

## POSITIVE EFFECTS OF SELF-AFFIRMATION AND ENVIRONMENTAL BEHAVIORAL REIN FORCERS ON FRUITS AND VEGETABLE CONSUMPTION.

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### ABSTRACT

**T**he effects of self-affirmation and environmental behavioral reinforcers on fruit and vegetable consumption were assessed. Fifty participants in Peru were compared to 83 US college students, split into two groups: self-affirmation and non-affirmation. Participants were given Satisfaction With Life Scale (SWLS) pre- and post-test. Participants were sent text messages and e-mails regarding fruit and vegetable consumption. Displays of the benefits of fruit and vegetable consumption were set up at the gymnasium to continuously reinforce consumption. Participants were assessed through a food diary over three weeks. Significant increase in consumption was found in both countries. No significant difference in the increase of consumption between the two affirmation groups was found in Peru or US. Significant increases in self-affirmation between groups was found by a repeated measures ANOVA,  $F(1,48)=52.977$ ,  $p=.0001$ . It can be concluded that self-affirmation and environmental behavioral reinforcers increase fruit and vegetable consumption as well as satisfaction with life. Findings could be transferred to a larger population in order to modify behavior for healthier worldwide consumption.

**Key terms:** Self-Affirmation, Behavioral Reinforcer, Healthy Consumption

## **Effect of Self-Affirmation and Environmental Behavioral Reinforcers on Fruits and Vegetable Consumption**

People attempt to exercise control over situations by giving attributions to causes, things, and people surrounding the individual (Liu & Steele, 1986). Self-affirmation is one method for changing evaluation of negative information and involves focus on important values, attributes, or past actions (Steele, 1988). Positive beliefs, thoughts, and experiences play an integral role in how people process and respond to negative information (Steele, 1988; Tesser, 1988). By focusing on positive aspects of the self, self-affirmation is theorized to restore or reinforce an individual's sense of self, thereby making them better equipped to face potential threats to it, including any self- threat arising from health information (Sweeney & Moyer, 2014). Self-affirmation has previously been related to consumption (Harris, Brearley, Sheeran, Barker, Klein, Creswell, Levine, & Bond, 2014). Self-affirmation is the cognitive process where individual get to accept the reality of things. In some way, after self-affirmation is accepted, the individual has to know the positive and negative aspects within him or herself. Previous studies have used self-affirmation manipulation to effectively promote responsiveness to health-risk information (Steele & Liu, 1983; Good & Abraham, 2011; Harris & Napper, 2005; Reed & Aspinwall, 1998). The impact of self- affirmation appears on (a) the acceptance of health-risk information, (b) intentions to adopt the recommended behaviors, and (c) subsequent behaviors (Epton, Harris, Kane, van Koningsbruggen, & Sheeran, 2014). As consumers want to reach the self integrity, consumers are influenced to purchase products indicated as "healthy" (Hersey, Wohlgenant, Arsenault, Kosa, & Muth, 2013). People generally prefer information that reflects well on the self and reminds them of their positive traits (Brown & Dutton, 1995; Sedikides & Strube, 1997; and Taylor & Brown, 1988). Self-affirmation has the potential to impact health behavior, as well as health intentions (Sweeney & Moyer, 2014).

### **Behavior Modification on Healthy Consumption**

Many times people are used to finding advertisements on walls of establishments, movies, or in different environments about a broad variety of products for direct consumption. In order to increase healthy consumption, basic healthy products must be shown more often to people as their mindset is modified progressively until they end up with a healthier diet. Presentation of the product can induce respondents to generate a judgment that would not have been generated otherwise (Kardes, Allen, & Pontes, 1993), which means that by increasing presentation of the product, consumption will also increase. This presentation of product is referred as an environmental behavioral reinforcer. Previous research suggests that mortality reminders interact with socially informed images (i.e., a healthy prototype) to increase food purchases that are likely to affect nutrition (McCabe, Arndt, Goldenberg, Vess, Vail III, Gibbons, & Rogers, 2014). Sensory experiences play a predominant role in shaping consumers' satisfaction and hence acceptance of fruits (Sabbe, Verbeke, & Van Damme, 2009). Behavior around the world must change towards better diet habits. By increasing the presentation of product as a reinforcer, the consumption must increase as Pepsi, Coke, and others do. There is a two-dimensional conceptualization of consumer attitudes: The first dimension is a hedonic dimension, resulting from sensations derived from the experience of using products, and the second is a utilitarian dimension derived from functions performed by products (Voss, Spangenberg, & Grohmann, 2003). This conceptualization is the study's target, which evokes to create a positive attitude towards fruit and vegetable consumption. In this study the hedonic dimension will be important at the time the person uses or tries the product as they fulfill their hunger and enjoy the taste. Hedonic dimension is becoming crucial at time of purchase (Kazakeviciute & Banyte, 2012). The utilitarian dimension will rise up

