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an Evolutionary Response to the Threat of Social Exclusion

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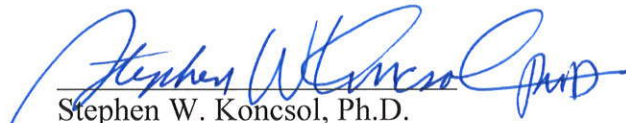
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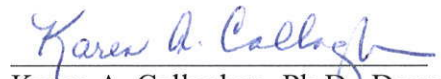
Eating Restriction and the Need to Belong:  
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## Abstract

The study examined, from an evolutionary perspective, the relation between eating restriction, a sense of belonging, fear of negative evaluation and cultural orientation in adult women. Participants completed the Drive for Thinness subscale of the *Eating Disorder Inventory* (EDI) which measures eating restriction, the psychological subscale of the *Sense of Belonging Instrument (SOBI-P)*, which measures feelings of fitting into a social group, the *Brief Fear of Negative Evaluation Scale* (BFNE), which measures fears of being negatively evaluated, and the In-group Solidarity dimension of the shortened *Individualism/Collectivism* (INDCOL) Scale which assesses cultural orientation. The study used correlations to assess associations between variables and multiple regression to assess the predictive impact of the variables on eating restriction. The study found that eating restriction was negatively associated with a sense of belonging and positively associated with fear of negative evaluation. The study also found that women with a low sense of belonging, high fear of negative evaluation and individualistic attitudes were more likely to restrict eating. Implications for theoretical models and therapeutic treatment were discussed. The conceptualization of eating restriction as a response to social threats is emphasized. Suggestions for treatment include the enhancement of perceived value to a social system, reduction of sensitivity to exclusion cues, and incorporation of collectivistic cultural elements to strengthen a sense of belonging.

Extensive research into the complex phenomena of eating pathology has provided strong evidence of an association between eating restriction and social fears. Recently, a sense of belonging and fear of negative evaluation has been shown to be related to eating pathology, most notably restrictive eating. Several theoretical models can offer possible explanations for this relation. However, there must be an examination of evolutionary explanations of eating disorders, which view eating restriction as a possible response to various types of threat, for a more thorough and ultimate understanding of the relation between eating restriction, a sense of belonging and fear of negative evaluation.

In order to more thoroughly examine the relation between eating restriction and social fears, there must first be a brief overview of evolutionary theory. Afterward, one can see how evolutionary theory is used in the field of evolutionary psychology. After an overview of the principles of evolutionary psychology, various different hypotheses for eating pathology will be examined. A thorough review of the major evolutionary hypotheses regarding eating disorders, with specificity to the role of eating restriction will follow. Various elements from the evolutionary hypotheses of eating disorders will be used to demonstrate the notion that eating restriction is a possible response to the threat of exclusion from the group; an individual who feels a threat to her sense of belonging may respond with eating restriction in order to maintain or increase group status. The relation between eating restriction and fear of negative evaluation will then be examined, demonstrating that individuals with high fears of negative evaluation are more likely to report high levels of eating restriction.

## General Evolutionary Theory

Evolutionary psychology is rooted in evolutionary theory. Evolutionary psychology is often considered to be a sub-discipline of psychology. However, evolutionary psychology is also described as a way in which the entire field of psychology can be studied using evolutionary theory as a meta-theoretical framework (Confer, Easton, Fleischman, Goetz, Lewis, Perilloux, & Buss, 2010). An understanding of evolutionary theory requires a description of several of its major features. Evolutionary theory is described with an explanation of two main components: natural selection and sexual selection.

### *Natural Selection*

Natural selection, a theoretical process proposed by Charles Darwin (February 12<sup>th</sup> 1809-April 19<sup>th</sup> 1882) in his 1859 book *On the Origin of Species*, is a key component of evolutionary theory which states that the organisms embody evolved adaptations which function to solve adaptive problems, or in other words, to help the organisms in a particular environment with survival and reproduction. The general public often refers to it as “change over time,” but natural selection can be better understood as “systematic change over generations.” Natural selection is the process by which heritable traits that make it more likely for an organism to survive and successfully reproduce, referred to as adaptive traits, are inherited by offspring, thus becoming increasingly common in a population over successive generations. The process of natural selection is sometimes referred to as "survival of the fittest." Rather than the commonly used inference of being “in the best physical shape” Darwin meant it as a metaphor for "better adapted for

immediate, local environment" when he first used the term "survival of the fittest" in the fifth edition of *On the Origin of Species* (Darwin, 1869).

Natural selection involves three main features. The first feature is that of genetically based inheritance of traits; this refers to the notion that some traits are passed down from parents to offspring in genes. The second ingredient is variation; this refers to the notion that heritable traits vary within a population. Darwin discussed variation as a central feature of his theory, though there was not a clear scientific understanding of how this variation occurred. Modern science has shown that mutation is the source of some of this genetic variation. The third ingredient is differential survival and reproduction; this refers to the notion that these traits will vary in how strongly they promote the survival and reproduction of their bearers.

The term selection refers to the process by which organisms with traits that are beneficial for survival and reproduction, adaptive traits, will be selected to survive by conditions in the environment. Selection acts on an organism's observable characteristics, or phenotype, but it is the organism's genetic make-up, or genotype, that is inherited. The phenotype of an organism is the result of the organism's genotype and the organism's environment. The traits that were beneficial to the organism for survival in a particular environment will be genetically inherited by offspring; thus those traits will be more strongly represented in the next generation. This is the basis of adaptive evolution. Due to exponential growth, any heritable advantage, even if the reproductive advantage is minimal, will become dominant in a population over generations. In this way environmental conditions select for adaptive traits, which causes gradual changes in species over generations. Being based on differential survival of variable individuals,



natural selection can help explain the broad scale patterns of evolution. Darwin believed that natural selection was creative; it has led and can continue to lead to new traits and new species. Natural selection has shaped the vast array of unique traits within and between species, and is responsible for the enormous diversity of life on Earth (Darwin, 1859).

### *Sexual Selection*

There are some evolved traits which seem to attract excessive attention, slow down the organism, and do not seem to offer any survival benefit whatsoever, such as the peacock's tail. Such aforementioned traits were the subject of much controversy and confusion for Darwin during his formulation of the theory of natural selection. After all, for what adaptive reasons and under what environmental circumstances would such a flamboyant and hindering feature such as the peacock's tail evolve? As Darwin explained with his theory of sexual selection, many traits that are selected for can actually hinder survival of the organism while increasing its reproductive potential. The peacock's tail, for example, is metabolically costly, cumbersome, and is highly noticeable to predators. However, the peacock's elaborate tail does function to attract mates. The process involved with the evolution of traits designed to enhance reproductive potential is referred to as sexual selection (Darwin, 1871). The theoretical process of sexual selection, also theorized by Charles Darwin, poses that organisms have evolved physical and psychological traits which function to help maximize the organism's reproductive opportunities. The evolved traits exemplified by sexual selection are designed specifically to attract mates (e.g., the peacock's tail) or to compete with same-sex members for access to the opposite sex (e.g., antlers). There are two types of sexual

selection; intersexual selection and intrasexual competition. Intersexual selection refers to the traits that one sex generally prefers in the other sex, (e.g. the peacock's tail).

Intrasexual competition refers to the competition for mates; when members of the same sex compete for access to mate with members of the opposite sex, (e.g. two stags locking antlers).

### Evolved Psychological Mechanisms

Evolutionary psychology is based on the hypothesis that, like physiological traits such as organs and limbs, cognition has evolved by evolutionary processes (Tooby & Cosmides, 2005). Evolutionary psychology views human cognitions and behaviors as evolved psychological adaptations which function to solve recurring problems in the ancestral environment. The set of human cognitions and behaviors that have been developed in our evolutionary history are referred to as evolved psychological mechanisms.

Evolutionary psychology is founded on the computational theory of mind; the theory that the mind is composed of complex neural structures in the brain. Neural structures in the brain and psychological traits such as memory, perception and language evolved by means of processes such as natural selection and sexual selection to solve adaptive problems. Modern evolutionary psychologists believe that human behavior can be explained with psychological adaptations that evolved to solve recurrent problems in human ancestral environments (Confer, Easton, Fleischman, Goetz, Lewis, Perilloux & Buss, 2010; Buss, 1995; Durrant & Ellis, 2003; Tooby & Cosmides, 2005).

### *Evolutionary Psychology Principles*

According to evolutionary psychologist David Buss (1995), evolutionary psychology rests on a foundation of five core premises. Evolutionary psychology's five core premises include the following: 1.) Manifest behavior depends on underlying psychological mechanisms, information processing devices housed in the brain, in conjunction with the external and internal inputs that trigger their activation. 2.) Evolution by selection is the only known causal process capable of creating such complex organic mechanisms. 3.) Evolved psychological mechanisms are functionally specialized to solve adaptive problems that recurred for humans over deep evolutionary time. 4.) Selection designed the information processing of many evolved psychological mechanisms to be adaptively influenced by specific classes of information from the environment. 5.) Human psychology consists of a large number of functionally specialized evolved mechanisms, each sensitive to particular forms of contextual input, which get combined, coordinated, and integrated with each other to produce manifest behavior.

Other researchers have identified features which are central to evolutionary psychology. Researchers Cosmides and Tooby (1997) have also described five principles to be the foundation of evolutionary psychology: 1.) The brain is a physical system. It functions as a computer with circuits that have evolved to generate behavior that is appropriate to environmental circumstances. 2.) Neural circuits were designed by natural selection to solve problems that human ancestors faced while evolving into *Homo sapiens*. 3.) Consciousness is a small portion of the contents and processes of the mind; conscious experience can mislead individuals to believe their thoughts are simpler than

they actually are. Most problems experienced as easy to solve are very difficult to solve and are driven and supported by very complicated neural circuitry 4.) Different neural circuits are specialized for solving different adaptive problems. 5.) Modern skulls house a Stone Age mind.

### *Environment of Evolutionary Adaptedness*

Evolutionary Psychology argues that to properly understand the functions of the brain, one must understand the environment, and the conditions of the environment, in which the brain evolved. That environment in which the human brain is thought to have evolved is known in Evolutionary Psychology as the environment of evolutionary adaptedness (EEA). The EEA can be conceptualized as a composite of situational features, operating as selective forces, which were instrumental in the development of specific adaptations (Irons, 1998). Generally, EEA refers to the environment to which an evolved mechanism is adapted. More specifically, the EEA is defined as “the set of historically recurring selection pressures that formed a given adaptation, as well as those aspects of the environment that were necessary for the proper development and functioning of the adaptation.” For example, the first moving organism that a chick was likely to see was its mother; therefore, attachment of chicks to their mother had great survival value for chicks in the environment in which chickens evolved. Thus, an adaptation for the chick to form an attachment to the first moving organism it sees functioned to solve adaptive problems for the chick, because the adaptation would properly function to form an attachment to the chick’s mother. Thus, the adaptation was selected for due to the features of the environment.

The aforementioned adaptation provides an example of the importance of EEA in regards to how adaptations appear in environments which do or do not resemble the environment in which the adaptation evolved. Evolutionary psychologists argue that it is important for the organism's current environment to adequately resemble the environment in which a specific adaptation evolved in order for the adaptation to function appropriately and produce its intended results. In different environments, the adaptation for chicks to form an attachment with the first moving organism it sees can, and often has, produced unusual behavior in chicks that are different from its intended functional purpose. For example, a novel environment which is unique to the chicks' EEA is one in which the chick is born on a farm surrounded by other animal species or domestically in a person's house. In such environments, the adaptation can malfunction by causing the chick to form an attachment to a pig or human instead.

Humans first appeared between 1.5 and 2.5 million years ago; which is the timeframe that represents the human EEA (Symons, 1992). The human EEA approximately coincides with the start of the Pleistocene period about 1.8 million years ago, thus, according to evolutionary psychology principles, the majority of human psychological mechanisms are designed to solve adaptive problems that were common in the Pleistocene environment. The aforementioned adaptive problems include the survival and reproductive problems of growth, development, differentiation, maintenance, mating, parenting, and social relationships.

The Pleistocene was a very different environment than the ones in which humans currently inhabit. As a result, some psychological mechanisms occasionally exhibit "mismatches" to the modern environment. One example of such a mismatch is the high

numbers of snake and insect related phobias in the U.S., considering the small amount of snake and insect related deaths in the U.S. per year. The incongruity can be explained with the understanding that snakes and insects once posed a significant threat to our ancestors in the Pleistocene environment, although they no longer pose the same danger. Thus, there is a mismatch between our general evolved phobic tendencies and the modern environment. Such a mismatch between our evolved psychological mechanism and our environment becomes apparent when one is, for example, experiencing a phobic response to seeing a snake in her yard, and reacts by fleeing and running through the street where there is oncoming traffic.

#### *Products of Evolutionary Process*

Evolutionary psychologists do not believe that all mechanisms are operating in ways they were designed to; they do not believe that everything is an adaptation. Researchers have described several different products of evolutionary process: adaptations, by-products, evolutionary noise, and exaptations (Buss, Haselton, Shackelford, Bleske, & Wakefield, 1998). Therefore, our behaviors do not necessarily all have adaptive function, and some may be negative aspects of otherwise positive mechanisms. Evolutionary processes result in four basic products: adaptations, byproducts of adaptations, and evolutionary noise, and exaptations (Buss et al., 1998).

An adaptation may be defined as an inherited characteristic of a species that was produced through natural selection because it helped to directly or indirectly facilitate survival or reproduction during the period of its evolution (Tooby & Cosmides, 1992). Adaptations solve survival or reproductive problems, that is, adaptations have functions. The lungs are an adaptation, and their function is to transfer gases to and from blood. A

psychological adaptation is a functional component of the nervous system that solves a particular reproductive problem (Buss et. al., 1998). Psychological adaptations are thought to operate in the information processing domain. The nervous system solves reproductive problems as information processing problems, and the functions which solve these particular problems are what evolutionary psychologists refer to as adaptations. Adaptations have evolved to perform specific functions with desired outputs that maximize reproduction (Buss et. al., 1998). For example, hunger is a psychological adaptation which functions to facilitate the desire to eat in order to replenish energy for survival. An example of an adaptation which can be felt as unwanted is depression, which has been argued to function as a signal to the individual of a poor environment for reproduction or survival.

Adaptations may sometimes be malfunctional. Research on autism from an evolutionary psychological perspective has offered support that autism may be a malfunction of an adaptation. Baron-Cohen argues that autism results from a malfunction of a psychological adaptation designed to allow humans to infer the mental states of others (Baron-Cohen, 1995).

Although adaptations are the primary products of the evolutionary process, they are not the only products. The evolutionary process also produces by-products of adaptations. By-products are characteristics that do not solve adaptive problems and do not have to have functional design. By-products are carried along with characteristics that do have functional design because they happen to be coupled with those adaptations (Buss et. al., 1998). An example of a by-product of an adaptation is the whiteness of bones. Bones contain large amounts of calcium, which was presumably selected for

because of properties such as strength, not because of their whiteness. Therefore, the large calcium content of bones is an adaptation, but the whiteness of bones is an incidental by-product of the fact that they contain large amounts of calcium. Although the whiteness of bones does not solve adaptive problems, as a by-product it is carried along with characteristics that do solve adaptive problems, such as large calcium content, because it happens to be coupled with those adaptations. Apart from the malfunctioning of adaptive mechanisms, by-products and evolutionary noise may also in many cases be considered as pathology or described as abnormal, depending on the desired state of the individual. In *Homicide* (Daly & Wilson, 1988), it is argued that many adult homicides are byproducts of male status striving.

The evolutionary process also produces random effects, or noise. Evolutionary noise are products of the evolutionary process which do not seem to contribute to the solution of an adaptive problem. According to researchers (Buss, et. al., 1998) noise can be the resulting products of random mutations that neither serve nor detract from an organism's functional design. Both by-products and noise are characteristics that do not solve adaptive problems; however, by-products are carried along with characteristics that do solve adaptive problems because they are coupled with the adaptations. Noise is differentiated from by-products in that it is not linked to adaptations. Unlike by-products, noise is independent of adaptations. Noise does not have any functional consequences, however, it can produce malfunctions in adaptive mechanisms created by evolutionary processes. In other words, noise which did not serve any adaptive function in the human EEA can be worked on over time by evolutionary processes such as natural selection,



which may select for and modify the noise, possibly resulting in malfunctions of adaptations or exaptations (Buss, et. al., 1998).

The evolutionary process may also produce an exaptation, which is an evolved characteristic of a species, but is not considered an adaptation. Whereas an adaptation is a characteristic produced by natural selection for its current function, an exaptation is a characteristic which performs a function, but was not produced by natural selection for its current function (Buss, et. al., 1998). Exaptations may be the result of noise, or random mutations, which have been modified and inherited through the process of natural selection and currently serve a particular function. Exaptations may also be characteristics which were originally produced by natural selection to perform a particular function, but currently serve a different function which is unrelated to the original adaptive problem it was produced to solve. A well-known example is that of feathers; bird feathers are an exaptation which were originally produced by natural selection for insulation, but are currently used for flight. A behavioral example may be one in which eating restriction, which may have originally been used for reproductive suppression or female intrasexual competition, is currently being used for maintaining or increasing status by demonstrating an abundance of resources, attractiveness, and control.

### Evolutionary Theories of Eating Disorders

#### *Reproductive Suppression Hypothesis*

The Reproductive Suppression Hypothesis (Wasser & Barash, 1983) has been used to explain eating restriction as an evolved adaptation which functions to protect the subject's lifelong reproductive success.

Although there is less research on evolutionary ideas of eating disorders, evolutionary theories have been discussed in the role of anorexia nervosa and eating restriction for several decades. Researchers have stated that the “remarkable consistency of this syndrome suggests the presence of a possible adaptive mechanism” (Nesse, 1984, p. 578). However, the earlier evolutionary ideas in the role of eating restriction focused on the loss of menstrual cycle in women with anorexia nervosa. Wasser and Barash (1983) posited that female mammals in a poor environment for reproduction could adaptively suppress reproduction by restricting their eating, and thus enhance their lifelong reproductive success. Wasser and Barash (1983) did not cite anorexia as a specific example, however, later eating disorder researchers began to focus on the loss of menses. The focus on the loss of menses facilitated speculation and investigation into the possibility that anorexia nervosa functions to delay reproduction (Anderson & Crawford, 1992). This reproductive suppression hypothesis posits that adolescent girls' desire to control their weight represents an evolutionary adaptation by which ancestral girls reduced the rapidity of their sexual maturation in response to cues about the probability of poor reproductive success.

The reproductive suppression hypothesis suggests that the ability to alter body fat is an evolutionary adaptation which allows women to adjust their reproductive capacity based on social and ecological conditions. According to this model, when a woman is in a situation that is not perceived as desirable for reproduction, she can actively suppress her reproductive abilities by lowering her body fat. Temporary reproductive suppression in an unsuitable environment is hypothesized to be beneficial for the woman's long-term reproductive success (Wasser & Barash, 1983).

Researchers who use the reproductive suppression hypothesis to explain anorexia suggest that the widespread phenomena of eating restriction is better explained not by societal pressures alone, but by a behavior that would have been advantageous in our ancestral environment (Anderson & Crawford, 1992). In cases of severe eating restriction, such as that associated with anorexia, the behavior is expressed in an exaggerated form. Nevertheless this behavior is argued to have once been adaptive in an environment that was perceived as unsuitable for reproduction.

The reproductive suppression hypothesis builds on two premises; adaptive reproductive suppression and the critical fat hypothesis (Wasser & Barash, 1983). Adaptive reproductive suppression is a biological concept which is based on several features of natural selection. The theory of sexual selection states that it is female mammals who select their mates. This phenomenon is due to the fact that male mammals produce a substantial amount of sperm throughout most of their lives in contrast to female mammals that are born with a limited and relatively small amount of ova that can be used in a lifetime. Therefore, reproduction for female mammals is much more costly, and they must, therefore, be much more “choosy” when selecting their mates. Adaptive reproductive suppression builds on the theory of sexual selection by elaborating on how the environment can affect the female mammal’s choice. Similar to modern times, our ancestral environments had varying characteristics, which made the environment more or less suitable depending on place, time, and overall situation. Undoubtedly, there were environments that were so characteristically negative, even detrimental, that reproduction in such environments provided substantial risk. Reproduction is inherently costly for female mammals, leading them to be highly selective with mate selection and, as

adaptive reproductive suppression suggests, highly selective with environmental selection as well. Environmental selection refers to the ability for a female mammal to suppress her reproductive capacity based on environmental factors. In an environment characterized by social or ecological conditions that are not, or are perceived as not, suitable for reproduction, female mammals can adaptively suppress their reproduction until either the conditions change or until the female is better able to cope with the situation. Although the intentional loss of the menstrual cycle is viewed by many as intuitively maladaptive, seemingly making severe eating restriction and eating pathology an evolutionary dilemma, adaptive reproductive suppression is thought to have been advantageous to female mammals in the ancestral environment who significantly increase their lifetime reproductive success by repressing reproduction when the environmental conditions were unfavorable.

The critical fat hypothesis is a reproductive biology concept which links the reproductive capacity of female mammals to the amount of body fat. Estrogen levels must be at a certain level in order for a female to have reproductive capacity. In female mammals, substantial amount of estrogen is stored in body fat, where androgens are converted to estrogen as well. Thus, reducing body fat below the threshold that is needed for storing and producing estrogen is equivalent to reducing reproductive capacity.

Reducing or even halting ovulation can often and easily be reversed, although there are some reported cases of severe and long-lasting eating pathology, i.e. severe anorexia nervosa over a period of many years, in which women who have lost their reproductive capacity do not gain it back once weight has been stabilized, but this is often not the case. Severe eating pathology is relatively rare when compared to eating

restriction which disrupts the menstrual cycle; however, even among female clients with eating disorders, resuming ovulation is simply a matter of stabilizing weight, i.e. gaining the amount of body fat necessary for ovulation. Therefore, adjusting body fat is an effective way to suppress reproduction. Therefore, when faced with environmental stress, adjusting body fat is an effective way to suppress reproduction until the conditions become more favorable. Such ability is theorized to have been adaptive for our ancestors, and is thought to be the determining factor in the widespread observations of reproductive suppression in female mammals.

The reproductive suppression hypothesis, when used to explain anorexia, suggests that the widespread desire for thinness among women and the eating restriction response is a manifestation of the activation of the mechanism suggested by the adaptive reproductive suppression and the critical fat hypotheses. The mechanism becomes activated when environmental cues suggest that it is a poor environment for reproduction. Cues of a poor environment for reproduction in our ancestral environment would be given particularly when, for example, the female is in an area with limited resources or has limited social support. Other conditions are also hypothesized to be cues of a poor environment for reproduction, including an environment with very high intrasexual competition between females and high levels of attention from undesirable males; both factors would cause significant stress for the female. Generally, environmental stressors were cues of a poor environment, and the female responded to the stress with the reproductive suppression mechanism in order to protect her chances for lifetime reproductive success.

