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The Effects of Dietary Supplements On Self-concept

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The Effects of Dietary Supplements On Self-concept

Submitted in partial fulfillment of the requirements for graduation with honors to the department of Psychology at Carroll College.

Running Head: Self-concept

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Abstract

The purpose of this study was to investigate the relationship, if any, between taking a dietary supplement and changes in self-concept. To research this relationship a study was performed using 40 female subjects ranging from 19 to 49 years old. The subjects were split into an experimental and control group each containing 20 subjects. The subjects from each group were given a questionnaire, which measured two important aspects of self-concept; self-esteem and body image. Following the administration of the questionnaire the experimental subjects started the supplement regiment for the experiment. All subjects completed an informed consent form agreeing to live within the experimental standard for a 30-day period. The experimental subjects agreed to take two Sportrim Turbo pills orally per day during the duration of the experiment. After a four-week period both groups were given a follow-up questionnaire similar to the first. The score from the first test was then subtracted from the post-test score, to determine the difference score. The difference scores were then computed in a t-test for independent groups to identify the probability of differences being due to sampling or other error. A statistically significant difference in change in self-esteem was found between the experimental and control group with the experimental group showing more gains. These results may be important in increasing the overall self-confidence of women or in decreasing the amount of eating disorders among women.
The Effects of Dietary Supplements on Self-concept

Every day millions of women make the decision to go on a diet, buy the new exercise equipment seen on an infomercial, or try that new magic pill that promises to make the pounds melt off, and each is supported by the thirty-three billion dollar diet and physical fitness industry (Morgan, 2002). All of these decisions have the same objectives at heart: to help the participating women lose weight and become healthier, more beautiful, more self-confident, and happier with one's self.

As stated by David Morgan, "Government statistics demonstrate that obesity is nearly epidemic, and the medical complications associated with being overweight are multifarious" (2002, p. 148). The Center of Disease Control and Prevention conducted a study in October of 2002 that found that 15 percent of children between the ages of 6 and 19 are overweight or obese, an estimated 5.3 million, these results are double what they were 20 years ago (Smolowe, 2002). The increase in weight in the country has been followed by a corresponding increase in weight-related health problems including high cholesterol, stroke, heart attack, gallbladder disease, and type 2 diabetes (Morgan, 2002, and Smolowe, 2002).

The problems that being overweight causes do not stop with health consequences alone. Studies have shown being overweight to be correlated to low and even negative self-concept. More specifically studies have shown that women who are overweight or who perceive themselves as being overweight score lower on standardized tests that measure their overall self-concept and their general opinion about their body and physical appearance (Moon, 2002, and Landwerlin, 1998). Health consequences are also suffered
because of low self-concept, such as depression and other emotional problems, leaving many women that are overweight to suffer both physically and emotionally.

With the percentage of those suffering from obesity increasing and new health problems being tied to excess weight every day, it is clear why there has been such a large push towards dieting and becoming physically fit. The problem is that ninety-five percent of people that attempt to lose weight by diet or exercise alone are not successful, suggesting it is difficult to get or stay healthy (Cloutare, 1995). For many who turn to natural products, such as herbal and dietary supplements which offer solutions for effective weight control, the products can be a considered a savior. But do they really work?

In recent years the social pressure to be thin has grown tremendously, especially for women. In Cultural Expectations of Thinness in Women, it is stated that, “the average weight of women presented in the Miss America Pageant and in Playboy Magazines over a 20 year span (1959-1978) decreased significantly over time (Garner, 1980). Another study done from 1979-1988 found that the weights of Playboy centerfold models were 13 to 19 percent lower than that of normal women (Morry, 2001). The average fashion model weighs twenty-three percent less than the average American woman (Ware, 1995). The above statements help to confirm that the criteria that society uses to construct the ideals of what women should look like are unreasonable and almost completely unattainable for the average woman.

The media continues to portray this ideal slim female form in everything from television shows to magazines. Exposure to both magazine advertisements and television programs have both been correlated with eating disorders and decreased body satisfaction
in women (Stice, 1994; Myers, 1992; Morry, 2001). Body dissatisfaction has also been shown to significantly predict poor self-esteem and depression (Morry, 2001). This clearly shows that society’s unrealistic ideal is harmful not only to a person’s physical health but can also affect mental health.

