

An Evolutionary Perspective on Anorexia Nervosa: Theoretical Explorations of
Applications for Art Therapy

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ABSTRACT

An Evolutionary Perspective on Anorexia Nervosa: Theoretical Explorations of
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Evolutionary theories of anorexia nervosa are explored towards the aim of integrating them within a new theoretical approach to art therapy with this population. Submission stress, feelings of inferiority, chronic negative self-evaluations in social comparison and high levels of shame, self-directed criticism and self-directed hostility, found to be common features of anorexia are considered in light of their evolutionary underpinnings. Theories and techniques of evolutionary psychotherapy for these unique issues as they relate to anorexia, are explored for their applications to art therapy with this population. The fields of therapeutic mental imagery, CBT, neuroscience, evolutionary theories of art and art therapy are woven together to arrive at a new evolutionary theory of art therapy for people with anorexia nervosa.

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Introduction

Evolutionary psychology is a newly emerging field that is concerned with connecting the way people think, feel and behave today to the adaptive pressures imposed on humans and their early primate ancestors through millions of years of evolution.

Evolutionary psychotherapy is also a burgeoning field that is using the lessons learned about human nature to inform psychotherapy practices and help people understand, cope and recover from mental illness. In this field various psychopathologies are explained by considering the early adaptive benefits of traits that are now considered undesirable such as anxiety, depression, and personality disorders. (Gilbert, Bailey & McGuire, 2000). In the following discussion, general theories of the etiology of anorexia will be presented along with evolutionary theories of this disorder, both older theories, based on sexual selection and reproductive suppression and newer theories, based in neuroscience, ethology, the concept of the human evolutionary importance of belonging to a group and the relationship between losses in perceived social attractiveness. Psychotherapeutic treatment implications of evolutionary explanations of AN will be presented, then an integration of art therapy principles with these treatment implications will be explored, in the context of their unique relevance to art therapy with patients with anorexia nervosa.

Etiological Theories of Anorexia Nervosa

Anorexia nervosa (AN) is a complex illness involving biological, genetic, psychological and social aspects. It has been the source of ample investigation and has proven to be a very difficult disorder to treat (Guisinger, 2003). Some of the most widely accepted theories of how anorexia develops include psychoanalytic, developmental, social, and biomedical. Bruch (1978), a pioneer in the field, considered anorexia to be a struggle for autonomy and control. Food became the means for the daughter to express

control in her lifelong experience of being exploited and dominated by her mother. Crisp (1980) expanded on this theory to take developmental concerns into consideration and considered anorexia to be an attempt to delay the development of puberty and hence adulthood, thought to result from a deep lack of confidence in oneself and one's ability to be autonomous. Feelings of low self-esteem, powerlessness, and inadequacy in patients with anorexia have been well documented and it is thought the ability to restrict food, deny the body's needs and lose weight are a source of pride and increased self-esteem to the person with AN (Bruch, 1978; Baird & Sights, 1986). A deep fear and contempt for sexuality was thought to cause the symptoms as well (Casper, 1983, as cited in Guisinger, 2003). A disturbance in the crucial phase of separation and individuation, around 12 to 36 months of age, was thought to be problematic and lead to AN symptoms (Johnson & Connors, 1987, as cited in Guisinger, 2003). Social theorists have blamed anorexia on the rise of unhealthy role models in fashion and mainstream media where the message of extreme thinness is absorbed and internalized by women and girls. The prevalence of this media in the developed Western world is connected to the higher incidence rates of AN in this region (Guisinger, 2003). Biomedical researchers have found a high rate of genetic heritability in this disorder. Chief among these inherited traits relevant to AN have been abnormal levels of neurotransmitters and hormones involved in the mechanisms of stress and appetite (Connan et al., 2003).

Current Theoretical Frames used in Art Therapy for Individuals with Anorexia Nervosa

Providing a detailed account of all art therapy interventions used with people with AN is beyond the scope of this discussion but an account of theoretical frames used in support of using art expression in therapy with people with AN will be given. Seven rationales will be discussed and connected to different authors.

The first rationale is based largely on the pioneering work of Bruch (1978). This entails a psychodynamic perspective, where within the psyche of the patient with AN, feelings of a lack of autonomy and dependency needs conflict with a powerful need for control. Individuals with AN may project their unconscious conflicts into their artwork, in a spontaneous, automatic manner. The art therapist and the client collaborate together to discover hidden meanings in the art that show the inner workings of the conflict. This rationale is based on the idea that art provides a direct link to the unconscious mind. Like Freud's interest in and use of free association and dream analysis, art making and imagery are thought to reveal implicit messages and repressed material that can aid in insight generation and resolution of conflicts (Rubin, 2001). Texts describing this approach with patients with AN include Crowl, 1980, Levens, 1995, Luzzatto, 1994 and Rehaviah-Hanauer, 2003.

A second rationale is closely related to the first. In this conceptualization, still related to the work of Bruch (1978) the client's feelings of a lack of control are very important. The person with anorexia is taking control over their lives and body through the control of food, shape and weight. The mother-child relationship is central because the child experienced domination from the mother, to the point where the child did not feel ownership or control over their own body. They were a vessel for the wishes, hopes and fears of the mother. Art therapy is considered in its unique capacity to provide feelings of control to the patient. This is a highly client-centered approach, where the session is primarily directed by the patient to give them the space they need. Through active manipulation of concrete art materials, art-making could take the place of food as the arena upon which to exercise control. A link between the concrete and tangible nature

of food and art materials is important. Texts describing this approach with patients with AN include Schaverien, 1994, Levens, 1995, Rehavia-Hanauer, 2003 and Makin, 2000.

A third rationale for using art expression in therapy with people with AN is the unique feature of body image distortion. Due to body 'image' being a visual concept, art's unique capacity to express visual assumptions about the body is capitalized on. As well, art therapists themselves use body tracings of patients for instance to provide visual feedback about the reality of the body's true shape. Texts describing this approach with patients with AN include Crawl, 1980, Makin, 2000 and Hinz, 2006.

A fourth rationale is the unique sensory and kinesthetic properties of art making and materials that can be strong stimulators of emotion (Hinz, 2009). Research and clinical observation show that emotional suppression and aversion is common in anorexia and that food restriction is used to numb and constrict affect (Fox, 2009; Hatch et al., 2010), which supports this use of art therapy. Texts describing this approach with patients with AN include Hinz, 2009; Hinz, 2006 and Makin, 2000.

A fifth rationale is based in the therapeutic benefits of mindfulness meditation practice and spirituality. The beneficial effects on the body of slowing down, breathing and becoming responsive to the body's signals ushers in healthy physiological effects as well as the potential to open up to a higher creative power, who's strength and wisdom can be found within. Art is regarded as a powerful modality to create and then internalize positive messages of healing and growth through symbolic expression. Again art's sensory and kinaesthetic properties encourage the expression of bodily impulses and facilitate connection with the physical body. Through clinical observation and research it is known that people with AN have a rigid control over bodily impulses and have less

awareness of their physical states (Kaye, 2008). Texts describing this approach with patients with AN include Makin, 2000, Levens, 1995 and Hinz, 2006).

A sixth rationale for using art expression in therapy with people with AN is art's unique capacity to address resistance to treatment that is so common in AN. Patients often engage in elaborate intellectual defenses against engaging in the therapeutic relationship and moving towards healing by using verbal language in intricate ways to avoid intimacy and exposing emotional pain. The persistence of this disorder is unique in that many people AN are resistant to recovery. The reasons for this are a subject of debate, ranging from sheer psychological will to stay thin or powerful, biological forces at work in the body, that maintain the symptoms (Gusinger, 2003). But generally art making in an empathic environment is thought to help bypass rigid intellectual defenses and resistance to treatment. It provides an alternative language through which to communicate, bypassing well-rehearsed verbal smoke screens. Texts describing this approach include Hinz, 2006, Levens, 1995, Rehavia-Hanauer, 2003 and Matto, 1997).

A seventh rationale is based in the irrational beliefs and cognitive distortions, considered central in AN by cognitive therapists, such as an overemphasis on shape and weight to define self-worth (Cooper, 2009). Art therapy integrates concepts and methods from cognitive behavioral therapy in order to rework problematic thinking-feeling links. For instance external circumstances or internal thoughts triggering specific emotions that prompt eating disorder behavior would be explored and expressed through art. Alternative thoughts and solutions to problems could be generated through art making. Art is considered to have a unique capacity to integrate emotion and cognition through its sensory qualities. Texts describing this approach with patients with AN include Matto, 1997, Hinz, 2006 and Hinz, 2009).

Older Evolutionary Theories of Anorexia Nervosa

There have been several different evolutionary theories of AN. In recent years, there have also been links made between anorexia-like syndromes in animals and AN in humans (Treasure & Owen, 1997). Evolutionary theorists have made use of these animal models of AN to further their arguments (Guisinger, 2003), so in this discussion, they will be presented interchangeably with evolutionary theories. These theories have attempted to explain the bizarre symptoms of AN from the loss of menarche to the characteristic hyperactivity and drive for thinness. One of the earlier evolutionary models was based on the loss of menses, and was labeled the reproductive suppression hypothesis (RSH). Anorexia was perceived as an adaptive mechanism to delay sexual maturity until a time when greater reproductive success was more likely, such as when a better quality mate could be found or in response to physiological stressors like starvation or social stress. This occurred through both the reduction of 'sexual fat' to limit attractiveness to the opposite sex as well as through suppression of biological reproductive function (Wasser & Barash, 1983; Surbey, 1987; Anderson & Crawford, 1992, as cited in Kardum et al., 2008; Voland & Voland, 1989). Critiques include the fact that the theory doesn't account for why a less costly means of delaying reproduction didn't evolve, or for the presence of a distorted body image and hyperactivity, or for why men and postmenopausal women would develop AN (Guisinger, 2003).

Other earlier evolutionary theories include the kin selection theory and the model of parental manipulation. Voland & Voland (1989) applied the kin selection theory to anorexia nervosa. This theory is based on the observation that in some animal species, including many bird species and some monogamous mammals (Emlen, 1984 as cited in Voland & Voland, 1989), certain members engage in altruistic, self-sacrificing helping

behavior to other reproducing family members and their offspring even at the expense of their own reproductive success because one's genes will ultimately still be passed down through the process of inclusive fitness (Hamilton, 1964, as cited in Voland & Voland, 1989). The presence of over-concern with the well being of other family members and high level of reported self-sacrifice within the family has been observed in families with an individual with AN, which adds to this theory (Minuchin et al., as cited in Voland & Voland, 1989).