Juda, Campbell, and Crawford (2004) tested hypotheses that they generated from the reproductive suppression model. The researchers hypothesized that perceived environmental stress would be related to dieting behavior in women. They hypothesized that environmental stress which would have signaled a poor environment for reproduction for our ancestors include perceptions of social support from their partners, family, and friends, as well as perceptions of parental readiness. The reproductive suppression model would suggest that women who experience stress related to perceptions of social support--critical for survival--might increase the overall success of their reproductive capacity by temporarily suppressing reproduction. Indeed, the researchers predicted a relation between perceived stress and dieting behavior. The research supported the predictions that were made. The study found that women who perceived low levels of support, particularly from romantic partners and family, reported increased dieting symptomology and lower perceptions of parental readiness. The stressful environment in which perceptions of support are quite low was related to a sense that it was not a good idea to currently have a child, and it was also related to eating pathology aimed at decreasing body fat, which would ultimately lead to reproductive suppression.

Juda, Campbell, and Crawford (2004) used their findings to suggest that, for women, disordered eating attitudes may reflect an ancestral reproductive suppression mechanism which is activated with modern cues that signal poor reproductive outcomes in ancestral environments. The implication of these findings as they apply to dieting behavior is that it is in fact stress, namely ecological and social, which triggers the dieting behavior in women because this stress activates our ancestral mechanism to keep

women's reproductive potential as successful as possible. The reason why we may find dieting to be increasing, especially in the West, can be attributed to the excessive amount and very frequent cues which activate this mechanism and which women are being confronted with nearly continuously. Today, the intensity and power of modern media, particularly in the West, has changed the situation in which this mechanism is operating. Compared to ancestral times, modern women, especially in the West, are confronted almost continuously with cues thought to signal high female competition, which is a hypothesized example of a poor reproductive environment. Excessive dieting, to the point that one's menstrual cycle is disrupted, is seemingly obvious disadvantageous behavior. However, such findings, which seem to support the reproductive suppression model, may help account for the large number of women around the entire world, but with higher numbers in the West, who are dieting to an excessive degree, sometimes developing eating disorders, and being preoccupied with losing body fat, often to an amount that is no longer congruent with male perceptions of female physical attractiveness.

There is further evidence that psychosocial stress is a cause of reproductive suppression in humans. The reproductive suppression hypothesis proposes that natural selection should favor factors that reliably predict conditions for reproduction. Boivin, Sanders, and Schmidt (2006) examined two such factors, age and social position, in women who were receiving fertility treatment. The researchers hypothesized that stress-related reproductive suppression would be more likely in younger compared to older women and in women in lower compared to higher social positions. The results showed that younger women were four times more likely to suppress than older women, and that unskilled and manual workers were more likely to suppress than those in middle social

positions (e.g., white collar workers). However, significant associations between stress and fertility were also observed for women in higher social positions (e.g., professionals and executives). The results of the study provided further support for the reproductive suppression hypothesis. Factors which should reliably predict conditions for reproduction, age and social position, were strongly associated with the tendency to suppress. Younger women were more likely to suppress than older women, and unskilled workers more likely to suppress than white collar workers. The findings that significant associations between stress and fertility were also observed for women in very high social positions was not hypothesized and appears unaccounted for by the reproductive suppression hypothesis.

The unexpected finding that significant associations between stress and fertility were also observed for women in very high social positions (Boivin, Sanders, & Schmidt, 2006) can be explained with the notion that environments of very high social status can be thought of as more competitive, which Gatward outlines in his threat of exclusion hypothesis (Gatward, 2007).

Several observations help support the reproductive suppression hypothesis for eating disorders like anorexia, which proposes that eating restriction is an adaptation for reproductive suppression. It is common for prepubertal girls who have been diagnosed with anorexia nervosa to have their menarche delayed. It is also common for previously menstruating women who have been diagnosed with anorexia nervosa to have their menses cease. Furthermore, research has demonstrated cases in which women, as well as females of other species, have their reproductive ability cease during times of increased environmental stress. It is possible that cues indicating unsuitable male attention, poor



social support, and inadequate resources could indeed have been indicative of poor times for reproducing in our ancestral environment, and are still functioning in the same way today. However, the reproductive suppression hypothesis has several limitations as well. The reproductive suppression hypothesis does not explain several features of anorexia nervosa that are integral to the disorder, including the distorted body image and hyperactivity that is commonly found in individuals with anorexia nervosa. Furthermore, the reproductive suppression hypothesis does not explain why anorexia nervosa is also present in wealthy well-fed women, postmenopausal women, and most notably men. It appears that the incidents of anorexia nervosa and eating restriction in men is largely overlooked in the reproductive suppression hypothesis. Men are reported to consist of a significantly small proportion of individuals with anorexia nervosa, but anorexia nervosa does appear in men, and eating restriction is prevalent among many men, particularly athletes; these facts cannot simply be ignored. The occurrence of anorexia nervosa in men must be accounted for as methodically as it is in women, and the prevalence of eating restriction in men needs as solid and thorough an explanation.

#### *Eating Restriction: Intrasexual Competition*

The sexual competition theories of anorexia nervosa view eating restriction as an evolved adaptation which functions to maximize the subject's mate value; eating restriction is viewed as a way to increase the likelihood for the subject to compete for a high quality mate in a sexually competitive environment (Abed, 1998). Such theories view a low waist-to-hip ratio, i.e. an "hour-glass" figure, as an indicator of reproductive potential. Therefore, a low waist-to-hip ratio for women is viewed as appearing more healthy, young, and fertile and thus more desirable to men.

The reproductive suppression hypothesis has been used to explain dieting to extreme levels and eating psychopathology with mounting evidence in its support. However, critics of the model as a theory of causation for eating pathology point to several issues which they feel that the reproductive suppression model does not properly explain, or even address, many of which were recognized by other researchers who attempted to explain eating restriction as a mechanism of intrasexual competition.

Abed (1998), who was among the first researchers to seriously pose the hypothesis that eating pathology was a manifestation of female intrasexual competition, used Darwinian theory to develop a hypothesis for eating disorders. The sexual competition hypothesis (SCH) for eating disorders, coined by Abed, not only posed an explanation for eating disorders, but for the general pursuit of thinness as well, a major motivator for eating restriction. Abed used evolutionary theory to hypothesize that eating restriction, manifested as anorexia nervosa in its severe form, is an adaptation--an evolved response to women's concern regarding physical attractiveness. Abed explains that this concern about physical attractiveness has evolved in the human female's brain as an adaptive tactic for successful reproduction. Concern about physical attractiveness is an important component of female mate attraction strategies, therefore, eating restriction would be a common competitive strategy used to resolve physical attractiveness concerns. The reason why eating restriction has become commonplace, especially in the West, is because the present-day environment of Western countries presents a range of conditions which have led to the over-activation or the disruption of the archaic female sexual strategy of maximizing "mate value." The overabundance of images of highly attractive women and the frequency of these images is one such condition. Furthermore,

Abed argues that the increased association in modern Western culture between physical attractiveness and thinness has caused thinness to become an increasingly stronger cue of female intrasexual competition. Eating restriction thus becomes a commonly used strategy to compete for mates in a highly competitive environment in order to achieve the thinness that is now so closely linked with female attractiveness; this sexual competition hypothesis thus provides an explanation for the tendency for many women to diet, restrict eating, and develop eating disorders.

Linda Mealey (2000) was also critical of the reproductive suppression hypothesis as a casual explanation for anorexia nervosa when she discussed the social and the evolutionary aspects of anorexia nervosa. Mealey posited that the cues which signaled a poor reproductive environment during ancestral times do not currently exist at the high levels necessary to account for the epidemic numbers of women with anorexia nervosa and the massive numbers of women who engage in eating restriction around the world, particularly in the West. The environmental dangers, including lack of social support, lack of resources, and attention from undesirable mates, are examples which she argues are not prevalent, certainly not increasingly prevalent, across the world. Further, Mealey argues that these danger cues certainly do not seem to be present with the population diagnosed with eating disorders the most frequently, which includes white, middle to upper class women in the West. Thus, Mealey argues that adaptive reproductive suppression is not an adequate explanation for the modern high levels of anorexia nervosa and eating restriction. Mealey also cited the epidemic levels of anorexia nervosa and eating restriction to refute the possibility that anorexia nervosa and eating restriction could be the result of an environmental mismatch.

Similar to Abed (1998), Mealey (2000) theorized that anorexia nervosa is an adaptation which has evolved in female's brains and functions to help women compete for mates. Thus, like Abed, Mealey believes that eating restriction in women is a mechanism of female intra-sexual competition. However, unlike Abed, Mealey conceptualizes anorexia nervosa as a strategy which is imposed on subordinate women by dominants. This type of adaptive manipulative strategy is often referred to as the extended phenotype, in which one individual's behavior directly affects a competitor. An example of an extended phenotype in humans would be an insult, which can serve to lower another individual's self-confidence, thus reducing their capability to compete (Gatward, 2007). According to Mealey's hypothesis, anorexia nervosa and milder forms of eating restriction such as dieting for significant weight loss, is a reaction by subordinate women to compete, for status as well as for mates, with the dominants. Dominants who glorify thinness as a symbol of status and physical attractiveness induce dieting to extreme levels in subordinate women attempting to compete; dieting at levels which jeopardize the subordinate's reproductive capacity and overall survivability, thus eventually weeding these subordinates out of the competition entirely. Mealey (2000) refers to anorexia as a losing strategy in both meanings of the term; women who restrict eating, particularly those who do so to extreme, unhealthy levels are not only losing weight, but they are also losing the fight--the intrasexual competition for status and mates. Due to excessive thinness, these women who take eating restriction to severe extremes ultimately lose their health, fertility, and even their lives.

Although female intrasexual competition has long been a feature of our evolutionary history, Mealey explains that the scope of female intrasexual competition

has only recently been enhanced by the wide-reaching and intense impact of modern media. In ancestral times, Mealey argues that cues signaling heightened female intrasexual competition was regulated by reality and experienced appropriately. In our modern environment, the cues signaling heightened female intrasexual competition are based on images far from reality; they include women who have been enhanced by make-up, improved by surgery, and altered or even created digitally. Further, these unrealistic cues are experienced with a frequency that is incomparable to ancestral times due to the modern media. Although the nature of our environment has changed drastically from ancestral times due to technological and communications advancement, the adaptations which evolved to solve survival and reproductive functions in our ancestral environment continue to persist. Thus, cues signaling increased competition are still felt in the same powerful way, as if there is a realistic and intense threat to one's status and ability to attract mates.

Modern media transmits images of beautiful, flawless women on a massive scale. Airbrushing techniques and photographic technology send out signals of perfect women and thus perfect mates. Modern media also has the ability to send out these signals through a number of various media outlets, including television, magazines, billboards, motion pictures, etc., and these images are broadcast and portrayed very easily, frequently, on a global scale, and throughout a major portion of the day; in the West, it can be argued that these signals are given almost constantly. The levels of cues signaling female intrasexual competition are thus hypothesized to be unprecedented in history, accounting for the growing numbers of women who are dieting, preoccupied with body image, and developing eating pathology such as anorexia nervosa.

There is some empirical data which lends support to Abed's SCH. In a study which examined the relations between female intrasexual competition (ISC), eating disorders, and eating disorder related symptomology, undergraduate women at University of Arizona, Tucson, completed surveys which measured female competition for mates, female competition for status, general competitiveness, and eating disorders symptomology (Faer, Hendriks, Abed, & Figueredo, 2005). Data from the study revealed that ISC for mates was ultimately the driving factor that contributed to female competition for status, general competitiveness, perfectionism, body dissatisfaction, drive for thinness, and both of the eating disorders measured, bulimia and anorexia. Results provided some evidence to support Abed's hypothesis that eating disorders and their associated psychopathology may be the result of an adapted strategy for women to maximize mate value.

Further data that lends support to the sexual competition hypothesis comes from an unlikely source, namely, from research which examined the role of reproductive suppression in eating restriction in women. Salmon, Crawford, Dane, and Zuberbier (2008) examined various experimental conditions thought to signal poor environments for reproduction and their effects on eating restriction in women. The experimental conditions examined included conditions in which participants experienced increased female competition, exposure to various types of media (high content of images of beautiful women media or news-related media), stressful male attention (attention from males who were undesirable mates), and increased levels of various types of stress (dealing with music lessons, gardening, as well as hospital visits). The data revealed that the experimental conditions which the reproductive suppression hypothesis predicts to be

related to eating restriction were indeed related to scores on the eating disorder inventory. Higher levels of perceived female competition produced higher eating disorder scores. Stressful male attention also produced higher eating disorder scores. Greater content of images of beautiful women in media also produced higher eating disorder scores as opposed to news-related media. Also, increased levels of stress, dealing with music lessons, gardening, as well as hospital visits, also all produced higher eating disorder scores.

The series of studies (Salmon, Crawford, et al, 2008) helped to support the reproductive suppression model; the conditions thought to signal poor environments for reproduction produced higher eating disorder scores. However, several features of the data may in fact be more supportive of the sexual competition hypothesis. Most notably, the condition which showed the largest effect size of all experimental conditions was the female intra-sexual competition condition. The researchers used the evidence to support the reproductive suppression hypothesis, but one could argue that the data also--if not solely--supports the sexual competition hypothesis. Both Abed and Mealey suggest that reproductive suppression may indeed be related to eating restriction, but is not the ultimate cause; that sexual competition is the ultimate cause. Abed (1998) notes that sexual competition through eating restriction can result in the loss of menses when taken to a dangerous extreme, as is often the case in anorexia nervosa. Mealey (2000) posits that the loss of menses and repressed reproductive capability in women restricting to a dangerous extreme is the result of the manipulative strategy used by dominant women who provoke subordinate women to restrict eating in an effort to compete for mates and status, thus causing these subordinates to lose their reproductive abilities and be removed

from the competition. In both variations of the sexual competition hypothesis for anorexia, reproductive suppression is considered an important feature, but not the ultimate cause. The data collected by Salmon and Crawford et al, (2008) appears to support the notion that sexual competition may be the ultimate cause. The two environmental pressures that were hypothesized to have favored mechanisms of reproductive suppression were a) female competition and b) attention from males who would have been undesirable mating partners in an ancestral environment. In this series of studies, both were predictive of dieting behavior, but female competition had a greater impact than male attention, and it also had the greatest impact overall. According to Abed and Mealey's hypotheses, the research conducted by Salmon and Crawford et al, (2008) could indeed be evidence of the sexual competition hypothesis.

The sexual competition hypothesis for anorexia nervosa has several strengths, most notably the empirical data which supports the relation between female intrasexual competition and dieting behavior. Further, the sexual competition hypothesis provides a new way to incorporate the role which the media plays in eating restriction. A more common socio-cultural approach explains increased dieting behavior as a phenomenon which the media perpetuates by glamorizing images of waif-like women, causing female viewers to compare themselves to these images and to engage in dieting behavior accordingly. However, the sexual competition hypothesis provides a more ultimate explanation of eating restriction, one which refutes the media's role as a causal agent and defines the media's role as a medium through which cues of female intra-sexual competition are transferred. Similar to the limitations of the RSH, the limitations of the sexual competition model include the fact that eating disorders in men are largely



ignored. It also largely ignores explanations of very common features of anorexia nervosa, such as associated symptoms of denial and hyperactivity. It also does not seek to explain the relations between anorexia nervosa and other constructs found to be closely related, including low feelings of control, hypersensitivity to criticism, and a variety of problems with social life. The sexual competition hypothesis also fails to explain the high numbers of eating disorders in some non-Western countries and cultures that are not influenced by the Western media. Iran, for example, is a non-Western country in which the Western media is mostly absent, and yet eating disorder rates in Iran have been found to be comparable to that of the U.S. Perhaps a more ultimate explanation of eating disorders and the role of eating restriction would be one that attempts to address some of these core concerns.

*Adapted to Flee Famine*

The Adapted to Flee Famine Hypothesis (Guisinger, 2003) for anorexia nervosa views eating restriction as an evolved adaptation which functions to facilitate migration to a more resourceful environment when the subject's depleted environment has resulted in famine.

Guisinger (2003) proposed the adapted to flee famine hypothesis as an explanation for anorexia nervosa, which he argues can logically explain many of the unusual physical and psychological symptoms of anorexia nervosa that no other theory has been able to account for. Guisinger argued that the loss of 15% or more of one's body weight is equivalent to that of experiencing famine, for which natural selection has exerted strong selective pressures. The adapted to flee famine hypothesis posits that some individuals have inherited a genetic ability to respond to such low body weight with

adaptations which function to facilitate the ability to leave food-depleted areas. Guisinger suggests that several peculiar symptoms of anorexia nervosa, which have previously been resistant to explanation, including restricted food intake, hyperactivity, and denial of starvation, are the manifestations of an ancient adaptive mechanism which responds to conditions of famine. In ancestral times, humans who had this mechanism would have been able to survive famine by fleeing their depleted environments and migrating to an area more rich in resources.

#### *Restricted Food Intake*

Laboratory investigations on various animal species have provided much support for Guisinger's (2003) adapted to flee famine hypothesis. Laboratory research has shown the presence of voluntary normal food restriction in pigs with wasting-pig syndrome, a condition characterized by slowing of growth and a listless or unthrifty appearance (Treasure & Owen, 1997). Excessive restlessness was also observed in the pigs with wasting-pig syndrome; they would often move continuously around their pens. Epling and Pierce (1988) also observed that if starved in a laboratory, many mammal species will exhibit voluntary food restriction and excessive exercise. Similar research has provided additional evidence of voluntary restriction of food intake in rats and eight other rodent species. Self-starvation has been observed in such animals that, when in a laboratory in which feeding time is restricted and there is access to a running wheel, these animals will refuse to eat when food is made available (Epling & Pierce, 1984; Hall & Hanford, 1954; Pirke, Brooks, Wilckens, Marquard, & Schweiger, 1993; Routtenberg & Kuznesof, 1967).

Restricted food intake is an odd symptom of anorexia nervosa; it may appear intuitive that when one is starving, and the potential to eat is high, one would certainly accept food once it becomes available. However, in animals and humans with anorexia nervosa symptoms, restricted food intake is a defining characteristic, even though the individuals are physically starving and are experiencing hunger as well as an intense desire to eat. Gusinger suggests that the refusal of food symptom of anorexia nervosa is part of the adaptive mechanism which aided some of our ancestors to flee famine. Gusinger explains that when an individual is in a very depleted environment, so much so that the conditions have sparked famine for the animal--in this case, the animal being human--refusing the food that is found and moving forward to an area where food is much more plentiful is far more advantageous than accepting the food that is discovered and continuing to live in the depleted area with few resources.

During our ancestral environment, people who were in such a poorly resourced area that the conditions caused starvation would have needed to escape the area and find a better one if they hoped to survive. The modern day individual experiencing anorexia nervosa is in a very different situation, and may have gotten to the point of starvation for a variety of different developmental, cultural, and psychological reasons, but she is experiencing exactly the same thing that was sparked in our ancestors with this adaption; the symptoms that proved evolutionarily advantageous for our ancestors then, are seen as bizarre, mysterious, and unexplainable characteristics of individuals with anorexia nervosa now. An individual with anorexia nervosa may not be in an area that is depleted and she may not be living in conditions of famine, but her extreme weight loss has essentially tricked her body into thinking that she is experiencing a famine, thereby

triggering the ancient adaptive mechanism used to flee. Guisinger argues that the adapted to flee famine mechanism can explain why individuals with anorexia nervosa restrict food intake even in a starved state and even when food is made available; rather than accepting the food that was found and continuing to live in an environmentally poor environment, our ancestors' lifetime reproductive success and chance for survival benefited by refusing food in a depleted environment and instead migrating to a more resourceful one.

Of course, not everyone who diets develops an eating disorder, and not everyone who severely restricts eating will develop anorexia nervosa symptoms related to the adapted to flee famine hypothesis. However, Guisinger argues that eating restriction can only develop into anorexia nervosa when a sufficient amount of weight loss has occurred, severe enough to trigger this mechanism. Furthermore, only after enough weight loss has occurred, anorexia nervosa will develop only in the individuals who have inherited the genetic adaption to flee famine. The genetic adaption for the adapted to flee mechanism was relatively rare in our ancestral environment, as it had to compete with the adaption for the intense desire to eat and satisfaction gained by eating during hunger, and the adaption continues to be a rare today. However, some people have inherited the mechanism from our ancestors, and this small percentage is predisposed to developing anorexia nervosa and experiencing a symptom which has puzzled researchers and has been resistant to explanation i.e., the voluntary restriction of eating when food is made available in spite of starvation, or as Guisinger argues, because of it.

### *Hyperactivity*

“Pure adrenaline kicks in when you're starving--you're high as a kite, sleepless, full of a frenetic, unstable energy ... your own drive and energy themselves are intense and focused. Your sense of power is very, very intense” (Hornbacher, 1998, p. 105).

Guisinger (2003) posits that the hyperactivity found in humans with anorexia nervosa is a form of migratory restlessness, which is common in many animal species during food shortage (Vincent & Pare, 1976). The term migratory restlessness alludes to the proposed function of the hyperactivity, which is to aid migration to more resourceful areas. There is evidence of migratory restlessness in birds and mammals (Helms, 1963) and laboratory rats that demonstrate an increase in wheel running if they are deprived of food (Hall & Hanford, 1954). Research has shown that under normal conditions, laboratory rats run, on average, less than 1 km/day. However, if the laboratory rats are significantly deprived of food, become emaciated, and their weight is maintained at 70% of their normal weight, the amount which the starving rats run on their exercise wheel increases dramatically, from 1km/day up to 20 km/day (Pirke et al., 1993).

Guisinger (2003) posits that the symptom of hyperactivity commonly found in individuals with anorexia is part of the adapted to flee famine mechanism. It has been documented that many individuals with anorexia display hyperactivity; these individuals may frequently feel restlessness, perceived high levels of energy, compulsive behaviors and a strong urge to move. The hyperactivity found in these individuals may be counterintuitive, given that they are severely restricting their food intake and are thus frequently low on energy from calories. It seems logical that all individuals suffering from anorexia nervosa or are otherwise engaging in severe eating restriction would be

significantly low on energy. However, individuals with anorexia nervosa often do experience hyperactivity, and research has provided data revealing that many other animal species experience hyperactivity during restricted food intake as well.