when the customer uses will get used to the positive benefits of the product (health, appearance, etc.). The main purpose of the study is that participants can increase their consumption of healthy products because of the benefits it has. Plant foods, fruits and vegetables can diminish ailments from headaches to heart disease (Steinmetz & Potter, 1996). Lack of adequate nutrition has been linked to a wide range of negative health consequences (Klein *et al.*, 2014). Fruit and vegetable consumption also controls satiation and sense of fullness because of the high content of water in some of them. Regular consumption of fruits, vegetables, whole grains, and other plant foods has been negatively correlated with the risk of the development of chronic diseases (Liu, 2013). In the current study, it was hypothesized that there would be a significant difference in consumption between self-affirmation and non-affirmation groups, that both groups would increase consumption by the end of the study, and that fruit and vegetable consumption would have a significant effect on Satisfaction with Life of the person.

### **Method**

Two studies were conducted in two separated locations to measure cultural variations. The first experiment was conducted in a small city in Peru, and the second in a small city in South Carolina, USA. Preliminary inclusion criteria included regular use of a gym for workout, with regularity defined as at least once a week. Participants were given a short questionnaire, adapted from Harris *et al.* (2014), containing demographic questions (sex, age, occupation) and an eligibility question: Currently, do you eat at least 5 portions of fruit and vegetables on a typical day? (1, No, and I do not intend to do so; 2, No, but I am thinking about it; 3, No, but I strongly intend to; 4, Yes, but it is difficult for me; 5, Yes, and it is easy for me). Those responding 1–4 were deemed eligible for the full study.

Participants then filled out the Satisfaction With Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) and those scoring in the bottom 50<sup>th</sup> percentile were placed in a self-affirmation group. Data was gathered with a food diary by self-reporting.

### **Pre- and Post- Satisfaction With Life Scale**

Using the method Harris *et al.* (2014) used, and developed by Sherman *et al.* (2009), participants in the self-affirmation group had to provide three reasons why their most important value was important to them and one example of something they had done that demonstrated its importance. Participants in the non-affirmation group had to provide three reasons why their least important value might be important to someone else and an example of something that person might do to demonstrate its importance. Self-affirmation worked sending messages designed to encourage people to change aspects of their lifestyle threaten their sense of adaptive and moral adequacy and prompt a need to restore this sense (Epton & Harris, 2008). Text messages were sent to every individual of the self-affirmation group, expressing the importance of themselves and the importance of their actions in order to reinforce their healthy consumption behavior. Text messages were sent everyday and were related to the increment of health products consumption. Free fruit was given away in both countries. In Cusco – Peru, the free fruit was given directly by the research staff. On the other hand, free fruit in United States was offered in a local fruit store so participants chose the fruits of their convenience.

## Statistical Design

Collected data were computed in Microsoft Excel. SPSS was used to conduct the data analysis. For  $H_0$ , Repeated Measures ANOVA was used to determine the increase or decrease in consumption. Consumption had three levels which were the total consumption of each week. For  $H_1$ , Independent Samples *t*-test was conducted to measure the difference on consumption increase between self-affirmation and non-affirmation groups. For  $H_2$ , Repeated Measures ANOVA was used to determine the increase or decrease in Satisfaction With Life Scale (SWLS) scores. SWLS had two levels which were the pre- and the post- tests. These three tests were conducted in both countries Peru and United State. The selection criteria set both groups in the same environment which were the location where behavioral reinforcers were shown. Self-affirmation behaved as a unique independent variable while the fitness center behaved as constant throughout the entire experiment.

## Confidentiality

Consent forms (see *Appendix A*) were given to all of the participants, where they accepted their participation on the study and also accepted giving their personal information (name, and number) as part of the study. Both experiments required the participant's phone number as part of the behavior reinforcement. The study abided by Helsinki declaration and APA ethical standards, and approval was obtained from the institutional IRB.