Another related theory is that of parental manipulation. Voland & Voland (1989), combined evolutionary theories of different types of altruism and fitness costs to both parents and offspring (Trivers, 1974, 1985) with clinical observations of familial dynamics in anorexia, namely the dominant, controlling nature of mothers of daughters with AN and the fact that these families seem to value ambition and upwardly-moving social success above all else (Sperling & Massing, 1970; Bruch, 1979 as cited in Voland & Voland, 1989). Parental manipulation theory of AN suggests that parents exert strong psychological pressure on certain daughters to value an ascetic, self-sacrificing and extremely hard-working and achievement-oriented existence, which lowers the chances of finding a suitable mate as well as the girl's reproductive potential and also increases the chances of upward social mobility of the family through promotion of the son's reproductive chances as a more valued member of the family and in creating inter-family connections (Voland & Voland, 1989). This theory does not seem to take into account however, the use of the reproductive capacity of girls to form alliances with other families, in the interest of upward social mobility. It also fails in explanatory power, considering that in many families with a member with AN, there is no major family dysfunction or pathology in the mother child relationship (Guisinger, 2003).

Abed (1998) presented the sexual competition hypothesis (SCH) of eating disorders. In this theory, sexual selection pressures over human evolution have shaped a drive for physical attractiveness in order to compete for good quality mates and male commitment. Drive for thinness in particular is associated with signaling a youthful, nubile shape which is a sign of high reproductive potential and that one isn't already pregnant. The high value placed on thinness in modern Western culture, also exacerbates this drive to an unhealthy degree. This author hypothesized that a decrease in fertility in the Western world, with women having less children and at a later point in life, along with the autonomy of the modern woman to choose her mating strategies, the high density of such autonomous women at reproductive age in modern cities and the wide spread access of media images of young, nubile female competitors, create an atmosphere of heightened intrasexual competition (ISC), which drive certain individuals to develop AN and bulimia nervosa (BN). Faer et al. (2005) conducted a study to test this hypothesis among a non-clinical sample of women. These researchers also considered the dimension of ISC for status with the hypothesis that women closer on the spectrum to anorexia would exhibit higher ISC for status while women closer on the spectrum to bulimia would exhibit higher ISC for mates. It was found that ISC in general was predictive of both AN and BN symptoms but that ISC for mates was the driving factor of ISC for status, general competitiveness, perfectionism, body dissatisfaction, drive for thinness and both AN and BN (Faer et al. 2005). In a critique of Abed's intrasexual competition theory, Gatward (2007) mentioned that this model would have a difficult time explaining the degree of weight loss that characterizes AN. Like the reproduction suppression model, the ISC implies efforts to increase the success of reproduction but the degree of weight loss and loss of reproductive ability would seem to make this strategy extremely unadaptive in the

long run. Abed (1998) did argue however, that many adaptive strategies have the potential to be taken to destructive extremes (Gatward, 2007).

Newer Evolutionary Theories of Anorexia Nervosa

Newer evolutionary theories of anorexia nervosa take into account the multiple scientific discoveries enabled by research into the neurobiology, neuroendocrinology, neuropsychology and genetics of both humans with AN and animals presenting with AN-like syndromes. Guisinger (2003) presented an interpretation of anorexia nervosa as an evolutionary adaptation to famine. In food depleted areas in our ancient ancestral environment, individuals that responded to the biological conditions of famine with hyperactivity, a drive to move, a refusal of local food, and a denial of their starvation (distorted body image) could forage longer, relocate and had higher chances of survival. In Guisinger's view, supported by animal studies, biological and historical findings, starvation can stimulate these adaptations in certain individuals, leading to the rigid compulsions of anorexia nervosa. In laboratory studies, when food is withheld from certain rats, they will increase their running wheel activity considerably and avoid food when it is presented (Epling & Pierce, 1984 as cited in Guisinger, 2003). In this conception, modern ideals and standards for women's beauty, as disseminated by mainstream media are the instigating factors behind dieting and help to explain the current high numbers of anorexia in females, but it is the starvation itself that triggers the ancient adaptation that allows individuals with AN to persist and live out their everyday and often highly ambitious lives having lost at least 15% of their average body weight where most individuals would be lethargic and conserving energy, a more normal response to starvation (Guisinger, 2003).

When researchers began to notice anorexia-like syndromes in animals, this provided an impetus to look at the disorder through a lens that extended beyond psychological, family and social considerations but to a deepening awareness of ancient, adaptive forces that could be operating in both animals given certain circumstances as well as more evolved animals – humans. Treasure and Owen (1996) conducted a review of ethological literature and made links to anorexia. They presented conditions such as ‘wasting pig’ and ‘thin sow’ syndromes. In these conditions, the animal restricts their food intake to drastic levels and engages in incessant hyperactive behavior. Farm veterinarians have observed that this happens most often when pigs unfamiliar with each other are grouped together. After a period of bullying and rearranging of the social order, some pigs, especially those bred for leanness and end up low in social rank, fail to cope and proceed into self-induced starvation (Treasure & Owen, 1996).

Connan et al. (2003) presented a neurodevelopmental model of anorexia. Anxious, insecure attachment patterns in early life based on caregiver variables combine with a genetic pre-disposition and the hormonal changes and stressors of the onset of adolescence, to increase the hyperactivity of the biological stress response, involving the over-secretion of specific neurotransmitters and hormones in the HPA axis. The unique form of chronic stress that Connan et al. (2003) proposed to be most relevant to anorexia is submissive stress, based on the findings of anorexia-like syndromes in animals, as discussed above. As well, they suggested that due to the common pre-existing traits in individuals with AN, of low self-esteem, increased levels of behavioral inhibition, harm-avoidance behaviors, feelings of inadequacy, helplessness, placation and perfectionism arising from developmental factors and personality structure, these individuals are particularly susceptible to low social rank. Low social rank produces a chronic level of

stress because conflict can't be won nor is escape permitted. So the individual is involuntarily trapped in a submissive stance where harm-avoidance and suppression of behavioral instincts are the only solution and maladaptive coping strategies are commonly witnessed (Gilbert & Allan, 1998 as cited in Connan et al., 2003). It has been shown that women with anorexia report high levels of submissive behavior and often feel inferior when compared with others (Troop et al., 2003 as cited in Connan et al., 2003), which the authors concluded made them particularly susceptible to submission stress (Connan et al., 2003).

The evolutionary significance of the dynamics of social hierarchies and the impact of perceived low social rank on modern day depression and other psychopathologies has been advanced and developed by researchers such as Gilbert (1992, 1997) and Stevens & Price (2000). Troop et al. (2003) conducted a study to explore the correlation between perceived low social rank, submissive behavior and the presence and severity of eating disorders. These researchers linked ethological models of anorexia as a response to submission stress in genetically predisposed animals and evolutionary theories of the psychological impact of social rank, developed by authors such as Gilbert and Stevens & Price. They presented pre-existing evidence supporting social ranking theory and eating disorders such as the high rates of feelings of inadequacy, low self-esteem, lack of assertiveness, and the perception that others are more powerful (Butow, Beumont & Touyz, 1993 as cited in Troop et al., 2003). All these traits can be linked to perceived involuntary subordination or low social rank. Also, feelings such as shame, envy and jealousy, found to be high in AN (Andrews, 1997 as cited in Troop et al., 2003) are also linked with perceived low social rank (Lazarus, 1999, as cited in Troop et al., 2003). Their findings showed that patients with eating disorders saw themselves as less

favourable than student controls in social comparison, were more submissive in every day life than controls and “unfavourable social comparison and submissive behaviour were significantly related to eating-disorder symptoms, even when other symptoms (in particular, depression) were taken into account” (Troop et al., 2003, p. 245). Troop & Baker (2008) added specificity to the connection between low social rank and eating disorder symptoms as distinct from the impact of low social rank on depression, since this condition is commonly co-morbid with eating disorders. In addition to finding that the connection remained after controlling for depression, they found that a sense of social defeat and perceived internal entrapment were more predictive of depressive symptoms while submissive behavior and unfavorable social comparison were more predictive of eating disorder symptoms (Troop & Baker, 2008).

Studies have focused on the role of shame in anorexia (Skarderud, 2007; Grabhorn et. al., 2006). Shame is conceived of as a socially-mediated emotion. “Intense internal shame is an inner experience of the self as an unattractive social agent, under pressure to limit possible damage to the self via escape or appeasement (Gilbert, 1998)” (Skarderud, 2007, p. 82). High levels of shame both of a global, pervasive nature as well as shame focused on particular areas such as body image, achievement failures and the experience and expression of emotions like anger and sadness, were found in a group of anorexic clients (Skarderud, 2007). Other studies confirm the high levels of shame in people with AN as compared to other clinical groups and was considered a factor in the onset, maintenance and risk of relapse in the disorder (Cook, 1994; Frank, 1991; Masheb, Grilo, & Brondolo, 1999 as cited in Goss & Allan, 2010).

Gilbert (1997) discussed how the experience of shame was an important adaptive emotion in our human evolutionary history as it prevented exclusion from groups. For

humans to survive and to reproduce in the ancestral environment, it was extremely important for them to belong to a group. Group inclusion meant food, safety, shelter, protection from the elements and predators and an opportunity to find a mate. Because of this, bids for dominance in the social hierarchy became more subtle and complex. There was an evolution from aggressive displays surrounding physical conflict, where one's strength and fearlessness equaled one's Resource Holding Potential (RHP) into an ability to attract attention and care from others, ensuring inclusion, good quality mates, useful relationships and support from one's subordinates. This latter ability is called one's Social Attention Holding Power (SAHP) and can also be equated with one's 'social attractiveness'. One can gain high positive SAHP by a variety of traits and behaviors such as being altruistic, friendly, artistic, intelligent, beautiful, talented or resourceful. (Gilbert, 1997).