The problems that have been shown to come from watching television and seeing magazines that promote the ideal model of thinness are also the key problems experienced by the individuals that suffer from eating disorders like bulimia and anorexia (Ruderman, 1992; Dieting, 2000). There are strong correlations between the diagnosis of individuals that suffer from eating disorders and having low self-esteem, body dissatisfaction, and depression (Ruderman, 1992). These results show that the feelings that are formed from being bombarded by society’s unrealistic standards of weight and beauty can be harmful to those that are not naturally slender, which is the majority of the population.

The desire to be thin is not spurred by society alone, there is some evidence that there is a biological need in each person to be attractive and to meet the standards that society sets forth (Cunningham, 1995). Natural selection may have influenced this need with regards to beauty preference because physical attraction responses are related to sexuality and reproduction (Cunningham, 1995). Today thinness may be the ideal because of the need for biological fitness, in the past the more physically fit a person was the less likely it was that they would get sick, thus increasing their chance of surviving to reproduce. Biological fitness is important not only in attracting a mate but has been important for centuries as a way to live or survive longer and have a greater probability of being fertile (Cunningham, 1995). The natural selection argument suggests that in order
for someone to survive and pass on their genetic makeup it is important not only to be physically fit and healthy but also to be attractive, by society's standards, thus increasing the probability of finding a mate.

Women today who try to meet the unrealistic standards of beauty set by society are forced to work extra hard dieting and exercising. It is harder today than ever before to stay thin and in shape because of the accessibility of fast-food and the inability to find time to work out while working 50 to 60 hours a week and raising a family. If it were easier to pass up that quick snack or find the time and money to go to the gym, then numerous women would melt off the pounds, resulting in better self-esteem, more body satisfaction, and an overall increase in self-concept and improved health.

Dietary supplements are a natural alternative to the pain of dieting and strenuous exercise. They claim to decrease hunger so it is possible to fight the craving to overeat and simultaneously increase energy to give the body a few extra steps at the end of a long hard day. If these supplements can offer results that have a positive effect on self-concept they may help millions of women become more satisfied with themselves, less obsessive about abstaining from food, and less likely to exercise to excess. In addition, supplements could have the added benefit of helping to decrease the rising rate of eating disorders that are plaguing young women each year.

In today's society the desire for instant gratification and "magic bullet" mentality have greatly increased the desire to lose weight fast using medication and pills, regardless of the health consequences. This encourages many to turn to dietary supplements as a way to lose weight without the excess effort that is needed with diet and exercise or as an
extra tool in an existing diet or exercise program. Encouraging the questions concerning the effectiveness of such supplements.

The current research focuses on the effects that the decision to take a dietary supplement has on a subject and how that decision affects a person's self-concept. Advertisements claim supplement use will result in more energy, decreased appetite, and weight loss, improving self concept. Self-concept is defined by Abhilasha Mehta as "the totality of the individual’s thoughts and feelings having reference to him or herself as an object" (Mehta, 1999, 81). Self-concept is composed of multidimensional characteristics. Two important aspects of self-concept include 1) self esteem, or how a person feels about themselves and their ability to succeed, and 2) body image, or how an individual perceives their physical appearance.

Before focusing in depth on the methodology used to conduct the experiment and compute the results of the research, it is important to first focus on past research that has been conducted and how it pertains to this experiment. It is necessary to focus additionally on how the ingredients in dietary supplements biologically affect the body.

Literature Review

There are few, if any, extensive studies that directly explore how dietary supplements affect self-concept. However, there are studies that pertain to nutritional supplements and certain aspects of self-concept such as self-esteem and body image. In addition there is a wealth of research that addresses various factors that influence self-concept. There are also medical studies that confirm how different chemicals affect the body.
A study done by Mary Ann Moon in 2001 discovered a relationship between weight status and self-concept in young girls. The research found that girls that were overweight or perceived themselves as overweight scored lower on tests that measured their overall self-concept and general opinion about their body and physical appearance (Moon, 2001). Of the 197 girls studied, 48 (25%) were overweight and 20 (10%) were obese. These girls scored significantly lower on self and body esteem then did their non-overweight peers (Moon, 2001). The results of this study suggest that simply being overweight negatively influences self-concept.

