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Master's Thesis

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# **The Correlation Between Deficits in Sense of Agency and Eating Habits**

Key words: sense of agency, eating habits, eating disorder, body image, locus of control

Thesis written under the  
supervision of

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WARSAW, 2017



I would like to express my gratitude to my supervisor Dr. Mira Marchinow who has helped, supported and encouraged me in each step of this thesis. I also would like to take this opportunity to thank my mother, father and sister who have supported me no matter what throughout this journey. I would also like to thank to Müberra Gizem Yıldız and Irem Pehlivan for their endless support.

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## Abstract

According to several research eating habits are an important public health issue. This study examines the possible relationship between controlling of one's own volitional actions and eating habits. This thesis provides research to show how deficits in Sense of Agency could be related to a person's eating habits. The hypothesis of this study is that poor eating habits correlate with low Sense of Agency. In response to this hypothesis 74 participants (35 Male, 39 Female) within the age range of 18 and 40 years completed research in the form of an online survey. The Survey contained the Locus of Control Scale, the Sense of Agency Scale and the Food Addiction Scale. As a result of the Shapiro-Wilk test, there was no homogenous distribution of the samples in any factor (at the 95% confidence level  $\text{sig.} < 0,05$ ), for this reason a non-parametrical test was used for every analysis. Non-parametrical t-tests were used for exploring the relationship between both the Food Addiction Scale and the Sense of Agency Scale. In addition to this also the relationship between the Locus of Control Scale and the Sense of Agency scale was explored. Locus of Control scale was used because both of these concepts are related to a person's persuasion that he or she can exercise control over certain events and interchange between events in the way chosen and intended. Put quite simply such a person is self-assured (Kush, Cochran, 1993). Preliminary findings indicated that there was a significant correlation between Food Addiction and External Locus of Control ( $r_s(8) = .669, p=.045$ ). People who have a high Internal Locus of Control tend to have normal eating habits. This result supports the idea that "controlling to self" is a determinant of poor or normal eating habits. Similar study showed that there was significant correlation between the Sense of Agency and Locus of Control. Irem Pehlivan (2017) found that Locus of Control is the predictor of the Sense of Agency. Also, there was no correlation between Sense of Agency and Food Addiction.

## 1. Introduction

### 1.1 Eating Habits

Inadequate eating habits are an important public health issue with regards to young adults who experience modulation into the college/university stage. According to Scrimshaw (1990) during this stage young adults are exposed to high levels of stress and are bereaved of enough time to prepare food. Several prevalent unhealthy eating patterns with regards to young adults include the preference of fast food, skipping meals, rejection of home cooked food and eating snacks (Scrimshaw, 1990). Prevention of diet related diseases mostly relate to encouraging a child in his/her early life to engage in healthy eating practices and form good habits (Schwartz, Scholtens, Lalanne, Weenen & Nicklaus, 2011). Food consumption is an important conductive element to the evolvement of chronic degenerative health problems in humans. It's concurrent that modifications in eating habits are significant to oppose food-related health problems and enhance people's health (Drewnowski & Popkin, 1997). It is difficult for children to be convinced of the importance of a diversified diet due to the fact children are often reluctant to try new tastes (Koivisto & Sjödén, 1996). With regards to this point families play vital roles in teaching and engraining into them optimal eating habits (Birch, 1998). There is a strong correlation between being overweight, obesity and poor eating habits. In this context, eating disorders can be regarded as the result of the wrong eating habits (Mata, 2008).

### 1.2 Etiology of Eating Disorder

Eating disorders may not be seen in every culture equally, the core reason for an eating disorder is generally the desire for slimness and is usually seen in cultures where food is plentiful.

The ideal body form is much more rotund for cultures in which food is not as abundant (Polivy & Herman, 2002). In this context, a culture with calorific abundance may be admissible as a reason for eating disorders. It is not expected however that an individual who grows up in this type of culture will develop an eating disorder (Polivy & Herman, 2002). In general, cultural abundance can be regarded as a background reason for an eating disorder. Slimness is shown as an ideal body form by the media, and it has an impact on people's eating habits (Polivy & Herman, 2002). A mother with an eating disorder for example may impress this upon her daughter's pathology. A mother who has an eating disorder may believe that her daughter should be slim and in turn prevent her from gaining weight. This kind of attitude by a mother will influence a child's eating habits (Hill & Franklin, 1998). Eating disorders affect some several million people at a specific time. In many instances occurring in adolescent and adult females between the ages of 12 and 35 and especially in female athletes, ballet students and fashion models (Thompson & Heinberg, 1999).

Nearly 30 million people of all ages and genders have suffered from an eating disorder in the US. Lifetime prevalence measurements of anorexia nervosa are 9% for women and 3% for men, bulimia nervosa 1.5% for women and 5% for men, binge eating disorder 3.5% for women and 2% for men (Hudson, Hiripi, Pope & Kessler, 2007). Eating disorders impact upon all ethnic groups. Environmental factors, personality traits, genetics and sociocultural factors may also be causes of an eating disorder (Culbert, Racine & Klump, 2015). Reviewing previous research is very much an important factor in understanding the behavior of a person who has an eating disorder and how psycho education, public health and family and community support can be beneficial to them. When examining literature with a media impact, family style seems to have an effect on developing an eating disorder, as well as this a distorted body image seems to also have an effect on developing an eating disorder (Aslan, 2001). As a result of body displeasure western women

are dieting for the purpose of losing surplus weight, many women have usually started to diet by the age of 14 (Paxton, 2002). A person can have a normal body weight but at the same time have a distorted body image so he/she feels the need to be dieting (Aslan, 2004). Body image is consistent with the evaluation of the self and self-attitude. (Oktan & Sahin, 2010). Whether a person's weight is within a healthy range is defined by the body mass index (BMI). BMI is found by dividing the weight of a person by their height squared (Babaoglu & Hatun, 2012).