Cultural SAHP indicates the qualities and attributes that certain cultures value over others, so by engaging in behaviors and possessing traits the culture values, such as thinness, beauty, fame and wealth in our culture, one's SAHP goes up, a positive outcome for the individual (Gilbert, 1997). Success in these types of goals is accompanied by pleasurable emotions due to a stimulation of the reward centers in the brain regulating motivational drives (Depue & Morrone-Strupinsky, 2005 as cited in Gilbert, 2010). This phenomenon also creates the variety between cultural groups. In general, people are very motivated to increase and maintain the positive attention they receive and to reduce negative judgments. They are in a sense "image managers" (Gilbert, 1997, p. 117). Shame is derived from our innate human need to be considered socially attractive. Again, the price of social exclusion in our ancient past was extremely high. The presence of shame allows us to perceive when we may have violated social and cultural rules and to

change our behavior, which is adaptive. Since doing or being something ‘shameful’ is such a powerful social threat, it can activate defensive behaviors such as a desire to hide and behavioral inhibition. Rigid, controlled behaviors are activated to signal submission, compliance and to avoid harm and further shaming at all costs. Shame is a social signal of submission, or in other words an adaptive *strategy* designed to have an effect on a potential attacker to de-escalate the conflict or aimed at members of the group who might exclude, reject, humiliate, disgrace, shun, or degrade. Shame is linked to general feelings of inferiority, inadequacy, negative social comparisons and a fear of negative evaluation. It is important to consider one’s attitude towards inferiority, however. If one is content with one’s ‘inferior’ position in a group, shame is not the automatic outcome. Shame ensues from an *involuntary* subordination and inferiority or loss of status (Gilbert, 1997).

There is also a distinction between internal and external SAHP. If one perceives oneself as valuable, attractive and talented for example, one has high internal SAHP. This is thought to result from signals received in early life from one’s caregivers. If positive attention and praise was directed towards the child, they are likely to internalize a greater degree of positive internal SAHP. If they were neglected, criticized or made to feel their accomplishments were not their own, they may have more negative internal SAHP. The concept of *self-esteem* is analogous to this understanding of oneself, where high self-esteem is associated with one’s contentment with one’s social status and level of SAHP. One’s external SAHP refers to the quality and the amount of attention people actually bestow upon a member of the group. One may need an excessive amount of external SAHP to boost their internal SAHP or sense of self-worth. Pride is on the other side of the emotional coin from shame. It is a social emotion that is activated when we

have done something to increase our social status and improve or gain acceptance from others (Gilbert, 1997).

After presenting Gilbert's (1997) theories in some detail, it may be important to acknowledge the connection being made to the high rates of submissive behavior, low self-esteem, and feelings of inadequacy, inferiority and shame in individuals with anorexia nervosa as discussed above. "Shame, the feeling of inferiority and self-dislike constitute an emotional and cognitive point of departure for a change in conduct. Individuals with negative or low self-esteem will seek ways to self-repair and to compensate such feelings. For the anorectic-to-be, the focus of coping is on the body, weight and dietary control" (Skarderud, 2007, p. 93). Control of the body and thinness, appearance traits valued in our culture for women, are used to compensate for perceived low Social Attention Holding Power. There is a shame-pride cycle in anorexia where pronounced shame over areas of one's life and feelings of inferiority are compensated for by the pleasurable pride felt in the areas of self-control, being extraordinary, appearance and the rebellion and protest activated through eating disorder behaviors (Skarderud, 2007).

Gatward (2007) has incorporated different evolutionary theories regarding responses to threat to try and explain the phenomenon of anorexia nervosa. This author has combined Guisinger's (2003) Adaptation to Flee Famine Hypothesis (AFFH) as well as Gilbert's (1992, 1997) concept of SAHP among other evolutionary ideas relevant to AN. Gatward proposed that since the threat of exclusion is so intense for humans due to the importance of belonging to a group in evolutionary history, some people try to increase their SAHP or social attractiveness/status by losing weight as this is valued in our culture as a sign of self-control, where obesity has reached epidemic levels. Once

dietary restriction has begun in response to a perceived threat of possible social exclusion, it is feasible that a special genetic mechanism is triggered by the conditions of famine in the body, which enables the maintenance of the very low body weight. Gatward incorporated Guisinger's (2003) Adapted to Flee Famine Hypothesis for this, which suggested that denial of available food, an optimistic denial of one's starving body and an increased hyperactivity to forage longer and farther was at one point adaptive in famine conditions, which would have been quite common in our ancient human history of nomadic hunter-gatherers. Gatward then called on Mealey's (2000) conception of anorexia as a 'losing strategy' imposed on subordinates by the female dominants in a society by providing impossible standards that stress and deplete their competitors systems in order to take them out of the competition for reproduction and good quality mates. What makes recovery from AN and gaining weight so difficult becomes the threat of re-entering into the competition for status and control and the parallel dangerous risk of social exclusion. Anorexia has been conceived of as a means of hiding, a form of submissive behavior meant to signal defeat. So re-gaining health, energy and vigor is considered a means of signaling that one is rejoining the fight for status and control of resources, both physical and social (other people are considered resources in evolutionary terms). Gatward drew on Strober's (2004) description of anorexia as an overexpression of fear-based learning, but instead of food and normal weight being the feared object, it is instead the fear of social exclusion, igniting a primitive mechanism to avoid isolation from our ancient history (Gatward, 2007). In an earlier paper, Gatward (2001) also suggested that there may be an inherent boost in self-esteem that occurs in people who are genetically predisposed to tolerate starvation well, a connection made in ancient times when people who were able to tolerate starvation and help others obtain sustenance would

have had an increase in status and group approval and hence a boost in self-esteem (Gatward, 2001). There does seem to be some contradictions in Gatward's (2007) theoretical model. The fact that losing weight is used to both increase SAHP suggesting competition for status becomes unclear when considering staying at a low weight is also seen as a way to hide from the 'competition.'

Implications of Evolutionary Theories for Psychotherapy with Anorexia

In the following discussion on the implications of evolutionary theories for psychotherapy, I will be combining recommendations made in the context of anorexia nervosa but also in the context of individuals who are highly shame-prone with a tendency towards extreme self-criticism and submissiveness as these problems have been shown to be relevant in AN. In the following sections, I will discuss possibilities for how art therapy can both complement treatment strategies based in evolutionary theory as well as expand on their implications for treatment.

I will first review some of the treatment implications suggested by the older evolutionary theories of anorexia. The emphasis for treatment according to some of the evolutionary theorists tends to be on incorporating this point of view into psycho-education and a cognitive-behavioral perspective to provide understanding for the complex and confusing emotions, thoughts and behaviors experienced in this disorder (Faer et al., 2005; Guisinger, 2003). Faer et al. (2005) suggested that an awareness of the destructive impact of a patient's intense intrasexual competitive tendencies can help challenge cognitive errors and biases. Guisinger (2003) in the context of his 'Adaptation to Flee Famine hypothesis' (AFFH), discussed how an emphasis on the evolutionary adaptive nature of anorexia as a means to survive famine, can help take the pressure off family systems and avoids 'parent-blaming', fostered by beliefs in the controlling,

intrusive mother. Guisinger acknowledged the role of sub-optimal familial interactions as a precipitator in many cases of AN, but also pointed to high numbers of cases that don't involve parental pathology. Guisinger saw the AFFH's value in therapy as providing a strong psycho-educational cognitive component that would help relieve the pressure and hostility for both patient and family around the stubborn symptoms of AN and act as a motivator to bring body weight to a certain point that wouldn't be setting off ancient adaptations for famine. Instead of seeing the symptoms as subjectively willed, they could be seen as powerful biological drives set off by neuroendocrine changes. For therapy, Guisinger recommended focusing on "the cultural pressures, family situation, personality factors, or traumatic life events that first led the anorectic to disregard the body's hunger signals and drive weight so low" (Guisinger, 2003, p. 756). Awareness into cultural high standards for weight needs to be raised and resistance to these toxic norms needs to be encouraged, as these tend to instigate the dieting in the first place. Addressing perfectionism in therapy is important. This common personality trait in people with AN, seems to be the factor that enables the perseverance of driving weight so low in the first place. Finding other modalities to heighten self-esteem and express individuality need to be found as well (Guisinger, 2003).

While these recommendations may be helpful, the most fruitful areas in evolutionary psychotherapy seem to be surrounding problems related to anorexia nervosa such as high levels of shame, submissiveness, negative self-evaluations in social comparison and self-criticism. The relationship of these affects, behaviors and thoughts to anorexia has been established above.

Gilbert (2000) discussed how human brains have evolved in a uniquely social context and adapted to take on multiple roles. Humans were designed over millions of

years to both send and receive social signals, especially non-verbal indicators like facial expression, body language and tone of voice. He described ‘social mentalities’ as the different organizations of affect, thoughts and behavior necessary to attend to complex social cues involved in important life goals such as finding a mate, defending territory, avoiding social exclusion, and developing close, affiliative relationships. For instance, there is a different social mentality for attending to cues of social rank than signs of affiliation and caring. Gilbert presented evidence showing that our perceptions of social cues can change our physiological states. There are many examples such as infant and mother attunement but of relevance here is that positive signals of approval, caring and support tend to lower stress hormones and boost certain rewarding neurohormones, like oxytocin while signals of aggression, derogation, criticism and shaming can elicit a spike in our stress hormones and lower the same pleasurable neurohormones (Gilbert, 2000).

Gilbert (2000) hypothesized that over time, human beings have internalized these interactive social messages. The ‘self-talk’ involved in self-criticism, inner shaming and outright attacks on the self can set off the same submissive defensive feelings, thoughts and behaviors that would have occurred *interpersonally*. These ‘social’ conflicts have become *intrapersonal*. He compared this idea to other theorists who see the human psyche as consisting of ‘part selves’ such as the ego and superego of Freud or the different ‘schemas’ of cognitive theorists. He suggested that negative and aversive internal voices or in other words the *hostile-dominant self* attacks the subordinate part of self and leads to feelings of shame, changes in physiological states by increasing stress and reducing rewarding neurohormones. Submissive behavior strategies and feelings can be set off such as the desire to hide, behavioral inhibition and inferiority. This dominant part of the self has evolved from mental modules designed to inhibit and derogate

competitors/subordinates. Gilbert distinguished between the goals of these attacking/dominant parts of the self. Based on studies of violence and aggression, he suggested that attacks based on failures of goals are essentially motivated towards self-improvement but can get out of hand. These attacks tend to subside once the goal has been achieved. On the other hand there are more sadistic attacks that do not respond to signs of submission and defeat and continue to derogate, abuse and shame (Gilbert, 2000). Barrow (2007), as cited in Goss & Allan (2010), found that patients with eating disorders scored at similar levels in self-criticism for the purpose of self-improvement compared to a nonclinical control group but scored significantly higher on self-criticism with the goal of self-harming.