Another study was completed on the relationship of self-concept to nutrient intake and eating patterns in young women. This study examined 153 women ages 18 to 35 years old and used a 92-item questionnaire to assess three days worth of food records. Records were specifically analyzed for nutrient composition and eating patterns. The results of this study found a strong correlation between more nutritional diets and positive self-concept and body image (Witte, 1991).

If as the above study suggests nutrient intake has a strong positive correlation with better self-concept, then it is important not only to consume nutrients in eating patterns but it may also be important to get these nutrients through supplement intake. People who do not get the nutrients and vitamins they need from their meals can turn to supplements in a pill or other form to offset the difference. This information has implications for the effects that dietary supplements may have on self-concept, because dietary supplements including the one used in this study contain many nutrients that are recommended for daily consumption.
Deborah Ossip-Klein (1989) conducted two additional studies regarding self-concept with her associates at the University of Rochester, one on the effects that running or other physical activities have on self-concept, and another on the effect that weight lifting has on self-concept. The overall conclusion of these studies is that self-esteem is the only variable to show consistent improvement with exercise. Ossip-Klein concludes that, “Subjects may respond favorably to actual or perceived improvement in fitness or weight loss which improves self-concept” (1989, p. 2). Both studies showed that participants perceived an increase in energy and improvement in fitness through either running or weight lifting. These findings support the hypothesis that self-concept can be improved by the perception of physical improvement and is not dependent on the occurrence of a measurable physical change (Ossip-Klein, 1989). It was not necessary for the subjects in these studies to have recordable improvements in fitness, energy level, or weight loss. To experience improvements in self-concept the subjects simply had to feel or perceive that a change or improvement had occurred for self esteem to be effected (Ossip-Klein, 1989).

The results of the above studies suggest that a similar effect may occur when a subject is taking a dietary supplement. If the supplement delivers what it promises in the advertisements, including weight loss and increased energy along with delivering needed nutrients to the body, the subjects could associate these changes with improved fitness or improved attractiveness. Since most Americans are extremely skeptical about the effectiveness of dietary supplements, the decision to take a supplement may make the subjects hypersensitive when inspecting whether any changes that may occur in the body are actual or only perceived differences.
In the research that has been completed, many different factors have been found to influence self-concept such as nutrient intake, physical activity, and simply being overweight. Since the research conducted indicates that dietary supplements may affect self-concept it is important to evaluate how the ingredients in the dietary supplements are known to affect the body. Knowledge of the physical affects of supplements may help to predict how the supplement might affect a subject’s self-concept.

As stated by Mary Camire, in *Nutrition Today*, “Unlike drugs and additives that must undergo rigorous scientific testing for safety and efficacy and the Food and Drug Administration (FDA) premarket approval, supplements have no formal regulatory requirements prior to going to market” (1999, p2). The lack of regulation and required testing results in very little information being available on some of the ingredients in supplements such as various herbs. The supplement used in the current study is advertised to curb the appetite, burn fat, increase metabolism, boost energy, prevent sugar from turning to fat, and facilitate weight loss (Amazing Turbo, 1998). To verify whether these promises are accurate, it is necessary to investigate as completely as possible how the ingredients affect the body.