Research on activity levels of many different animal species during conditions of famine has provided support for Guisinger's (2003) hypothesis. It has been found that during times of food shortage, many animals will actually increase their levels of activity, much like how humans with anorexia nervosa will develop a perplexing degree of hyperactivity during severe eating restriction and even at starvation levels (Vincent & Pare, 1976). Laboratory findings on rodents have provided further support for the increase of activity found in some animals during food shortage. Studies have found that in some animals experiencing food shortage, the starved animals will develop compulsions, such as urges to move as well as to refuse food (Pirke et al., 1993). Urges to move and refuse food are also well known compulsive traits in humans who are heavily restricting their eating, such as individuals with anorexia nervosa. Furthermore, it has been noted that some animals in many different species often refuse food when eating comes into direct competition with other activities that are paramount to survival, such as migrating and breeding (Epling & Pierce, 1988). The findings that many animals will show anorexia nervosa symptoms during starvation and food shortage adds further support to the adapted to flee famine hypothesis.

### *Denial*

The defense mechanism of denial--of the significant weight loss, of one's emaciated physical appearance, of the severity of the situation--is symptomatic of anorexia nervosa, and has been one of the most difficult symptoms for clients in eating

disorder treatment to overcome, and for researchers to attempt to explain. Guisinger (2003), however, states that the denial found in individuals with anorexia nervosa today would also have been found in our ancestors with the shared inherited potential for the activation of the adapted to flee famine mechanism when it was necessary for them to escape their depleted environment in order to survive. The individuals experiencing a famine during our ancestral environment would need to experience symptoms of euphoria, i.e. a “rush” of energy, even if only briefly, in order to have the motivation necessary to escape the depleted environment and search for a better one; an acceptance of their poor physical state and their dire starvation condition would not have proven beneficial to an individual who needed physical and mental strength to literally get up and move forward. It makes sense then that denial, a mental state that is almost always present in an individual with anorexia nervosa, would have been adaptive and even necessary for an individual to leave her environment and search for an area that is more food-plentiful and nutrient rich.

There is some evidence which supports the notion that denial is a feature of the adapted to flee famine mechanism which functioned to facilitate our ancestors’ migration by providing hope, optimism and motivation. Researchers have noted that even in healthy individuals self-deception is commonly used to make one’s situation appear more positive (Martin, Abramson, & Alloy, 1984). Misrepresentation of reality can often have advantageous effects. Researchers have viewed self-deception as a possibly adaptive tool for providing a sense of optimism to an individual, which she will need to change her condition if she were in a particularly dire situation (Trivers, 2000). An example of being trapped in a burning house can clearly illustrate the crucial role of optimism when an

individual's actions can change the circumstances. If an individual is trapped in a burning house and sees the engulfing flames, suffocating smoke and understands her grave danger, she may submit to the horrific situation, proceeding with inaction due to her assessment that she has little to no chance of survival. However, if an individual in the same dire and equally fatal situation were to have a certain degree of self-deception, perhaps with positive self-statements assuring her that she will be able to escape and "she will be okay," such optimism may provide motivation for action on the individual's part, perhaps fueling her formulation of a plan for escape. Guisinger (2003) argues that denial similarly fueled our ancestors with the motivation necessary to escape their dangerous environments. If an emaciated, starved individual in a poor environment for survival were to easily recognize the grave severity of her condition and her situation she may not have the false sense of optimism that would provide hope for the possibility of survival, nor the motivation to escape her dangerous environment, and the physical and mental energy necessary to flee famine. Although our modern environment is starkly different than that of the Pleistocene environment, the individuals who have inherited the adapted to flee famine mechanism and have anorexia induced starvation experience the denial of one's severe symptoms in much the same way.

Restricted food intake, hyperactivity, and denial of the severity of their physical states, are among the most unusual characteristics of anorexia nervosa and symptoms for which previous evolutionary models for anorexia nervosa have offered incomplete explanations (Guisinger, 2003). Guisinger argues that the common, but unusual and perplexing symptoms associated with anorexia nervosa would have been necessary in order for our ancestors to respond to the life-threatening conditions of famine, and thus



would have been highly adaptive for the individuals who have inherited the adapted to flee famine mechanism, allowing for the physical and mental energy necessary to escape depleted areas in favor of more resourceful environments.

### *The Threat of Exclusion*

The Threat of Exclusion Hypothesis (Gatward, 2007) for anorexia views eating restriction as an evolved exaptation, i.e. the utilization of a structure or feature for a function other than that for which it was developed through natural selection, which currently functions to maintain the subject's status and belonging to the group when both are felt as under threat. The idea of thinness as a high status achievement is well-expressed in the popular children's nursery rhyme:

*Fat and Skinny had a race  
All around the pillow case.  
Fat fell down and broke her face.  
Skinny said, "ha-ha,  
I won the race."*

Gatward (2007) used various evolutionary ideas about responses to threat to propose a new model of anorexia nervosa; one in which eating restriction is described as one of a number of possible responses to a perceived threat of exclusion from the social group. Gatward's threat of exclusion hypothesis for anorexia nervosa is a synthesis of several evolutionary models for eating pathology; Gatward was the first to propose that the initial attempt to lose weight through eating restriction is a direct response to social fears. Gatward used the concept of the need to belong to explain how eating restriction, which he refers to as "dietary restriction" may be part of an attempt to maintain belonging and status within a group when both are perceived to be under threat.

When an individual feels a significant threat, she can choose to respond in one of two ways, a) by flight (removing herself from the source of threat) or b) fight (making a conscious effort to directly counter the threat). The situation can be illustrated well with a saber-tooth tiger scenario. If an individual were to come into contact with a saber-tooth tiger, she could choose flight (literally running away) or to fight (staying in the environment and challenging the animal, by, for example, attempting to wound or kill it).

Similarly, when an individual experiences a threat to the sense of belonging, possible alternative responses to direct flight/fight would be submission/ resistance. During competition, submission is the act of giving clear signals of surrender (waiving the white flag during battle) or defeat (tapping the floor during a wrestling match); submission is the demonstration of signals that one is not a threat to dominants. This flight alternative response is witnessed across animal species, and as alluded to previously with the example of battle and sports, is present in humans as well. The flight alternative response can manifest itself psychologically in several ways. This is clear when an individual feels a threat to status and belonging and chooses to signal defeat rather than attempt to maintain status. Several researchers have hypothesized that depression is a clear example of a flight alternative response to such fears. In the social competition model of depression (Price, 1967; Gilbert, 1992; Sloman & Gilbert, 2000), socially subordinate individuals adaptively develop depression in order to facilitate behavior changes which signal to competitors that they do not pose a threat, thereby protecting the subordinate from possible further attack and exclusion. Depression is not typically thought of as an adaptation, since it can be detrimental to an individual's well-being in its severe forms, but it functioned to increase ones overall chances of survival in

ancestral environments by preventing further attack or exclusion from the group.

Although depression can be painful, uncomfortable, and unwelcomed, it helped our ancestors survive highly threatening situations, particularly those which may have been unwinnable (Cosmides & Tooby, 1999).

When an individual experiences a threat to status or sense of belonging, another type of response he can make is to “fight.” Gatward argues that eating restriction can be considered a fight response; eating restriction is a method in which to fight for ones status and belonging; it is used to maintain status and belonging when both feel under threat. Gatward details exactly why eating restriction can be chosen as an effective “fighting” strategy.

The threat that the individual feels is to her sense of belonging, therefore, an effective fighting method would be one which raises her sense of belonging to the group. The sense of belonging is a construct which refers to how much an individual feels a part of a group, and whether they believe that they are, or are perceived to be, a significant group member. The sense of belonging is composed of several constructs, including perceived fitness within a social system, as well as perceived attractiveness, importance, and value to the social system. The more an individual perceives herself to be an attractive, important, and valuable member of the group, the higher her level of a sense of belonging. Eating restriction can be an effective method to increase one’s attractiveness as well as how highly important and valuable she is considered to be by fellow group members.

Eating restriction can be used, and frequently is used, as an effective method to increase one’s physical attractiveness. For both women and men, a healthy body mass

index (BMI) is a good indicator of one's physical health. One's physical health deteriorates considerably on many levels when one becomes overweight, putting one at risk for many health issues, including diabetes, stroke, and heart problems. Both men and women are physically attracted to features that signal health and youth, both of which imply fertility (Buss, 1998). Features such as thick hair, glossy skin, toned muscles are all indicators that an individual is in good health, is likely to be fertile, and is thus a good mate choice. Similarly, body weight is a major and important indicator of health, fertility, and even youth. When an individual has a higher BMI, she not only looks less healthy, she also looks significantly older. A smaller body frame and lower BMI is considered to be an evolutionary adaptive feature which resembles the smaller body frames of young women and girls i.e., those most likely to be fertile. Of course, variations in what is considered to be overweight exist within different cultures and time periods, however, it is generally universally accepted that an individual who is overweight enough to be considered medically obese is considered to be physically unattractive. Researchers have noted the strong selective pressures exerted on a thin body, a body which indicates health, youth, and fertility (Abed, 1998), suggesting that reducing one's body weight is an effective strategy for women to increase their mate value by achieving a thin, nubile form. Reducing one's body weight through eating restriction is thus an effective mechanism for achieving a more attractive appearance, and thus, increasing levels of one's sense of belonging.

A sense of belonging is also composed of one's importance and value to the group, both of which are closely associated with status. The higher an individual's social status, the more important she appears to be and the more valued she is by group

members. This is true across many species, including humans, and our modern, highly civilized environment is certainly not an exception to this aspect of animal behavior. The relationship between social status and one's level of importance and value by others is clearly seen in everyday life. It goes without mentioning that individuals who make more money and are more popular are more sought after for friendships and relationships and are looked at as being more important and valuable. Celebrities are an example; more often than not, when a celebrity walks into a room, she receives a great deal of attention and is sought after by a massive amount of people who may not even know her.

Celebrities are also talked and reported about often even when the stories lack any journalistic or relevant substance; this is testimony to how important these individuals are and how highly valued they are in their society. For an individual who is attempting to fight for her sense of belonging, she will need to choose a response which will enhance her importance and value to the group; both of which are features that are closely associated with higher social status. Thus, an effectual strategy to increase a sense of belonging is to increase one's social status.

In today's societies, eating restriction is considered to be an effective strategy to increase one's social status, because weight loss is a demonstration of one's wealth and one's control. Eating restriction demonstrates social status in several ways; it does so by signaling to other group members one's high wealth of resources, and by signaling one's high level of self-control.

Eating restriction and weight loss as a signal of one's wealth and resources is somewhat controversial. Throughout most of human civilization weight gain was associated with greater wealth status and obesity was a sign of good resources, because

only those with great wealth and plentiful resources could be financially capable to afford obesity i.e., a sign of abundant food resources.

However, obesity has stayed a sign of wealth and resources only until recently (20<sup>th</sup> century), because in most modern cultures food is abundantly available and relatively cheap. Obesity is no longer a symbol of wealth and resources, because our modern environment no longer limits obesity for only the rich. In fact, it is quite the contrary. Obesity is now much more prevalent in lower classes in impoverished areas; and excessive dieting and restriction is much more common in higher classes living in more resourceful areas. Individuals who cannot afford to buy healthy foods, which are more expensive, quicker to spoil, and less plentiful in impoverished areas, eat more fast food, snacks, and high carbohydrate (“junk”) food in their diets. Individuals who tend to buy healthier, organic, and expensive high protein foods have greater income. These wealthier individuals are much more likely to restrict eating, because they can afford to turn away high caloric foods. This is illustrated well with high obesity rates in impoverished areas such as Harlem, and excessive dieting rates in wealthy areas such as Beverly Hills. Researchers have discussed this recent role of thinness as a status symbol, explaining that eating restriction, weight loss, and thin physiques have come to symbolize self-discipline, control, and higher socio-economic class (Horesh, Apter, Ishai, & Danziger, 1996).

In fact, food that is more associated with obesity, such as high carbohydrate, high calorie density “junk food” is actually cheaper to buy and maintain than food that is associated with a thin and fit body, such as high protein, low calorie density, high fiber food (e.g. meats, nuts, and vegetables). Healthy foods are more expensive than junk food;

it costs more money to buy fish and vegetables, which spoil quickly, than cake and candy which can last for months. Healthy foods are more plentiful in wealthy areas than poorer areas; organic and health food stores are extremely rare in impoverished areas, which in general have less full service grocery stores and more fast food restaurants. Now that eating high calorie dense foods is made easy and cheap, eating nutritious healthy foods with low calorie density has become a symbol of a wealth of resources, since only those who are wealthy have easy access to healthy foods, can afford to pay the higher prices for healthy foods, and can afford not to eat. A former sufferer of anorexia and bulimia described the noticeable association between status and eating restriction, “Money--class, really--and eating disorders share a direct relationship with each other. In our culture, thinness is associated with wealth, upward mobility, success... Conversely, fat is associated with weakness, laziness, and poverty” (Hornbacher, 1998, p. 46). Though it is a sharp contrast to much of history, high status is now illustrated through svelte bodies, weight loss, and thinness, as opposed to obesity. Perhaps the most telling evidence of this shift in body ideal can be found in a Western proverb that is just as common as it is disturbing, “You can never be too rich or too thin.”

Furthermore, today, in most cultures, food is abundantly available and relatively cheap; resisting it has become a sign of self-control (Stevens & Price, 2000). “Your ability to withstand pain is your claim to fame. It is ascetic, holy. It is self-control” (Hornbacher, 1998, p. 124). Maintaining and raising levels of control is an effective strategy for maintaining and raising one’s status. This is due to the fact that social status and control are closely associated; increases in status are associated with increases in control. Individuals who perceive an increase in status also demonstrate an increase in

self-control, and as these individuals are perceived to have higher levels of status by group members, they are also perceived to have higher levels of control (Gatward, 2007).

Control i.e., the ability to make changes, is an important component of position in the social hierarchy, or social rank. Social rank itself is associated with status, as high ranking members tend to have high status and increases in social status tend to elevate an individual's position in the social hierarchy. Individuals who have higher social rank display more dominant behavior, and individuals who have lower social rank display submissive behavior. Dominant behavior is likened to high levels of control, as dominants have more control than submissive members (Gatward, 2007). Dominants who behave accordingly, with dominant behavior, have greater control over their group, their environment, and any particular situation involving other members. In general, dominant behavior is likened to higher levels of control. Thus, the more an individual feels in control, the more dominant her behavior is and usually the higher the position she occupies in the social hierarchy. When an individual's social rank and thereby status is lowered, she feels a loss of control, and when she feels a loss of control, she might perceive her social rank and status as lowered. This is similar to the loss of control that is experienced when an individual feels attacked. For example, when an individual is physically attacked, it is a violation of her abilities to make changes or choices, and may be experienced as a severe loss of control. Similarly, it is argued that a sudden or severe loss of control i.e., being "force fed" may be felt as an attack.

Social status and control are shown to be related; therefore, it is theorized that an effective way to raise one's status is by raising one's level of control. Environmental pressures have made the incentive to eat very high, and eating food, especially high



calorie dense food, is considered to be pleasurable. Resisting food effectively is necessary for losing weight through eating restriction, but in today's environment where food, especially high calorie dense food, is cheap and plentiful resisting the temptation to eat takes a great deal of will-power and control. Thus, weight loss, as evidenced by eating restriction, is a clear signal for high levels of control. Since a high level of control is likened to dominant behavior that is demonstrated by dominants who have high social rank and status, a high level of control is a symbol of high social rank and status. Essentially, maintaining and raising ones level of control is an effective strategy to maintain and raise one's status. Eating restriction has been shown to be a commonly used strategy in the attempt to achieve that control. Hornbacher's sincere acknowledgment that she secretly wanted people to know that she had an eating disorder illustrates her desire to be praised for her efforts. "On one level, I wanted very much to get caught. I did not want to get caught to be saved. I wanted to get caught to be seen as something, to have a claim to greatness, to have the sick admiration that comes to those of us who destroy ourselves particularly well. My god! People say. You have so much *self-control!*"(Hornbacher, 1998, p. 124).

It is hypothesized that individuals who restrict their eating may do so to maintain status when they feel a threat to their status and belonging; one way an individual can achieve increased status is by increased levels of control. It is thus interesting to note the common role of control for individuals with anorexia nervosa. Individuals with anorexia nervosa have reported that the control they feel when they restrict is often the only control they have ever felt. Many clients have reported that they have had lives which have been heavily controlled by others, and their eating is thus the only thing they felt

they had control over. Thus, controlling their eating, particularly in challenging ways such as through severe restriction, substitutes as a means of gaining a sense of control in other facets of their lives. In the words of a woman who battled anorexia, "By controlling the amount of food that goes into and out of you, you imagine that you are controlling the extent to which other people can access your brain, your heart" (Hornbacher, 1998, p. 68).

Individuals with anorexia, a disorder which itself revolves around control and the obsession with strict control over food, often note the low levels of control, autonomy, and independence they felt that they had before restricting eating. They further report increased feelings of control they felt they gained when they began restricting eating. Researchers have previously hypothesized that anorexia may be an attempt to raise an individual's level of control when she may otherwise not feel that she has any (Bruch, 1982).

There is abundant evidence which demonstrates a relation between control and restrictive eating pathology (Frederick & Grow, 1996). The research literature on anorexia nervosa has consistently shown a relation between eating restriction and low levels of perceived control; including substantial evidence demonstrating the strong association between eating restriction and having an external locus of control, which is the perception that one's life is more strongly influenced by outside forces rather than by oneself (Horesh, Zalsman, & Apter, 2000).

As opposed to non-clinical women, women who have been diagnosed with eating pathology, especially anorexia, are more likely to report a lower sense of personal control over their lives as well as over external events in the world, even after depression levels

are co-varied out (Dalglish, Tchanturia, Serpell, Hems, de Silva, & Treasure, 2001). There is substantial data showing that individuals with anorexia nervosa are also much more likely to have an external locus of control as opposed to non-eating disordered individuals, feeling that they have a lowered ability to influence their own lives. Furthermore, among women who have been diagnosed with anorexia, a low sense of control and an external locus of control have been found to be positively associated with the severity of symptoms (Horesh, Zalsman, & Apter, 2000; Strober, 1982). Individuals with anorexia who reported having a lower sense of control or an external locus of control have been found to have more severe restrictive eating pathology. Locus of control has consistently been shown to be the best predictor for the presence or absence of anorexia, as well as the best predictor for the severity of eating disorder symptoms, when compared to other variables such as family overprotection, enmeshment, and rigidity (Harding & Lachenmeyer, 1986).

Individuals who have had anorexia nervosa have often noted the contentment they felt from the increased sense of control when they were heavily restricting their eating. Many clients with anorexia nervosa find that the perceived loss of control when attempting weight gain is one of the most unpleasant aspects of recovery. The quantitative and qualitative evidence supporting the association between self-control and eating restriction supports the hypothesis that eating restriction is a response to maintain status by establishing control; restricting one's eating in an environment where food is abundant and cheap and many individuals are struggling to lose weight does indeed demonstrate a great deal of personal will-power and self-control, which is associated with status. Not only does re-feeding i.e. integrating new, previously restricted foods or

increasing one's caloric intake, feel like a ceding of control to others for individuals with anorexia nervosa, but eating restriction may feel as an establishment of control and status to individuals in a non-clinical population. As a woman with anorexia wrote in her autobiography *Wasted* regarding the high demand for women to exude status by demonstrating control, "This is one of the terrible, banal truths of eating disorders: when a woman is thin in this culture, she proves her worth, in a way that no great accomplishment, no stellar career, nothing at all can match. We believe she has done what centuries of a collective unconscious insist that no woman can do--control herself. A woman who can control herself is almost as good as a man. A thin woman can Have It All" (Hornbacher, 1998, p. 81-82).

Eating restriction is hypothesized to be a response to the threat of exclusion when one's status and sense of belonging are threatened. Eating restriction is used as a fight response in order to raise or maintain one's status or sense of belonging. In order to maintain sense of belonging, one must achieve attractiveness, importance and value in the group. Eating restriction helps to raise attractiveness by allowing the individual to achieve a nubile body, associated with youth and fertility. Eating restriction also maintains sense of belonging because eating restriction helps to achieve higher social status, which includes one's importance and value in the group. Eating restriction maintains status in several ways; it demonstrates wealth and resources (which symbolize status) because only the wealthy can afford to be "choosy" with their diet and can afford to turn food away, and it demonstrates control (which is attributed to dominants with high social rank and status) because it takes a great deal of control not to eat. Eating restriction and control are related; eating restriction is hypothesized to be a strategy to demonstrate

control. Due to the fact that eating restriction helps achieve attractiveness and status, successful eating restriction can be felt as very rewarding. Eating restriction can be effective in maintaining attractiveness and status, which lead to a sense of belonging. Eating restriction can thus be one of several responses to the threat of exclusion, and can be used as a strategy to fight for one's status and belonging when both feel under threat.

Gatward's (2007) hypothesis regarding eating restriction as a response to the threat of exclusion will be used for purposes of the present study. However, Gatward's threat of exclusion hypothesis for anorexia nervosa includes the synthesis of several other evolutionary ideas to further explain the course of the eating disorder. Gatward explains that an individual who is restricting will only develop anorexia when weight loss reaches a critical low point that sets off the reactivation of an old adaptive response to famine, previously discussed as the basis of the adapted to flee famine hypothesis. However, the reactivation of the ancient response to famine only occurs in the individuals who have genetically inherited it, which is a very small percent of the population.

This genetic inheritance explains why, though eating restriction is very common in our modern environment and is frequently used to demonstrate status, very few individuals go on to restrict their eating to increasingly severe levels, and even fewer individuals develop restrictive eating pathology such as anorexia nervosa. When there is a threat to one's status or belonging, of the individuals who choose to fight this threat by responding with eating restriction, only the individuals who have inherited the ancient response to famine, and only those who have reached a critically low weight necessary to set off this response, will continue eating restriction and will go on to develop anorexia nervosa.

After a significant amount of weight loss is demonstrated in individuals with severe anorexia, the detrimental repercussions greatly increase in intensity and severity; one's health, fertility, attractiveness, sociality, and survivability are compromised and placed at high risk. However, individuals with anorexia nervosa continue to restrict. At first, eating restriction is often an attempt to be more popular and more well-liked. As eating restriction becomes more severe, one's social life is often so problematic that it is characterized by loneliness, anxiety, and fear. Increasingly severe anorexia is often accompanied by avoiding friends, losing friends, avoiding public situations entirely and becoming increasingly isolative. These individuals, who tend to have been perfectionistic, gifted, and intelligent individuals with a tendency to over achieve, will find themselves in the severe stages of anorexia giving up entirely on their goals and dreams. At this point, it seems that their only concern is their weight and that they are comfortable sitting alone in their defeat, loss, and self-imposed death sentence. The fact that these individuals will continue to restrict their eating even in such a grave situation has been a difficult paradox for researchers to explain, but Gatward (2007) states that it is a normal reaction for someone who has been removed from competition, i.e. gives up competing for mates.