Gilbert (2000) has developed a strategy for psychotherapy that addresses this internalized dominant/submissive struggle. He looks to the separate but parallel mentality of caring and compassion, which evolved alongside our sensitivity to competition and social rank. These capacities evolved to send and attend to cues involved in friendship, kin-helping and other mutually supportive relationships. The affects of empathy, sympathy and soothing are paramount here. Care giving is defined as “the provision of guidance, protection and care for the purpose of fostering developmental change congruent with the expected potential for change of the object of nurturance” (Fogel, Melson & Mistry, 1986, p. 55 as quoted in Gilbert, 2000). Recruiting of the caring mentality needs to happen because the internal bully/victim module may have become heavily ingrained and rehearsed over time and this module provides an alternative affective tone and inner relational exchange. It is an approach that is connected to CBT but Gilbert emphasized the feeling tone of these self-delivered messages. Rather than coldly and rationally telling oneself the evidence against a negative thought, which can

turn into more internal bullying and shaming, the message needs to be delivered in a relational, personified manner with compassion, attending to details such as the visual look and tone of voice of the personified compassionate figure. This is because we have evolved to react instantaneously to non-verbal cues before language capacities developed so the *emotional quality* of the signal is important. He described techniques of visualization where the inner attacker/victim and compassionate helper are imagined in visual, auditory and affective detail. Internal dialogues can occur between these personified characters (Gilbert, 2000).

An externalizing method is the “two-chair” technique. The patient takes the chair of the inner attacker and then the subordinate, verbalizing their entangled thoughts of aggression and defeat one at a time. The ‘three-chair’ technique is used when the client also takes the chair of the inner figure of compassion in order to deliver nurturing messages to both the attacker and the victim and to hear what they have to say. Based on interpersonal aggression studies, there are three distinct ways of reducing aggression: counter-attack, developing moral beliefs against attacking and developing capacities for warmth and compassion, in this case internal, self-directed capacities (Gilbert, 2000). A compassionate approach may focus on healing and understanding the inner bully rather than counter-attacking. It is important to check-in with people’s beliefs about warmth and compassion because they may see it as weak and may believe the only way to feel better is to continue to appease their inner hostile-dominant self. Gilbert warned that beginning to activate inner caring signals can stimulate intense grief due to the absence or loss of caring figures in one’s life so this needs to be worked through first. Also caring signals may stimulate alarm due to past abuses from trusted others. The caring inner figure may help the person to tolerate difficult emotions like sadness and anger in a self-

soothing, empathic manner rather than simply trying to reduce pain. Gilbert also discussed the important role of self-forgiveness and forgiveness towards others in this compassion work. “*Self-forgiveness* in evolutionary terms might be seen as reducing the hostile-dominant – submissive internal relationship” (Gilbert, 2000, p. 143). This concept as well as the idea of compassion for healing partly derives from Buddhist philosophies of self-acceptance and recognizing the inevitability of human fallibility (Gilbert, 2000).

Gilbert has developed these ideas into a more formalized therapeutic approach for people with high levels of shame and self-criticism, which he called Compassion Focused Therapy (CFT), an expansion on CBT, which also involves Compassionate Mind Training (CMT). He drew on the principles outlined above, formalizing the approach. CMT involves techniques of visualization of compassionate imagery, involving the mind and body through active self-soothing, breathing rhythms and internal focusing techniques in order to access one’s inner wisdom and caring figures (Gilbert, 2010).

This approach has been used for the treatment of eating disorders due to the recognition of the important maintaining role of shame, pride, self-directed hostility and criticism in these disorders (Goss & Allan, 2010). Goss & Allan (2010) used a ‘transdiagnostic’ approach called CFT-E including patients with a spectrum of eating disorders under one umbrella due to common psychological, emotional and behavioral factors and the frequent shifting between the different diagnostic categories. These authors discussed and presented research evidence for the concept of the shame-pride cycle as a precipitating and maintaining factor in anorexia. “...individuals who feel vulnerable to negative social outcomes (e.g., rejection) may seek ways to defend themselves against such threats by attempting to change body weight and shape toward

some (actual or perceived) culturally desirable body weight or shape” (Goss & Allan, 2010, p. 146).

The CFT general program takes into account ‘three affect regulation systems’ that have evolved to accommodate different life goals and roles based on the work of Depue & Morrone-Strupinsky, 2005). These include the Threat and Protection system, the Drive and Excitement system and the Contentment, Soothing and Social Safeness system. (Goss & Allan, 2010; Gilbert, 2010). These are like the ‘mentalities’ described above. The threat and protection system involves rapid responses to potential threat cues and involves emotions such as anxiety, anger, disgust and behaviors such as fight/flight or submit. It employs the rapid use of safety strategies to cope and the primary brain region in control is the amygdala. Internal cues like ruminating self-criticism can activate this threat system as well as external cues. Early life experiences sensitize these safety strategies and emotional memories can stimulate automatic self-protection responses, such as recurrent submissive strategies, leading to shame and low self-esteem. Understanding the origin and function of these safety strategies is an important aspect of therapy (Gilbert, 2010).

The drive and excitement system involves our innate motivations towards things that feel good, (or that release dopamine in the reward area of our brains) because these ‘things’ represent goals that were important in our evolution: success, status, alliances, sex, and food for example as was alluded to above in the discussion of SAHP. The pursuit of these goals doesn’t lead to lasting contentment because in our evolutionary history, they had to be continually pursued. Pleasure motivates us to acquire resources and achievements and pushes us to find more and more. The threat and drive systems can be linked in complex ways because one may use the pleasurable rewards of achievements

to drive off feelings of threat and insecurity, such as social exclusion and rejection. So failure can go beyond disappointment to setting off powerful threat alarms, driving the cycle of addiction to achievement (Gilbert, 2010).

According to Goss & Allan (2010) this is what is occurring in anorexia. Restricting food and lowering weight are behaviors used to manage the threat of alarming affective states but also the fear of social exclusion due to beliefs of inferiority. The drive towards thinness and its perceived social benefits becomes powerfully rewarding and pleasurable. The surge of dopamine released when one is successful at limiting food becomes addictive and is continually used to ward off the primitive threat of social exclusion and provides safety. Pride becomes connected with drive and helps to sustain the cycle. “Fear of losing this sense of achievement, and their way of managing painful affect, can lead to weight checking behavior and a range of self-critical thoughts designed to frighten the self into continuing to pursue weight loss (e.g., people won’t like me if I am fat)” (Goss & Allan, 2010, p. 149). As part of an integrative neuroscience model of AN based on experimental evidence, Hatch et al. (2010) described how there is a hyper-sensitivity to danger/negative cues in anorexia (not only food/body related stimuli), occurring along automatic brain-body networks, not available for conscious regulation. Food restriction becomes associated with numbing of this over-sensitive danger processing. Occurring at the same time is a significantly reduced awareness of emotional experience, necessary to provide meaning and gain understanding of emotions (Hatch et al., 2010). In AN, this threat-drive cycle tends to exclude strategies stemming from the third affect regulation system, that of self-soothing, social connectedness and affiliation. This system, evolving with human attachment behavior, is associated with a contented feeling of well being and the release of opiate endorphins that soothe the mind and reduce

sensitivity of the amygdala fear circuits (Gilbert, 2010). People with AN have significantly low levels of self-compassion. The naturally healing properties of this system are under developed. In CFT-E, among other interventions drawn from CBT, the teaching and development of self-compassion skills is paramount (Goss & Allan, 2010).

Compassion development in CFT-E involves group elements of showing compassion both to self and others. Compassionate Mind Training (CMT) in CFT-E involves more individually-based practices such as cultivating mental imagery, designed to activate self-soothing. Visualization and mental imagery focus on the following areas: “being a very compassionate person, offering compassion to others, receiving and using compassion from others, offering compassion to the self (and) receiving and using self-compassion” (Goss & Allan, 2010, p.155). CMT draws on Buddhist meditations of loving-kindness from the Theravadan tradition. (Gilbert, 2010). “At root, CMT is concerned with physiological regulation, using exercises to help to bring on line particular types and patterns of brain states, such as activating the insula to enable empathy which in turn enables patients to process information with empathic compassion” (Gilbert, 2010, p. 106). What is important is the ‘practicing’ of empathic-compassionate states of mind through visualization like an actor rehearsing for a role, even if one doesn’t feel like a compassionate person from the beginning. In this way neural networks are activated and solidified over time (Gilbert, 2010).

Compassion-focused therapy for people with eating disorders was first developed in response to new understandings of how shame, pride, self-directed hostility and problems with self-compassion are actually etiological, maintenance and relapse risk factors of these disorders, as reviewed above (Goss & Allan, 2010). Compassion-focused therapy with other populations with these same etiological, maintenance and relapse risk

factors such as depression, anxiety and psychosis has had positive results in reducing these factors as well as leading to improvements in psychiatric symptoms (Gilbert & Proctor, 2006; Mayhew & Gilbert, 2008; Laithwaite et al., 2009 as cited in Goss & Allan, 2010). Subclinical groups with restrictive/binging patterns have been shown to experience improvements in levels of shame and rates of disordered eating after self-compassion induction, which provides preliminary evidence for CFT within the eating disorder population (Adams & Leary, 2007 as cited in Goss & Allan, 2010).

Neuroimaging research has shown that there is hyperactivity in the right amygdala in people with AN compared to healthy controls. This reactivity is multi-modal in that aversive external stimuli from any of the senses can trigger an overreaction as well as internal stimuli. In terms of hemispheric lateralization of emotional regulation, the right amygdala has been shown to be more involved in the processing of ‘negative’ stimuli while the left is more active in processing ‘positive’ stimuli (Joos et al., 2011). There is also decreased activity in the right cingulate cortex in AN, an important area for emotional regulation, adjacent to the subcortical limbic structures. “The finding of reduced activity of the cingulate cortex, in addition to the hyperreactivity of the amygdala, can be discussed in the light of a negative feedback loop of emotional processing, i.e. as a dysfunction of top-down processes of the dorsal stream of emotion processing” (Joos et al., 2011, p. 194). The circuits between the dorsal area of the amygdala and the cortical areas involved in emotional processing involve ‘top-down’ mechanisms where higher-order cortical processes help to regulate more primitive subcortical emotional excitation (Joos et al., 2011).