Some ingredients that are claimed to be active in decreasing the appetite in supplements include Ma Huang, Garcinia Cambogia, and a Magnesium and Chromium combination. These ingredients are also advertised to be important in producing other positive results. Ma Huang and Iodine are used to help the body burn fat (Amazing Turbo, 1998). Ma Huang is said to increase the metabolism, and it is claimed that Garcinia Cambogia and Chromium are important in preventing sugars from turning into fat (Amazing Turbo, 1998).
Ma Huang is an important ingredient in many dietary supplements. A shrub-like plant found in the desert regions of the world, this herb has been used for over 5,000 years by the Chinese to relieve water retention, alleviate sweating, and lung or bronchial constriction (Foster, 1996 and 1999). Ma Huang is a natural source of ephedrine, an adrenergic agent that has been widely used in this country for its purported properties as a weight loss agent (Jancin, 1999). Ma Huang works by stimulating the central nervous system and adrenals, dilating the bronchial tubes, and increasing blood pressure and heart rate (Crabtree, 2000 and Foster, 1999). This causes an increase in the body’s main functions; it increases sweating, raises blood pressure, acts as a diuretic, and dilates bronchioles increasing the amount of blood flow to the skin and mimicking the effects of adrenaline causing an increase in energy and a decrease in appetite (Chevallier, 2000). Ma Huang may also play a large role in increasing the amount of fat the body burns. Advertisements claim it is active in this process by stimulating beta-receptors on the brown adipose tissue, causing them to burn white fat cells for energy at a faster than normal rate and creating thermogenic effects that prevent the slowing of the resting metabolic rate (Amazing Turbo, 1998). This causes the body to burn more fat at a faster rate without slowing, which leads to overall weight loss.

Garcinia Cambogia is a small pumpkin-shaped fruit whose curd extract traditionally has been used to improve digestion and make meals more satisfying (Clourare, 1995). The rind of this fruit contains hydroxycitrate and hydroxycitric acid or HCA (Cloutare, 1995). As printed by Health News and Review, "HCA reduces the rate at which carbohydrate calories are turned to fat. It lowers the production of both cholesterol and fatty acids, and it increases the production of glycogen in the liver, which promises
greater and more sustained energy" (Cloutare, 1995, p.2). This decreases the amount of fat that is stored because fewer calories are turned to fat, decreasing weight. HCA works though the peripheral nervous system by suppression of fatty acid synthesis in the upper digestive tract resulting in lower body fat without altering body protein levels (Herbal Fields, 2002).

The *Physicians Desk Reference* states that, “HCA is a putative anti-obesity agent, which is a competitive inhibitor of the enzyme adenosme triphosphate citrate lyase or ATP citrate layase” (Walsh, 2002, p 159). In the cytosol, ATP catalyzes the conversion of citrate and coenzyme A to oxalacetate and acetyl coenzyme A (ACETYL-COA) (Walsh, 2002). Acetyl COA is used in the synthesis of fatty acids and cholesterol (Walsh, 2002). It is also used in the synthesis of acetylcholine in the CNS (Walsh, 2002). It is believed that the anti-obesity effects are due to suppression of fatty acid and fat synthesis. In the liver HCA stimulates gluconeogenesis, which diverts carbohydrates from lipid biosynthesis to hepatic glycogen synthesis, resulting in altered metabolic processes and reduced food intake (Herbal Fields, 2002; Walsh, 2002). The effects of this ingredient should result in decreased appetite of an individual and the prevention of sugar from turning to fat, leading to overall weight loss.

An advertisement for Sportron Inc. also claims that Magnesium and Chromium are used in combination with each other to help balance blood sugar levels to reduce food cravings (Amazing Turbo, 1998). This may be possible since Chromium works with insulin in the metabolism of sugar, which could increase the amount of sugar that is burned, decreasing fat production by the body (Mindell, 1985).
Chromium decreases hepatic extraction of insulin and improves glucose tolerance and disposal (Walsh, 2002). Insulin controls the passage of nutrients through the cells in the body, and these cells need glucose to burn for energy, thus speeding up the process of burning food for energy (Amazing Turbo, 1998). The result of this interaction is less stored fat and more energy.