BMI has various classifications as shown in the table below (Muskoka, 2014).

**Adult Body Mass Index (BMI) Classification**

Classification	BMI category	Risk of developing health problems	Potential health problems
<b>Underweight</b>	<18.5	Increased	Undernutrition, Osteoporosis, Infertility, Impaired Immunocompetence
<b>Normal Weight</b>	18.5 - 24.9	Least	
<b>Overweight</b>	25.0 - 29.9	Increased	Type 2 Diabetes, Dyslipidemia, Hypertension, Coronary Heart Disease, Gallbladder Disease, Obstructive Sleep Apnea, and certain Cancers
<b>Obese</b>	30 and over		
<b>Class I</b>	30.0 - 34.9	High	
<b>Class II</b>	35.0 - 39.9	Very high	
<b>Class III</b>	≥ 40.0	Extremely high	

Another study showing the mean of total body image-scores found from using the body-mass index and questionnaire total scores were statistically significant. Particularly that the scores of the dieting students were found to be relatively lower than the scores of the non-dieting students. There were significant differences in the aspect of total-scale-scores between the groups which wished to be a lower weight and groups which were content with their weight (Aktaş, Aştı, Bakanoğlu & Çelebioğlu, 2010). In another research it was found that non-obese women and men have a more

accurate body image. At the same time those who are obese tend to see themselves as normal (Ata, Vural & Keskin, 2014).

Self-esteem is the ethological point of view which proposes that self-worth or self-esteem is an adapted way of thinking that evolved from conservation domination in social interactions (Prochaska & DiClemente, 1986). Research shows that there is a negative and significant correlation between body image and self-esteem. When body image scores increased self-esteem scores in turn decreased. This inverse relationship is verified by this research hypothesis. Low scores obtained from the scale shows a high body image (Oktan & Şahin, 2010). Consequently, if the relationship is a positive relationship and satisfaction with body image is shown that in turn increased their self-esteem scores. Therefore, individuals without a body image problem have high self-esteem, at the same time individuals with a body image problem have low self-esteem (Oktan & Şahin, 2010).

### 1.3 Eating Disorder

Eating disorders are a type of mental illness that affect the sufferer's quality of life and cause acute disturbances. People who struggle with an eating disorder are generally obsessed with their body weight and food intake. Anorexia nervosa and bulimia nervosa are known as two main types of eating disorder, alongside those binge eating disorder is classed as an eating disorder but is yet to be investigated (Bowler, Oh, He, Mattern & Jeng, 2012).

Anorexia nervosa is the third most common chronic disorder amongst adolescent girls in the USA. The term anorexia includes self-induced vomiting and using laxatives and diuretics. Anorexia nervosa starts usually between the ages 14-18 years (Phelps & Wilczenski, 1993). According to the *Diagnostic and Statistical Manual of Mental Disorders* the attitude of restraining

energy intake leads to a significantly lower body weight in context with the person's age, gender, developmental path, and body health. Significantly lower body weights are defined as below the usual lowest average or below the lowest expected for children and young people. Anorexia is often defined as an excessive fear of weight gain or the avoidance of weight gain despite already having a low body weight, when an individual has a problem with his or her own body image and when an individual cares about his or her own weight unnecessarily. (5<sup>th</sup> ed.; *DSM-5*; American Psychiatric Association, 2013).

Bulimia Nervosa indicates the tendency of uncontrollable overeating (binge eating) and may occur along with an impulse to engage in self-induced vomiting (Garner, Olmstead, Polivy & 1983). According to *DSM-V* Bulimia Nervosa consists of continual episodes of binge eating. The sufferer may exhibit inappropriate behaviors including self-induced vomiting, the use of laxatives, excessive exercise, and the use of diuretic medication. A person may exhibit self-induced behaviors after excessive eating to limit weight gain (5<sup>th</sup> ed.; *DSM-5*; American Psychiatric Association, 2013).

According to *DSM-V*, Binge Eating disorder is a new type of mental disorder within the eating disorders category (5<sup>th</sup> ed.; *DSM-5*; American Psychiatric Association, 2013). Binge Eating Disorder is defined by the behavior of overeating. People who suffer from binge eating disorder eat too much food too often, they eat without the physical feeling of being hungry. Eating has usually taken place within a specific time period (2 hours) and there is a sense of lack of control during this period (Dingemans, 2009). According to *DSM-V* binge eating symptoms include; eating faster than normal, eating too much food to the point it becomes physically uncomfortable, eating alone due to the feeling of shame, guilt, and depressive due to overeating, feeling stressed from the behavior of gluttony, having at least two eating attacks per week within a six month

period and without vomiting, excessive exercise and any feelings of hunger (5<sup>th</sup> ed.; *DSM-5*; American Psychiatric Association, 2013). Binge eating periods are accompanied by at least three or more of the following symptoms; Eating faster than normal, eating until the feeling of fullness causes physical discomfort, eating excessive amounts of food without the feeling of physical hunger, eating alone due to embarrassment or shame of eating too much food and to feel disgusted, depressed, or great guilt after eating a meal (Pitzer, Yanovski, Wadden, Wing, Marcus, Stunkard & Horne, 1993).