People with AN have also been found to have a reduced ability for *set-shifting*, in other words the flexible shifting between different cognitive information-processing

modes. Cognitive tests have shown they also have difficulty in accurately recognizing and incorporating affective and social stimuli in the environment. In addition, people with AN have deficiencies in the insular cortex, a system important for interoception: the processing of the value of sensory stimulation's meaning for the body, in other words bodily self-awareness (Kaye, 2008). Neurological and behavioral studies have shown impairments in social-emotional processing in people with AN (Oldershaw et al., 2011). Areas of difficulty include heightened interpersonal sensitivity and bias towards a 'threatening' subjective perception of social-emotional cues and avoidance of such stimuli, deficits in recognizing facial emotions in others and emotions of the self as measured by comparing self-reports and physiological arousal, and finally deficits in 'mentalizing' about the emotions of others and the self, otherwise called 'Theory of Mind' exist (Oldershaw et al., 2011). The studies reviewed by these authors indicate a pivotal role of the hyperactivity of the amygdala and decreased activity in important cortical areas involved in the regulation of emotion, as having contributing and maintaining effects in these social-emotional impairments and indicate over-conditioned fear responses at the expense of emotional integration by cortical meaning-systems. (Oldershaw et al., 2011).

Looking at Art Therapy for AN from an Evolutionary Perspective - Introduction

In the following sections, the connection between evolutionary psychotherapy for AN as well as for high levels of shame, self-criticism, self-directed hostility, submissive behavior and harm avoidance, traits which have all been linked in the previous discussion with AN, will be made with specific theories and research in art therapy. Additional areas of study and research will be explored for their applications to art therapy with people with AN, such as theories pertaining to the evolution of art making behavior and

neurocognitive investigations of creativity. Firstly, the topic of mental imagery, as recommended for people with both high levels of shame and self-criticism (Gilbert, 2000; 2010) and for AN (Goss & Allan, 2010) will be elaborated on, from a CBT perspective. Subsequently the integration of art therapy and CBT will be explored. Then a discussion of art therapy's natural enhancement of therapeutic techniques involving mental imagery will be presented. Following this, a perspective on the evolutionary origins of art presented by Dissanayake (2006, 2007, 2009) will be integrated with a focus on the potential benefits of therapeutic art making considering the evolutionary underpinnings of shame and self-criticism. And finally, connections between neuroscience, physiology and therapeutic art making will be explored within the evolutionary framework established.

The Therapeutic Benefits of Mental Imagery from a CBT perspective

The use of mental imagery in Cognitive-Behavioral Therapy has been steadily increasing. Clinicians using CBT frameworks are increasingly interested in the impact of internal, spontaneously generated images on the maintenance of psychological disorders as well as the therapeutic benefits of consciously generated imagery (Stopa, 2009). "A great strength of imagery is its plasticity: people can imagine different outcomes, face their fears, rehearse behavioral sequences, transform old and painful memories, and create images that represent desired and feared parts of their selves" (Stopa, 2009, p. 2). Imagery has been used traditionally by psychodynamic theorists and clinicians, such as the pioneers Jung and Freud. It wasn't widely accepted in CBT models until more recently, where it is experiencing a new growth. The experimental designs of Paivio (1965, 1969, 1971) showing the impact of imagery on mental retention and learning, aided in the development of the use of mental imagery in CBT. It is now commonly accepted by CBT clinicians that mental images are a combination of representational

features (shape, form, colour, etc.) and propositional elements (meaning, knowledge, concept) so mental images are understood as accessing both neural information systems. CBT techniques such as 'imagery re-scripting' are considered effective because it is thought that by mentally changing the representational aspect of an image, the meaning or propositional nature can change as well. CBT clinicians are mostly concerned with the complex mental imagery in relation to the self that draws its sources from autobiographical memories, fears, and hopes and accepts that these images can occur in any sensory modality. Other common CBT imagery techniques include systematic desensitization through imaginal exposure (Stopa, 2009). Imagery is considered important in therapy due to its relationship with affect. Evidence-based research shows that imagery was a stronger activator of emotion than words alone (Holmes, Mathews, Mackintosh & Dalgleish, 2008 as cited in Stopa, 2009). Imagery re-scripting has been shown to be an effective moderator of social anxiety and depression (Wild, Hackmann & Clark, 2007; Wheatley et al., 2007 as cited in Stopa, 2009). Outcome-based research has shown that imaginal exposure to emotionally distressing stimuli can help to alleviate this distress (Holmes et al., 2007 as cited in Stopa, 2009). Autobiographical memories are thought to be extremely important in defining one's sense of self, from self-identity to self-esteem, and images often accompany these memories, another reason for the impact of imagery on the self and the power of harnessing this imagery for personal growth (Stopa, 2009). Mental imagery is seen as a way of practicing new emotional patterns, where clients are asked to imagine themselves thinking, feeling and behaving in a more desirable manner. This practicing is thought to help buffer and reduce the stress generated by negative self-talk (Maultsby, 1984; Ellis, 1993 as cited in Loth Rozum & Malchiodi, 2003).

The impact of mental imagery on the precipitation, maintenance and recovery from eating disorders has been explored by Cooper (2009). This author reviewed the important role of imagery in this disorder such as the commonly reported mental images of food and shape, as well as the central role of a distorted body image or an internal mental schema of the body not founded in reality. A study conducted by Somerville et al., 2007 (as cited in Cooper, 2009), showed that the mental imagery of patients with ED's was more negative and anxiety-provoking than a control group and the patient group images contained more sensory modalities and had greater vividness ratings than controls. These researchers suggested that the role of imagery in maintaining ED's is as important as automatic 'verbal' thoughts, originally the cornerstone of CBT interventions. An imagery technique used with ED populations that has shown success in alleviating symptoms is the use of guided imagery to encourage self-soothing, relaxation and self-exploration (Esplen et al., 1998 as cited in Cooper, 2009). Manipulating internal images may be a promising strategy in therapy but also has applications to assessment, "...evidence from anxiety disorders indicates that imagery provides a rapid way to access deeper level beliefs, including assumptions and core beliefs, and that the information obtained in this way is particularly rich and detailed, including when compared to information obtained via verbal cognitions" (Cooper, 2009, p. 194).

While CBT with ED populations has tended to focus largely on verbal cognitions, there are several studies that are connecting the study of self, mental imagery and eating disorders. Research has shown that in eating disorders, there are specific problematic issues of negative self thoughts and beliefs such as low self-esteem, a negative self-evaluation and lack of assertiveness. Studies have also shown the importance of mental imagery in self-related cognitions. Researchers are now bringing these two areas of study

together to explore the importance of mental imagery in both sustaining and recovering from eating disorders (Cooper, 2009). The cognitive theory of Guidano and Liotti, 1983 (as cited in Cooper, 2009) suggested that in infancy, multi-modal imaginal representation dominates over verbal representation in the areas of reasoning and problem-solving. For this reason, mental imagery is essential in the formation of personal identity, implying that mental images may be an important tool in the recovery of people with eating disorders who have a vulnerable personal identity structure. Researchers and clinicians are also considering the role of *embodied* imagery, in addition to mental imagery, in the process of recovery from an eating disorder. Morin, 1998 (as cited in Cooper, 2009) discussed the importance of the ‘preconceptual self’, which posits that our early pre-verbal representation systems had more of an embodied or kinesthetic nature. Images can be based in the body. These bodily images “emerge as meaningful structures for us chiefly at the level of our bodily movements through space, our manipulation of objects, and our perceptual interactions” (Morin, 1998, p. 29 as quoted in Cooper, 2009). So ‘self-concept’ is not merely cognitive but is ingrained in the body from early development. Since the body is so important in eating disorders, these ideas may be of considerable value. A related, more recent cognitive theory of emotion suggests its non-verbal, non-propositional nature (Teasdale & Barnard, 1993 as cited in Cooper, 2009), which implies that the best ‘language’ to treat this ‘hot cognition’ is not verbal but instead imaginal (Cooper, 2009). There is some recent emerging evidence around the benefits of using ‘imagery re-scripting’ with ED patients. Certain case studies show benefits of imagery re-scripting in modifying ‘emotionally held schemas’ as well as behavioral tendencies (Ohanian, 2002; Mountford & Waller, 2006 as cited in Cooper, 2009). Other emerging techniques have focused on the importance of early autobiographical memories

in the recurring imagery of ED patients and have used these memory mental images as points of departure towards reorganizing negative beliefs as well as using the comforting imagery of a trusted adult with whom the patient interacts (Cooper et al., 2007, 2008 as cited in Cooper, 2009).

Linking the imagery research with the evolutionary perspective, Gilbert (2009) discussed how the imagination has evolved to be an ‘internal stimulator’. Early human ancestors who had the capacity to *imagine* outcomes of conflicts, rehearse potentially dangerous scenarios and mentally imagine what others in the group thought of them were more likely to both survive and avoid social exclusion with its associated devastating consequences. From the ability to imagine and think about ourselves as well as our self in relation to others, “we have evolved into a species that lives in two worlds: the world ‘as is’ and the world ‘as imagined’” (Gilbert, 2009, p. 207). This is how and why our ‘Theory of Mind’ evolved or in other words the ability to think about the thoughts and feelings of others, to adapt to living in increasingly complex social milieus. Our sense of self is in part created by how we believe we exist in the minds of others and this type of imaginative speculation is rich in imagery. Gilbert again provided evidence of how internally generated imagery can effect changes in our brains and physiology as exemplified by the hunger response generated by mental images of food or sexual excitation in response to arousing inner images. MRI studies show activation of different brain areas dependent on mental imagery (George et al., 1995 as cited in Gilbert, 2009) and with imaginal practice, changes can actually occur in the brain (Begley, 2007; Schwartz & Begley, 2002 as cited in Gilbert, 2009).

CBT and Art Therapy

To bring together the fields of therapeutic mental imagery and art therapy, a discussion of the rich integration of art therapy and CBT will first be presented. While the field of art therapy has traditionally been associated with a psychodynamic framework, there have been many developments in the last few decades that have joined CBT and art therapy together (Rosal, 2001). Early pioneers in art therapy such as Carnes (1979) and Rhyne (1979) drew upon theories placing importance on the non-verbal aspects of people's beliefs and personal construct systems (hypotheses about how the world works). Views that imagery, visual thinking and creativity are all elements of cognition helped unite the two fields as well as awareness that art making could help to expand the potential range of solutions in problem-solving endeavors. Art's connection with emotional arousal has also been a pivotal element in its integration with CBT and in its use of bridging thinking and feeling (Rosal, 2001).