Gatward (2007) again uses evolutionary ideas about threat to explain the continued eating restriction that is found in anorexia when weight loss is severe and life-threatening, and the individual has appeared to stop "fighting." They are on their way to losing everything, so why then, do they continue restricting? Gatward explains that individuals at this severe stage of anorexia, who have lost a significant amount of weight, are no longer in the competition for status and mates. Eating again would mean gaining

weight and thus becoming healthier and increasing reproductive capacity, which means re-entering the competition for status and mates and once again being at risk for attack by dominants or exclusion from the group. Hornbacher (1998, p. 279) described the sense of peace that can be found when a game is lost and one no longer has to play, "There is, in fact, an incredible freedom in having nothing left to lose."

In the case of an individual who has reactivated the adapted to flee famine mechanism and therefore has lost a significant and severe amount of weight, they have effectively been removed from competition--no longer appearing at all healthy or reproductively capable--and this is felt as rewarding, because they no longer have to deal with a frightening competitive environment in which they must constantly "fight" with individuals who either are, or who are perceived to be, more dominant; they no longer have to deal with the uncomfortable and scary environment in which they feel there is a high potential for being attacked or excluded from the group. Therefore, the concept of weight gain, and of re-entering the competition, is felt as profoundly dangerous because it can once again elicit the undesirable and treacherous possibility of attack or exclusion. Gatward (2007, p. 6) explains that "When others try to get the person to eat this will be felt as an attack and a ceding of control to others, and thus be defended against vigorously. This then may explain why it is so difficult to recover from anorexia nervosa." When viewed from this context, the mystery of why recovering from anorexia nervosa is so difficult becomes more clear; asking an individual in a non-sensitive manner to eat more and gain weight is essentially felt by the individual as if she is being asked to re-enter a fighting match , one in which she is certain she cannot win.

Few individuals, without extensive boxing experience, will be willing to enter a boxing competition with heavyweight champion Mike Tyson. If the individual has the evolved ability to realistically compare himself to others, he will understand that he is likely not to win. Thus, the average person would most likely not enter the boxing competition with Mike Tyson. It is also important to note that the person would most likely not box Mike Tyson even if there was a large incentive, such as a large sum of money. The average person would likely refuse to box Mike Tyson no matter what the winning prize is, because the cost of defeat is likely to be perceived as being far too great and the chances of defeat are likely to be recognized as being far too high. Anorexia nervosa is often viewed as a puzzle because, for the general population, the extremely high incentive of eating cannot feasibly compare to the incentive of weight loss, especially once starvation has set in. However, for the individual who has activated the adapted to flee famine mechanism and has lost enough weight to be removed from the competition, the possibility of re-entering competition and facing the hazards that surround life at the bottom of the social hierarchy is considered dangerous enough to keep the incentive to eat low and the incentive to continue eating restriction high. When an individual's survival depends on her membership in a social group, and the potential punishment for defeat in such a fighting match is abandonment, it is understandable why she will be afraid and even vehemently refuse to enter the ring (competition).

#### A Sense of Belonging

A sense of belonging is the perception of one's integration and personal involvement within a social environment or system (Hagerty, Lynch-Sauer, Patusk, Bouwsema, & Collier, 1992). The experience that one is a valuable, needed, and an



important member of the group composes a sense of belonging; in other words, an individual feels like she belongs when she feels that others in the group value her, believe she is a necessary member, and view her as having a certain level of status which qualifies her as important. Thus, an individual feels a sense of belonging when she feels valued, needed, and significant to the group.

A sense of belonging has been shown in recent years to be a fundamental aspect of psychological well-being, and researchers have urged greater study into the construct and how it relates to mental health (Baumeister & Leary, 1995). Despite the belief that a sense of belonging is a critical feature involved in mental pathology, relatively little research has been done on the matter, and even fewer researchers have considered a sense of belonging as a feature of eating disorders and eating restriction. However, there is support that a sense of belonging is an important element in overall human nature, in understanding psychopathology, and specifically involved in the phenomena of eating restriction.

After examination of the strong desire for belonging, Baumeister and Leary (1995) firmly stated that “The desire for interpersonal attachment may well be one of the most far-reaching and integrative constructs currently available to understand human nature” (p. 522). The researchers explained that the importance of interpersonal relationships in human nature lead the researchers to point out that the array of adaptive mechanisms in our evolved psychology includes mechanisms for maintaining membership and co-existence within a social group. Gatward (2007) elaborated on the need to belong as one of the most, if not the most, critical constructs in psychological well being, stating that it is likely “to see belonging to a group as the most fundamental of

human needs” (p. 3). Gatward used the concept of the need to belong in a theory for anorexia nervosa in which dietary restriction is initially a “fight” response to the perceived threat of exclusion from the group (Gatward, 2007).

### *Sense of Belonging and Psychopathology*

A sense of belonging has been shown to play an important role in many areas of mental health. Studies have provided strong evidence that a sense of belonging is a critical feature of the human condition. Researchers Bailey and McLaren (2005) found that a low sense of belonging is associated with high levels of depression as well as high levels of suicidal ideation. Kissane and McLaren (2006) further examined a sense of belonging and depressive symptoms and found that, additionally, a lower sense of belonging is also associated with having fewer reasons to live.

Gay and lesbian men and women are an example of a particular population which has recently been the subject of research in regards to the relationship between a sense of belonging and mental health. In a study on resilience among male farmers, McLaren and Challis (2009) found that a sense of belonging compensated for high levels of depression and that social support and a sense of belonging operated as protective factors against suicidal ideation from depression. A sense of belonging was found to weaken the depression–suicidal ideation relation, which led the researchers to suggest that the mental health of male farmers may benefit by increasing their sense of belonging.

In a study (McLaren, 2009), on the sense of belonging to the general community and the sense of belonging to the lesbian community as predictors of depression among self-identified lesbians a sense of belonging to the general community and a sense of belonging to the lesbian community were both directly related to depression. Further,

McLaren (2009) found that a sense of belonging to the general community, or the lack of, contributed significantly to the prediction of depression in lesbians. The researcher noted the importance of a sense of belonging to both the general and the lesbian communities for mental health, but, particularly for lesbians who do not feel a sense of belonging with the lesbian community, enhancing a sense of belonging to the general community is a priority for the mental health of lesbians. The clinical implications of the study are that lesbians suffering from depression may be able to reduce depressive symptoms by increasing a sense of belonging; thus, treatment should encourage meaningful participation in the general community in order to develop a sense of belonging which can further reduce depressive symptoms.

A similar study was previously conducted using gay men as participants (McLaren & McLachlan, 2008). The researchers examined a sense of belonging to the general and gay communities as predictors of depression among gay men. A high sense of belonging to both the general and gay communities was found to have mediating effects upon depression. The data suggests that depression among gay men decreases with an increase in a sense of belonging to both communities.

Choenarom, Williams, and Hagerty (2005) examined heterosexual individuals with depression to investigate the role of a sense of belonging and social support on stress and depression. The researchers found that increased perceived stress and decreased sense of belonging had significant direct effects on the severity of depression and that the effects were consistent over a longitudinal period of nine months, while the other features of the study, including social support and spousal support, had only indirect effects that fluctuated over time. The results led the researchers to highlight the influential role that a

sense of belonging may have for the treatment of depressive symptoms; interventions aimed at stress reappraisal and the promotion of a sense of belonging were specifically mentioned as possible methods to yield direct and stable effects for decreasing symptoms of depression.

A sense of belonging has also been shown to play an important role in areas such as adjustment. In a study on college adjustment (Ostrove & Long, 2007), social class background was found to be significantly associated with a sense of belonging at college and was marginally related to academic performance. Further, researchers found that a sense of belonging mediated the relationship between class background and adjustment to college. The results imply that if a student, for example, came from a lower socioeconomic status background, he was more likely to have a healthy adjustment to college if he felt a high sense of belonging. However, social class background is associated with a sense of belonging, which makes it difficult for the protective mechanism of belonging to take place when the individual comes from a lower class. Results suggest that students finding it difficult to adjust to college could increase their levels of healthy adjustment with an increase in a sense of belonging, and that students from a lower social class background may require additional assistance.

The data from the research reveals the important role that a sense of belonging plays in human well-fare. Despite a long history of being ignored as a relevant construct in the field of psychology, a sense of belonging is paramount for psychological well-being and is a fundamental feature of the human experience. This has led researchers to pay closer attention to the construct and test models of psychopathology which include the consideration of a relationship of illness to a sense of belonging. Recently,

researchers have named a sense of belonging as “a vital mental health concept” (Hagerty, Lynch-Sauer, Patusky, & Bouwsema, 1992, p. 172) and “as an integral dimension of the human experience” (Friedman, 2007, p. 3394). Friedman explains that a sense of belonging “is a distinct and essential component of social connection, yet one that has been largely ignored by the field of psychology.” Friedman argues that a sense of belonging must become a focus of study and argues for its centrality in the field of psychology. Friedman asserts that “the cultivation of sense of belonging is crucial for an individual's physical and mental health throughout the lifespan, and that addressing this need is both critical and timely.” (Friedman, 2007, p. 3394)

Gatward (2007) explained what he called dietary restriction using the concept of the need to belong. Gatward hypothesized that when an individual experiences a threat to one's status or of exclusion from the group, the individual may respond with dietary restriction as an attempt to maintain status and belonging. Obesity has been a symbol of high status for much of history, because food was expensive and rare and only the wealthy could afford to be obese. However, in the majority of the modern world, food--especially food with high calorie density--has become cheap and plentiful, and restricting one's food intake, as can be evidenced by weight loss, has accordingly become a symbol of high status, because only those with the most wealth and control can afford to restrict eating. In sum Gatward theorized, in regards to eating restriction, that the threat of exclusion causes low levels of a sense of belonging, which may result in the individual attempting to maintain status and belonging through restriction, which has become a symbol of status and control.

Gatward's (2007) ideas about a sense of belonging and restrictive eating are supported by the view that belonging to a group is a fundamental human need and data exists which links social pathology and eating pathology. Such data is evidence demonstrating the important role of social support and friendship quality to eating restriction and eating disorders. Further data illustrates the relation between sociality and eating restriction; for example, several studies show that eating disorder patients report poor social networks. Tiller, Sloane, Schmidt, Troop, Power, & Treasure (1997) found that individuals diagnosed with an eating disorder had smaller social networks than controls. Further, of the individuals diagnosed with an eating disorder, those diagnosed with anorexia nervosa, which implies more severe eating restriction, were significantly less likely than those diagnosed with bulimia nervosa to have a romantic partner.

Social support involves more than relationships with friends, confidantes, and romantic partners; it includes family relationships as well. Research dealing with eating disorders and family relationships has also demonstrated a relation between eating restriction and low levels of perceived support from family members in particular. Karwautz, Nobis, Haidvogel, Wagner, Hafferl-Gattermayer, and Wober-Bingol (2003) found a disparity in the perception of family relationships of young women diagnosed with anorexia nervosa and their nondiagnosed sisters. The researchers found that despite living in the same familial environment, the girls diagnosed with anorexia nervosa reported lower individual autonomy and higher cohesion in their family relationships than their nonpathological sisters, but no difference existed with levels of emotional connectedness. Although the girls with anorexia nervosa felt less autonomy and increased familial cohesion, there was no subsequent increase in perceived emotional support.

Although there is evidence citing belonging as a fundamental human need and data which illustrates a relation between social pathology and eating pathology, Gatward's (2007) threat of exclusion hypothesis was among the first to cite a sense of belonging specifically as a critical agent for eating restriction. There is evidence demonstrating the importance of a social life to eating restriction. A link between a sense of belonging, which is a specific essence of social life, and eating restriction has not yet been empirically established, as it has not, to date, been a subject of empirical study. There is however some evidence which suggests an association between the sense of belonging and eating restriction.

Case studies of women suffering from restrictive eating disorders were evaluated in order to examine the interaction between religious faith, pathogenesis and clinical management (Morgan, Marsden, & Lacey, 1999). The researchers studied the role that four women's religious faith had on their eating disorders and treatments. Although the focus of the study was on faith, the researchers found evidence which supported the notion that a sense of belonging is critical in regards to eating restriction. The researchers found that in some cases religious faith had detrimental effects on individuals who held the concept of a punitive God. In other cases, religious faith provided strong benefits for individuals who experienced a sense of belonging that was provided through their religious organizations. The researchers discovered that religious faith provided a containment of maladaptive behaviors, not through the religious beliefs but partly through a sense of belonging to the religious community. The study set out to examine how religious faith in Christianity interacts with eating disorders. The study indirectly provided support for the notion that a sense of belonging may play a critical role in eating

disorder treatment. A sense of belonging to a religious community may be critical in eating disorder treatment irrespective of the specific religious beliefs because it provides the more fundamental need to belong. There are important implications for eating disorder treatment; a sense of belonging may be a significant factor in treatment effectiveness and relapse prevention, meaning that clients may have better treatment and post-treatment outcomes if they are encouraged to join a group which reflects their personal faith, or other organizations with strong communities that provide a sense of belonging, e.g. 12-step-type programs.

If eating pathology has deep roots in perceived threats and eating restriction is a response to the threat of exclusion, encouraging a client with an eating disorder to become more involved in her community or to participate in a group may be a very powerful tool for eating disorder treatment. There must be strong consideration given to the types of social groups that the treatment professional may recommend for a client. A sense of belonging is a very deep human need and the threat of exclusion is felt as highly dangerous. If, in fact, a social group may be more prone to facilitate eating restriction, a sense of belonging to such a group could worsen the symptoms. Groups which may be more prone to facilitate eating restriction include groups which revolve around activities that put high emphasis on low weight (e.g. dancing, wrestling, and modeling), and groups which demonstrate higher levels of competition, specifically competition within the group, especially intra-sexual competition (e.g. high-status clubs such as those which require an expensive fee for membership, sports, sororities). Sororities are a specific example of groups which can be thought of as having very highly competitive environment, especially intra-sexual competition. The competition is illustrated by their



high levels of same-sex interaction as well as in their membership requirements which tend to focus on appearance, money, and popularity. Research has shown that membership in such highly competitive groups as sororities is in fact related to eating pathology (Alexander, 1998; Meilman et al., 1991). Basow, Foran and Bookwala (2007) found that women who belonged to sororities, as well as women who intended to join sororities, had higher levels of disordered eating than women who did not belong to a sorority or women with no intention to join. The women who belonged to a sorority and intended to join also had higher levels of body objectification and social pressure compared to the women who were not members and who were not interested in becoming members.

The researchers (Basow, Foran and Bookwala, 2007) also discovered data which may demonstrate how belonging may influence one's eating when membership is toward a group with intense competition and emphasis on appearance. The researchers found that the amount of time spent living in a sorority house is positively related to eating restriction; women who lived in a sorority house longer had higher levels of body objectification and disordered eating. Living in a sorority house means living in an environment in which the competition is all around you, all the time. The competitive environment was experienced as stronger by individuals who had lived in the house longer, which may partially explain why those individuals had higher levels of disordered eating.

Although a low sense of belonging is hypothesized to facilitate the response to restrict eating; belonging to a sorority appears to enhance the likelihood of eating pathology. The results do, however, provide compelling support for the threat of

exclusion hypothesis. Gatward (2007) hypothesized that eating pathology would be more common in groups with a high same-sex ratio, because of increased intra-sexual competition. He also stated that women of higher social class may be more likely to restrict eating because such circles would be highly competitive as well. Sororities not only revolve around female-only membership, but membership that is based on popularity, requires a great deal of money, and emphasizes appearance. Being a member of such a highly competitive same sex environment would mean higher levels of competition for status and belonging, and thus higher levels of eating restriction. Thus, the finding that sorority members restrict eating more than nonsorority members, as well as the finding that members who have lived for a longer length of time in a sorority house will have higher levels of eating pathology, supports the threat of exclusion hypothesis. These individuals restrict eating more because they are in an environment in which competition for status and belonging will be experienced as greater. The evidence here not only supports the threat of exclusion hypothesis, but provides some important clinical implications. If eating restriction is a response to maintain one's status and belonging when one feels a threat of exclusion, then facilitating a sense of belonging should be a major goal for eating disorder treatment. However, the community to which a clinician encourages belonging should be taken into careful consideration, noting that groups which operate in an unusually high competitive arena and emphasize appearance may facilitate eating pathology in individuals with a tendency to restrict eating as a threat response.

Further evidence which suggests a possible association between a sense of belonging and eating restriction may be provided in a study which examined what school

experiences influence dental hygiene and nutrition behaviors of Canadian adolescents. Researchers found that nutrition is strongly associated with social support (Ma, 2007). The data revealed that schools which most effectively promote healthy eating behaviors show strong parental support and positive peer influence.

A field which has been privy to some recent research in regards to eating restriction and a sense of belonging is ethnic identity. Research has provided some support that a strong ethnic identity is negatively associated with eating restriction (Stojek, Fischer, & Collins, 2010). Researchers have posed that a strong ethnic identity may foster a higher sense of belonging (in this case, belonging to an ethnic group) which lowers the likelihood of eating restriction (Chan & Owens, 2006). It may be that the sense of belongingness one feels to an ethnic group, regardless of the ethnicity, is the pivotal factor which lowers the likelihood of eating restriction. The research suggests that it is not a strong ethnic identity to a particular ethnicity, but rather, it is the sense of belongingness to a group in general that lowers the likelihood of eating restriction.

Recently, a study has provided strong support for the role of a sense of belonging in eating restriction by asking the individuals who are most affected by eating restriction, current and former eating disorder patients, about what life factors are most important (De La Rie, Noordenbos, Donker & Van Furth, 2007). A sense of belonging was cited by the participants as the single most important aspect of their lives. Specifically, the researchers provided support for the role of a sense of belonging for current and former eating disorder patients when they investigated the personal views of these individuals on their quality of life. The participants named the most important aspects of their lives and rated themselves on their current level of functioning on each aspect. Both current eating

disorder patients and former eating disorder patients named sense of belonging as the most important aspect for their personal quality of life. Participants also ranked what they felt was the most important aspect of life in general, sense of belonging was most often ranked as the single most important life aspect. Furthermore, current eating disorder patients reported poor quality of life on most life aspects, and former eating disorder patients reported significantly better quality of life than current eating disorder patients.

Although former eating disorder (ED) patients reported their quality of life as better on most life aspects, it is noteworthy that both former and current eating disorder patients agreed on the most important aspect of life and the most important aspect for their quality of life (QOL)--a sense of belonging. The results showed that 93.0% of the participants in the study mentioned a sense of belonging as important to their quality of life, which led the researchers to conclude “that having a family, partner or friends seems to be of particular importance in the perception of the QOL of both current ED patients and former ED” (p. 18). The study also found that a sense of belonging was mentioned most often as the most important aspect of life, which led the researchers to conclude that “To enhance the QOL of ED patients it seems important to address the quality of the patient’s social relationships when treating eating disorders” (p. 18). The researchers’ suggestions are congruent with previous conclusions made by researchers who have also noted the unique clinical significance of sociality on eating disorder treatment. Bloks, Van Furth, Callewaert, and Hoek (2004) conducted a study in which they examined coping strategies and recovery in eating disorder patients who demonstrated severe eating restriction. The researchers found that for patients who severely restrict their eating, recovery is significantly associated with seeking social support.

Despite the large body of evidence demonstrating the important role that sociality plays in eating pathology, a sense of belonging's specific relationship to anorexia nervosa or eating restriction has not to date been a subject of inquiry. However, the previously mentioned studies suggest the likelihood of an association between sense of belonging and eating restriction. The body of evidence is strong enough to call for further inquiry into the threat of exclusion hypothesis, and, specifically, into the relationship between eating restriction and sense of belonging.

#### The Relationship Between Eating Restriction and Fear of Negative Evaluation

Individuals who have eating pathology and significantly restrict eating have frequently been shown to also exhibit various forms of social pathology as well. Clinically, eating disorders have a very high co-morbidity with social phobia. Research shows that individuals who restrict eating have a higher degree of sensitivity to criticism from others than nonclinical individuals (Gerner & Wilson, 2005). Furthermore, research has demonstrated that there is a significantly high rate of Avoidant Personality Disorder in the eating disorder population; men and women with eating disorders are more likely to be diagnosed as having avoidant personality disorder than any other pervasive personality disorder. Additional research demonstrates that women with eating disorders were more likely to report previous social exclusion, problems with attachment, and difficulty with friendships. In a cross-cultural study of African American and Hispanic adolescent women, both groups were found to be more likely to have eating disorder behaviors and attitudes if there existed feelings of "not fitting in" with their peers (Wal, 2004). Research has also shown that a major predictor in dieting behavior of nonclinical adolescent women is fears of being negatively evaluated (Vander Wal & Thomas, 2004).

Studies of non-clinical American samples of women have also demonstrated a link between disordered eating and feelings of social exclusion (Oaten, 2008). Researchers have found that in a sample of college students, feelings of social exclusion were significantly correlated to not only self-image, but also dieting behavior (Ferrier & Martens, 2008). Drawing on these preliminary findings, researchers later examined the relationship between eating disorders and fear of negative evaluation. The findings were all consistent; there is a strong link between the fear of negative evaluation and eating restriction, but no such link has been found between the fear of negative evaluation and other subscales of eating disorders, most notably bulimia (Gilbert & Meyer, 2003; Troop, Treasure & Katzman, 2003). The data supports Gatward's (2007) hypothesis that eating restriction is a response to the perceived threat of exclusion from the group. When a woman feels a threat to her status or belonging, she may respond with an attempt to "fight" by restricting. Restricting eating, as has been previously discussed in depth, is used to increase one's sense of belonging by increasing attractiveness (through achieving a nubile form), and increasing levels of importance and value to the group (through increasing status by demonstrating wealth and high levels of control--only the wealthy can afford to restrict and it takes a great deal of control to resist the temptation to eat). The results support the threat of exclusion hypothesis because the data suggests that eating restriction is a common strategy used by women in order to raise their status among their peers.

Several studies were later done to more closely examine the link between eating pathology and the fear of negative evaluation. Gilbert and Meyer (2005 a) found that among nonclinical samples, negative evaluation fears regarding people in general are

linked to restrictive eating i.e. anorexic but not with bulimic psychopathology. The evidence supports the notion that eating restriction may be a response to the threat of exclusion from the group. Furthermore, it draws an important distinction between anorexic and bulimic pathologies. The data suggests that eating disorders as a cluster may not be related to the fear of negative evaluation, which previous data regarding eating disorders and social pathologies might imply. It is eating restriction that has a clear, strong, positive link to the fear of negative evaluation. The suggestion made from the threat of exclusion theory has stronger ground on such data which strongly suggests that there is a threat, or perceived threat of exclusion from the group by an individual. Perhaps this threat is warranted. On the other hand, the perception may be false, possibly attributed to the significantly low degree of empathy, high rates of social phobia and avoidant personality disorder and higher sensitivity to criticism that characterize individuals with eating disorders. Whether the threat is real or unreal seems to be irrelevant. It is the “perceived” threat of exclusion from the group--exclusion stemming from being evaluated negatively by others--that is correlated to eating restriction. Eating restriction is likely to be a response from high fears of negative evaluation which signal a possible exclusion from the group, a move fatal to our ancestors and a behavior universally distressing and paralyzing, even today.