## First Experiment

### Participants

The experiment had 50 participants from a medium-sized city in Southeastern Peru and it was conducted in a commercial fitness center. The gym was a central location where participants gathered and followed up. Participants were separated into self-affirmation and non-affirmation groups of 25 people each. All of the participants gave their phone numbers (if they owned one) or a contact number, and they were given a food diary to record their consumption through a 21 day process. The self-report included the number of total fruits and vegetables consumed over each week by portions. Each portion of either fruit or vegetable was established as the size of the palms of their hand.

### Procedure

Participants recorded their fruit and vegetable consumption at the gym. In order to apply direct behavioral reinforcement, the research staff gave away fruits and vegetables daily. Environmental behavioral reinforcers (EBR) in the forms of poster-style advertising were placed at the gym on every wall so that while working out, the different reinforcers were able to be seen and read. EBR included the picture of the fruit or vegetable with the description of the positive outcomes in health produced by their consumption. The self-affirmation group received text messages to encourage them to consume fruits and vegetables, with positive messages and health information about fruits and vegetables consumption, while the non-affirmation group did not receive such reinforcement.

## Results

Repeated Measures ANOVA showed an increase in overall consumption of both groups,  $F(1,49) = 57.022$ ,  $p=.0001$ , from week one to week three ( $M_{\text{week1}} = 19.84$ ,  $SD_{\text{week1}} = 14.77$ ;  $M_{\text{week2}} = 23.06$ ,  $SD_{\text{week2}} = 12.72$ ;  $M_{\text{week3}} = 30.2$ ,  $SD_{\text{week3}} = 13.03$ ). Independent Sample T-test showed no difference between self-affirmation and non-affirmation groups in change over week's consumption (Table 1),  $t_{\text{week1-2}}(48) = -.1118$ ,  $p=.272$ ,  $t_{\text{week2-3}}(48) = -1.113$ ,  $p=.271$ ,  $t_{\text{week1-3}}(48) = -1.555$ ,  $p=.131$ .

There was no significant effect of consumption on SWLS,  $F(1,49) = .972$ ,  $p=.588$ ; however, there was an approximate increase on SWLS scores that averaged 15% (3.14). Significant data points by comparing the increment in consumption and its difference between the two groups (see *Figure 1*). SWLS scores also showed differences between both groups and a significant data points in the increase within each group (see *Figure 2*). A difference is also noticeable between the beginning average consumption of both groups, giving that self-affirmation group (with lower SWLS scores) has also lower consumption. This direct relation between consumption and SWLS can be noticeable by looking at the starting points of both groups in *Figure 1* and *Figure 2*.

## Discussion

Among participants, irrespective of condition, fruit and vegetable consumption increased, demonstrating at least some efficacy of the EBR advertising. The affirmation group had a larger increase in consumption, even if not significant in effect, and the SWLS change may have been influenced by ancillary factors related to the dietary benefits of such behavioral change.

The importance of attending a gym to work out increases the likeliness of consuming healthier products. If the person has a proper diet, attends to proper fitness, and has proper training, that person can maximize the results in their physical and inner health. Individuals can increase their physical strength, endurance, and exhibit improvements in psychological well-being (Auchus & Kaslow, 1994). Exercise appears to improve self-concept (Ossip-Klein, Doyne, Bowman, Osborn, McDougall-Wilson, & Neimeyer, 1989).

The study can be further developed with the combination of a fitness center attendance control combined with a controlled diet to measure the outcomes of these two healthy practices. The fact that the experiment was assessed and controlled in the same environment through the entire process can be improved by giving food diaries to increase the up to date data from all the participants. The data from this study can be a small framework to start creating database of fruits and vegetables consumption trends in Peru and also in most parts of South America.

## Second Experiment

### Participants

A total of 83 participants were recruited from a small, rural, church-affiliated college in the Southeastern United States. During the course of the experiment twenty participants dropped the study giving a total of 63 participants with full, valid data. Participants attended the college's gym and were exposed to EBR translated from those used in Peru. There were 28 final participants in the non-affirmation group and 35 participants in the self-affirmation group. All of the participants gave their phone numbers (if they owned one), or a contact number and were given a food diary for 21 days.