In contrast to people who have bulimia nervosa, they do not attempt to expel the food from their body by self-induced vomiting or using any other dangerous methods for example laxative abuse or fasting. Binge eating disorder is chronic and may cause critical health complications especially severe obesity, hypertension, diabetes and various cardiovascular diseases. (5<sup>th</sup> ed.; *DSM-5*; American Psychiatric Association, 2013).

Obesity is defined as compulsive food intake with a complete lack of food restriction (Cota, Tschöp, Horvath & Levine, 2006). Starvation is an insufficiently described cognition, given the fact that it motivates overeating, but there is no constant argument that the density of starvation is associated with being overweight (Östman, Arner, Engfeldt & Kager, 1979). Previous research showed that poor eating habits are important determinants for the development of obesity (Kuźbicka & Rachoń, 2013).

#### 1.4 The Sense of Agency

The concept of Sense of Agency explains the experience of controlling one's own actions and through them the events in the outside world. According to Haggard and Chambon (2012) Sense of Agency is important because psychotic patients have reported that their actions do not

belong themselves but rather were being controlled by some other factor. According to this idea Sense of Agency exists in humans, and most probably a lot of other animals, the experience of Sense of Agency is broadly approved. In addition to this, two further theoretical expositions of Sense of Agency have been put forward. According to one view, Sense of Agency contains retroactive attribution that a fact has been occasioned by one's own action instead of different a cause (Haggard & Chambon, 2012). According to the second view Sense of Agency is an experimentation related to the approximations or "active inferences" shaped by the willing motor system for goal-directed behavior (Yoshie & Haggard, 2017).

Sense of Agency occurs during controlling bodily movements such as walking, talking etc. All willing behavior linked with motor abilities can be accepted in terms of Sense of Agency. Furthermore it should also be possible that people can control those movements (Balconi, 2010). Complex actions such as higher order functions are able to be completed by people who do not possess objective self-awareness; these people are not able to look in and observe the processes that allowed them to be fulfilled (Balconi, 2010). Objective self-awareness is the opposite of an incomparable side of some self-systems. Objective self-awareness refers to the capability of one's self to know him/her self consciously (Balconi, 2010). It is the mental condition that means there is self-awareness. Once development of consciousness happens, procedure of agency, part of the self-mechanisms, like the Sense of Agency, goes under the control of the conscious considers (Balconi,2010). Perceptual defects are particularly interrelated to the representation of self within bundle and the representation of a person's own body (Balconi, 2010). Body perception and body consciousness present a broad characterisation of embodiment, that in return helps to provide beginning points for theories of the self and of agency (Balconi, 2010). Visual data covers a primary visual identification: "since I can see my own body as well the bodies of the other people,

I need to distinguish between mine and theirs. By proprioceptive information about someone else's body, I am assured that the source of information is my own body. Consequently, proprioceptive self- ascription does not depend on the identification of the body as one's own unlike the visual self-ascription of bodily properties" (Haggard & Chambon, 2012 p.390).

### 1.5 Locus of Control

Julian Rotter created the term LoC (Locus of Control), as a social learning theory that considers the internal-external control of reinforcement. It identifies the extent to which an individual believes that reinforcement is dependent upon his or her own conduct and behavior. People with an internal control believe that reinforcements are dependent upon their own conduct, behavior, limits, and characteristics. LoC is an indicator to the degree of controlling one's own life and environment. When a person thinks that he-she capable of controlling his/her life, he/she is prospering (Rotter, 1966).

For instance, it is clearly visible that a person who is prospering is in control of their own life. This situation is called Internal Locus of Control, unsuccessful people are those who face problems in dealing with and controlling their own lives. This situation is called External Locus of Control (Rotter, 2004). A person who has a high level of Internal Locus of Control perceives that he or she is able to manipulate and control his or her environment. People with a high level of Internal Locus of Control have the capability to manipulate and conduct the environment around them and they are also more creative. When considering the reaching of goals, they are more effective compared to people with a lower level of Internal Locus of Control (Rotter, 1966).

External Locus of Control refers to people who believe that reinforcements are not under their own control but rather are under the control of other factors for example; luck, chance, destiny etc. (Rotter, 2004).

As a result, people who have an External Locus of Control believe that reinforcement of their behaviors is directly due to fortune, destiny, effectiveness and capabilities of others or other environmental factors, instead of their own actions, behaviors and personality (Rotter, 1966). When literature is examined, it is pointed out that these two terms (Sense of Agency and Locus of Control) are both similar concepts. Both of these concepts are related to a person's persuasion that he or she can exercise control over certain events and interchange between events in the way chosen and intended. Put quite simply such a person is self-assured (Kush, Cochran, 1993). Because of this reason Locus of Control scale was used to check results.

#### 1.6 Transtheoretical model of the change

Transtheoretical Model of Change was developed by James Prochaska and Carlo Diclemente (1982). According to this model, behavioral change is a process of stages and for the ease to change behaviors individuals use appropriate initiatives to enter into each stage of change (Prochaska & Diclemente, 2000). The model was tested on people who have smoking, alcohol and drug addictions for use in preventing modern illness and improving their health and also to help them develop good exercise habits (Prochaska & Velicer, 1997). The Transtheoretical model is an intentional behavior change model and it offers many large volumes of research and services in the areas of behavior. This model explains the process of change, the balance of decision making for positive and negative aspects of change, condition dependent trust or self-efficacy in behavior changes and the tendency to relapse (Bulduk, Seher, Dincer & Ardic, 2015). The trans theoretical

model considers behavioral changes as a process rather than simply a situation (Bulduk, Seher, Dincer & Ardic, 2015). There are five stages of the Transtheoretical model.