Additional data suggests the possibility that bulimic pathology may arise in the long-term when the initial eating restriction does not succeed in easing the anxiety experienced by individuals with high negative evaluation fears. In a study by Gilbert and Meyer (2005 b), the exclusive link between heightened negative evaluation fears and restrictive eating attitudes was examined longitudinally. Gilbert and Meyer found that

dietary restriction, which is highly linked to fear of negative evaluation cross-sectionally, is not replicated longitudinally. However, bulimic pathology, which has no link to fear of negative evaluation in cross-sectional studies, appears highly correlated to fear of negative evaluation longitudinally. Their findings support a threat of exclusion model whereby individuals with heightened fears of negative evaluation may use eating restriction to raise their status among peers. The researchers used their data to suggest that if this mechanism of dealing with fears of negative evaluation is not sufficient in the long term, individuals may develop bulimic symptoms to deal with their negative evaluation fears. This supports the evolutionary theory which proposes that eating restriction--independent of bulimic pathology--is a response to the threat of being negatively evaluated by others, which would be typical of exclusion from the group. Bulimic pathology seems to appear in the long-term only if and only after the initial response to the threat, anorexic symptomology, does not ease the anxiety.

#### Fear of Negative Evaluation, Sense of Belonging, and Eating Restriction

Belonging to a group has been so essential for our survival that environmental pressures heavily selected for a strong and universal need to belong. This evolutionary mechanism explains why the associated features of belonging, which signal a high sense of belonging to the group, such as favorable comparisons, high social rank, acceptance and popularity, are felt as rewarding. The possibility of exclusion, however, was deadly in our ancestral environment and continues to be felt as such, as threatening as any other grave attack or high risk to one's life. The associated features of possible exclusion that signal one's low sense of belonging, such as unfavorable comparisons, low social rank, ostracism, and rejection are felt as extremely painful. Although the associated features of



exclusion are unwanted, uncomfortable, and painful, they do serve an important purpose as potential warnings of possible exclusion because they indicate negative evaluation from other group members. Individuals who are negatively evaluated by the group are more likely to face a threat of exclusion, and individuals who are faced with possible exclusion have necessarily been negatively evaluated by group members. Given this association, it is hypothesized that individuals who have lowered feelings of belonging will have heightened fears of being negatively evaluated. Thus, sense of belonging and fear of negative evaluation are expected to have a negative association.

The relationship between disordered eating and abnormality in social life has been illustrated in many research studies. The well-documented social abnormalities in individuals who restrict eating represent not only a general difficulty with feeling a sense of belonging to a group (poor friendship quality, low social networks, ostracism and exclusion), but also, heightened sensitivity to belonging cues (hypersensitivity to criticism and rejection, poor social comparison, heightened fears of being negatively judged, ridiculed, and disliked). Essentially, individuals who have restrictive eating pathology have been shown to have difficulty fitting in (lowered levels of feeling they belong), as well as being hypersensitivity to signs that they do not fit in (heightened fears of being negatively evaluated). Thus, it is hypothesized that eating restriction levels will have a negative association with a sense of belonging levels, and eating restriction levels will have a positive association with fears of negative evaluation levels).

## Eating Restriction and Cultural Orientations

### *Eating Restriction in American Cultural and Iranian Cultural Women*

One way to determine whether the proposed link between eating restriction and a sense of belonging and fear of negative evaluation represents an evolutionary response to the threat of exclusion from the group would be to conduct cross-cultural comparisons of the variables. The relation between eating restriction and a sense of belonging and fear of negative evaluation has not been cross-culturally examined. A group of particular interest in such a study would be Persian women, given the high rates of eating pathology for women in Iran, which matches the rates seen in Western countries (Nobakht & Dezhkam, 2000). Cross-cultural analyses have shown that in general, Western countries have a higher percentage of women suffering from eating disorders than non-Western countries, which is attributed to the Western thin ideal and the role of the Western media. Iran, considered a non-Western country, is one of the few exceptions; body dissatisfaction and dieting have been found to be as prevalent in Iran as in the United States.

In order to more closely examine the eating pathology found in Iran and the United States, Abdollahi and Mann (2001) evaluated the prevalence of eating disorder pathology in Persian women living in Iran, and Persian women living in the United States. The study was cross-sectional and controlled for several possible confounds. The researchers expected to find evidence that Persian women in the US are more likely to have eating pathology than Persian women living in Iran. To the contrary, Persian women living in Iran were just as likely to have eating pathology as Persian women living in the US. It was concluded that neither the western ideal of thinness nor the influence of the media had an impact on eating pathology in Persian women. Both the thin ideal and the

power of western media have been viewed as playing critical roles in eating disorder development (Mealey, 2000), but seemed to play little to no role in the development of eating pathology for the sample of Persian women. It is important to understand how the various causes of eating disorders function independently or together to cause eating pathology, and if there are variances in how and why eating pathology is developed for women in other countries or with different cultures.

*Cultural Orientations: Individualism and Collectivism*

Older, collectivistic cultures place greater emphasis on the importance of social groups (being accepted, fitting in, being valued, and being liked by group members), whereas newer, individualistic cultures tend to place less emphasis on the importance of social groups. Decades of research have suggested these claims (Bakan, 1966; Hui & Villareal, 1989; Triandis, 1988; Triandis, 1991).

The difference in the emphasis placed on the importance of social groups between collectivistic and individualistic cultures is thought to be because individuals in older cultures were more reliant on the social group for survival (Triandis, 1988). Older cultures necessitated belonging to a group for survival, both of the survival of the individual and of the species itself. Ancestral environments required group membership if one was to eat regularly and find a mate, as well as have shelter and protection. Older, more collectivistic cultures since the Pleistocene era are thought to place greater emphasis on social groups for the same reasons. Older, collectivistic cultures developed during a time in which survival without a group was unlikely, thus, chances of survival were much greater if an individual was a social group member. Membership required being accepted, or in other words, positively evaluated. Newer, more individualistic

cultures are thought to place less emphasis on social groups because they developed during a time in which the chances of survival without group membership had markedly increased. Individualistic cultures developed during a time in which individuals were much less reliant on one another for survival. Due to technological, medical, and other cultural advancements newer individualistic cultures offer an environment which makes survival more likely without the resources, mates and protection offered by a social group. However, given that our adaptations are a mechanism of our ancestral environment, the adaptation for fear of exclusion and pain from rejection continue to be felt in the same way. Newer, more individualistic cultures may place less emphasis on the importance of social groups because, in fact, social groups in these environments are less important for survival. However, the adapted fears of exclusion, pain of rejection, and intense hurt from ostracism continue to be felt as painfully as they did in ancestral environments which did indeed forecast a somber end for an individual who was deemed an outcast.

A notable difference between Iran and the United States is the value placed on groups, Iran being a more collectivistic country and the United States having a more individualistic culture. Researchers have illustrated that older, more collectivistic cultures place higher value on social groups (Triandis, 1988). Collectivistic and older cultures view the evaluation of others as more paramount to one's success, health, and happiness (Caldwell-Harris and Ayçiçeği, 2006). The importance placed on outward appearance is demonstrated in the desire to wear the nicest clothes, present your most expensive belongings, and appear as generous and friendly as possible when others are around. As a result, distress is often present in the individual who is living in a climate in which the

evaluation of others is so critical. For example, research has found that certain psychopathology is more common in collectivistic cultures than individualistic cultures, most notably, social phobia and social anxiety. Caldwell and Ayçiçeği (2006) found that collectivistic cultures reported greater levels of social anxiety and more fear of blushing than individualistic cultures. They also discovered a significant positive relation between the extent to which attention-avoiding behaviors are accepted in a culture and the level of social anxiety or fear of blushing symptoms. Studies have also shown that East Asians generally endorse higher social anxiety than do Westerners (Hong & Woody, 2007) and that social phobia is more common among middle-eastern college students than American college students (Al-Hinai et al., 2006). The data suggests that collectivistic cultures, which place a high level of importance on how one is evaluated by others, may often enhance anxiety regarding social behavior. The significant role that evaluation by others plays in one's life in a collectivistic culture, especially a culture like Iran in which the culture enhances the power of outward appearance, may foster high levels of fear of negative evaluation. Perhaps it is a high level of fear of negative evaluation, reinforced by the collectivistic attitudes of the culture, which has resulted in such high rates of eating restriction in the non-Western country of Iran.

Persian culture is known to place a very high value on the evaluation of others (Janghorbani, Amini, Willett, et al., 2007; Majd, 2008). Persian culture is uniquely known for its "tarouf" rule, which is understood by Iranians as "exaggerated politeness" and can be most accurately translated in English as "the best for your guest." Persian etiquette, specifically tarouf, demands the simultaneous offering of goods to guests and the absolute refusal of acceptance of goods from the guests (Majd, 2008). This "give and

no take” rule is frequently the cause of conflict and distress. These conflicting norms reflect the crucial role that evaluation from others plays in social life. It is essential to be seen as generous but just as important to not be seen as greedy; receiving the extreme of either of those evaluations can seriously harm the Persian individual’s social standing in Iran. It is possible that this pressure to receive positive evaluation, which is often in conflict with itself, may cause anxiety in many Iranians (Majd, 2008). Persian women may experience fear regarding such negative evaluation, signaling the possible exclusion from the group, and resulting in an eating restriction response.

Whether eating restriction develops in the same way for women with different cultures, or develops in a different way under a different cultural climate, is important for the understanding of eating pathology. If a sense of belonging and fear of negative evaluation are not found to be associated with eating restriction in women with collectivistic attitudes, then other powerful correlates must be at work. If collectivistic attitudes in women experiencing social threats are found to be predictive of eating restriction, it will enhance the argument that eating restriction is an evolutionary response to the perceived threat of exclusion from the group. It is important for future research to examine variables such as a sense of belonging, fear of negative evaluation and eating restriction as they relate to culture. Researchers can study social threat and eating restriction in different countries, or they can study the variables and examine how they relate to different cultural orientations, i.e., individualism and collectivism.

If collectivistic attitudes in women experiencing social threats are found to be a predictive of eating restriction, it may explain why some Western as well as non-Western countries such as Iran have equally high rates of eating disorders despite critical

differences in beauty norms and media influence. It may also suggest a stronger link between evolutionary mechanisms and eating disorders. No study to date has examined the possible predictive impact of collectivistic attitudes on eating restriction.

### Rationale and Hypotheses

#### *Rationale*

Understanding the cause of any pathology is important. It can allow for more accurate diagnoses, treatment, and prognoses. Research which can shed light on the cause of eating restriction can allow for a better understanding of the nature of dieting, restricting, and eating pathologies such as anorexia nervosa. Research can thus help fuel the development of eating disorder treatment options which can improve the treatment success rates for eating disorders such as anorexia nervosa, a pathology notoriously resistant to treatment, and reduce its notably high rate of relapse.

Clinically, research providing evidence for a causal explanation for eating disorders such as anorexia nervosa may provide a more accurate conceptualization and treatment of the nature of eating restriction. Nonclinically, a causal explanation may provide a better understanding of the dynamics of eating restriction and why so many individuals feel the need to deprive themselves of food, why dieting appears to be increasing, and how the behavior can be modified when it begins to cause distress.

The current study will add to the understanding of the causal nature of eating restriction in several important ways. It is the first empirical study to date which examines the correlation between eating restriction and a sense of belonging. A sense of belonging has been historically under-investigated as a subject of empirical inquiry, despite its significant role in psychopathology. A sense of belonging has not only been

shown to be related to many psychopathologies such as mood disorders and anxiety disorders, but has also been shown to be predictive of depression. Perhaps of most importance to clinicians is the finding that an increased sense of belonging has been shown to have high therapeutic value, with evidence suggesting its contribution to decreasing depressive symptomology and improving treatment effectiveness.

There is reason to believe that a sense of belonging plays a crucial role in eating restriction and eating disorders, being specifically noted by individuals suffering from anorexia nervosa as the most important aspect of life. There is qualitative and quantitative evidence that underlying much of pathological eating restriction and eating disorders is a need to belong; individuals with anorexia nervosa often feel unimportant and ineffective with low levels of control, negatively evaluated, rejected, devalued, and lonely. Individuals who feel a threat to being excluded from the group may respond with an attempt to fight by maintaining social status and belonging. Eating restriction has been argued to be effective at increasing status by attaining the attractive nubile body form. It is also argued that in modern times eating restriction can be used to maintain status by demonstrating control, which is highly related to dominance and social rank, thus increasing its importance to and value within the group. Eating restriction is thought to be a mechanism used to increase social status and belonging when both are felt to be threatened.

Various related aspects of a low sense of belonging to the group, such as: peer rejection, poor friendship quality, poor social networks, and low social-rank have all been shown to be positively associated to eating restriction and eating disorders. However, the nature of the relation between eating restriction and the specific construct of a sense of



belonging has, surprisingly, gone unexamined. The current study specifically examines the relation between eating restriction and a sense of belonging. The findings of the current study are valuable for the understanding of the causal nature of eating restriction and eating disorders. The findings may also help with the understanding of the dynamics involved in eating restriction, including how it is used as a “fight” i.e. a defensive mechanism and, eventually, how it is used as an avoidance mechanism to keep oneself out of competition. The findings may also illuminate the dynamics involved in eating restriction by providing theoretical explanations for why eating restriction is found more in some people, such as people with high sensitivity to criticism, and in some places, such as highly competitive environments, more so than in other people and in other places. Most notably for the individuals suffering from excessive eating restriction and for the clinicians who work with them, the findings may have strong implications for the treatment of eating disorders. If underlying the phenomena of pathological eating restriction is the threat of exclusion from the group, a shift in treatment focus to the patients’ sense of belonging may prove strikingly beneficial for treatment effectiveness; increasing the notoriously low rates of recovery and decreasing the disappointingly high rates of relapse for eating disorder treatment.

The current study also adds to the understanding of the causal nature of eating restriction by examining the association previously found between eating restriction and fear of negative evaluation (Gilbert & Meyer, 2003; Gilbert & Meyer, 2005 a). Not only will this cross-sectional replication study add more support for the association between high levels of restricting eating and high fears of being negatively evaluated, but it will replicate the findings in current participants with different cultural orientations, i.e.,

individualism and collectivism. The current study looks at the variables within one sample and examines how they relate to the different cultural orientations within the sample. If a positive association between eating restriction and fear of negative evaluation is replicated in both cultural orientations, as expected, the argument for an evolutionary explanation of eating restriction will be strengthened. Finding similar associations between the variables in participants with strikingly different cultural orientations, individualistic versus collectivistic, will provide strong evolutionary evidence for the association between eating restriction and fear of negative evaluation.

The current study will add to the understanding of the causal nature of eating restriction by exploring the relationship between eating restriction and social belonging with an examination of the association between eating restriction and culture-type in terms of collectivism versus individualism. It is hypothesized that cultural orientation is associated with eating restriction and has a predictive impact. Given that older, collectivistic cultures are more likely to place greater emphasis on the importance of group inclusion, in part because individuals in collectivistic cultures have historically been more dependent on each other for survival, it is expected that eating restriction will be found at higher levels in women with higher levels of collectivistic attitudes. If more emphasis is placed on belonging, it is thought that perceived fears of negative evaluation and thus perceived threats to one's sense of belonging will be found at higher levels as well, possibly increasing the eating restriction response.

Whether eating restriction develops in the same way for women with different cultural orientations, or it develops in a different way under a different cultural climate, is important for the understanding of how eating pathology begins and functions. It is

thought that eating restriction is a possible evolutionary response to social threats, thus, eating restriction is thought to be found in women across cultural orientations who are experiencing social threats. Due to the greater importance placed on social belonging in the collectivistic orientation, it is thought that collectivistic attitudes will increase the likelihood of eating restriction in women experiencing social threats. The current study examines different cultural orientations in a sample of adult women. It is expected that women with a low sense of belonging and high fear of negative evaluation who endorse collectivistic attitudes will be more likely to restrict eating. The current study can help demonstrate that eating restriction is not solely a phenomenon of Western individualistic culture, but is found across cultural orientations, and is more of a testament to the powerful and universal need to belong. The current study may help to illuminate key fundamental dynamics of excessive eating restriction, by possibly showing that individuals today may be more likely to restrict their eating when they feel that their group status and belonging is under threat. The current study can add support to the notion that eating restriction is an evolutionary response to the perceived threat of exclusion from the group.

The current study will add to the understanding of the causal nature of eating restriction in another important way. The inclusion of an item on a demographic questionnaire regarding participants' household income examines the notion that eating restriction is a threat response to the loss of status and belonging. The study examines eating restriction as a response to social threats in highly competitive environments for social status with an income item examining socioeconomic status. Socioeconomic status

was expected to have an effect on eating restriction, with higher SES women having higher levels of eating restriction.

The current study uses the threat of exclusion hypothesis to examine several predictions about eating restriction and sociality. The relation between eating restriction and a sense of belonging, specifically, will be examined for the first time to date. The positive association that has previously been found between eating restriction and fear of negative evaluation will also be examined and sought to be replicated in the current sample. The relation between eating restriction and cultural orientation, given cultural orientations' profound impact on how human beings view society, will also be examined. Further, all three variables, social exclusion, fear of negative evaluation and cultural orientation will be assessed for their predictive impact on eating restriction.

### *Hypotheses*

H1: It is hypothesized that women with low levels of a sense of belonging will have higher levels of eating restriction. The proposed inverse or negative association between a sense of belonging and eating restriction is expected due to the premise of the threat of exclusion hypothesis which posits that eating restriction may be a threat response to maintain status and belonging when both are felt as under attack.

H2: It is hypothesized that women with high levels of fear of negative evaluation will have higher levels of eating restriction. The proposed positive association between fear of negative evaluation and eating restriction is expected due to the proposed function of negative evaluation cues as cautionary signals of a possible impending attack or exclusion from the group.

H3: It is hypothesized that women with high levels of fear of negative evaluation will have lower levels of a sense of belonging, due to the proposed function of negative evaluation cues as cautionary exclusion signals.

H4: It is hypothesized that women with a low sense of belonging, high fear of negative evaluation and collectivistic attitudes will be more likely to restrict eating. Collectivistic women with a low sense of belonging and high fear of negative evaluation are expected to be more likely to restrict eating than individualistic women due to the greater emphasis placed on the importance of social groups in the collectivistic orientation.

H5: It is hypothesized that women who have a higher socioeconomic status (i.e. a greater household income) will have higher levels of eating restriction than women with a lower socioeconomic status. The effect of socioeconomic status on eating restriction is expected due to the proposed increase in eating restriction as a fight response to the threat of social status or belonging, which is thought to occur more frequently in more competitive environments.

## Method

### *Participants*

Participants were 383 adult (18-years-old and older) women. Participants' ages ranged from 18-years-old to 56-years-old. The mean age was 26-years-old. Seventy-seven participants did not indicate their age. Participants were 199 White, 41 Black or African American, 37 Hispanic, 5 Asian, 13 Caribbean, 1 Native American or Alaska Native, and 14 "Other." Seventy-three participants did not identify their race or ethnicity. Participants identified themselves on an income item as earning either "More than \$75,000" (62 participants), "\$40,000 - \$74,999" (87 participants), or "Less than \$40,000"

(158 participants). Seventy-six participants did not identify their income level.

Participants were unpaid volunteers who were not asked to identify themselves by name.

Barry University students had the opportunity to receive course credit for their participation. Additional volunteers recruited via *Facebook* and email did not receive compensation or incentive for participating.

### *Measures*

*Sense of Belonging Instrument (SOBI)*. The SOBI (Hagerty & Patusky, 1995) is a 33-item self-report measure of an individual's perception of her belongingness to a social group. Belongingness is defined as one's value, importance, acceptance, and fit within a social system. The SOBI consists of two separately scored scales, including psychological state (SOBI-P) and antecedents (SOBI-A). The scale's construct validity is supported by the inter-scale correlation of the psychological and the antecedents subscales ( $r = .45$ ). The test-retest reliability coefficients for the instrument have been measured as  $r = .84$  for psychological state and  $r = .66$  for antecedents over an 8-week period. The internal consistency has been reported as  $\alpha = 0.93$  for psychological state and  $\alpha = 0.72$  for antecedents (Hagerty & Patusky, 1995). The SOBI-P will be the scale used for purposes of the current study (See Appendix A).

The 18 items of the psychological subscale of the SOBI assess an individual's experience of feeling valued, needed, accepted, and the perception of fit or connectedness within a system or environment (e.g., "In general, I don't feel a part of the mainstream of society," "I feel like a piece of a jigsaw puzzle that doesn't fit into the puzzle"). Research has shown the instrument to be a valid and reliable measure (Hagerty & Patusky, 1995). The items ask participants to reflect on the past month, and to give ratings on a 4-point

Likert scale (1 = *Strongly Agree*; 4 = *Strongly Disagree*). The scores on the SOBI-P are continuous with higher scores indicating a greater sense of belonging. A mean score on the SOBI-P represents the sense of belonging for each participant. The SOBI-P takes approximately 5 minutes to complete in its entirety. High scorers and low scorers are divided using a median split from the SOBI-P scores.

*Eating Disorder Inventory (EDI)*. The EDI (Garner & Olmstead, 1984) provides information regarding the psychological and behavioral dimensions of eating disorders and is commonly used as an aid to form an eating disorder diagnosis. The EDI is a 64-item self-report measure of psychological features commonly associated with anorexia nervosa and bulimia nervosa.

There are eight subscales in the EDI. The subscales include: Bulimia, Body Dissatisfaction, Drive for Thinness, Ineffectiveness, Perfectionism, Interpersonal Distrust, Interoceptive Awareness, Maturity Fears. There are three eating related subscales of the EDI (e.g., Body Dissatisfaction, Bulimia, and Drive for Thinness). The Body Dissatisfaction subscale contains nine items which address attitudes regarding body image. The Bulimia subscale contains seven items which address bulimic tendencies. The Drive for Thinness subscale contains seven items which address eating restriction. The present study used the Drive for Thinness subscale of the EDI to assess each participant's level of eating restriction (See Appendix B).

The Drive for Thinness subscale of the EDI contains seven items which assess attitudes regarding one's dieting and eating attitudes (e.g., "I am terrified of gaining weight," "I exaggerate or magnify the importance of weight"). The internal consistency for Drive for Thinness has been reported as high  $\alpha = .90$  (Garner & Olmstead, 1984).

Participants are asked to rate all items on each subscale of the EDI on a one to six scale (1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Frequently*, 5 = *Usually*, 6 = *Always*). The scores on the EDI are continuous with higher scores indicating a higher degree of eating restriction. A mean score on the Drive for Thinness subscale represents the eating restriction for each participant. The Drive for Thinness subscale takes less than 5 minutes to complete in its entirety. High scorers and low scorers are divided using a median split from the Drive for Thinness scale scores.