## Procedure

After the exclusion criteria 100 participants were obtained. Participants were followed up through three weeks. Week by week they had to control their fruit and vegetable consumption with a food diary given to them. The food diary included the number of fruits and vegetables they consumed over the week, their cooking method, and leftovers. As weeks went on, they were receiving text messages encouraging them to eat fruits and vegetables and to not miss any work out session at the gym. As a general reinforcer for everyone, free fruit was given to the participants at a fruit store where they could pick their daily fruit. EBR took place at the gym where they worked out. Different letter size sheets with pictures of fruits and vegetables and the healthiest description they could have. Self-affirmation group received text messages to encourage them to consume fruits and vegetables with positive messages and health information about fruits and vegetables consumption. Non-affirmation group received text messages too but with neutral meaning neither positive nor negative, just describing the outcomes of a healthier daily consumption habit. By having data per week, the study gave results showing the increase or decrease within the consumption of the participants.

## Results

Repeated Measures ANOVA showed a significant increase in overall consumption of both groups,  $F(1,49) = 57.022$ ,  $p=.0001$ , from week one to week three ( $M_{\text{week1}} = 21.06$ ,  $SD_{\text{week1}} = 16.54$ ,  $M_{\text{week2}} = 23.04$ ,  $SD_{\text{week2}} = 16.52$ ,  $M_{\text{week3}} = 29.51$ ,  $SD_{\text{week3}} = 17.86$ ). Independent Sample T-test showed no difference between Self-affirmation and non-affirmation groups in change consumption by week (Table 2),  $t_{\text{week1-2}}(61) = .675$ ,  $p=.502$ ,  $t_{\text{week2-3}}(61) = -1.328$ ,  $p=.189$ ,  $t_{\text{week1-3}}(61) = -.496$ ,  $p=.622$ .

There is a significant effect of consumption on SWLS,  $F(1,62) = 3.213$ ,  $p=.041$ . Thus, there was an average 14% increase on SWLS scores (2.97). Significant differences existed comparing the increment in consumption and its difference between the two groups (see Figure 3). A difference is also noticeable between the beginning average consumption of both groups, giving that self-affirmation group (with lower SWLS scores) also has lower consumption. SWLS scores also showed difference between both groups and a significant data points in the increase within each group (see Figure 4). This direct relation between consumption and SWLS can be noticeable by looking at the starting points of both groups in Figure 3 and Figure 4.

## Discussion

Among the U.S. participants, irrespective of condition, fruit and vegetable consumption increased, demonstrating at least some efficacy of the EBR advertising. Similar to the Peruvian sample, the affirmation group had a larger increase in consumption, even if not significant in effect.

According to Sabbe et al. (2009) a decrease in beliefs about health and nutritional benefits is usually noticed when taste expectations are negatively assumed. Taste of fruits and vegetables may be different in United States because of the processes that are immersed within their production. The option of offering juices and smoothies can give the experiment the possibility to null this assumption within the experiment. Sugar, water, and combination between fruits and vegetables will neutralize the possible disliking taste of some fruits by some consumers. Market place success and sustainable long-term consumption of novel food products largely depend on their acceptance and consumer satisfaction (Sabbe, Verbeke, Deliza, Matta, & Van Damme, 2009). In this occasion, it can be concluded that the success of combining diet with proper

exercise to increase health in persons can be triggered through the EBRs and increased familiarity with fruits and vegetables. The presentation of different fruits and vegetables' characteristics to the participants has to wake up their desire to be healthy.

### **General Discussion**

United States has a main health problem which is obesity, while Peru suffers two health problems which are obesity and malnutrition. Economic differences and culture standards were set apart in these experiments. Both countries fell under the same behavior modification strategy and gave similar results. The purpose of doing a cross-cultural study and using the same variables and constants was to achieve the same goal - make the people go from not consuming a product or service to become loyal of it. We realized that at the moment an idea has to be sold the only thing that matters is how you get in touch with your potential customers. Self-affirmation can decrease bad habits such as alcohol and tobacco consumption (Armitage, Harris, Hepton, & Napper, 2008; Armitage, Harris, & Arden, 2011) and increase good habits such as fruit and vegetable consumption (Harris et al., 2014). Consumption will increase depending on how the person feels towards the product; consumption will increase even more if the product shows that it is useful, healthy, and cares about the person. Environmental behavioral reinforcers, such as the posters used here, can be a small but powerful aide to increasing the health of the populace.