Currently, art therapists integrate CBT techniques and theories into their practice and research in a variety of ways. Increasing self-control over thoughts and feelings is one of the most pivotal goals of CBT. Art therapy helps to increase the internal locus of control through guided imagery of sensory experiences as well as by externalizing internal feelings. Having this concrete feedback through the art product is considered valuable in that it provides an opportunity to witness one's internal interaction of thoughts and feelings (Rosal, 2001). The active nature of art making and its physical manipulation of problems has been used to help with this sense of control (Loth Rozum & Malchiodi, 2003). The CBT technique of uncovering cognitive distortions, has been facilitated by using art to identify and label emotional triggers to disruptive thoughts. The use of art has also been shown to reduce anxiety when confronting difficult emotions through the

CBT technique of systematic desensitization. Art making has been shown to decrease avoidance in facing these emotions, and again gives more control to the client when actively depicting the avoided event or emotion through art (Rosal, 2001).

Malchiodi & Loth Rozum (2003) presented some guidelines in employing a CBT style to art therapy. Clients can make images of “negative schema, anxiety-producing cognitions, and negative self-talk” (Malchiodi & Loth Rozum, 2003, p. 74), thought to help ‘de-mystify’ these mental phenomena. By externalizing and understanding them better, they may have less power over the person’s life. Clients can also be asked to visually represent their ideal manner of thinking, behaving and feeling. Cognitive restructuring can occur when the images of the negative mental processes can be transformed by positive imagery that represent ways of building confidence and coping with the problem (Loth Rozum & Malchiodi, 2003). Other beneficial art therapy adaptations of CBT goals are drawing solutions to problems, decreasing stress by creating a relaxation response through soothing media which helps to increase mental imagery, decreasing negative inner-speech by drawing these messages and then changing them, increasing connections between inner and outer worlds through externalizing inner reality and increasing empathy by greater awareness of one’s own emotions. With children and adults, the active behavioral aspect of art therapy helps to address problematic behaviors and increase control over these actions (Rosal, 2001). “Art therapy is particularly suited to CBT, because making art is an inherently cognitive process. When creating a piece of art, the artist must be involved in uncovering mental images and messages, recalling memories, making decisions and generating solutions. Whether drawing or sculpting, creating art involves instant feedback systems and the ongoing reinforcement of satisfying behaviors” (Rosal, 2001, p. 217).

As discussed earlier, Matto (1997) used an integrated CBT art therapy model in work with eating disorder clients. She found that using art making provided a safe means to confront threatening emotions. By starting with images of the least difficult feelings and working towards the most difficult, she employed systematic desensitization through art. Matto presented this method as particularly effective in challenging and replacing negative, self-destructive, irrational beliefs. Since people with eating disorders are often prone to intellectualization as a defense, the use of art can help stimulate the affective level, which may help the client to integrate their cognitive understanding with affective experience (Matto, 1997).

Art Therapy and Mental Imagery

In the following discussion, the benefits of image making in expanding and concretizing mental imagery within a safe, therapeutic relationship will be elaborated on. The purpose of this discussion is to expand upon the use of mental imagery in the Compassion-Focused Therapy (CFT) model for people with high levels of shame and self-criticism (Gilbert, 2000, 2009, 2010) and for people with AN (Goss & Allan, 2010) in order to incorporate art therapy within this evolutionary treatment perspective and technique.

It can be argued that visual expression through art making could be an important element in the mental imagery work advocated by Gilbert (2000, 2009, 2010) and Goss & Allan (2010). Some clients have poor visualization abilities, especially if they have a complex background of problems or trauma history. It can be difficult for some clients to remain focused and concentrated on all the complex imagery that is hoped to be both summoned up from within as well as internally manipulated. This may also be due to emotional avoidance of internal images as they may be experienced as too threatening

(Stopa, 2009). It is also difficult for many people who have experienced a loss, absence or abuse from caring figures to access inner images of compassion and resonate with them (Gilbert 2000, 2009, 2010). The value of art making in externalizing difficult emotions and images is very significant (Hinz, 2009; Rosal, 2001; Loth Rozum & Malchiodi, 2003). If someone has difficulty accessing and/or holding onto inner images of the dominant self, the submissive self and/or the compassionate inner figure, either due to emotional avoidance or difficulties in concentration, art making can create a record of these inner experiences. If the client is resistant to looking within explicitly, they can make up an image or a sculpture of these above-mentioned characters and then resonate with them in the mind's eye in a reverse order, until it feels safe enough to accept the compassionate figure or to face the inner bully for example.

The sensory and kinesthetic nature of mental images (Morin, 1998 as cited in Cooper, 2009) can be further elaborated on in art therapy. Creating concrete art images can perhaps initiate a feedback loop where the sensory and kinesthetic aspects of art making can generate new mental images as well as help to express the multimodal nature of inner images. Gilbert (2000) spoke about the importance of attending to the non-verbal, sensory and even kinesthetic nature of the conjured inner caring figures because our 'social mentalities' dealing with social rank as well caring affiliation have evolved to respond to the non-verbal nature of social signals such as facial expression, tone of voice and body language. Art therapy employs the kinesthetic modality by naturally incorporating movement, rhythm and action into art making (Hinz, 2009). The various rhythmic or actively soothing qualities associated with an inner compassionate figure can be expressed and rehearsed with both the activity used in making either a two or three-dimensional art piece, as well as in the rhythmic motion used in interacting or 'playing'

with a 3-dimensional art product for example. The same applies to the expression and manipulation of the inner dominant and submissive characters as well. The sensory aspect is also inherently involved in art making. Interaction with and manipulation of media as diverse as wet clay, scratchy sandpaper, smooth paint, soft yarn and fabrics can stimulate the senses and invigorate physiological systems. The sensory exploration of art materials in all modalities: visual, tactile, auditory and sometimes gustatory, can increase the client's awareness of inner sensations and can help in the formation of mental imagery (Hinz, 2009; Lusebrink, 2004). The sensory qualities of the inner figures can be translated into art expression and can be physically felt as well as internally imagined. Both the kinesthetic and sensory modalities within art therapy can also help to stimulate affect (Hinz, 2009). Depending on the affects aroused by a certain sensory or movement experience in art making, one could be drawn to different media to represent the inner figures. Depending on one's individual associations, an experience or media triggering fear could be used in the formation of the submissive character. An experience or media triggering anger or frustration, could be used for the dominant figure. Media eliciting soothing, calming sensations could be used to make the inner compassionate caring figure. Or individual associations could instead link the inner dominant figure with power and control, the inner caring figure with disgust and the submissive figure with hatred, for example. These individual associations with affect, media and inner mental imagery can provide fertile ground for exploring and modifying one's relationship to the evolved and internalized 'social mentalities' discussed by Gilbert, 2000.

The evolutionary function of art: Social cohesion and anxiety relief

Turning to evolutionary theories of the function of art throughout the history of human culture, it is thought that light may be shed on the value of art within a therapeutic

context for the problems that are at the focus of this discussion, namely high levels of shame, self-criticism and anorexia. There are several different theoretical orientations regarding the evolutionary function and development of art making. In Dissanayake's (2007) view, most of these theories are founded in a conception of art based primarily on the Western fine-art tradition that took root in the 18th century. Evolutionary theories of art include the views that art is a reflection of perceptual and cognitive patterns of organization in the human visual brain, that art is a reflection of emotional aesthetic responses and preferences towards features that provided adaptive advantages, that art is a means of signaling 'costly' resources to gain sexual selection advantages, that art reflects the use of the imagination to practice potentially risky scenarios for survival advantages, that art has been used as a tool for manipulation, control and propaganda to achieve one's aims, that art evolved as a means of symbolic communication associated with verbal language, implying higher intelligence, that art is an evolutionary by-product of other adaptations and is used to push pleasure buttons in the same way as eating high calorie foods and finally that art has encouraged bonding and solidarity between kin through artistic traditions passed through lineages (Dissanayake, 2007).

In Dissanayake's (2007) conception of the evolutionary function of art, all the art forms (performance, dance, music, as well as visual art) are taken into consideration and connected to anthropological and archeological evidence of the recurrent use of art forms in ritual. Ritualized art forms often involve the whole group, rather than one single member. What is important to this author is the 'behavior' of art rather than only the final product. She called this 'artification', which evolved alongside ceremonial behaviors. In this mode, "one intentionally makes ordinary reality extra-ordinary through certain operations: formalization, elaboration, repetition, exaggeration, and (sometimes)

manipulation of expectation, or surprise” (Dissanayake, 2007, p. 9). To make ordinary elements ‘special’ through adding emphasis, or even distortion is the essential behavior of art. This is also the basis of ceremony in traditional societies. This ‘behavior’ of art does not emphasize skill, or the advertisement for mates or even higher cognitive ability. It is instead based in the adaptive advantage of relieving anxiety through social cohesion and behaviors that bring groups together. Art behavior is a psychobiological motivation system in itself, not the outcome of other domains such as the preference for ‘beauty,’ brain organization, imagination (fiction), play, skill, symbol formation or signals of costliness. Dissanayake looked to traditional subsistence societies in the past and present, and pointed out that individual glorification is taboo and participation in group activities is valued over unique skill. This author moved away from the value placed on *individual* competition and fitness and focused instead on the rich human evolutionary history of dependence on the *group*. As human conscious awareness evolved, people could begin to ponder their existence and the forces that acted upon it. Communal living offered protection and resources but it also became a powerful means to moderate the anxiety caused by the unpredictable and dangerous elements not under human control such as floods, storms, drought, famine, infestation and disease. These events, along with the transitions between life phases; birth, puberty, marriage and death all had biologically important outcomes. These elements inspired rituals, as a means to exert some level of control over potentially high-risk outcomes (Dissanayake, 2007).

Dissanayake (2006) hypothesized that the origins of religious practices arose from this burgeoning awareness in the human mind of their own perceived vulnerability. From these anxieties, religious and cultural beliefs took root in order to provide some measure of control or means of interaction with the perceived forces that were in control of human

fate. Like religion, the arts are found in every human society. They can be seen as the early behavioral counterpart of religious beliefs, in effect an action oriented mode of 'doing something' to relieve anxiety and show reverence to powerful forces. Performing these demonstrations of emotional investment within the group helped to reduce stress. Having social support and some sense of psychological control manifested through group ceremonial activities could have bestowed an advantage to those individuals, compared to being isolated and not having a way to manage the stress of uncertainty (Dissanayake, 2006).