*Brief Fear of Negative Evaluation Scale.* Participants completed the *Brief Fear of Negative Evaluation Scale* (BFNE; Leary, 1983). This survey is designed to measure the threat of being unfavorably evaluated by others. The construct of fear of negative evaluation (FNE) consists of feelings of apprehension about others' evaluations, distress over these negative evaluations, and the expectation that others will evaluate one negatively (Watson & Friend, 1969).

The BFNE scale is a shortened version of the *Fear of Negative Evaluation Scale* (FNE), a self-report questionnaire that was designed to assess fear of being negatively evaluated by others. The FNE has been shown to be highly reliable (Watson & Friend, 1969) and FNE scores have been shown to be predictive of several features of social anxiety. For example, high scorers on the FNE are more likely to catastrophize in reaction to mildly negative social events and to focus attention on social threat words (Stopa & Clark, 2001). High scorers are also more likely to identify others' facial expressions as negative (Winton, Clark, & Edelman, 1995), and to overestimate the observability of negative social characteristics (e.g., awkwardness, long gaps in speech)



and underestimate the observability of positive social characteristics (e.g., confidence, self-assurance) they exhibit during public speaking (Mansell & Clark, 1999).

The 12-item BFNE uses a 5-point Likert-type rating scale, ranging from 1 (not at all characteristic of me) to 5 (extremely characteristic of me), rather than the true–false format of the original FNE. Undergraduates’ responses were correlated highly with the original scale ( $r = .96$ ), and the BFNE demonstrated both high internal consistency ( $\alpha = .90$ – $.91$ ) and 4-week test–retest reliability of ( $r = .75$ ) in undergraduate samples (Leary, 1983; Miller, 1995).

The BFNE consists of eight items that are straightforwardly worded, and four items that are reverse-worded (See Appendix C). The BFNE includes straightforwardly worded items such as “I am frequently afraid of other people noticing my shortcomings” and reverse worded items such as “Other people’s opinions of me do not bother me.” The scores on the BFNE are continuous with higher scores indicating a higher degree of fear of negative evaluation. A mean score represents the fear of negative evaluation for each participant. The BFNE takes approximately 5 minutes to complete. High scorers and low scorers are divided using a median split from the BFNE scale scores.

*Individualism-Collectivism Scale (INDCOL) - short form.* The shortened INDCOL scale Hui and Yee (1994) is a 33-item assessment of participants’ value systems in terms of cultural orientation, whether their orientations are more individualistic or collectivistic. The items ask participants what they would think and do in various situations to assess whether their orientations are more individualistic or collectivistic, in which collectivism is defined as a set of feelings, beliefs, behavioral intentions, and behaviors related to solidarity and concern for others.

The original INDCOL scale was 63 items and factor analyses showed the internal structure to be insufficient. Hui and Yee (1994) revised and shortened the scale to a 33-item instrument which was shown to be valid. The instrument is composed of two dimensions: In-group Solidarity (i.e., Family Interdependency), which measures the degree of solidarity and interdependency with members of the family and friends, and Social Obligation (i.e., Cultural Interdependency), which measures the extent of friendliness, courtesy and respect and the preservation of accord in relationships with others in the greater community. The In-group Solidarity dimension was used for purposes of the present study.

In-group Solidarity consists of three subscales which measure (a) supportive exchanges between colleagues and friends (8-items) (e.g., “There is everything to gain and nothing to lose for co-workers to groups themselves to help each other”), (b) consultation and sharing with parents (5-items) (e.g., “Young people should take into consideration their parents’ advice when making career/education plans”), and (c) personality distinctiveness from parents (5-items) (e.g., “Children should not feel honored even if the father were highly praised and given an award by a government official for his contribution and service to the community”). Hui and Yee (1994) found that personality distinctiveness from parents had a low alpha ( $\alpha = .38$ ). Personality distinctiveness from parents will be dropped from the present study due to the low alpha. The resulting Cronbach alpha for the In-group Solidarity dimension ( $\alpha = .76$ ) has been demonstrated as good (Nasim, Corona, Belgrave, Utsey, & Fallah, 2007).

Questions are scored on a Likert scale from 0-5 (0 = *Strongly Disagree* and 5 = *Strongly Agree*). Higher scores indicate identification with collectivistic values, while

lower scores indicate identification with individualistic values. Items on the instrument are either added or subtracted from each other to yield a subscale score (See Appendix D). The In-group Solidarity dimension of the shortened INDCOL takes approximately 5 minutes to complete in its entirety. High scorers and low scorers are divided using a median split from the shortened INDCOL Scale scores.

*Demographic Survey.* Participants in both samples completed a demographic questionnaire that assessed age and ethnicity. For purposes of the study, the demographic survey also included an additional item, an income item which assessed each participants' total household income (See Appendix E).

#### *Procedure*

All participants were tested utilizing internet sampling. Participants completed a survey online which included the Drive for Thinness subscale of the EDI, the Sense of Belonging-Psychological subscale of the SOBI, the Brief Fear of Negative Evaluation scale (BFNE), the In-group Solidarity dimension of the shortened Individualism-Collectivism Scale (INDCOL), and demographic information. The survey was uploaded online onto psychsurveys.com.

Recruitment of the participants took place at Barry University and volunteers who were Barry University students had the opportunity to receive course credit or extra credit for completing the survey. A flyer, which included the link to the survey, was posted in the Psychology Department of Barry University inviting participation. Additionally, a link to the survey was posted on the author's *Facebook* status weekly throughout the data collection process. Additional recruitment of participants took place via email. When participants followed the link to the survey presented on any one of the above invitations,

the screen displayed a letter of introduction and informed consent. The survey was conducted between April 2011 and May 2011.

### *Analysis*

Correlations were conducted to assess the relation between a sense of belonging and fear of negative evaluation with eating restriction (Table 1). It was hypothesized that a sense of belonging would be correlated with eating restriction and that the correlation would be negative (i.e., a lower sense of belonging would be associated with more eating restriction). In accordance with the hypothesis, a sense of belonging was found to have a significant negative relationship with eating restriction,  $r = -.44, p < .01$ .

It was hypothesized that fear of negative evaluation would be correlated with eating restriction and that the correlation would be positive (i.e., a heightened fear of negative evaluation should be associated with more eating restriction). In accordance with the hypothesis, fear of negative evaluation was found to have a significant positive relationship with eating restriction,  $r = .51, p < .01$ .

Additionally, a sense of belonging was correlated with fear of negative evaluation. It was expected that the correlation would be negative (i.e., a lower sense of belonging should be associated with a heightened fear of negative evaluation). In accordance with the expectation, a sense of belonging was found to have a significant negative relationship with fear of negative evaluation,  $r = -.66, p < .01$ .

A multiple regression was conducted to assess the predictive impact of the predictor variables on eating restriction. Eating restriction was the criterion variable. The predictor variables were a sense of belonging, fear of negative evaluation, and cultural orientation. It was hypothesized that sense of belonging, fear of negative evaluation and

Table 1

*Correlations Between Questionnaire's Scores and subscales scores*

Questionnaire						
Scales	1	2	3	4	5	6
1. Eating restriction	-	-	-	-	-	-
2. Sense of belonging	-.44**	-	-	-	-	-
3. Fear of negative evaluation	.51**	-.66**	-	-	-	-
4. In-group solidarity	-.18**	.22**	-.05	-	-	-
5. (In-group solidarity) Friends	-.10	.05	.05	.88**	-	-
6. (In-group solidarity) Parents	-.21**	.34**	-.16**	.75**	.35**	-

\*\*  $p < .01$

cultural orientation would predict eating restriction in adult women. In accordance with the hypothesis, a sense of belonging, fear of negative evaluation, and cultural orientation was found to significantly predict eating restriction in adult women (Table 2). However, women with a low sense of belonging, high fear of negative evaluation and individualistic attitudes, as opposed to collectivistic attitudes, were found to be more likely to restrict eating. The proportion of variance that was accounted for by sense of

Table 2

*Summary of Multiple Regression Analysis for Variables Predicting Eating Restriction*

Model	<i>B</i>	<i>SE</i>	<i>t</i>	<i>Sig.</i>
(Constant)	10.70	1.89	5.66	.000
Sense of belonging	.11	.04	2.77	.006
Fear of negative evaluation	.24	.04	5.60	.000
Ingroup solidarity	-.10	.05	-1.97	.050

belonging, fear of negative evaluation, and cultural orientation in eating restriction was 30%,  $R^2 = .30$ ,  $F(3, 272) = 38.56$ ,  $p < .001$ .

A one-way analysis of variance (ANOVA) was conducted to assess the effect of SES (i.e. a greater household income) on eating restriction (Table 3). The factor SES (i.e. a greater household income) had three levels (low, medium, high). The current study did not yield a significant main effect for SES (i.e. a greater household income) on eating restriction,  $F(2, 301) = .08$ , *n.s.*

### Discussion

A significant negative relationship was found between eating restriction and a sense of belonging. The data revealed that individuals who have a lower sense of belonging endorse higher levels of restrictive eating attitudes and behaviors. In contrast, individuals who have a higher sense of belonging will endorse lower levels of restrictive eating attitudes and behaviors. The data supports the hypothesis proposed by the current

Table 3

*Means and Standard Deviations for Income Item Levels (N = 304)*

Income for 2010	<i>M</i>	<i>SD</i>	<i>N</i>
Less than \$40,000	22.09	7.17	155
\$40,000 - \$74,999	22.08	7.66	87
More than \$75,000	22.52	8.34	62

study that women who have a lower sense of belonging are more likely to think about and restrict their eating. The data is among the first empirical studies that specifically examined the association between eating restriction and a sense of belonging. In doing so, the current study has provided strong evidence for the threat of exclusion hypothesis which posits that women may restrict their eating when they feel a threat to their status and belonging.

This data enriches the field of eating behavior and social pathology in several ways. By demonstrating an association between restrictive eating and a sense of belonging, the research is enhancing the body of evidence showing a link between eating restriction and social fears. Previous research has focused on restrictive eating with variables such as fears of rejection, feelings of ostracism, and negative evaluation,

however, research has not previously delved deeper beneath the surface to explore the construct that is believed to be most vital to all of those variables, the need to belong.

The present study proposed that perceptions of negative evaluation are evolved cues whose function is to signal possible exclusion; given that it was social exclusion that had a direct impact on human's survival in ancestral times. It is suggested that it is social exclusion that continues to be at the heart of one's fears in modern times as well, and that perceptions of being negatively evaluated are felt as uncomfortable and distressing because they are warning signs that one might be in danger of social exclusion.

A relevant example of an unpleasant cue as a cautionary signal is that of a fire alarm. When a fire alarm rings and people flee, they are not leaving because they are afraid of the fire alarm, they are leaving because they are afraid of what the fire alarm means--that there might be a fire and that their lives are thus in danger. Nevertheless, a fire alarm is extremely unpleasant; it is very loud, distracting, obnoxious, and even painful to hear. However, it is the purpose of the fire alarm to be felt as uncomfortable; it must get your attention if the warning is to be recognized, and if the danger is one that is as fatal as a fire, then the warning must be distressing enough to get your attention immediately if it is indeed going to serve its purpose. As distressing as the fire alarm is, the point is that it is meant to get your attention, because if it does not get your attention, the danger that it is signaling is high enough to take your life. Similarly, fear of negative evaluation is proposed to not be the danger itself, but a cue to the danger, although it is a very painful cue nonetheless. This study sought to empirically explore the more fundamental root of social fears in relation to eating restriction, and proposed that eating restriction is a mechanism used when one feels a threat to their sense of belonging. It was



hypothesized that eating restriction and a sense of belonging would thus have a negative association. This hypothesis was supported by the current data.

In accordance with prior research findings, a significant relationship was found between negative evaluation fears and restrictive eating attitudes. The current findings are consistent with a model previously described by researchers whereby eating restriction is one mechanism in which women attempt to alleviate fears of being negatively evaluated by others. However, the reason why engagement in eating restriction should alleviate negative evaluation fears has been the subject of speculation.

There has not been extensive research on why eating restriction specifically should necessarily be a common route to alleviate social fears. Prior researchers have, however, offered suggestions for the positive association. Paxton, Schutz, Wertheim, and Muir (1999) described restrictive eating attitudes and behaviors as one mechanism via which an individual can gain acceptance from others. Paxton, Schutz, Wertheim, and Muir (1999) suggested that restrictive eating attitudes, such as a desire to be thin, are used to increase an individual's status among peers. However, given the established link between social pathology and diagnosable eating disorders within a clinical sample, (e.g., Krause et al., 2000) it can be argued that social pathology is related to eating pathology due to the general negative impact that all severe mental health issues have on social functioning. It can also be argued that there is a relationship between social fears and all eating disorders in general, given the evidence that disordered eating attitudes and behaviors have been found among highly sociotropic individuals, who have a strong need for close relationships and are preoccupied with securing bonds with important persons (Friedman & Wiseman, 1998; Krause, Robins, & Lynch, 2000). However, if the latter

were the case, and an association between social fears and eating restriction is telling of all eating pathology, one would expect to find similar associations between social fears and all variants of eating disorder symptomology, including bulimia and binge eating disorder.

To the contrary, recent evidence has established a unique relationship between social fears and anorexic symptomology, independent of other eating disorder related symptoms. A heightened fear of negative evaluation has been exclusively linked to restrictive eating attitudes and behaviors, but not to bulimic attitudes and behaviors (Gilbert & Meyer, 2003; Gilbert & Meyer, 2005a; Gilbert & Meyer 2005b, Hinrichsen, Waller, & Wright, 2001). A very clear distinction between eating restriction and bulimic symptomology as they uniquely relate to eating restriction was found in a longitudinal study by researchers Gilbert and Meyer (2005 b). In the study, heightened fears of negative evaluation were related to eating restriction, but not to bulimic symptoms when studied cross-sectionally. In contrast, heightened fears of negative evaluation did not predict eating restriction over time, but did predict the development of bulimic symptoms over time. These findings support a model proposed by the researchers that individuals with heightened fears of negative evaluation--possible cues to the threat of exclusion--will respond by restricting their eating to raise their status among peers. However, if eating restriction is not sufficient in alleviating the fears in the long term, these individuals may develop bulimic symptoms in an attempt to deal with their negative evaluation fears.

The significant positive association found between fear of negative evaluation and eating restriction in the current study is consistent with prior research. It also adds further

support to the notion that eating restriction, uniquely and independently of other eating disorder symptomology, is a mechanism used to alleviate negative evaluation fears by increasing ones status among peers. Previous researchers have suggested that eating restriction may be employed when there are heightened fears of negative evaluation in order to increase status. This notion, as well as supportive data, are in accordance with the threat of exclusion hypothesis (Gatward, 2007), which posits that eating restriction is a mechanism chosen to “fight” a threat to one’s belonging or status, with fear of negative evaluation thought of in the current study to serve as a cue to possible exclusion.

It can be argued that negative evaluation, in and of itself, may not have been fatal to our ancestors. A human being today could potentially reproduce and survive if she is negatively evaluated by group members. However, social exclusion was, almost certainly, fatal to our ancestors. A human being could not have reproduced or survived if she was excluded from the group. The current study posits that negative evaluation serves an important purpose; but the purpose is to cue an individual of a threat to a more fundamental human need. Thus, the study sought to analyze the relation between eating restriction and the fundamental human need of group inclusion. The function of fears of negative evaluation is to signal that one may be at risk of exclusion from the group, likely the single most important asset for the individual’s and the species’ survival, an asset so critical that simply perceiving cues of its possibility are, even today, felt as powerfully painful.

In addition to the significant negative relationship found between eating restriction and a sense of belonging, as well as the significant positive association found between eating restriction and fear of negative evaluation, a correlation analysis revealed

a significant negative relationship between a sense of belonging and fear of negative evaluation as well. As fear of negative evaluation increases, a sense of belonging decreases. The latter association was expected, and its presence supports the notion held by the current study that fear of negative evaluation is closely related to a sense of belonging; specifically, that relation is conceptualized as fears of negative evaluation serving an important function as adaptive cues for an impending threat of exclusion from the group.

As suggested by the current study, a significant association was found between eating restriction and cultural orientation. Interestingly, the relationship was in an unexpected direction, but a direction which helps support the threat of exclusion hypothesis regardless. A significant negative relationship between eating restriction and cultural orientation was found, meaning that individuals who had higher eating restriction attitudes and behaviors were less likely to be collectivistic and more likely to be individualistic in their cultural orientation than individuals who had lower eating restriction. In other words, women who were more collectivistic were less likely to think about restricting and to restrict their eating. In accordance with the research hypotheses, significance was found between the two variables eating restriction and cultural orientation, but the direction of the relationship was previously unexpected, although not entirely surprising when you take the implications of having a collectivistic orientation and the evidenced benefits of belonging to a social group into consideration.

It was hypothesized that cultural orientation would play a predictive role in the model of eating restriction due to its large role in how we think about and interact with one another in society. However, collectivistic attitudes were expected to have a forceful

impact on eating restriction because of the greater importance placed on maintaining interpersonal relationships and the greater emphasis placed on the importance of social groups in the collectivistic orientation. It was thought that sensitivity to exclusion cues would be heightened for an individual with a collectivistic orientation, given the magnified role of the social group in collectivism. Due to the notion that eating restriction is a mechanism employed when one feels a threat to their status and group belonging, and sensitivity to exclusion cues were thought to be heightened in the collectivistic orientation, eating restriction was expected to increase with higher levels of collectivism.

Prior research helped support the expected role of collectivism in the current study. In the collectivistic country Iran, group inclusion is paramount and “tarouf”--the exaggerated social rule of generosity and humility translated as “the best for your guest”--guides everything from international politics to even the most basic daily interactions (Majd, 2008). Notably, Iran has very high eating disorder rates, comparable to those in the Western world such as the United States (Nobakht & Dezhkam, 2000). Iran was used by the current study as an illustrative example of how collectivism may be associated with increased sensitivity to exclusion cues and thus increased eating restriction. Additional examples of an association between collectivistic orientation and increased social sensitivity were also examined (Caldwell & Ayçiçeği, 2006; Hong & Woody, 2007). It was therefore expected that with the possibly increased sensitivity to exclusion cues, there may be a greater likelihood of finding evidence for eating restriction, which is a proposed response to the threat of exclusion as a mechanism to alleviate the pain from exclusion cues by attempting to increase one’s status.

The present study showed significance regarding eating restriction and cultural orientation, but with collectivism playing a protective role. Individuals who were more likely to endorse collectivistic attitudes were found to be less likely to have eating restriction. Research reveals that this association may be likely due to the greater sense of community, camaraderie, unity, and belonging to a group that comes along with collectivistic attitudes and values (Hui & Yee, 1994).

This explanation is supported by, and explained well, by the threat of exclusion hypothesis for anorexia (Gatward, 2007). The threat of exclusion hypothesis posits that individuals respond to threats to their sense of status and belonging with eating restriction, in order to raise their status. Using the threat of exclusion hypothesis, the current study suggested that individuals who endorse a lower sense of belonging will have higher levels of eating restriction, which the current data validated. It is reasonable to expect that individuals who are a part of a culture or who endorse a belief and value system which emphasizes the importance of the social group are more likely to display attitudes and behaviors which reflect the value system, these attitudes and behaviors are exactly the kind which encourage a stronger connection to social groups and foster a sense of belonging. Such collectivistic attitudes and behaviors include more interpersonal interactions and less avoidance, more sharing and less privacy, and having a greater passion for family or community growth rather than individual competition. By definition, collectivistic individuals take more actions geared toward the building of the social group, the strengthening of interpersonal relationships and the preservation of harmony between family and friends (Hui & Yee, 1994). In light of these facts about the nature of collectivism being one which promotes attitudes and behaviors that foster group

cohesion and solidarity, it is reasonable to assume that collectivism may play a protective role in eating restriction, because a sense of belonging plays a protective role in eating restriction. Evidence has shown that individuals who have a stronger sense of group identity, be it racial, national, or sexual orientation identity, are protected from a wide array of psychological distress, including eating pathology. The current study's significant finding that collectivism is negatively associated with eating restriction makes sense given that collectivism is defined by many attitudes and behaviors which facilitate a strong sense of group identity and thus encourage the perception that one belongs to a social group.

It is logical that individuals who have greater value for the social group, and a stronger sense of group identity, would be much more likely to feel that there is some sort of environment or system to which they are a part of, whether it is based on racial, national, or sexual identity community, there is a social group out there to which they have membership, and thus, higher levels of a sense of belonging.

The current study interprets the predictive impact of cultural orientation on eating restriction, with more collectivism predicting less eating restriction, as a mechanism of an increased sense of belonging. An increased sense of belonging is associated with less eating restriction and is thought to come along with more collectivistic attitudes.

A review of the literature surrounding a sense of belonging provides evidence for the interpretation of the current studies results. Some of this evidence can be found in research surrounding eating restriction and ethnic identity. Research has provided some support that a strong ethnic identity is negatively associated with eating restriction (Stojek, Fischer, & Collins, 2010). Researchers have posed that a strong ethnic identity

may foster a higher sense of belonging (Chan & Owens, 2006). It may be that the sense of belongingness one feels to an ethnic group, regardless of the ethnicity, is the pivotal factor. The research suggests that it is not a strong ethnic identity to a particularly ethnicity, but rather, it is the sense of belongingness to a group in general that lowers the likelihood of eating restriction.

In a study which examined the relationship between ethnic identity and eating pathology, Stojek, Fischer, and Collins (2010) found that ethnic identity was negatively correlated with thinness expectancies and eating pathology, and those thinness expectancies mediate the relationship between ethnic identity and eating pathology. The results of the study suggest that ethnic identity may be a factor in developing eating pathology in minority as well as in non-minority women. It may be that a developed sense of ethnic identity is associated with positive psychological outcomes in that it strengthens the individual's sense of belonging; a developed sense of ethnic identity provides a stronger sense of belonging to one's ethnic group. The data provided by Stojek et al (2010) supports the notion that sense of belonging may be negatively associated to eating restriction; the participants with more developed ethnic identity were less likely to have eating pathology irrespective of their ethnicity, which implies that it was the sense of belonging, to any ethnic group, that decreased the likelihood of eating pathology.

Similar findings were found in a study of the mediating and moderating effects of ethnic identity and acculturation for perfectionism and eating disorder symptomology in Chinese immigrants (Chan & Owens, 2006). Researchers found that the relationship between positive perfectionism and eating disorder symptoms were moderated by a



strong sense of belonging and attachment towards Chinese culture and valuing other ethnic groups. In their sample, Chan and Owens (2006) found that a strong sense of belonging predicted a lower sense of interpersonal distrust. The data led the researchers to conclude that for Chinese immigrants it may be beneficial to promote strong ethnic identification along with values toward the mainstream culture and positive perfectionism. Similar to the findings of Stojek et al (2010), the study showed that strong ethnic identity was a factor in decreased eating disorder symptomology, likely due to the strong sense of belonging that was provided along with a strong sense of identification toward the Chinese culture.

