., Speer, E. M., & Ehrhart, I. J. (2003). Who Drinks More?: Factors Affecting Front-Loading and BAC Levels. Paper presented at Virginia Psychological Association, Tyson's Corner, VA.

Keene, W. R., Geller, E. S., Lehman, P., & Fournier, A. (2003). Fast-food can be healthier, and so can you: Intervening to educate and reduce the weight of fast-food consumers. Poster presented at Virginia Psychological Association, Charlottesville, Virginia.

Keene, W. R., Williamson, K., Thomas, S., Froome, E., & Taliaferro, M.C. (2003). Intervening to reduce intoxication: Initial results of a group randomized trial study. Paper presented at Virginia Psychological Association, Charlottesville, Virginia.

Keene, W. R., Geller, E. S., Hirota, T., Andrews, R., Harmon, H., & Esson, P. (2004). Intervening to increase healthier fast-food consumption: Assessing response generalization in fast-food menu item selection. Paper to be presented at Eastern Psychological Association, Washington, D. C.

Keene, W. R., Geller, E. S., Andrews, R., Harmon, H., & Hirota, T. (2004). Intervening to influence fast-food choices: Measuring response generalization in nutrition-

- related behavior. Poster to be presented at Association for Behavior Analysis, Boston, Massachusetts.
- Ehrhart, I., Stuart, M., Keene, W., Groves, K., & Counts, A. (2003). Drinking your worries away: The effect of anxiety on students' levels of intoxication. Paper presented at Virginia Psychological Association, Charlottesville, Virginia.
- Wiegand, D., Keene, W., Grandin, D., & Geller, E. (2003). From sober to wasted: Quantifying perceptions of alcohol intoxication. Poster presented at Association of Behavior Analysis, San Francisco, CA.
- Rayne, S., Fournier, A., Hargrove, M., & Keene, W. (2003). Alcohol consumption: An agent for male intimacy. Poster presented at Association for Behavior Analysis, San Francisco, California.
- Valentino, S., Glindemann, K., Wiegand, D., Doyle, J., & Keene, W. (2004). Assessing environmental factors affecting college students' alcohol consumption at fraternity parties. Paper to be presented at Association of Behavior Analysis, Boston, Massachusetts.

COMPUTER SKILLS:

Working knowledge of:

SPSS
 SAS
 Microsoft Excel
 Microsoft Power Point
 Microsoft Word

PROFESSIONAL KNOWLEDGE, SKILLS & ABILITIES:

Research Leadership: Research Planning, Writing Protocols, Training Staff

Research Implementation: Protocol Execution, Data Collection

Research Analysis: Data Entry, Data Verification, Data Analysis

Literature Review: Library Research, Internet Research

Psychological Test Evaluation and Assessment

Classroom Instruction: Lesson Planning, Lecturing, Grading Assignments, Leading Discussion

Intellectual Assessment: Administering, Scoring, Interpreting, and Reporting on

Wechsler Adult Intelligence Scale, Third Edition (WAIS-III), Wechsler Memory Scale-Third Edition (WMS-III), Woodcock-Johnson Achievement Test, Third Edition (WJ-III), and Wechsler Intelligence Scale for Children, Third Edition (WISC-III)

Personality Assessment: Administering, Interpreting, and Reporting on Millon Clinical Multiaxial Inventory, Third Edition (MCMI-III) and Minnesota Multiphasic Personality Inventory, Second Edition (MMPI-2)

Clinical Interviewing: Administering and Interpreting the Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I)

Psychological Testing: Administering, scoring and interpreting the measures listed below:

Beck Anxiety Inventory	BAI
Beck Depression Inventory	BDI
Conners' Adult ADHD Rating Scale-Self	CAARS-S
Conners' Adult ADHD Rating Scale-Other	CAARS-O
Conners' Continuous Performance Test II	CPT-II
Conner's Retrospective Structured Clinical Interview	CAADID
Learning and Study Strategies Inventory, 2 nd edition	LASSI
Mental Status Exam	MSE
Paced Auditory Serial Attention Test	PASAT
Rosenberg Self-Esteem Scale	RSE
State Trait Anger Inventory-2	STAXI-2
Structured Clinical Interview for DSM-IV Axis I	SCID-I
Symptom Checklist 90, Revised	SCL-90-R
Wechsler Memory Scale, 3 rd Edition	WMS-III
Wender Utah Rating Scale	WURS
Wender Parents' Rating Scale	WPRS
Wechsler Adult Intelligence Scale, 3 rd Edition	WAIS-III
Woodcock-Johnson III Test Achievement, 3 rd Edition	WJ-III

RELEVANT GRADUATE COURSES:

Assessing Human Intelligence	Clinical Practicum
Personality Assessment	Research and Thesis
Research Methods	Statistics in Social Sciences
Adult Psychopathology	Child Psychopathology
Large Scale Systems of Behavior Management	Developmental Psychology
Personality Processes	Ethics

RELEVANT UNDERGRADUATE COURSES:

Psychological Measurements	Helping Relations
----------------------------	-------------------

Senior Research
 Senior Seminar in Psychology
 History and Systems
 Field Education in Psychology
 Research Practicum in Psychology
 Behavior Principles
 Research Design
 Ethics

Physiological Psychology
 Personality Theory
 Abnormal Psychology
 Computing in Psychology
 Social Psychology
 Developmental Psychology
 Effective Behavior
 Marriage and the Family

ADDITIONAL EXPERIENCE:

Member of Averett Student Foundation, Danville, VA. Duties include: participation and organization of various activities designed to promote excellence at Averett University. January 1999 to May 2002.

Newspaper Assembly and Delivery for Montgomery County Newspapers, Christiansburg, VA. Duties include: organizing and inserting advertisements, newspaper delivery to local merchants. May 2001 to August 2001 (Contact person: Gail Beavers).

Radio Disc Jockey for WBTM Broadcasting, Danville, VA. Duties include: training as on-air disc jockey. June 2000 to September 2000.

Cashier for Rite Aid Pharmacy, Danville, VA. Duties include: film development, cashier management, customer relations, store maintenance. May 2000 to July 2000.

Doorman and Concessions Employee for Carmike Cinemas, Bluefield, WV. Duties include: concessions work, janitorial duties, theater maintenance. May 1999 to August 1999.