Kohut theorized that the self and self-object relationship between mother and infant provides the foundation for the 'group self' ("the common psychological experiences of individuals in a group" (Dissanayake, 2006, p. 315)), which is how a person continues to feel mirrored and affirmed, and provides a sense of belonging and meaning. Dissanayake (2006) connected Kohut's idea of 'cultural selfobjects' based primarily on the notion of modern Western art to the ceremonial practices of traditional, small-scale societies, that represent the majority of human history and evolution. The arts are what give form, shape, meaning and support to the 'group self'. The taking of the ordinary and transforming it into the extraordinary through the arts is what makes the ceremony special and meaningful to the group self. It is through ceremonies, that individuals are initiated into the group. The group's values and beliefs are re-affirmed through these ritualistic elaborations on every day life that are "extravagant, memorable, sensorially rich, and emotionally gratifying" (Dissanayake, 2006, p. 321). Evolutionary psychiatry views the origin of many psychological disorders in the mismatch between our evolved emotional predispositions and current circumstances. 'Pleistocene psychology' refers to the dispositions engendered by living in socially close-knit hunter gatherer

societies, where a sense of hands-on competence was fostered by everyday life and one's emotional needs of belonging and meaning were attended to by the empathic network of group life. Dissanayake views modern societies as not providing enough avenues for people to experience socially shared meanings and feelings of belonging and hands-on competence, which the arts can provide. "Even today, when the arts are typically created and even appreciated in solitude, their origins in the mechanisms for mutuality suggest that they are motivated by a desire for intersubjective communication and response" (Dissanayake, 2006, p. 316).

Brown & Dissanayake (2009) focused on the orbitofrontal cortex (OFC), located at the base of the prefrontal cortex. They presented neuroimaging studies, showing that this region of the brain (along with projections to the cingulate cortex, located directly above the limbic system) is the most active in rewarding, positively-valenced emotional assessments of aesthetic objects, such as paintings and music (Kawabata & Zeki, 2004; Blood & Zatorre, 2001 as cited in Brown & Dissanayake, 2009). The OFC also has an important role in the activation of pleasurable emotions associated with social affiliation, mitigated primarily by the neurohormones, oxytocin and vasopressin (Bartels & Zeki, 2004; Carter et al., 1999; Miller & Rodgers, 2001 as cited in Brown & Dissanayake, 2009). So the OFC is considered to be a 'superordinate' center of emotional regulation that spans focus and valence. Since emotions of different focus but similar valence are considered mutually reinforcing in the integrating center of the OFC (Clore & Ortony, 2000 as cited in Brown & Dissanayake, 2009), social emotions of trust and affiliation can be linked to aesthetic emotional responses to objects such as attraction. The authors suggest this region is responsible for the multi-modal processing involved in the ritualized behaviors of mother-infant attunement, ceremonial practices and 'artification'.

“Additionally, the contribution of oxytocin to stress reduction supports an argument that some social participation in the arts, in addition to other functions, may relieve individual anxiety” (Brown & Dissanayake, 2009, p. 53).

This potential function of art throughout our evolutionary history has some interesting points of convergence with the evolutionary considerations of anorexia nervosa and the benefits of art making in an empathic environment. When the traits of submissiveness, feelings of inferiority, behavioral inhibition, harm avoidance and high levels of shame and self-criticism are considered, a feeling of belonging and harmony, fostered through shared experiences in art making could be very beneficial to this population. If art making behaviors are conceived as evolving through the need for mutuality, empathic mirroring and the regulation of anxiety through social soothing, engagement in ‘artification’ with an empathic art therapist or within an art therapy group could help to replace an immobilizing sense of fear and shame with the pleasurable rush of being part of something special. Even making art in the presence of an art therapist in a one-on-one context could spark the instinctive evolutionary mechanism of art making; mutuality, shared meanings and empathic understanding. As Dissanayake pointed out, the association of art with individual success and mastery has been a relatively recent phenomenon. It is also widely accepted in the field of art therapy that it is the ‘process’ of making art that can have significant therapeutic benefits and not just the ‘product’ (Hinz, 2009). What matters more in a behavior like art-making is its intertwined history in the social and ceremonial lives of human beings evolving over hundreds of thousands of years to foster feelings of social cohesion, alleviation of anxiety in the face of unpredictable dangers, and experiences of shared meanings and hands-on competence that helped to provide a measure of psychological control over life outcomes. Art therapy

for people with anorexia in both a group and individual format could help to stimulate these more recently evolved areas of the brain designed for affiliation and mutual support rather than the social rank emotions and behaviors of dominance and submission and their associated fight, flight or freeze responses controlled by older, more primitive areas of the brain (Depue & Morrone-Strupinsky, 2005 as cited in Gilbert, 2010).

Art-making, Evolution and Neuroscience: Implications for Art Therapy with AN

In the following sections, a discussion of the cross-sections of evolutionary psychology, neuroscience and art therapy for people with anorexia will be presented. To start off, the concept of empathy will be viewed from its functioning in the brain along with a discussion of how art therapists have integrated this important information into their practice. The rationale here is that, people with anorexia have been shown to have very low levels of self-compassion as shown through perpetual harsh self-criticism and high levels of shame and feelings of inferiority (Goss & Allan, 2010). Gilbert (2010) used the terms ‘compassion’ and ‘empathy’ interchangeably and so will this review. A look at the neurophysiological role of the stress response will follow along with art therapy’s unique contribution to the regulation and soothing of this system. This topic is considered important in this context due to the important place of stress in anorexia from the ‘submission stress’ focused on in Connan et al. (2003), to the overused threat detection and protection emotional regulation pathways proposed by Gilbert (2010) and Goss & Allan (2010) to evidence showing the hyperactivity of the amygdala and stress response in AN (Joos et al., 2011). Thirdly, a discussion of recent research into the hemispheric lateralization of approach and avoidant emotions (Demaree et al., 2005) will be explored for applications to anorexia and art therapy protocols designed to address hemispheric integration will be applied in this context. And finally, the temperamental

traits of harm-avoidance and cognitive rigidity, known to be common in AN (Kaye, 2008; Connan et al., 2003) will be examined in light of how spending time engaged in creative thinking within an art therapy context could help to open up stuck modes of thought and behavior.

Art Therapy and Neuroscience

As discoveries regarding the human brain mount; its neuroplasticity throughout life, the capacity of empathic, relational therapy to reorganize the brain, and its responsiveness to non-verbal, sensory and motor modalities for healing and reintegration, art therapists are incorporating these findings into their practice, theory and research (Kapitan, 2010). Art therapy is a mind-body intervention based on the interconnections between the brain and bodily systems such as the sympathetic and autonomic nervous systems and immune system (Malchiodi, 2003). Studies show that art-making in an empathic environment can affect body systems positively, by inducing a ‘relaxation response’ as seen in DeLue’s (1999) study of the physiological effects of drawing mandalas (as cited in Malchiodi, 2003) and reduction of chronic pain (Camic, 1999 as cited in Malchiodi, 2003). While it used to be thought that art making was only a “right-brained” activity, research has shown that art expression engages both hemispheres, including language centers, findings based in studies of brain damage (Gardner, 1984; Ramachandran, 1999 as cited in Malchiodi, 2003). It has been shown that even simple drawings involve complex interaction from many areas of the brain (Frith & Law, 1995 as cited in Malchiodi, 2003). These brain regions may include areas such as decision-making, multi-sensory mental imagery centers, emotion and conceptual centers and memory (Chavez-Eakle, 2007). Art therapy’s advantages are also thought to reside in its ability to capitalize on the brain’s plasticity. The naturally rewarding properties of art

making can help to reinforce the learning of new modes of behavior and coping. The recruitment of healthier brain states facilitates the strengthening of imagination, so necessary for the experience of empathy, both towards the self and others (Kapitan, 2010). The following section is divided into four parts addressing art therapy for people with AN within different areas of neuroscience that apply to the evolutionary theories under discussion: first, empathy, secondly, the stress response and emotional processing, thirdly, hemispheric lateralization and integration and finally, cognitive styles.

Art Therapy, Empathy and AN

A therapist's empathic understanding of a client is thought to be an essential element of treatment from a psychobiological attachment perspective. The empathic attunement of a therapist to a client attempts to simulate the ideal mother-infant relationship that helps to regulate emotion and organize important neurological patterns. This helps to address unmet attachment needs later in life (Schore, 2000, 2003 as cited in Franklin, 2010). Empathy implies a shared understanding of someone's experience. But what if it is the client's empathic capacity that needs to be stimulated? According to Gilbert (2000, 2010) and Goss & Allan (2010), it is a lack of self-compassion that is at the root of problems in anorexia. A harsh, self-punishing stance is taken on and closely monitored. Social interactions are assessed in terms of their potential for threat, shaming and rejection rather than their potential to augment and regulate the self through empathic communication (Goss & Allan, 2010). Studies show that people with AN have a heightened sensitivity to interpersonal danger cues such as negative facial expressions indicated by faster speeds of automatic emotional processing (Hatch et al., 2010). On an *intrapersonal* level, people with high levels of shame and self-criticism, and by extension people with AN, may be engaged in an internal struggle of dominance and submission.

The ‘weak’ part of the self is constantly criticized and bombarded by punishing voices (Gilbert, 2000). In the case of AN, these voices are driving the self to appease the inner aggressor with ever more militant behavioral regimes of food restriction, constant exercise and perfection in many other realms of life such as obtaining a perfect academic record or exceptional athletic performance (Bruch, 1978). The dominant self does not appear to have any empathy for the subjectively perceived weak, lazy, ‘fat’, no-good self. “Self-criticism and self-directed hostility are closely linked to internal shame. The process of continually shaming oneself by focusing on one’s own negative self-evaluations both maintains and exacerbates internal shame” (Goss & Allan, 2010, p. 144). These same authors note that “eating disorder patients have marked difficulties in accessing self-compassion and self-soothing” (p. 148) as a result of high levels of self-criticism and self-directed hostility. People with anorexia also have difficulty with Theory of Mind (ToM) or in other words, forming ideas and intuitions about what other people are thinking about, called ‘mentalizing’ (Oldershaw et al., 2011; Hatch et al., 2010). ToM is linked to empathy in that both are concerned with understanding the experience of others, however shared *emotional* experience distinguishes empathy (Hass-Cohen, 2008b). Studies have also shown that people with anorexia have a reduced awareness of what they themselves are experiencing, emotionally and physically, as ascertained by measurements of physiological states in connection to self-reports (Kaye, 2008).