Iodine is purported to be essential in the fat burning process. The Iodine in this supplement is derived mainly from kelp, a sea vegetable. Iodine is a trace element that is vital to the function of the thyroid gland, which is needed for normal development and metabolism (Walsh, 2002). Iodine’s major action in the body is to be a precursor in the formation of thyroid hormones (Walsh, 2002). It is taken up by the thyroid gland by means of an active iodide transport mechanism, which is catalyzed as sodium/iodide symporter (Walsh, 2002, p229). Since the thyroid gland controls metabolism, and iodine influences the thyroid, an under-supply of this mineral can result in slow mental reaction, weight gain, and a lack of energy (Mindell, 1985). The advertisements state that it “helps to restore muscle tissue and stabilizes levels of insulin, which increases the amount of fat that can be burned” (Amazing Turbo, 1998). When fat is burned faster, weight is lost and a slimmer, firmer figure will emerge.

The known chemical properties of the above ingredients may all work together in the body to help the subjects lose weight and have more energy without having strong cravings, and they give the body needed nutrients. If these chemical effects are legitimate they should be helpful in aiding in weight loss or weight control. The effect of increased energy may lead a subject to become more active which could enhance the probability of actual or perceived improvements in fitness and attractiveness.
In this research only one dietary supplement is being tested to avoid variation and to increase validity of the results. The dietary supplement chosen is called Sportrim Turbo, manufactured by Sportron International, Inc. This supplement was used to test the hypothesis that the intake of dietary supplements may have a positive effect on self-concept.

The present study compared the changes in self-concept over a four-week period of women who were taking a dietary supplement to women that did not. To measure the change a questionnaire was given to both groups before any supplements were taken. A follow-up survey was administered four weeks after the experimental group started the dietary supplement regimen. The pre- and post-test scores were then compared for both groups to determine the fluctuations in self-concept that are natural over time to those that are caused by the supplement.

Methods

The current experiment was conducted with 40 female subjects ages 19 to 49. These women represent a convenience sample of individuals who volunteered to be active in the study. The subjects resided in Helena or Great Falls, Montana at the time of the study. All of the subjects in the sample had completed at least 12 years of general education and at least one year of higher education. Two subjects withdrew from the experimental condition of the study, because they were not comfortable with the effects the dietary supplement had on their heart rate. These two subjects were replaced by women of the same age who completed the study as described below.

Subjects were separated into an experimental and a control group each consisting of 20 subjects. Both groups were provided with an informed consent form that described
what was expected of them during the experimental process. Subjects committed to these expectations by signing the form. The control group agreed to continue living as they do normally by taking no supplement during the experimental process. The experimental subjects agreed to continue living as they normally do with the exception of taking two Sportrim Turbo pills orally each day for the duration of the experiment. Subjects were instructed to take the first pill in the morning between 8 and 9 A.M., and the second pill at least four hours later.

All subjects were asked to complete a questionnaire, once at the beginning of the study and once at the end, in a test retest format. The questionnaire measured two important aspects of self-concept: self-esteem and body image. The questionnaire consisted of two parts, both completed by the subjects in one sitting. Scores for each part of the questionnaire were calculated both together and separately.

The first section of the survey measured self-esteem and was gathered from Self-esteem or Self-abuse, a workbook created by W.W. Johnston. This survey has been used by the author in educational and counseling settings for seven years (Johnston, 1990). The original questionnaire, “Evaluating Your Self-esteem,” contains 50 statements that are rated on a 0 to 3 scale, with 0 indicating that the statement is not true, 1 indicating the statement is partially true, 2 indicating the statement is largely true, and 3 indicating that the statement is completely true (Johnston, 1990).

Twenty of the original fifty statements were selected for use in the first section of the conducted survey. The reduction in questions was designed to create a less intimidating and time-consuming questionnaire for the subjects (see appendix A). Of the twenty statements chosen, ten were even-numbered statements and the other ten were
odd-numbered statements. This selection of questions was necessary to keep the scoring of the survey as similar to the original as possible.

Scoring of the first section was completed by adding the individual scores for all of the even-numbered statements, and from this total subtracting the sum of all the odd-numbered statements (Johnston, 1990). The resulting sum is a score that Johnston called a self-esteem index. The scores for this section can range from +30 to −30. The greater a subject’s self-esteem index, the more positively s/he views herself or himself and the greater the self-esteem (Johnston, 1990).