A sense of belonging to a community has been shown to be a powerful protective mechanism. Evidence has shown that the type of community to which the individual belongs can be as diverse and varied as the forms of distress from which the sense of belonging is protective against. However, ethnic identity stands out in the literature because it particularly supports the suggestion made by the data gathered by the current study regarding collectivism. Individuals who have a stronger sense of ethnic identity, regardless of the ethnicity, have been shown to be protected against eating pathology and are less likely to restrict eating, possibly due to the sense of belonging that the individual feels toward their ethnic group. Individuals who endorse collectivistic value systems are necessarily expected to have a greater sense of ethnic identity than individualistic individuals, given the nature of collectivism as one which emphasizes the family and community as opposed to the individual. Thus, individuals who endorse more collectivistic attitudes might be more likely to feel that they are a part of some social system or environment, and are thus more likely to be protected from eating restriction.

### Research Implications

There is a call for further investigation into the association discovered by the current study between eating restriction and cultural orientation. If collectivism does indeed play a protective role from eating restriction, and perhaps other eating pathologies, the implications can be quite dramatic for society at large, which is particularly obsessed with weight and dieting in the Western world. The implications of a protective role of collectivism on treatment for individuals suffering from eating disorders like anorexia nervosa can be likewise quite powerful. Based on the findings of the current study alone, mental health professionals are encouraged to use one's cultural orientation in the therapeutic process. The current study found that a higher sense of belonging is associated with less eating restriction. There are many attributes of the collectivistic orientation which encourage the development of a sense of belonging. Collectivism should not be argued as the preferable cultural orientation of choice in regards to individuals seeking treatment for severe eating restriction, but the therapeutically relevant, positive aspects from the values endorsed by collectivism can be used to benefit the client. By examining collectivistic values, some lessons can be learned and attitudes and behaviors can be modeled which encourage more involvement in and a greater appreciation for one's family, friendship, and community circles, thus helping to foster a sense of belonging.

The development of collectivistic attitudes is not necessarily the aim, however, suggesting that a client be more actively involved with her family, friends, and in her community will likely encourage the client to view her close social circles and her community with more consideration, appreciation, and value, and will encourage her

family, friends and community to likewise view her as a more valuable group member. For example, a client with eating restriction and a low sense of belonging may benefit from psychotherapy which focuses on helping the client discover what it is she likes about her family, friends, neighbors, and community. Treatment can help explore and identify social and political issues relevant to her community which may be particularly important to her, arouse her interests and stir her passions. There may be local issues regarding community parks and recreations, activities, and legal issues that may strike her as important and which she would like to get involved in. There are various ways that a client can become involved in activities that strengthen a community's bond, such as neighborhood watch, block parties, or political committees. Similarly, a client can be encouraged to be more involved in her family and with her circle of friends. How often does she opt out of babysitting for a sibling, of sharing what she has learned in school that day with her parents, of going to the movies, attending a gathering, and helping to organize a party? Encouraging the client to, gradually and appropriately, be more involved in her family and friends' lives will go a long way to helping appreciate her family and friends and take on attitudes and actions that will allow her family and friends to appreciate her.

A sense of belonging is defined as the perception of one's "fit" in the environment as well as her perceived importance and value to the group (Hagerty & Patusky, 1995). It is expected that placing greater importance and value on the social group can have a reciprocal effect for the client. Viewing one's family, friends, and community as more important and valuable to her can put forth into motion many attitudes and actions that will cause others to perceive her as important and valuable to the group. This can

facilitate the development or strengthening of a deep sense of belonging. For an individual suffering from eating restriction, likely to have high fears of negative evaluation and a low sense of belonging, her sense of belonging to her social system must be addressed in order for her fears to be alleviated in a long-term, meaningful way and for her eating restriction to be treated. The literature reveals that a sense of belonging to various types of groups can be protective from psychological distress and helpful for symptom reduction of a variety of different psychological disorders. Therefore, a client with anorexia who has a low sense of belonging should be encouraged to grow and develop the interpersonal relationship in whatever social group may be relevant and appropriate for her. For example, a client who values, or once valued, her different ethnic or national heritage, can be encouraged to seek out other members with a similar background and to be more involved within that racial, ethnic or cultural community within her area.

Research has shown that involvement in religious groups, such as regularly attending church, is protective against various types of psychopathology including eating disorders, regardless of the individual's religious affiliation (Morgan, Marsden, & Lacey, 1999). This is suspected to be due to the increased sense of belonging that may come with regular group activity. People are likely to feel belonging to a group the more they participate in the group. This knowledge can be effectively utilized in treatment, especially when a client with eating restriction notes a personal proclivity towards a religious or spiritual orientation. Encouraging the client to pursue those values in her life, for example, by finding and frequently attending a place of worship, seeking out others who share her values, and participating in the religious or spiritual community may

significantly enhance her chances for successful eating restriction treatment by increasing her sense of belonging. Encouragement for participation and involvement in other types of groups relevant to the clients' personal interests is expected to have similar positive effects. A sense of belonging has been shown in the current study to not only be associated with eating restriction, but to also be a factor in predicting it. As a result of prior research (De La Rie, Noordenbos, Donker & Van Furth, 2007) and the current study, the argument for an emphasized role of a sense of belonging in eating restriction treatment is more compelling.

The effect of income during the 2010 year on an individual's level of eating restriction was not found to be significant in the current study. There are several reasons why a possible effect was not shown in the current sample that highlight possible limitations of that specific research question in the present study. The income question was added to the survey in order to briefly examine the effect of social status on eating restriction. However, research has shown that while income is one important indicator of social status, it is certainly not the sole indicator. Social status is a construct that is composed of many different factors, some of which several scholars have dissenting views (Zunker, 2008). Most researchers agree that social status is composed of some major features including income, but also race/ethnicity, as well as one's educational level and the educational level of one's parents. It can be argued that the income question assessed merely one important aspect of the multifaceted and complex construct of social status. Thus, the investigation of income's effect on eating restriction may be a testament of income only and eating restriction rather than a fully accurate exploration of the effect of social status and eating restriction.

Further, there may have been certain issues with the income question itself that may have created limitations in its fair use to explore the effect of income on eating restriction. The specific question was worded so that participants would be answering based on the estimated income made by themselves as well as their parents, guardians or providers if they were allotted any financial assistance; the reasoning behind this is to tap as much into an individual's social status, as opposed to income alone, that one income question would allow. Further, considering that most of the sample was composed of undergraduate college students, it was assumed that a large majority would be receiving financial assistance from parents, guardians, etc, and that an income question that did not include the providers' income would be irrelevant to the social status with which the young and nonworking, or working part time, college student belongs. The wording of the question was written so that this intention was made as clear and comprehensible as possible. However, considering the data gathered it may be possible that the inclusion of parents, guardians, or providers' income in the question was not completely clear, well-understood, or taken into full consideration.

The confusion is deemed possible after analyzing the data, which shows that many of the participants reported that they were young adults, largely recruited from an undergraduate sample at a private Catholic university. Given this information, it is expected that most of these young students are being supported, at least in some way if not fully, by parents or other providers. The question asked to include the income made by providers if you were given any financial support. Thus, it is expected that the majority of the participants would report being in the highest income bracket. However, a large majority of the participants answering the question reported that they were in the

lowest income bracket, 0-\$40,000 (See Table 3). While there may certainly be individuals who are in early adulthood, attending university, and are supporting themselves entirely without any assistance--including cost of living, college tuition and books--it is perhaps more likely that many participants answered the question based on their own personal income, without inclusion of their parents, guardians, or spouse's incomes whom may have offered them financial support.

It is not possible to know exactly how many people may have answered the question without keeping their providers' income in mind, however, if the case was indeed that many participants answered the question inaccurately, then the data gathered regarding the question is not fully illustrative of what it was expected to assess. The income question would have been more representative of the starting income of many young students' first, often part-time jobs, not representative of the income earned by the individuals who are actually supporting them. If a 19-year-old college freshman who is attending a private Catholic university is being given help for tuition, textbooks, and/or rent by her parents, who earn over \$100,000/year, then she is clearly not in the lowest income bracket choice for the survey. However, if she is proudly working a part-time waitressing job and answered the question based only on those waitressing earnings, she would have reported that she was in fact in the lowest income bracket, telling the research inaccurate information about her social status.

There is substantial theoretical reasoning and empirical evidence suggesting an effect of social status on eating restriction (Gatward, 2007) and this area should be subject to greater empirical inquiry. Suggestions for future research in this area include the use of additional items to assess the income level of the participant and her

family/providers if she is provided with financial assistance. Also, using the general population and not just college students would provide more data on income level and SES.

The addition of differently worded but similar questions may help make the intention of the items clearer for individuals who may misread or misunderstand what a question is asking. Perhaps researchers could break up the question into multiple items, such as, “How much did you personally earn last year?” and “How much did your parents earn last year?” and “How much did your spouse/ domestic partner earn last year?” Further, to make a more valid assessment of one’s social status, it is suggested that items which assess other areas of the construct be included (Zunker, 2008). Depending on the researcher’s conceptualization of social status--its definition, its components--and what theorists’ approach the researcher is using, the additional items could ask a large array of questions that assess a multitude of life factors. Some suggestions for additional items, however, include race/ethnicity, personal educational level, mother and father’s educational level, employment, luxury items, i.e., “How many cars does your family own?” and perhaps living situation (i.e. apartment, house, type of neighborhood or community). There is room for variety and creativity in forming the items. Primarily, in order to assess more than income alone, which is a very important aspect of social status, additional items should cover all of the components that make up social status, based on the researcher’s specific operationalization of the construct.

#### Limitations and Areas for Further Research

As is the case with research studies, this study had several limitations which should be taken into consideration when considering the data analysis and particularly



when composing future studies that attempt to replicate or extrapolate on the current findings. One limitation of the study was the composition of the majority of research participants. Results do not represent the greater population; the majority of the present sample comes from women who are in early adulthood and attending university. Further, the sample at Barry University was offered incentive for taking the survey in the form of an extra credit point for a psychology class. With this, as with all other surveys conducted in which there is a minor reward, the incentive of the reward must be taken into some consideration when establishing the likelihood of the validity of the data, considering that it is possible for students to complete the survey without actually reading the questions thoughtfully, or at all, simply to receive the extra credit point for their psychology class. It is however impossible to know how frequently, or how rarely, this happened, if it happened at all.

Other limitations come in the form of the survey items. The survey used to assess cultural orientation, the INDCOL scale, had an acceptable validity. However, the cronbach's alpha for the INDCOL scale was on the lower end of what is generally considered good ( $\alpha = 0.76$ ) and was much lower than the cronbach's alpha's of the other scales used. The INDCOL scale did yield several significant results; it was significantly associated with eating restriction and a sense of belonging in correlation analysis, and was predictive of eating restriction when assessed using a multiple regression analysis. However, the correlation, though significant, was weaker than the other significant correlations found in the study. While the regression analysis showed it to be a significant predictor of eating restriction, it also showed it to account for the least amount of variance in eating restriction than any of the other variables, i.e. fear of negative

evaluation and sense of belonging. The significance found between cultural orientation and eating restriction – as well cultural orientation and sense of belonging – should not be taken lightly, they are important indicators of an association between the variables, indicators which had never been previously studied. However, the lower cronbach's alpha of the INDCOL scale should be recognized, acknowledged, and taken into full consideration.

Recommendations for future studies would be to examine cultural orientation as a correlate and/or a predictor of eating restriction in a variety of different ways, such as using a different cultural orientation scale, or several different cultural orientation scales, to compare and contrast the scales with each other and with the INDCOL in terms of whether an association with eating restriction yields significant results. If there is indeed a significant relationship between cultural orientation and eating restriction, one would expect to see the effect replicated across different samples using different cultural orientation scales, as long as they are reliable and valid measures of the construct.

Another suggestion for a future study would be to assess cultural orientation using both dimensions of the INDCOL scale in order to examine similarities or differences in the different dimensions' relations with eating restriction. For purposes of the present study, one out of the two dimensions of the INDCOL scale was used, the in-group solidarity dimension as opposed to the social obligation dimension, because the in-group solidarity dimension was hypothesized to be more representative of what the study sought to measure, which was collectivistic attitudes toward one's family, close friends, and colleagues. The other dimension, social obligation, was considered less relevant for the current study. No matter what the results of the current study were, it would be

interesting for future studies to examine if and how the entire INDCOL scale relates to eating restriction. However, in light of the significant findings discovered in the current study, it is particularly important to examine this issue further given that cultural orientation was found to have a significant relationship with eating restriction as well as a predictive impact.

It is also important to examine the cultural orientation issue further due to the lack of empirical study surrounding this feature of eating restriction. Based primarily on the threat of exclusion hypothesis, and supported by a great deal of literature linking social fears with eating restriction, it was hypothesized that cultural orientation would impact eating restriction due to its paramount role in how we live and interact with one another and how we think about, behave with, and value social groups. The support for a link the current study hypothesized between cultural orientation and eating restriction was largely theoretical and based on indirect evidence. This is because empirical study of the specific association between cultural orientation and eating restriction did not exist until the current study. Now that a link between the variables was found, it is highly suggested that studies seek to replicate the findings as well as expand them. To fully understand eating restriction and its various causes, it is necessary that researchers conduct replication and expansion studies when significant associations, as well as significant predictive impacts are found, particularly when research in the specific area of study is at best sparse.

The findings of the current study, as a whole, are very enlightening in regards to the nature of eating restriction. The findings were largely as expected, demonstrating a link between eating restriction and social fears. Specifically, eating restriction was found to be negatively related to a sense of belonging and positively related to fear of negative

evaluation. Individuals who were less likely to feel like they belonged with a social group, as well as individuals who were more likely to have heightened fears of being negatively evaluated, were significantly more likely to restrict their eating. The study offers powerful evidence for the threat of exclusion hypothesis, which would interpret the results as evidence that women who feel a threat to their sense of belonging or status may respond with eating restriction in an effort to maintain or raise their status. Individuals who have heightened fears of negative evaluation--which are thought to be important cues of the threat of exclusion--may also respond to these cues with eating restriction in an effort to maintain or raise their status so that they will not face social exclusion.

Further, cultural orientation was found to be negatively associated with eating restriction, so that the less an individual endorses collectivistic attitudes, the more likely she will be to report eating restriction. These results can be seen as logical and supportive of the threat of exclusion hypothesis, given that the more collectivistic one's attitudes, the more likely they are to have ethnic identity, which fosters a sense of belonging. Collectivism, by definition, encourages greater importance and value of the social group as opposed to the individual, the betterment of the family and community over the individual; it encourages sharing, consultation, and the preservation of harmony. Thus, individuals who endorse these attitudes and values, again by definition, are likely to feel more connected to a social group and thus more likely to feel a sense of belonging. As the current study empirically established, a greater sense of belonging is associated with less eating restriction, making it logical that higher collectivistic attitudes may be associated with less eating restriction. Further, the predictor variables, which all had significant correlations with eating restriction, all showed to have a predictive impact on eating

restriction as well. The regression model showed that a sense of belonging, fear of negative evaluation, and cultural orientation each had predictive impacts, and together accounted for nearly 30% of the variance of eating restriction. The results suggests not only an association between the variables, but that individuals who have a low sense of belonging, high fears of negative evaluation, and endorse individualistic attitudes are actually more likely to report eating restriction than individuals who do not.

The results are very encouraging for the threat of exclusion hypothesis, which has profound theoretical and therapeutic implications. Theoretically, the idea that eating restriction, and therefore eating disorders like anorexia, may have a basis in evolution and an adaptive function is controversial, but credible. Therapeutically, if researchers and clinicians know that a threat to one's sense of belonging is at the core of the eating restriction response, and that the individuals who are more perceptive to cues of this threat--cues like negative evaluation--are more likely to respond with eating restriction, then they are empowered with knowledge that can lead to much better eating disorder treatment efficacy. Therapists can formulate new treatment models and provide enhanced care which focuses on these issues, appropriately and sensitively for each distinct client. The fact that every single client is an individual, separate and unique from even those who share her symptoms and diagnoses, should never be underestimated or overlooked. The threat of exclusion hypothesis and the evidence supporting it found in the current study could, however, be used as a framework from which to understand how each individual has responded to the motivations, desires, and fears surrounding a need that is common to humankind. The threat of exclusion hypothesis and the evidence supporting it can be used as a framework from which to understand how each individual, though

distinct and unique, may respond to the powerful and universal need to belong, a need ancestrally essential for the survival of the individual, the species, and a need that continues to be shared by us all.

## References

- Abdollahi, P., & Mann, T. (2001). Eating disorder symptoms and body image concerns in Iran: Comparisons between Iranian women in Iran and in America. *International Journal of Eating Disorders*, 30(3), 259-268. doi:10.1002/eat.1083
- Abed, R. (1998). The sexual competition hypothesis for eating disorders. *British Journal of Medical Psychology*, 71, 525–547.
- Alexander, L. (1998). The prevalence of eating disorders and eating disordered behaviors in sororities. *College Student Journal*, 32, 66–75.
- Al-Hinai, S., Al-Saidy, O., Dorvlo, A., Al-Riyami, B., Bhargava, K., Northway, M., et al. (2006). Culture and Prevalence of Social Phobia in a College Population in Oman. *College students: Mental health and coping strategies*, 115-132.
- Anderson, J. L., & Crawford, C. B. (1992). Modeling costs and benefits of adolescent weight control as a mechanism for reproductive suppression. *Human Nature*, 3(4), 299-334. doi:10.1007/BF02734054
- Bailey, M. & McLaren, S. (2005). Physical activity alone and with others as predictors of sense of belonging and mental health in retirees. *Aging and Mental Health*, 9(1), 82–90. doi:10.1080/13607860512331334031
- Bakan, D. (1966). *The duality of human existence*. Chicago: Rand McNally.
- Baron-Cohen, S. (1995). *Mindblindness: An essay on autism and theory of mind*. Cambridge, MA US: The MIT Press.
- Basow, S., Foran, K., & Bookwala, J. (2007). Body objectification, social pressure, and disordered eating behavior in college women: The role of sorority membership.

*Psychology of Women Quarterly*, 31(4), 394-400. doi:10.1111/j.1471-6402.2007.00388.x

Bloks, H., Van Furth, E. F., Callewaert, I., & Hoek, H. W. (2004). Coping Strategies and Recovery in Patients with a Severe Eating Disorder. *Eating Disorders: The Journal of Treatment & Prevention*, 12(2), 157-169.

doi:10.1080/10640260490445131

Boivin, J., Sanders, K., & Schmidt, L. (2006). Age and social position moderate the effect of stress on fertility. *Evolution and Human Behavior*, 27(5), 345-356.

doi:10.1016/j.evolhumbehav.2006.03.004.

Bruch, H. (1982). Treatment in anorexia nervosa. *International Journal of Psychoanalytic Psychotherapy*, 9303-312.

Bulik, C., Beidel, D., Duchmann, E., & Weltzin, T. (1991, September). An analysis of social anxiety in anorexic, bulimic, social phobic, and control women. *Journal of Psychopathology and Behavioral Assessment*, 13(3), 199-211.

doi:10.1007/BF00960784

Buss, D. (1998). The psychology of human mate selection: Exploring the complexity of the strategic repertoire. *Handbook of evolutionary psychology: Ideas, issues, and applications* (pp. 405-429). Mahwah, NJ US: Lawrence Erlbaum Associates Publishers.

Buss, D. M. (1995). Evolutionary psychology: A new paradigm for psychological science. *Psychological Inquiry*, 6, 1-30. doi:10.1207/s15327965pli0601\_1



- Buss, D., Haselton, M., Shackelford, T., Bleske, A., & Wakefield, J. (1998). Adaptations, exaptations, and spandrels. *American Psychologist*, *53*(5), 533-548.  
doi:10.1037/0003-066X.53.5.533.
- Caldwell-Harris, C. L., & Ayçiçeği, A. (2006). When Personality and Culture Clash: The Psychological Distress of Allocentrics in an Individualist Culture and Idiocentrics in a Collectivist Culture. *Transcultural Psychiatry*, *43*(3), 331-361.  
doi:10.1177/1363461506066982
- Chan, C., & Owens, R. (2006). Perfectionism and eating disorder symptomatology in Chinese immigrants: Mediating and moderating effects of ethnic identity and acculturation. *Psychology & Health*, *21*(1), 49-63.  
doi:10.1080/14768320500105312.
- Choenarom, C., Williams, R., & Hagerty, B. (2005). The Role of Sense of Belonging and Social Support on Stress and Depression in Individuals with Depression. *Archives of Psychiatric Nursing*, *19*(1), 18-29. doi:10.1016/j.apnu.2004.11.003.
- Confer, J., Easton, J., Fleischman, D., Goetz, C., Lewis, D., Perilloux, C., & Buss, D. M. (2010). Evolutionary psychology: Controversies, questions, prospects, and limitations. *American Psychologist*, *65*(2), 110-126. doi:10.1037/a0018413.
- Cosmides, L., & Tooby, J. (1999). Towards an evolutionary taxonomy of treatable conditions. *Journal of Abnormal Psychology*, *108*, 453-464. doi:10.1037/0021-843X.108.3.453
- Cosmides, L; Tooby J (1997-01-13). "Evolutionary Psychology: A Primer". Center for Evolutionary Psychology. <http://www.psych.ucsb.edu/research/cep/primer.html>. Retrieved 2008-02-16.

- Dallos, R., Denford, S. (2008). A qualitative exploration of relationship and attachment themes in families with an eating disorder. *Clinical Child Psychology and Psychiatry, 13*, 305-322. doi:10.1177/1359104507088349
- Daly, M., & Wilson, M. (1988). *Homicide*. Hawthorne, NY US: Aldine de Gruyter.
- Darwin, C. (1859). *On the origin of the species by means of natural selection, or, preservation of favoured races in the struggle for life*. London: Murray.
- Darwin, C. (1871). *The descent of man and selection in relation to sex*. London: Murray.
- De La Rie, S., Noordenbos, G., Donker, M., & Van Furth, E. (2007). The patient's view on quality of life and eating disorders. *International Journal of Eating Disorders, 40*(1), 13-20. doi:10.1002/eat.20338
- Durrant, R., & Ellis, B. (2003). Evolutionary psychology. *Handbook of psychology: Biological psychology, Vol. 3* (pp. 1-33). Hoboken, NJ US: John Wiley & Sons Inc.
- Eagles, J. M., Johnston, M. I., & Millar, H. R. (2005). A case-control study of family composition in anorexia nervosa. *International Journal of Eating Disorders, 38*, 49-54. doi:10.1002/eat.20151
- Epling, W. F., & Pierce, W. D. (1984). Activity-based anorexia in rats as a function of opportunity to run on activity wheel. *Nutrition and Behavior, 2*, 37-39.
- Epling, W. F., & Pierce, W. D. (1988). Activity-based anorexia: A biobehavioral perspective. *International Journal of Eating Disorders, 5*, 475-485.  
doi:10.1002/1098-108X(198807)7:4<475::AID-EAT2260070405>3.0.CO;2-M
- Faer, L., Hendriks, A., Abed, R., & Figueredo, A. (2005, September). The evolutionary psychology of eating disorders: Female competition for mates or for status?.