This study showed the similarity between two cultures and helps to find different ways to fit these cultures in the best approachable way. The location of the first experiment was favorable because of the size of the city; but location of the second experiment was restricted for the same reason - size, given that the rural southeastern US location was not favorable for massive consumption. Many factors can affect the study such as time, weather, and income, but by focusing on personal consumption the study will be more independent of these factors. With this study we were able to recognize the consumer's behavior across two different cultures. With the same purpose in both studies of looking for health by encouraging healthy practices, the study will give a broad appreciation of person's self-esteem and self-respect. This study will be helpful for future studies in marketing and advertising of different companies that may want to increase their products' health aspect. This study is likely to promote health and self-appreciation attitudes towards every person's life. Considering that we are promoting "health consumption," this study is segmented to every person around the world, without importance on age or gender. This study will be a determinant in elders' life as the result of consuming fruits and vegetables is to prevent several chronic diseases given that elders are more prone to them. Lifestyle modifications of dietary and physical activity behaviors are important interventions for enhancing the Health Related Quality of Life (HRQL) of overweight and obese, and older adults who have knee osteoarthritis (Rejeski, Focht, Messier, Morgan, Pahor, & Penninx, 2002). It is possible to count the number of servings of fruits and vegetables consumed daily if there is agreement on what counts as a serving of fruit or vegetable (Slavin & Lloyd, 2012), so if person self-reports their consumption they are more likely to set their own standards of consumption. Marketing departments in many firms will be able to use this information to contrast and evaluate the importance and impact that going into a healthier market has in their revenues. This experiment looks for the understanding of people's attitudes, considering that besides cultures we are similar in our brain's processes. Culture is a big factor on deciding a product segment, but remembering that people have similar attitudes towards some particular products, will establish the difference between success and failure in the market. Certain patterns are built by observations, but encouraging people to be better is a firm's responsibility. If a firm is concerned for their consumers' health, it will increase the firm's popularity and consumers' affection towards their products.

Fruit and vegetables stores will be able to manage their products presentation by explaining the benefits of them when eaten. Adding extra values and extra services such as smoothies or juices will be the path for a future success in promoting health and changing behaviors without the target persons noticing it. Direct shoppers are found to place greater importance on freshness, locally grown foods, and vitamin content (Bond, Bond, & Thilmany, 2009). This means that persons are more likely to buy if they know what they are going to earn by consuming the product (fruit or vegetable). Despite language barriers if the business wants to reach any person, it has to think in all of the possible ways to do it. By applying the same strategies the study is likely to unify two separate countries, cultures, and thoughts in one single experiment in order to demonstrate that everybody tend to follow the same patterns and change their behaviors by similar approaches. Thus, this type of study can potentially unify cultures by integrating same concepts of self-integrity, self-care, and self-love. In conclusion, these studies will annul many stereotypes that people have about different cultures and how to reach them with a simple product such a palm size apple.

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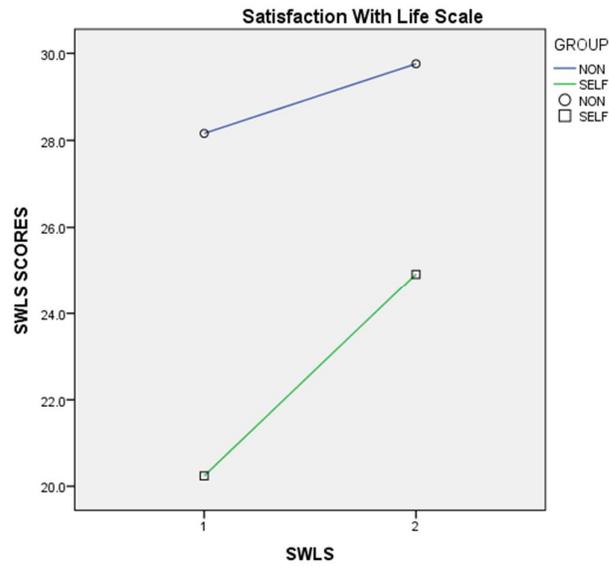
**Table 1.** Change in consumption for Peruvian sample.

	Self-affirmation	Non-affirmation
Change Week 1-2	M=166.3%, SD=±424.5%	M=64.6%, SD=±163.9%
Change Week 2-3	M=52.4%, SD=±51.32%	M=32.9%, SD=±70.43%
Change Week 1-3	M=297.5%, SD=±694.9%	M=94.6%, SD=±188.1%