In the precontemplation phase individuals are not willing to change their behavior or do not intend to change their behavior within the next six months. These individuals are much less aware or even completely unaware of any problems they have, however their parents and other relatives generally are aware of their problems. Individuals are unreflecting of behavioral change and feel themselves facing pressure from their surroundings (Prochaska & Velicer, 1997). These individuals have often tried to change their behavior at various different times but have failed and therefore are now resistant to change, unmotivated or simply not ready for facing any programs that may improve their health. Many widely ongoing health promotion programs are unable to meet the needs of individuals within this stage (Prochaska & Velicer, 1997).

In the contemplation phase individuals are willing to or intend to change their behavior within the next six months. People tend to be more aware of problems and the positive aspects of changing their behavior, they are aware of coping skills they can use and have thought about this but at the same time feel unable to put these skills into action. Due to this conflict of emotion people tend to stay in this stage for a longer period of time (Diclemente, Prochaska, Fairhurst, Velicer, Velasques & Rossi, 1991). During this stage frequent and chronic thinking behaviors can be determined as procrastinating or using delaying tactics. Individuals start to think about solutions to their problems in the contemplation stage. They are not ready for action-oriented programs due to a lack of energy and effort towards dealing with problems (Diclemente, Prochaska, Fairhurst, Velicer, Velasques & Rossi, 1991).

During the preparation phase individuals intend on taking action within the next month and have usually already made an attempt before although unsuccessfully. These individuals tend to already have an action plan, for example; to participate in some form of health education, attend counseling sessions, talk with a health care professional or buy a book about the subject, these are actions that show a willingness to change but are not regular or effective enough in creating it (Prochaska & Diclemente, 2000). Prochaska and DiClemente (1992) describe the preparation stages as an ignition of the transition to action (Prochaska & Diclemente, 2000).

During the action phase individuals with problem behaviors have successfully changed certain behaviors or made specific modifications to their lifestyle within the last six months. To help themselves cope with problems these individuals try to change certain behaviors, experiences or environments. Movement or changing behaviors are considered to be synonymous. However in the Transtheoretical Model action is only one stage and does not define change (Prochaska & Velicer, 1997). For example, reducing the number of or changing to low tar and nicotine cigarettes is considered to be moving. The movement phase at the same time prevents old behaviors from returning (relapse) this is a critical step that requires effort to consolidate the acquired behaviors (Prochaska & Velicer, 1997).

The maintenance stage is an extended period of time following the first six months after change begins to happen. This stage is about preventing relapse of behaviors and the consolidation of success achieved within the movement phase. Individuals are less affected by any stimulus that may encourage problematic behaviors and feel an increased confidence in themselves and the belief that they can sustain the changes made (Prochaska & Velicer, 1997). Continuity is not a phase or process; for certain behaviors continuity is lifelong. In the maintenance stage problematic behaviors are dealt with by the acquisition of new or alternative behaviors. Prochaska and

DiClemente's (1992) spiral model proposed that the individuals could return to the previous progress in stages of change. Returning to previous stages caused a feeling of failure and guilt, this causes a resistance towards change to develop (Prochaska & Velicer, 1997).

For the dietary and nutrition sector Transtheoretical Model is more advantageous. Continuity in dieting behavior, gaining healthy eating habits and motivation are basic needs. Motivational interview is the individuals oriented approach. The basis of motivational interviewing is supporting the self-sufficiency of individuals, showing empathy to help resolve the contradictions in behavior modification and identify behaviors that require modification (Uysal & Enç, 2012). To increase an individual's motivation, individual self-sufficiency should be supported. When changing the diet and physical activity patterns, complete behavioral changes are required rather than reshaping or simply avoiding the original behaviors. For the acceptance of dietary applications and to ensure self-monitoring individuals have a need for strategies that will motivate them (Miller & Rose, 2009).

Hasler, Delsignore, Milos, Buddeberg and Schnyder (2004) carried out a study to appraise stages of change in people diagnosed with eating disorders and to analyze their interrelationships with clinical essence and treatment processes exploiting the transtheoretical model of change by Prochaska. Even as there was no association between diagnostic subtypes, age, illness, duration, previous treatments and motivational stages, there was a positive relationship with treatment motivation. Sensual inclusion, especially behavioral change procedures, and progressing of treatment were correlated with further forward stages of change (Hasler, Delsignore, Milos, Buddeberg & Schnyder, 2004).

### 1.7 Hypothesis

The present research will investigate the impact of Sense of Agency on eating habits.

H1: Poor eating habits correlate with low Sense of Agency.

Ho: Poor eating habits are not correlate with low Sense of Agency.



## 2. Methodological Approach

Quantitative research design and an online survey method were used in this research.

### 2.1 Participants

The study was conducted on 74 participants. Participants consisted of 35 males and 39 females within the age range of 18 - 40 years. Participation was on a voluntary basis. The large majority of participants were from Turkey although a number of participants were also from Germany, France, Spain, Ukraine, Poland, The US and The UK.