The second section of the survey measured body image. This survey was compiled from measures used in previous research that was conducted on body image. A study done by Russell Waugh entitled “A test of a Multi-Faceted, Hierarchical Model of Self-concept,” used a survey with questions that were very similar to a survey used by Lauren Landwerlin in her study, “The Effect of Being Weighed on the Body Image of College Freshman” (Waugh, 1999; Landwerlin, 1999). The 15 questions used in the survey conducted for this experiment were used in both of these studies to measure body image (appendix 2). The questions in this section of the survey consisted of 6 regarding appearance, 4 on weight, 2 on diet, and 2 on eating patterns (Landwerlin, 1999). Each question is presented as a statement and subjects respond by circling yes or no.

The body image portion of the survey was scored using a +1 or −1 scale (Landwerlin, 1999). A point was added or subtracted to the total score for each answer, resulting in a range of scores from +15 to −15. A point was added for answering yes to questions 2 and 11, and answering no to 1, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, and 15 (Landwerlin, 1999). A point was subtracted for every answer that was opposite of the
ones listed above (Landwerlin, 1999). The higher the score the more positive the subject feels about his or her overall appearance, weight, and eating patterns.

Before starting each questionnaire the subjects were told to take as much time as was needed, to read over the instructions carefully, and to answer each question as truthfully as possible. After completing both sections of the first questionnaire, the experimental group was given a detailed description of the dietary supplement regiment. The description was scripted to ensure that each subject received the exact same information. The script read as follows:

"You are to take two Sportrim Turbo tablets orally with water each day. The first is to be taken in the morning between 8 and 9 A.M. and the second is to be taken at least four hours later. I recommend taking your second pill no later than 2 P.M. to avoid any problems getting to sleep. If you have any side effects that are not normal for you or that cause you any distress please notify your physician and stop the supplement regiment."

After each subject signed the informed consent contract, they began the dietary supplement regiment and continued it for a four-week period (appendix B).

Following the four-week period, the self-concept questionnaires were readministered to each group. Before starting the second questionnaire all subjects were again instructed to take as much time as was needed, to read the instructions carefully, and to answer each question as truthfully as possible. The second questionnaire used the exact same questions as the first with the order of the questions rearranged to limit the repetitive feel of the survey for the subjects. For the second administration, one question was added for the experimental group. This question asked each subject to circle any
answer that corresponded to the results that they received from taking the dietary supplement including weight loss, increased energy, decreased appetite, or none. This question was added simply to see if the subjects taking the dietary supplement perceived any changes while taking the supplement. The question did not ask for specific numbers or amounts of change seen.

Results

After the subjects completed both questionnaires, the scores were calculated for each individual. The scores from the first questionnaire were then subtracted from the scores on the second, for both the self-esteem and body image sections, resulting in two difference scores for each subject. The difference scores represent how much a subject’s perception of self-concept and body image changed over the four-week period. The individual difference scores for each subject in the separate groups were then totaled to equal the complete difference score for body image or self-esteem for the experimental and control group.

The difference scores for the control group on the self-esteem questionnaire ranged from +7 to −2 with a mean of .7 for the 20 subjects. The difference scores for the experimental group on self-esteem questionnaire ranged from +12 to +1 with a mean of 5.25 for the 20 subjects. The body image difference scores for the control group ranged from +8 to −4 with a mean of .65, while the body image difference scores for the experimental group ranged from +13 to 0 with a mean of 4.1 (appendix C: Graph 1). The individual scores of the control group were often higher than the individual scores of the experimental group but the amount of increase, or difference scores, between the questionnaires was significantly higher in the experimental group (appendix C: Graph 2).
Graph 1: Changes in Self-esteem, and 2: Changes in Body Image, in appendix C show a comparison of the difference scores for each section.

To determine, whether the difference scores were due to chance factors, a t-test for independent groups was performed for each questionnaire to determine if one group mean differed significantly from another. Both tests were conducted using a .01 significance level to decrease the probability of a type I error. The results for the self-esteem scores were of (38) \( t = -4.212, p < .01 \). These results indicate that there was a significant difference in the change in self-esteem for the subjects that consumed the dietary supplement when compared to those that did not. The results for the body image scores t-test were of (38) \( t = -4.256, p < .01 \). The results for this test also indicate that there is a significant difference in the perception of body image by those that consumed the dietary supplement when compared to those that did not.