*Psychology and Psychotherapy: Theory, Research and Practice*, 78(3), 397-417.

doi:10.1348/147608305X42929

Ferrier, A. G., & Martens, M. P. (2008). Perceived incompetence and disordered eating among college students. *Eating Behaviors*, 9(1), 111-119.

doi:10.1016/j.eatbeh.2007.06.004

Friedman, R. (2007). Widening the therapeutic lens: Sense of belonging as an integral dimension of the human experience. *Dissertation Abstracts International*, 68(5-B), 3394.

Garner, D.M., Olmsted, M.P., & Polivy, J. (1983). Development and validation of a multidimensional Eating Disorder Inventory for anorexia nervosa and bulimia.

*International Journal of Eating Disorders*, 2, 15–34. doi:10.1002/1098-

108X(198321)2:2<15::AID-EAT2260020203>3.0.CO;2-6

Gatward, N. (2007, January). Anorexia nervosa: An evolutionary puzzle. *European*

*Eating Disorders Review*, 15(1), 1-12. doi:10.1002/erv.718

Gerner, B., & Wilson, P. H. (2005). The relationship between friendship factors and adolescent girls' body image concern, body dissatisfaction, and restrained eating.

*International Journal of Eating Disorders*, 37, 313–320. doi:10.1002/eat.20094

Gilbert, N., & Meyer, C. (2003). Social anxiety and social comparison: Differential links with restrictive and bulimic attitudes among nonclinical women. *Eating*

*Behaviors*, 4(3), 257-264. doi:10.1016/S1471-0153(03)00026-6

Gilbert, N., & Meyer, C. (2005 a). Fear of negative evaluation and eating attitudes: A replication and extension study. *International Journal of Eating Disorders*, 37,

360–363. doi:10.1002/eat.20103

- Gilbert, N., & Meyer, C. (2005 b). Fear of Negative Evaluation and the Development of Eating Psychopathology: A Longitudinal Study among Nonclinical Women. *International Journal of Eating Disorders*, 37(4), 307-312. doi:10.1002/eat.20105
- Gilbert, P. (1992). *Depression: The evolution of powerlessness*. New York, NY US: Guilford Press.
- Guisinger, S. (2003). Adapted to flee famine: Adding an evolutionary perspective on anorexia nervosa. *Psychological Review*, 110(4), 745-761. doi:10.1037/0033-295X.110.4.745
- Hagerty, B. M., Lynch-Sauer, J., Patusky, K. L., & Bouwsema, M. (1992). Sense of belonging: A vital mental health concept. *Archives of Psychiatric Nursing*, 6(3), 172-177. doi:10.1016/0883-9417(92)90028-H
- Hagerty, B., Lynch-Sauer, J., Patusky, K., & Bouwsema, M. (1992). Sense of belonging: A vital mental health concept. *Archives of Psychiatric Nursing*, 6(3), 172-177. doi:10.1016/0883-9417(92)90028-H.
- Hall, J. F., & Hanford, P. V. (1954). Activity as a function of restricted feeding schedule. *Journal of Comparative Physiological Psychology*, 47, 362–363. doi:10.1037/h0060276
- Helms, C. W. (1963). The annual cycle and Zugunruhe in birds. *Proceedings of the XII International Ornithological Congress*, 13, 925–939.
- Hong, J., & Woody, S. (2007, August). Cultural mediators of self-reported social anxiety. *Behaviour Research and Therapy*, 45(8), 1779-1789. doi:10.1016/j.brat.2007.01.011

- Horesh, N., Apter, A., Ishai, J., & Danziger, Y. (1996). Abnormal psychosocial situations and eating disorders in adolescence. *Journal of the American Academy of Child & Adolescent Psychiatry, 35*(7), 921-927. doi:10.1097/00004583-199607000-00019
- Hornbacher, M. (1998). *Wasted: A memoir of anorexia and bulimia*. New York, NY: Harper Collins.
- Hui, C. H., & Villareal, M. J. (1989). Individualism-collectivism and psychological needs: Their relationships in two cultures. *Journal of Cross-Cultural Psychology, 20*, 310-323. doi:10.1177/0022022189203005
- Hui, C., & Yee, C. (1994). The shortened Individualism-Collectivism Scale: Its relationship to demographic and work-related variables. *Journal of Research in Personality, 28*(4), 409-424. doi:10.1006/jrpe.1994.1029
- Janghorbani, M., Amini, M., Willett, W. C., Gouya, M., Delavari, A., Alikhani, S., & Mahdavi, A. (2007). First nationwide survey of prevalence of overweight, underweight, and abdominal obesity in Iranian adults. *Obesity, 15*(11), 2797-2808. doi:10.1038/oby.2007.332
- Juda, M.N., Campbell, L., & Crawford, C.B. (2004). Dieting symptomatology in women and perceptions of social support: An evolutionary approach. *Evolution and Human Behavior, 25*, 200-208. doi:10.1016/j.evolhumbehav.2004.02.001
- Karwautz, A., Nobis, G., Haidvogel, M., Wagner, G., Hafferl-Gattermayer, A., Wober-Bingol, C., et al. (2003). Perceptions of family relationships in adolescents with anorexia nervosa and their unaffected sisters. *European Child Adolescent Psychiatry, 12*, 128-135. doi:10.1007/s00787-003-0319-1

- Kissane, M., & McLaren, S. (2006). Sense of belonging as a predictor of reasons for living in older adults. *Death Studies, 30*, 243–258.  
doi:10.1080/07481180500493401
- Leary, M. R. (1983). A brief version of the Fear of Negative Evaluation Scale. *Personality and Social Psychology Bulletin, 9*, 371–375.  
doi:10.1177/0146167283093007
- Ma, X. (2007). Assessing school effects on dental hygiene and nutrition behaviors of Canadian adolescents. *Educational Review, 59*(1), 37-54.  
doi:10.1080/00131910600796876.
- Majd, H. (2008). *The Ayatollah Begs to Differ: The Paradox of Modern Iran*. New York, NY: Doubleday.
- Mansell, W., & Clark, D. M. (1999). How do I appear to others? Social anxiety and processing of the observable self. *Behaviour Research and Therapy, 37*(5), 419-434. doi:10.1016/S0005-7967(98)00148-X
- Martin, D. J., Abramson, L. Y., & Alloy, L. B. (1984). Illusion of control for self and others in depressed and nondepressed college students. *Journal of Personality and Social Psychology, 46*, 125–136. doi:10.1037/0022-3514.46.1.125
- McClelland, L., & Crisp, A. (2001). Anorexia nervosa and social class. *International Journal of Eating Disorders, 29*, 150–156. doi:10.1002/1098-108X(200103)29:2<150::AID-EAT1004>3.0.CO;2-I
- McLaren, S. (2009). Sense of belonging to the general and lesbian communities as predictors of depression among lesbians. *Journal of Homosexuality, 56*(1), 1-13.  
doi:10.1080/00918360802551365.

- McLaren, S., & Challis, C. (2009). Resilience among men farmers: The protective roles of social support and sense of belonging in the depression-suicidal ideation relation. *Death Studies, 33*(3), 262-276. doi:10.1080/07481180802671985.
- McLaren, S., Jude, B., & McLachlan, A. (2008). Sense of belonging to the general and gay communities as predictors of depression among gay men. *International Journal of Men's Health, 7*(1), 90-99. doi:10.3149/jmh.0701.90.
- Mealey, L. (2000). Anorexia: A 'losing' strategy?. *Human Nature, 11*(1), 105-116. doi:10.1007/s12110-000-1005-3
- Meilman, H. V., von Hippel, F. A., & Gaylor, M. S. (1991). Self-induced vomiting in college women: Its relation to eating, alcohol use, and Greek life. *Journal of American College Health, 40*, 39-42.
- Miller, R. S. (1995). On the nature of embarrassability: Shyness, social evaluation, and social skill. *Journal of Personality, 63*(2), 315-339. doi:10.1111/j.1467-6494.1995.tb00812.x
- Morgan, Marsden, & Lacey (2000) "Spiritual Starvation?": A Case Series Concerning Christianity and Eating Disorders. *International Journal Eating Disorders, 28*, 476-480. doi:10.1002/1098-108X(200012)28:4<476::AID-EAT19>3.0.CO;2-T
- Nasim, A., Corona, R., Belgrave, F., Utsey, S. O., & Fallah, N. (2007). Cultural orientation as a protective factor against tobacco and marijuana smoking for African American young women. *Journal of Youth and Adolescence, 36*(4), 503-516. doi:10.1007/s10964-006-9097-7
- Nesse, R. M. (1984). An evolutionary perspective on psychiatry. *Comparative Psychiatry, 25*, 575-580. doi:10.1016/0010-440X(84)90038-5

- Nesse, R. M., & Lloyd, A. P. (1992). The evolution of psychodynamic mechanisms. In J. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 601–624). Toronto, Ontario, Canada: Oxford University Press.
- Nobakht, M., & Dezhkam, M. (2000). An epidemiological study of eating disorders in Iran. *International Journal of Eating Disorders*, 28(3), 265-271.  
doi:10.1002/1098-108X(200011)28:3<265::AID-EAT3>3.0.CO;2-L
- Oaten, M., Williams, K., Jones, A., & Zadro, L. (2008, May). The effects of ostracism on self-regulation in the socially anxious. *Journal of Social & Clinical Psychology*, 27(5), 471-504. doi:10.1521/jscp.2008.27.5.471
- Ostrove, J., & Long, S. (2007). Social class and belonging: Implications for college adjustment. *Review of Higher Education: Journal of the Association for the Study of Higher Education*, 30(4), 363-389.
- Palmer, B. (2003). Concepts of eating disorders. In J. Treasure, U. Schmidt, & E. Van Furth (Eds.), *Handbook of eating disorders* (2nd ed.). Chichester: John Wiley & Sons.
- Pirke, K. M., Brooks, A., Wilckens, T., Marquard, R., & Schweiger, U. (1993). Starvation-induced hyperactivity in the rat: The role of endocrine and neurotransmitter changes. *Neuroscience and Biobehavioral Review*, 17, 287–294.  
doi:10.1016/S0149-7634(05)80012-0
- Price, J. S. (1967). Hypothesis: The dominance hierarchy and the evolution of mental illness. *Lancet*, 2, 243–246.



- Routtenberg, A., & Kuznesof, A. W. (1967). "Self-starvation" of rats living in activity wheels on a restricted feeding schedule. *Journal of Comparative Physiological Psychology*, *64*, 414–421. doi:10.1037/h0025205
- Salmon, C., Crawford, C., Dane, L., & Zuberbier, O. (2008). Ancestral mechanisms in modern environments: Impact of competition and stressors on body image and dieting behavior. *Human Nature*, *19*(1), 103-117. doi:10.1007/s12110-008-9030-8
- Sloman, L., & Gilbert, P. (Eds.). (2000). *Subordination and defeat: An evolutionary approach to mood disorders and their therapy*. London: Lawrence Erlbaum.
- Sloman, L., Gilbert, P., & Hasey, G. (2003). Evolved mechanisms in depression: The role and interaction of attachment and social rank in depression. *Journal of Affective Disorders*, *74*, 107–121. doi:10.1016/S0165-0327(02)00116-7
- Stevens, A., & Price, J. (2000). *Evolutionary psychiatry: A new beginning*. (2nd ed.). London: Routledge.
- Stojek, M., Fischer, S., & Collins, B. (2010). Thinness and restricting expectancies mediate the influence of ethnic identity on bulimic symptoms. *Personality and Individual Differences*, *49*(2), 102-106. doi:10.1016/j.paid.2010.03.012.
- Stopa, L., & Clark, D. M. (2001). Social phobia: Comments on the viability and validity of an analogue research strategy and British norms for the fear of negative evaluation questionnaire. *Behavioural and Cognitive Psychotherapy*, *29*(4), 423-430. doi:10.1017/S1352465801004039
- Swinbourne, J., & Touyz, S. (2007, July). The co-morbidity of eating disorders and anxiety disorders: A review. *European Eating Disorders Review*, *15*(4), 253-274. doi:10.1002/erv.784

- Symons, D. (1992). On the use and misuse of Darwinism in the study of human behavior. In J. H. Barkow, L. Cosmides, J. Tooby, J. H. Barkow, L. Cosmides, J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 137-159). New York, NY US: Oxford University Press.
- Tiller JM, Sloane G, Schmidt U, Troop N, Power M, Treasure JL. (1997). Social support in patients with anorexia nervosa and bulimia nervosa. *International Journal of Eating Disorders*, 21, 31–38. doi:10.1002/(SICI)1098-108X(199701)21:1<31::AID-EAT4>3.0.CO;2-4
- Tooby, J., & Cosmides, L. (1992). The psychological foundations of culture. In J. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture* (pp. 19–136). New York: Oxford University Press.
- Tooby, J., & Cosmides, L. (2005). Conceptual Foundations of Evolutionary Psychology. *The handbook of evolutionary psychology* (pp. 5-67). Hoboken, NJ US: John Wiley & Sons Inc.
- Treasure, J. L., & Owen, J. B. (1997). Intriguing links between animal behavior and anorexia nervosa. *International Journal of Eating Disorders*, 21, 307–312. doi:10.1002/(SICI)1098-108X(1997)21:4<307::AID-EAT1>3.0.CO;2-S
- Triandis, H. C. (1988). Collectivism vs. individualism: A reconceptualization of a basic concept in cross-cultural psychology, In G. Verma & C. Bagley (Eds.), *Cross-cultural studies of personality, attitudes and cognition* (pp. 60-95). London: MacMillan.

- Triandis, H. C. (1991). Cross-cultural differences in assertiveness/competition vs. Group loyalty/cooperation. In R. A. Hinde & J. Groebel (Eds.), *Cooperation and prosocial behavior* (pp. 78-88). Cambridge, UK: Cambridge University Press.
- Trivers, R. (2000). The elements of a scientific theory of self-deception. In D. LeCroy & P. Moller (Eds.), *Annals of the New York Academy of Sciences: Vol. 907. Evolutionary perspectives on human reproductive behavior* (pp. 114–131). New York: New York Academy of Sciences.
- Troop, N. A., Allan, S., Treasure, J. L., & Katzman, M. (2003). Social comparison and submissive behavior in eating disorder patients. *Psychology and Psychotherapy: Theory, Research and Practice*, 76, 237–249. doi:10.1348/147608303322362479
- Vander Wal, J. S., & Thomas, N. (2004). Predictors of body image dissatisfaction and disturbed eating attitudes and behaviors in African American and Hispanic girls. *Eating Behaviors*, 5(4), 291-301. doi:10.1016/j.eatbeh.2004.04.001
- Vincent, G. P., & Pare, W. P. (1976). Activity-stress ulcers in the rat, hamster, gerbil, and guinea pig. *Physiology and Behavior*, 16, 557–560. doi:10.1016/0031-9384(76)90215-8
- Wal, J. (2004). Eating and body image concerns among average-weight and obese African American and Hispanic girls. *Eating Behaviors*, 5(2), 181-187. doi:10.1016/j.eatbeh.2004.01.007
- Watson, D., & Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology*, 33(4), 448-457. doi:10.1037/h0027806

- Wasser, S. K., & Barash, D. P. (1983). Reproductive suppression among female mammals: Implication for biomedicine and sexual selection theory. *Quarterly Review of Biology, 58*, 513–538.
- Winton, E. C., Clark, D. M., & Edelmann, R. J. (1995). Social anxiety, fear of negative evaluation and the detection of negative emotion in others. *Behaviour Research and Therapy, 33*(2), 193-196. doi:10.1016/0005-7967(94)E0019-F
- Zhang, J., Norvilitis, J., & Ingersoll, T. (2007). Idiocentrism, allocentrism, psychological well being and suicidal ideation: A cross cultural study. *Omega: Journal of Death and Dying, 55*(2), 131-144. doi:10.2190/OM.55.2.c
- Zunker, V. (2008). *Career, work, and mental health: Integrating career and personal counseling*. Thousand Oakes, CA: Sage Publications.

## Appendix A

*Sense of Belonging Instrument - Psychological Experience (Hagerty and Patusky, 1995)*

Instructions: Here are some statements with which you may or may not agree. Using the key listed below, indicate the number that most closely reflects your feelings about each statement.

1 = Strongly Agree      2 = Agree      3 = Disagree      4 = Strongly Disagree

1. I often wonder if there is any place on earth where I really fit in.
2. I am just not sure if I fit in with my friends.
3. I would describe myself as a misfit in most social situations.
- \*4. I generally feel that people accept me.
5. I feel like a piece of a jig-saw puzzle that doesn't fit into the puzzle
6. I would like to make a difference to people or things around me, but I don't feel that what I have to offer is valued.
7. I feel like an outsider in most situations.
8. I am troubled by feeling like I have no place in this world.
9. I could disappear for days and it wouldn't matter to my family.
10. In general, I don't feel a part of the mainstream of society.
11. I feel like I observe life rather than participate in it.
12. If I died tomorrow, very few people would come to my funeral.
13. I feel like a square peg trying to fit into a round hole.
14. I don't feel that there is any place where I really fit in this world.
15. I am uncomfortable that my background and experiences are so different from those who are usually around me.
16. I could not see or call my friends for days and it wouldn't matter to them.
17. I feel left out of things.
18. I am not valued by or important to my friends.

Scoring Information:

Asterisks indicate reverse score item. Item 4 is reverse scored so that higher scores indicate higher sense of belonging.

*Note.* From "Developing a Measure of a Sense of Belonging," by Hagerty and Patusky, 1995, *Nursing Research*, 44, 9-13.

Appendix B

*Eating Disorder Inventory (Garner, Olmstead, and Polivy, 1983)*

Drive for Thinness Subscale

Instructions: Read each of the following statements carefully and indicate which most closely reflects your feelings about each statement according to the following scale:

1 = Always      2 = Usually      3 = Often      4 = Sometimes      5 = Rarely      6 = Never

- \*1. I eat sweets and carbohydrates without feeling nervous.
- 2. I think about dieting.
- 3. I feel extremely guilty after overeating.
- 4. I am terrified of gaining weight.
- 5. I exaggerate or magnify the importance of weight.
- 6. I am preoccupied with the desire to be thinner.
- 7. If I gain a pound, I worry that I will keep gaining.

Scoring Information:

Asterisks indicate negatively keyed item. Item # 1 is negatively keyed so that lower scores indicate less eating restriction.

*Note.* From “Development and Validation of a Multidimensional Eating Disorder Inventory for Anorexia Nervosa and Bulimia” by Garner, Olmstead, & Polivy, 1983, *International Journal of Eating Disorders*, 2(2), 15-34.

## Appendix C

*Brief Fear of Negative Evaluation Scale (Leary, 1983)*

Instructions: Read each of the following statements carefully and indicate how characteristic it is of you according to the following scale:

- 1 = Not at all characteristic of me
- 2 = Slightly characteristic of me
- 3 = Moderately characteristic of me
- 4 = Very characteristic of me
- 5 = Extremely characteristic of me

1. I worry about what other people will think of me even when I know it doesn't make any difference.
- \*2. I am unconcerned even if I know people are forming an unfavorable impression of me.
3. I am frequently afraid of other people noticing my shortcomings.
- \*4. I rarely worry about what kind of impression I am making on someone.
5. I am afraid that others will not approve of me.
6. I am afraid that people will find fault with me.
- \*7. Other people's opinions of me do not bother me.
8. When I am talking to someone, I worry about what they may be thinking about me.
9. I am usually worried about what kind of impression I make.
- \*10. If I know someone is judging me, it has little effect on me.
11. Sometimes I think I am too concerned with what other people think of me.
12. I often worry that I will say or do the wrong things.

Scoring Information:

Asterisks indicate reverse score item. Items 2, 4, 7, and 10 are reverse scored so that higher scores indicate less fear of negative evaluation.

*Note.* From "A brief version of the Fear of Negative Evaluation Scale," by Leary, 1983, *Personality and Social Psychology Bulletin*, 9(3), 371-375.

## Appendix D

*Individualism-Collectivism Scale – short form (Hui and Yee, 1994)*

Instructions: Read each of the following statements carefully. Using the key listed below, indicate the number that most closely reflects your feelings about each statement.

- 0 = Strongly Disagree
- 1 = Moderately Disagree
- 2 = Slightly Disagree
- 3 = Slightly Agree
- 4 = Moderately Agree
- 5 = Strongly Agree

1. The motto “sharing both blessing and calamity” still applies even if one’s friend is clumsy, dumb, and causes a lot of trouble.
2. I would help if a colleague at work told me that he/she needed money to pay utility bills.
3. If a colleague lends a helping hand, one needs to return the favor.
4. There is everything to gain and nothing to lose for co-workers to group themselves to help each other.
5. Colleagues’ assistance is indispensable to good performance at work.
6. I like to live close to my good friends.
7. It is a personal matter whether I worship money or not. Therefore it is not necessary for my friends to give any counsel.
8. To go on a trip with friends makes one less free and mobile. As a result, there is less fun.
9. I would not let my parents use my car (if I have one), whether they are good drivers or not.
10. I would not let my needy mother use the money that I have saved by living a less than luxurious life.
11. I would not share my ideas and newly acquired knowledge with my parents.
12. Teenagers should listen to their parents’ advice on dating.
13. Young people should take into consideration their parents’ advice when making education/career plans.

Scoring Information:

Supportive exchange between colleagues and friends (CF) = 1 + 2 + 3 + 4 + 5 + 6 – 7 – 8

Consultation and sharing with parents (PA) = 12 + 13 – 9 – 10 – 11

In-group solidarity = CF + PA

*Note.* From “The shortened Individualism-Collectivism Scale: Its relationship to demographic and work-related variables.” by Hui and Yee, 1994, *Journal of Research in Personality*, 28(4), 409-424.



Appendix E

*Demographic Survey*

**Requirements:** Requirements for participation in the study include being a Female and being at least age 18 years old or older.

**Instructions:** Read each of the following statements carefully. Please indicate the answer to each question using the options provided.

1. Please indicate your sex using the key below.

- 1 = Female
- 2 = Male

2. Please indicate your age.

\_\_\_ years old

3. Please indicate your ethnicity using the key below.

- 1 = European American
- 2 = African American
- 3 = Hispanic
- 4 = Afro-Caribbean
- 5 = Asian
- 6 = Other

4. Please indicate your total household income for 2010 using the key below. Please include your parents/guardians total household income for 2010 if you are claimed as a dependent or are provided with financial assistance.

- 1 = Less than \$40,000
- 2 = \$40,000 - \$74,999
- 3 = More than \$75,000

*Note.* Demographic survey developed by the principal investigator.