### 2.2 Instruments

There were four measures used in the study. First, the demographic survey included questions about the participants' age, gender, education level, current location and it also asked participants to determine the size of the city in which they come from. Two structured inventories were applied which were Yale Food Addiction Inventory (YFAS), Rotter's Locus of Control (LoC) Internal- External scale and Sense of Agency (SoA) scale was used.

### 2.3 Rotter's Locus of Internal - External Scale

This scale was used for a better understanding of the Sense of Agency Scale. Locus of Internal- External Scale was created by Rotter. It is a measurement of the control of beliefs. It consists of twenty-nine pairs of items and its self-evaluation inventory. Every item pair has two choices of answer. Reliability: internal consistency calculations for Rotter's Locus of Control Scale lined up among 0.65 and 0.79. Test re-tests reliability calculations for Rotter's Locus of Control Scale lined up among 0.49 and 0.83. When compared with the Marlowe- Crowne Social Desirability Scale lined up among -0.41 and -0.12 in validity. Each item has its own scoring

method. Specific answers and responses have specific scores. According to the test result, if the number of A's scored is high, this indicates an external Locus of Control, if the number of A's scored is low, this indicates an internal Locus of Control, as shown in Appendix B.

#### 2.4 Yale Food Addiction Inventory (YFAS)

The Yale Food Addiction Inventory was created by Ashley N. Gearhardt, William R. Corbion and Kelly D. Brownwell (2009). This scale is a gauge that has been created to display those who are probable to display signs of substance dependence by the depletion of raised sugar levels and fat nourishment. This Scale consists of 25 items. Answers of 16 items are based on likert scale (0 to 4). Answers of 8 items are based on yes or no reply. An answer of one item is based on an ordinal measurement (one or fewer times, 2 times, 3 times, 4 times, 5 or more times). Some sets of items are based on specific inferences. Item one, two and three are related with the quantity of a substance and the consumption over time in a longer period than intended. Item four, twenty-two, twenty-four, twenty-five are related with the insistent craving or recurrent taking of steps in the direction to leave.

Items five, six, seven are related to the time or action to get, use or heal. Items eight, nine, ten and eleven are related with the crucial social, vocational or recreational activities having been given up or decreased. Item nineteen is related to the maintenance counter of the negative implications. Items twenty and twenty-one are related to tolerance. Items twelve, thirteen and fourteen are related to treatment of withdrawal symptoms. Items fifteen and sixteen are related to the reasons for clinically significant deterioration or boredom. Each specific response has its own scoring as shown in Appendix D. Single factor analysis of inventory was .50 or higher.

There is good internal reliability (Kuder-Richardson  $\alpha = .86$ ). A collinear factor measurement was handled for the seven halved diagnostic criteria and once more a single factor structure was

defined. Single factor was .69 or higher for all criteria and factor loadings. The Yale Food Addiction Scale is a one factor structure. There are different response categories so Kuder-Richardson's alpha coefficient is reported generally for the explanation of internal consistency.

### 2.5 Sense of Agency Inventory

Adam Topel's unstructured Sense of Agency scale was used for this study. The main aim is to check whether there is correlation between Sense of Agency scale and Rotter's Locus of Control Scale. The results obtained are also important for the development of the Sense of Agency Scale. This scale consists of 11 items. These items measure the scale of which people are dominant in their behavior or activities. Since the concept of Sense of Agency is a relatively new concept, there are no extensive measurement techniques available in literature. There is just one measurement method available in this area which is related to hypnosis. According to Kihlstrom, (2008), Weitzenhoffer, (1974) Woody & McConkey, (2003) there has been no unanimity about the best method to measure modifications to SoA in hypnosis and no standard way has been imposed. Although the fact that agency modifications have been declared as a main characteristic of hypnosis (Thau, 2002).

### 3. Results

All the statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS), version 18.0 for Windows.

Table 1. *Distribution of participants according to gender*

	Frequency	Percent
Male	35	47.3
Female	39	52.7

As shown in the table, the ratio of male/female participants was nearly equal in this study. Previous studies have shown that similar participants have often displayed evidence of disparity between males and females in their samples (Costa, Terracciano & McCrae, 2001). Besides this, equivalence in gender reflects the standardization of this study.

Table 2. *Distribution of participants according to education*

	Frequency	Percent
High School	8	7.2
College	12	16.2
University	54	76.6
Total	74	100.0

As shown in the Table 2 the education level of 7.2% of participants was high school, 16.2% of participants was college and 76.6 % of participants was University.

Table 3. *Distribution of participants according to their ages*

	Frequency	Percent
18-26 (young adult)	43	58.1
27-40 (adult)	31	41.9
Total	74	100.0

The participants have been classified into two groups of age: between 18-26 years of age- young adult, between 27-40 years of age-adult. Table 3 shows that the age of more than half (58.1 percent) of the respondents were between the ages of 18 and 26 years old. Less than half (41.9 percent) of the respondents were between the ages of 27 and 40 years old.

Table 4. *Distribution of participants according to city*

	Frequency	Percent
In a village	2	2.7
In a small city	21	28.4
In a big city	51	68.9
Total	74	100.0

There was a big difference amongst the participants according to the residential area they lived. While only 2.7 % (2) of the participants lived in a village, 28.4 % (21) of the participants lived in a small city, 68.4% (74) of the participants lived in a big city. These findings are associated with the areas in which the study was made.