Discussion

The results of this study support the original hypothesis that dietary supplements will positively affect self-concept in women. The alpha level used for significance allows for a less than 1 in 100 chance that the change in self-concept of the experimental group happened by chance alone.

The above finding has many possible implications for future use. If dietary supplements seem to improve the self-concept of those that take them, they may possibly be used in a hospital setting for people that need to lose weight in order to avoid serious health problems or health risks. The supplements may help overweight persons to be more confident by boosting their self-esteem, and decrease the avoidance and embarrassment of working out by decreasing the negative body image. Another use of
the supplements that may be feasible in a hospital setting is to administer them to people that are suffering from a deficiency of the needed vitamins or minerals that the supplements supply, such as Magnesium, Potassium, and Iodine. By replenishing these needed minerals, supplements may be able to help those with deficiencies live healthier and happier lives.

Another anticipated use for this type of supplement could be in counseling settings to help treat patients that suffer from depression, low self-esteem, or low self-worth. Such supplementation could be helpful in treating patients with potential eating disorders including anorexia and bulimia, by helping to promote a higher level of self-esteem and more positive body concept. By decreasing the number of women that have low self-esteem and a negative body image, it may be possible to decrease the number of women that have eating disorders.

During the course of this study two subjects decided to discontinue their use of the supplement, because they were not comfortable with the increase of heart rate that was caused by the supplement. These two subjects were instructed to consult their medical professional if any symptoms continued after the use of the supplement was discontinued and were released from the study. The subjects were replaced with two new subjects of the same age. A follow up phone call was completed with both subjects that were released from the study after two weeks of no supplement intake to verify that there were no lasting affects of the supplement.

To determine if any of the presented implications of this research are feasible, it is necessary to do much more testing and research in this area in the future. There are confounding variables that this research did not control for or that were not realized as
possible downfalls until after the research was completed. Future studies and research could expand on this study and reduce the confounding variables to create more accurate and generalizable results.

The main confounding variable in the present study was the small sample size, which decreases the ability to generalize the results to a whole population. The subjects were all women and were all gathered from a small sample in two cities in Montana and were middle to upper-middle class. Future research needs to be conducted using larger samples of both men and women from different parts of the United States and from different economic backgrounds or races.

Another variable that needs to be addressed in future studies is the placebo effect. The experimental subjects were all told at the beginning of the study what the side effects of the supplement could be and all had to be willing to take the supplement for the duration of the study. This willingness to take the supplement along with reading the description that the company prints on the side of each pill bottle may have combined to increase the likelihood that the subjects would perceive results even if none had occurred. This could be corrected by using unlabeled bottles for both the supplement pills and the placebo pills before providing them to the subjects, thus decreasing the variability of the subjects knowing the difference in the pills and the skewing of the subjects’ perceptions to be skewed by the advertisements on the company bottle. In the future this could be corrected also by giving the control subjects sugar pills in the same type of bottles that the supplement pills are given to the experimental group in to control for this variable.

Since the experimental subjects volunteered to take the supplements knowing some type of improvement may result, they may have been struggling with their self-
esteem and body image prior to the experiment. By this self-selection of participants, in
the experimental group the experimental group may have started the experiment with
lower self-esteem and body image then the control group. The scores on the first
questionnaire taken by the subjects were consistently lower for the experimental group
than for the control group, thus it is possible that the experimental group simply started
with more negative self-esteem and body image than the control group, making it more
likely that their scores would increase.

If the above confounding variables were controlled for in future studies, it would
make it more valid to generalize the results found to the entire population and would
improve the reliability of the data. These changes would make data more reliable and
clarify how far to expand the use of dietary supplements into new and interesting settings
and situations like those listed above.