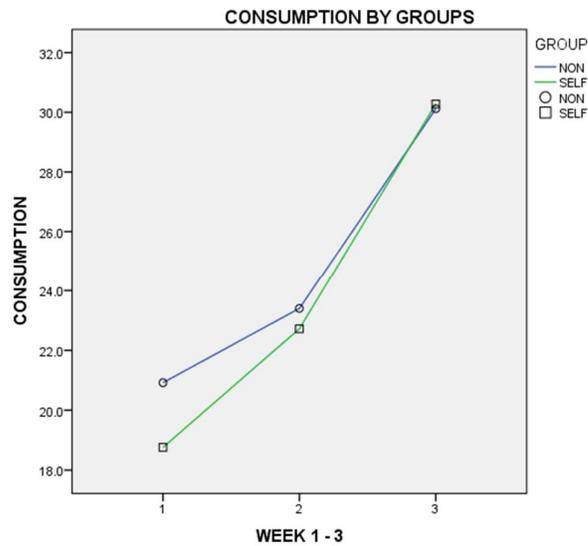
**Table 2.** Change in consumption for U.S. sample

	Self-affirmation	Non-affirmation
Change Week 1-2	M=34.3%, SD=±90.6%	M=58.6%, SD=±187.9%
Change Week 2-3	M=58.3%, SD=±62.9%	M=36.2%, SD=±69.3%
Change Week 1-3	M=146.2%, SD=±369.4%	M=105%, SD=±265.8%

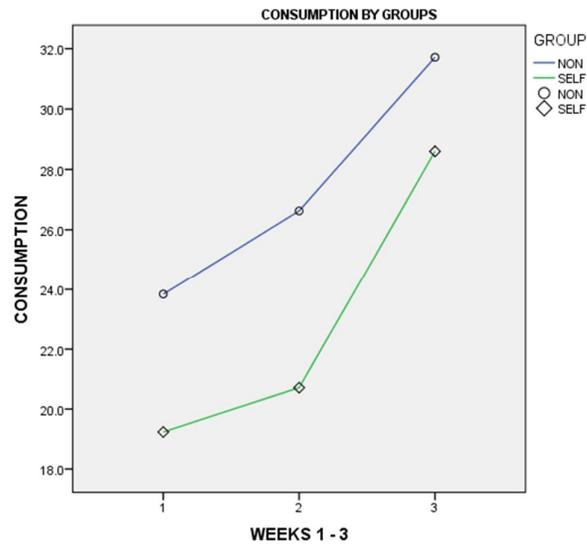
**Figure 1.** Pre- and post-test change in SWLS by group for Peruvian participants.



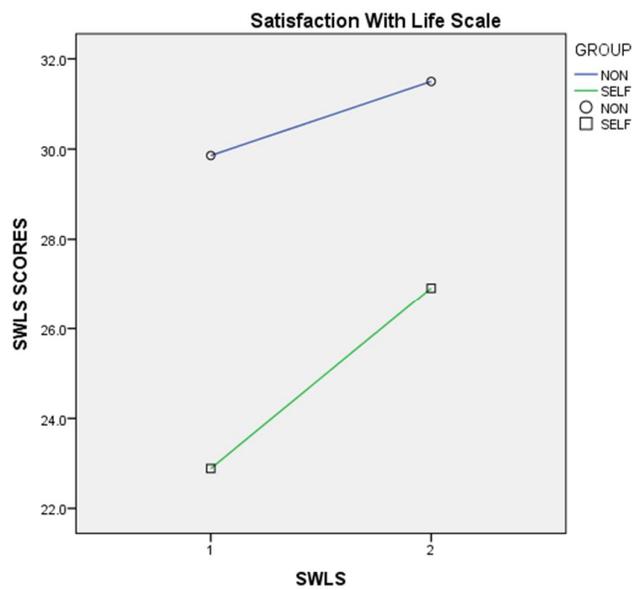
**Figure 2.** Change in consumption by group for Peruvian participants.



**Figure 3.** Increase in consumption by groups for US participants



**Figure 4.** Change in SWLS by groups for US participants





## **APPENDIX B**

### **The Life Satisfaction Scale**

By Ed Diener, Ph.D.

DIRECTIONS: Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by placing the appropriate number in the line preceding that item. Please be open and honest in your responding.

1 = Strongly Disagree

2 = Disagree

3 = Slightly Disagree

4 = Neither Agree or Disagree

5 = Slightly Agree

6 = Agree

7 = Strongly Agree

\_\_\_\_\_ 1. In most ways my life is close to my ideal.

\_\_\_\_\_ 2. The conditions of my life are excellent.

\_\_\_\_\_ 3. I am satisfied with life.

\_\_\_\_\_ 4. So far I have gotten the important things I want in life.

\_\_\_\_\_ 5. If I could live my life over, I would change almost nothing.