Table 5 *Reliability Statistics of SoA, LOC, FAS*

	Cronbach's Alpha	N of Items
LoC	.715	23
SoA	.502	11
FAS	.875	25

Table 5 shows reliability score of the scales in present study. As shown in the table Cronbach's alpha score for LoC was .715. The Locus of Control scale was found highly reliable (23 items;  $\alpha = .715$ ). Score of FAS was .875. The Food Addiction Scale was found highly reliable (25 items;  $\alpha = .875$ ). Cronbach alpha score for SoA was .502. Sense of Agency Scale was not found highly reliable (11 items;  $\alpha = .502$ ).

Table 6. *Descriptive Statistics and scores of Shapiro-Wilk test for normality*

	M	SD	Min	Max	N	Sig.
Age	25.38	3.722	18	40	74	.000
Education	4.69	.600	3	5	74	.000
LoC	.725	.22	.17	1.00	74	.000
SoA	3.82	.485	1.00	.73	74	.000
FAS	.49	.139	.05	.73	74	.001

In Previous study sample was smaller than 2000 (  $N < 2000$ ) because of this reason Shapiro Wilk test was used (Razali & Wah, 2011). Findings of the descriptive statistics are shown in Table 6. In addition, the Shapiro-Wilk normality test was applied to determine whether the distribution of the groups was homogeneous. As a result of Shapiro-Wilk test, there was no homogenous distribution

of the samples in any factor (at the 95% confidence level  $\text{sig.} < 0,05$ ), for this reason a non-parametrical test was used for every analysis.

Table 7. *results Spearman's rho nonparametric correlation between SoA, LoC, FAS*

Variables	1	2	3
1 LoC	-	-.168	.452**
2 SoA	-.168	-	-.134
3 FAS	.452**	-.134	-

\*\* . Correlation is significant at the 0.01 level (2-tailed).

A Spearman's rank- order non-parametrical correlation was run to determine the relationship between Loc, SoA and FAS. There was a strong positive correlation between LoC and FAS, which was statistically significant. ( $r_s(8) = .669, p=.045$ ). This correlation suggests that if a person has Locus of Control (if the events related to the person are believed to be related to environmental factors such as destiny); she/he is more likely to develop poor eating habits. At the same time, people who think that the events are due to more internal causes are more likely to have better eating habits. According to other results there was no correlation between SoA and FAS. Which means that H1 (There is a positive correlation between the Sense of Agency and Eating Habits.) is rejected and Ho (There is no correlation between the Sense of Agency and Eating Habits.) is not rejected.

Table 8. *Nonparametrical test results of scales (FAS, SoA, and LoC) comparison with age and gender*

	Age	Gender
FAS	.592	.154
LoC	.000**	.000**
SoA	.878	.934

Nonparametric t- test was applied to determine whether FAs, LoC, and SoA results differed between age and gender. As shown in the table only LoC shows a significant difference between gender and age groups in this study. Young adults are more likely to have an external Locus of Control when compared with other age groups. The significant difference between genders can be explained as follows. More Females ( $M= 13.46$ ,  $SD =3.25$ ) have an external Locus of Control than males ( $M= 10.33$ ,  $SD = 2.52$ ).

#### **4.Discussion**

The hypotheses of this study aimed to examine the relationship between the Sense of Agency and Eating Habits. Verification of the hypotheses was questionable due to a low reliability of SoA observed in this research, there are no similar studies in this field documented due to this reason, results of this kind bring new research questions and modifications regarding Sense of Agency and the Sense of Agency Scale.

In this study the age of the participants was generally between the ages of 18 and 27 years, for that reason, it can be claimed that the results are closely related to people between the ages of 18 and 27 years old. This is a kind of limitation in terms of generalization; working with the same number of participants for all age groups would be more beneficial in terms of a more generalized outcome. According to these results there is a significant correlation between age and LoC. It was observed that an individuals Locus of Control tendencies increase with age. This finding matches results of Angelova's study (2016) which found that older people are better at controlling themselves when compared to the self-control of younger people

Moreover, 51 percent of the participants were living in big cities, consequently, it can also be claimed that results are closely related to people living in crowded cities. The nationalities of the participants were mostly Turkish, the results of the study may directly be related to "Turkish people living in a big city between the ages of 18 and 27 years. For the reasons stated, a further study should be held in a village and the age range of the participants should be wider. As previously stated, a study working with the same number of participants for all age ranges would be more beneficial for accurate results.

At this point, two factors may be investigated in terms of LoC. As stated previously, the greater proportion of the participants were living in big cities. Exploring literature has shown that

there is not a significant relationship between LoC and the place of residence. In this study it was also found that there was no significant correlation between LoC and the place of resident.

Another important result seen during the eating habits analysis is that there are significant differences between males and females. It is also seen that females scored slightly higher in terms of scientific determination. At that point, this result may be interpreted as females are more prone to suffer with poor eating habits than males. According to Wade, Keski-Rahkonen and Hudson in the United States approximately 20 million females and 10 million males will suffer from an eating disorder or poor eating habits in their future life (Wade, Keski-Rahkonen, & Hudson, 2011). Results of previous studies supported the results shown in this study. In addition to that according to the results more females are shown to have an External Locus of Control than males. This means that females tend to believe in external factors being the determinant for their eating habits.