Conclusion

This research was designed as a preliminary study to set the stage for future
studies in the area. The results of this study show that there appears to be a strong
correlation between taking the Sportrim dietary supplement and increased self-concept.
However, much additional work is needed for conclusive results to be obtained.
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Appendix A: Questionnaire

Initials: __________________________

Age: __________________

This is the first of two surveys. The purpose of this survey is to collect information that will be used for research purposes for an Honors Thesis at Carroll College. All of the information collected is completely confidential. The initials given will only be used for organizational purposes and kept completely anonymous. Please be as honest as possible when choosing an answer. Thank you for your participation.

Rate the following: 0- if not true 1- if a little true 2- if mostly true 3- if completely true

_____ 1. I am often embarrassed by the actions of my family and friends.
_____ 2. I accept compliments and gifts without embarrassment or obligation.
_____ 3. I customarily judge my self-worth by comparing myself to others.
_____ 4. I make and keep friends without trying.
_____ 5. I tend to belittle my own talents, possessions and achievements.
_____ 6. I willingly take responsibility for the consequences of my own decisions.
_____ 7. I am a “professional people pleaser.”
_____ 8. I am usually poised and comfortable among strangers.
_____ 9. I am very concerned about what others think and say about me.
_____ 10. I usually anticipate new endeavors with quiet confidence.
_____ 11. I have a strong need for recognition and approval.
_____ 12. I normally do my own thinking and make my own decisions without asking advice.
_____ 13. I often condemn myself for my mistakes and shortcomings.
_____ 14. I usually feel warm and friendly towards all I contact.
_____ 15. I have a need to prove my worth and excellence.
_____ 16. I have a great enjoyment and zest for life.
_____ 17. I am fearful of exposing my “real self.”
_____ 18. I rarely experience jealously, envy or suspicion.
_____ 19. I am a compulsive perfectionist.
_____ 20. I rarely feel uncomfortable, lonely or isolated when alone.
Part two
Circle the answer the best applies

1. Have you ever been or are you on a diet?
   Yes   No
2. Do you think you are physically beautiful and/or attractive?
   Yes   No
3. Do you have specific body parts that you pinch or monitor to measure if you are gaining or losing weight?
   Yes   No
4. Does the number on the scale affect your mood and/or self-worth for the day?
   Yes   No
5. Do you set weight goals for yourself?
   Yes   No
6. Do you often find yourself comparing your appearance and weight to others, friends and strangers?
   Yes   No
7. Do you feel as though you have a conscience or a voice that tells you negative things about yourself?
   Yes   No
8. Do you feel guilty after eating a large amount of food and/or snacking?
   Yes   No
9. Do you feel that if you eat a large amount of food you will instantly gain weight?
   Yes   No
10. Do you avoid certain situations (i.e., swimming) because of the clothing you have to wear?
    Yes   No
11. Are you ever satisfied with the number on the scale?
    Yes   No
12. Do you weigh yourself often?
    Yes   No
13. Do you think life would be better and/or people would like you more if you were thinner?
    Yes   No
14. Do you continually feel unsatisfied with your appearance even after compliments from others?
    Yes   No
15. If given the opportunity to get plastic surgery, would you?
    Yes   No
Appendix B: Consent Form 1

To Whom It May Concern:

I ________________, agree to participate in, and abide by the dietary supplement regiment required for this research project. I agree not to exceed the recommended dosage, for two pills a day, and to strictly follow the supplement schedule for a five-week period.

I have been informed about the supplement including recommended dosage, administration, and the possible side effects that it may have. I except all responsibility for the action of taking the dietary supplement and any side effects that I may occur. I have agreed to stop taking the supplement and contact my doctor if I have any negative reactions.

Date:

________________________________________
Signature
Appendix B: Consent Form 2

To Whom It May Concern:

I ____________________________ , agree to participate in, and abide by the regiment required for this research project. I agree to not ingest any supplements that may effect weight or energy levels for a five-week period. I except all responsibility for my actions during this research period and agree to live and eat as normally as possible without the consumption of any supplements.

Date: ______________________

Signature: ____________________
Appendix C: Graph 1

Change in Self-esteem

Subjects

1 3 5 7 9 11 13 15 17 19

- Control
- Experimental
Change in Body Image

Subjects

Appendix C: Graph 2