According to results there is a significant correlation between FAS and LoC. This result supports the idea of self control being a determinant for poor or normal eating habits. In this study a SoA and FAS correlation was expected, although according to the test results, surprisingly there was no significant correlation found between SoA and Fas. There may be many reasons for this result, firstly, as mentioned previously SoA scale was not standardized and is unconfirmed, the second reason may be SoA cannot be explained with LoC when investigating eating habits. Also when literature is examined, it is pointed out that these two terms are both similar concepts (Sense of Agency and Locus of Control) (Kush, Cochran, 1993). Having said this, the date of Kush and Cochran's studies are not current, and many concepts may have changed over the years. In addition to this the amount of items for the SoA scale may not be enough to measure the Sense of Agency. The results of present research may be a light for the revision of the SoA scale.

#### 4.1 Limitation of the Study and Suggestions for Future Research

The main limitation of this present research was the fact there is no standardized scale for measuring SoA. This situation could be a huge barrier in measuring the effect of SoA on eating habits. During the literature investigations SoA seems to be related with the Locus of Control scale and it is for this reason the LoC scale was used in the present research (Kush, Cochran, 1993). According to these findings the SoA scale could be revised.

Another important limitation was the motivation of the participants. As mentioned in the method section an online survey was used but included in this were three different scales, the length of the survey could have been a reason for unwillingness to participate. A small reward like a discount coupon, movie ticket or small payment could have possibly increased motivation, focus and willingness to participate.

In addition to these factors, cultural differences may have been a limitation in this present study. Participation was open to participants of all nationalities in all countries and open to anybody with knowledge of English. Therefore, answers of participants may depend on cultural differences. According to Schwartz, Thompson and Johnson eating difficulties may not be seen equally in every culture (Schwartz, Thompson & Johnson 1985). Further research could be held with participants from the same cultural group; in this manner results would be more valid and generalized

The Size of the sample is another factor open to criticism. There were 74 participants in this present study. Would the results change if the number of participants doubled? Due to this critical question being a factor and the likelihood that using a much larger sample size would change the result of the study, it could be recommended that a larger sample size be used in any future research.

Another possible limitation is the age range of the participants. In this present research the age range is between 18 and 40 years of age. As shown a relatively young population was used in this study. Young participants could be considered as being in the process of development, for this reason their character and attributions may be more ambivalent when compared to older adults. Future studies should take this fact into consideration and should conduct research using participants from a different age range with a broader sample in order to obtain more reliable findings.

Further crucial factor requires participants major of study at university to be taken into account. In this present research all the participants were university students, but they were not grouped or classified according to their majors, there were also no additional questions regarding their majors of study at university in the demographical section. For future study, this may be another point to take into consideration.

Final factor is the place in which the participants live. According to the results, the participants dominantly live in a city with only two participants living in a village. It is therefore difficult to analyze the attitude of people who live in village. Future studies should also look at participants who live in a village for a more reliable outcome.

For future studies it may be possible to achieve a more reliable result when the sample size is increased and different aspects including culture, place where the participants live, language and university major are taken into consideration.

## 5. References

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## 6. Appendices

### Appendix A

#### Demographic Information

1- What is your gender?

2- What is your age?

3- Where do you live?

4- Where are you from?

5- What is your level of education?

## Appendix B

### Rotter's Locus of Control Scale

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. In some instances, you may discover that you believe both statements or believe neither one, in such cases be sure to select the one you most strongly believe to be the case as far as you're concerned. Also, try to respond to each item independently when making your choice, do not be influenced by your previous choices.

1. a. Children get into trouble because their parents punish them too much.	b. The trouble with most children nowadays is that their parents are too easy on them.
2. a. Many of the unhappy things in people's lives are partly due to bad luck.	b. People's misfortunes result from the mistakes they make.
3. a. One of the major reasons why we have wars is because people don't take enough interest in politics.	b. There will always be wars, no matter how hard people try to prevent them.
4. a. In the long run people get the respect they deserve in this world.	b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries
5. a. The idea that teachers are unfair to students is nonsense.	b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks, one cannot be an effective leader.	b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. a. No matter how hard you try some people just don't like you.	b. People who can't get others to like them don't understand how to get along with others.
8. a. Heredity plays the major role in determining one's personality.	b. It is one's experiences in life which determine what they're like.
9. a. I have often found that what is going to happen will happen.	b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.
10. a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.	b. Many times exam questions tend to be so unrelated to course work that studying is really useless.
11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.	b. Getting a good job depends mainly on being in the right place at the right time.
12. a. The average citizen can have an influence in government decisions.	b. This world is run by the few people in power, and there is not much the little guy can do about it.
13. a. When I make plans, I am almost certain that I can make them work.	b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.

14. a. There are certain people who are just no good.	b. There is some good in everybody.
15. a. In my case getting what I want has little or nothing to do with luck.	b. Many times we might just as well decide what to do by flipping a coin.
16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.	b. Getting people to do the right thing depends upon ability. Luck has little or nothing to do with it.
17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.	b. By taking an active part in political and social affairs the people can control world events.
18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.	b. There really is no such thing as "luck."
19. a. One should always be willing to admit mistakes.	b. It is usually best to cover up one's mistakes.
20. a. It is hard to know whether or not a person really likes you.	b. How many friends you have depends upon how nice a person you are.
21. a. In the long run, the bad things that happen to us are balanced by the good ones.	b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
22. a. With enough effort, we can wipe out political corruption.	b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.	b. There is a direct connection between how hard I study and the grades I get.
24. a. A good leader expects people to decide for themselves what they should do.	b. A good leader makes it clear to everybody what their jobs are.
25. a. Many times, I feel that I have little influence over the things that happen to me.	b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. a. People are lonely because they don't try to be friendly.	b. There's not much use in trying too hard to please people, if they like you, they like you.
27. a. There is too much emphasis on athletics in high school.	b. Team sports are an excellent way to build character.
28. a. What happens to me is my own doing.	b. Sometimes I feel that I don't have enough control over the direction my life is taking.
29. a. Most of the time I can't understand why politicians behave the way they do.	b. In the long run the people are responsible for bad government on a national as well as on a local level.

Source:

Rotter, J. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied*, 1-28.

## Appendix C

### SoA Survey

The items marked with an asterisk (\*) denote a "positive agency" factor, the remaining items denote a "negative agency" factor. The original response scale was from 1 (strongly disagree) to 7 (strongly agree).

1. I am in full control of what I do.\*
2. I am just an instrument in the hands of somebody or something else.
3. My actions just happen without my intention.
4. My movements are automatic – my body simply makes them.
5. The outcomes of my actions generally surprise me.
6. Things I do are subject only to my free will.\*
7. The decision whether to or when to act is completely within my hands.\*
8. Nothing I do is actually voluntary.
9. While I am in action, I feel like I am a remote controlled robot.
10. My behavior is planned by me from the very beginning through to the very end.\*
11. I am completely responsible for everything that results from my actions.\*

Source: (Adam Tapal, SoA Survey)

## Appendix D

### Food Addiction Scale (FAS)

This survey asks about your eating habits over the past year. People sometimes have difficulty controlling their intake of certain foods such as:

- **Sweets such as chocolate, doughnuts, cookies, cake, candy, ice cream**
- **Starches such as white bread, rolls, pasta, and rice**
- **Salty snacks such as chips, pretzels, and crackers**
- **Fatty foods such as steak, bacon, hamburgers, cheeseburgers, pizza, and French fries**
- **Sugary drinks such as soda pop**

When the following questions ask about “CERTAIN FOODS” please think of ANY food similar to those listed in the food group or ANY OTHER foods you have had a problem with during the past year

IN THE PAST 12 MONTHS:		Never	Once a month	2-4 times a month	2-3 times a week	4 or more times or daily
1.	I find that when I start eating certain foods, I end up eating much more than planned	0	1	2	3	4
2.	I find myself continuing to consume certain foods even though I am no longer hungry	0	1	2	3	4
3.	I eat to the point where I feel physically ill	0	1	2	3	4
4.	Not eating certain types of food or cutting down on certain types of food is something I worry about	0	1	2	3	4
5.	I spend a lot of time feeling sluggish or fatigued from overeating	0	1	2	3	4
6.	I find myself constantly eating certain foods throughout the day	0	1	2	3	4
7.	I find that when certain foods are not available, I will go out of my way to obtain them. For example, I will drive to the store to purchase certain foods even though I have other options available to me at home.	0	1	2	3	4
8.	There have been times when I consumed certain foods so often or in such large quantities that I started to eat food instead of working, spending time with my family or friends, or engaging in other important activities or recreational activities I enjoy.	0	1	2	3	4
9.	There have been times when I consumed certain foods so often or in such large quantities that I spent time dealing with negative feelings from overeating instead of working, spending time with my family or friends, or engaging in other important activities or recreational activities I enjoy.	0	1	2	3	4
10.	There have been times when I avoided professional or social situations where certain foods were available, because I was afraid I would overeat.	0	1	2	3	4
11.	There have been times when I avoided professional or social situations because I was not able to consume certain foods there.	0	1	2	3	4
12.	I have had withdrawal symptoms such as agitation, anxiety, or other physical symptoms when I cut down or stopped eating certain foods. (Please do NOT include withdrawal symptoms caused by cutting down on caffeinated beverages such as soda pop, coffee, tea, energy drinks, etc.)	0	1	2	3	4
13.	I have consumed certain foods to prevent feelings of anxiety, agitation, or other physical symptoms that were developing. (Please do NOT include consumption of caffeinated beverages such as soda pop, coffee, tea, energy drinks, etc.)	0	1	2	3	4
14.	I have found that I have elevated desire for or urges to consume certain foods when I cut down or stop eating them.	0	1	2	3	4
15.	My behavior with respect to food and eating causes significant distress.	0	1	2	3	4
16.	I experience significant problems in my ability to function effectively (daily routine, job/school, social activities, family activities, health difficulties) because of food and eating.	0	1	2	3	4

IN THE PAST 12 MONTHS:		NO	YES
17.	My food consumption has caused significant psychological problems such as depression, anxiety, self-loathing, or guilt.	0	1
18.	My food consumption has caused significant physical problems or made a physical problem worse.	0	1
19.	I kept consuming the same types of food or the same amount of food even though I was having emotional and/or physical problems.	0	1
20.	Over time, I have found that I need to eat more and more to get the feeling I want, such as reduced negative emotions or increased pleasure.	0	1
21.	I have found that eating the same amount of food does not reduce my negative emotions or increase pleasurable feelings the way it used to.	0	1
22.	I want to cut down or stop eating certain kinds of food.	0	1
23.	I have tried to cut down or stop eating certain kinds of food.	0	1
24.	I have been successful at cutting down or not eating these kinds of food	0	1

  

25.	How many times in the past year did you try to cut down or stop eating certain foods altogether?	1 or fewer times	2 times	3 times	4 times	5 or more times
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**References:** Gearhardt, A.N., Corbin, W.R., & Brownell, K.D. (2009). Preliminary validation of the Yale Food Addiction Scale. *Appetite*, 52, 430-436.