Art therapy has unique properties and techniques that can help to increase relational ToM activity. An activity called the ‘dual drawing’ is an intervention that consists of the therapist and client or two clients drawing together. Each person takes turns making marks on the page. This process naturally elicits thoughts about what the

other person's intentions, motivations and hopes are for the drawing. By focusing on the other's intentions, mutual understanding and attunement can occur and mentalizing abilities may be augmented within this shared attentional and goal-directed state (Hass-Cohen, 2008b). Another aspect of art therapy that may increase empathic mentalizing is the socially constructed meanings of art works produced during a session. Instead of overarching, fixed meanings ascribed to symbols, art therapists and clients work together to understand relevant meanings and this process can increase empathy through the awareness of shared meanings as well as associations to the art that don't match (however it is always the client's associations that are most important). By viewing their own products, clients have a new, non-verbal, symbolic means of understanding themselves (Hass-Cohen, 2008b). "Art therapy offers the opportunity to activate neural integration and ultimately higher cortical functions that come from mentalizing personal idiosyncratic epistemologies (how we know who we are). On the page, as the client and therapist correspond about their mentalizing, new ways of knowing the self are co-constructed" (Hass-Cohen, 2008b, p. 303).

Studies in the mirror neuron system show true empathic responses are occurring at a bodily, experiential level. The observation of actions, sensations and emotions and hearing another's voice can activate the same neural areas that would be activated if one was doing, feeling and saying the same things, which is the basis of the mirror neuron findings (Keysers & Gazzola, 2006; Gallese, 2006; Iacoboni & Dapretto, 2006 as cited in Hass-Cohen, 2008b). Art therapy is in a good position to harness the embodied and experiential nature of empathy. Clients are engaged in physical movements, rhythms, reactions to diverse media and vocalizations in the selection of media. They are making and interacting with art work as well as talking about it. Art therapists receive this

communication and experience it in their own brains and bodies through the mirror neuron system. They can then transmit this empathic understanding of the client through their own body language and vocal and affective qualities in order to resonate with the client. Since empathy implies more than understanding someone else but a motivation to relieve their distress, this intention will be picked up on by the client (Hass-Cohen, 2008b).

Since mother-infant attunement occurs at the non-verbal level through sensory modalities such as gaze (sight), touch, smell, sound, and rhythmic movement, it is thought that attunement to a client can be enhanced by engaging the non-verbal modalities of art expression in the empathic response of the therapist (Franklin, 2010). Franklin elaborated upon and presented case illustrations of using ‘third-hand’ empathic art responses to the client, based on the work of Kramer (1986) on the art therapist as ‘auxiliary ego’ and Lachman-Chapin’s (1983, 2001) interactive art therapy methods and study of mirror neurons. By observing and experiencing at a physiological level the physical, verbal, emotional and artistic communications from clients, art therapists can create images that reflect their embodied experience, filtered through clinical awareness, back to the client. It is important for the therapist to be neutral, unassuming and nonjudgmental in the same way as a therapist would bracket out their countertransference feelings. This provides a deeper way of feeling ‘seen’ for the client and may stimulate the client to experience self-empathy and develop interpersonal relatedness (Franklin, 2010). By feeling heard and understood at such a profound level, the client with anorexia may be able to internalize this empathic response and begin to feel empathy and compassion for themselves in their own mirror neuron response to the therapist.

Art Therapy, the Stress Response, Cortical Affective Integration and AN

As we have seen stressors can come from within and without. We can respond to something potentially threatening in the environment or we can set off our own alarm bells by our own fear-inducing thoughts (Kravits, 2008; Gilbert, 2000). In anorexia, this internal pattern of self-generated alarming thoughts is thought to occur frequently through self-shaming, self-criticism and harsh self-directed hostility. The result of this is a rigid behavioral program of food restriction and denial of the body's needs for rest, sustenance or even reciprocal affiliative care. It is thought that at the expense of relatively dormant pro-social, affiliative, caring, compassion-based neural networks, there is an overreliance on 'safety' strategies involving the threat detection system, balanced by the drive/reward system in order to stave off threatening thoughts of imperfection and potential social exclusion (Goss & Allan, 2010). This primitive fear of social exclusion reaches far back into our evolutionary history where a member of a group who perceived their SAHP (Social Attention Holding Potential) to be very low, would be biologically driven to increase their SAHP (Gilbert, 1997). Since we have seen that people with anorexia tend to generally view themselves as inferior to others (mediated by the pride and feelings of superiority generated by low body weight) and tend to behave submissively (Troop et al., 2003), it can be assumed within this context, that this unique type of submission stress (Connan et al., 2003) can awaken strategies to increase SAHP at all costs. In our current culture, what is valued for women is thinness so this becomes the means (Gatward, 2007).

In anorexia, a dysregulation of the HPA axis has been found, leading to a more prolonged, chronic stress response. This over-reactivity of the HPA axis is thought to interfere with appetite in AN, within models of the disease that link psychosocial stressors (specifically submission stress) to the suppression of appetite (Connan et al, 2003). The

brain responds to stressors along two different routes. Within the faster, *direct* route, potentially threatening sensory information is sent directly to the amygdala within the limbic system where a cascade of physical reactions may be initiated. The slower, *indirect* route involves processing within cortical areas, like the OFC, which adds analysis, judgment and meaning to the incoming information before sending it back to the amygdala, providing integration and reducing the likelihood of a physical stress response (LeDoux & Muller, 1997 as cited in Kravits, 2008). As we have seen, in AN, there is a faster automatic processing of ‘danger cues’ than in normal controls (Hatch et al., 2010). Therapeutic intervention can interrupt the direct route by involving cortical pathways in the exploration of emotion, automatically generated stress responses and images. By consciously analyzing and finding meaning in stressful stimuli, the indirect route involving the cortex can be strengthened and utilized to temper the direct physiological stress response and the originally threatening stimuli can be modulated and redefined. “Art therapy practices provide a unique opportunity for expression of emotions and practicing the regulation of affect. Colors and textures easily arouse affectively laden limbic memories while purposeful art-making provides a here and now opportunity to express, understand and integrate emotional reactions” (Hass-Cohen, 2008a, p. 31). In addition, art therapy or guided imagery interventions can stimulate the relaxation responses of the parasympathetic nervous system, which regulates the excitatory sympathetic stress response (Kravits, 2008).

“Chronic stress experiences shift the person away from the integrated feelings and thoughts associated with the function of the frontal lobes towards a limbic-based survival reaction” (Hass-Cohen, 2008a, p. 26 citing Henry & Wang, 1999). When a person is under chronic stress, emotional processing tends to stay primarily within limbic circuits,

the older part of the brain, with much stronger neural networks than the ones connecting to the cortex, leading to survival-based emotions in times of crisis (Panksepp, 1998 as cited in Hass-Cohen, 2008a). Emotional processing occurs along a vertical plane with basic emotions arising in the subcortical limbic system, which are fine-tuned and modulated by cortical structures. The steps of emotional integration include arousal, regulation, transformation, awareness and meaning making (Greenberg & Pascual-Leone, 2006 as cited in Hass-Cohen, 2008b). Arousal involves the firing of the amygdala, regulation is commenced by the orbitofrontal cortex (OFC) and the anterior cingulate cortex (ACC), both areas lying directly above the limbic system. Transformation, awareness and meaning making come from frontal lobe cortical input. Art materials naturally summon up emotional reactions in addition to clients being asked to make art about explicitly emotional subjects for them. The amygdala will fire even at the detection of a false perception of danger, such as mistaking a stick for a snake (LeDoux, 2002 as cited in Hass-Cohen, 2008b). This implies that vague imagery, for example in collage cut-outs or unusual textures like lumpy clay, can stimulate the amygdala. From these reactions, meaning can be explored and assigned to the stimuli, recruiting cortical integration. Desensitizing the amygdala, through imagery and art expression can be an important way of eliminating fear responses (Hass-Cohen, 2008b). The inclusion and experience of positive emotions in emotional processing is also very important (Bridges, 2006 as cited in Hass-Cohen, 2008b). “It is likely that meaningful change happens by inviting positive experiences and integrating them with older, avoidant responses. The transformation of a negative response into a positive or assertive response can result in a shift from neuroendocrine-mediated feeling of *loss of control*, to a sympathetic nervous system-based feeling of being *in control*” (Hass-Cohen, 2008b, p. 298 citing Henry &

Wang, 1999). The natural joy and pleasure of art making, arising from the brain's reward centers, can pair these two types of experience for integration (Hass-Cohen, 2008b).

Kravits (2008) also interweaved the important relational aspect of art therapy as instrumental in promoting pro-social autonomic responses involving the polyvagal nerve. This nerve runs throughout the length of the parasympathetic system. Its dorsal portion, of an older evolutionary origin, controls the response of 'freezing' when an extreme threat scenario is deemed out of one's control. The ventral portion is phylogenetically more recent in origin and it is responsible for facilitating social interaction and is involved in attachment. Social connection is facilitated by a rapid reduction in heart rate, motor and sensory coordination of gazing and smiling at and attending and listening to another person. An interpersonal situation deemed safe will stimulate the ventral portion of the polyvagal nerve. There are a host of benefits of this type of engagement, such as the release of rewarding and soothing opiates in the system like oxytocin, increased immune response and decrease of the fight/flight and freeze types of stress (Porges, 2001 as cited in Kravits, 2008). By combining the trust and safety of the therapeutic relationship with art making as a tool for meaning-making as well as stimulating a relaxation response, the negative consequences of prolonged, chronic stress may be buffered (Kravits, 2008).

There is another way of conceiving the relationship between the stress response and art therapy. Being asked to create art in front of someone can be a novel, threat-arousing experience for some clients, especially in the case where there is heightened sensitivity to interpersonal threat, like in AN. A stress response allows the client and art therapist to explore the client's reaction to this novel request. Making art in a therapeutic context initially may cause an increase in stress, but once the client begins to internalize the safety and trust in the relationship, this can help to mitigate the stress response and

allow the client to move deeper into an expression of their affective experience. Fear-based reactions can be soothed by providing clear directives. Within this structure there are choices for style, subject matter and materials so art making can provide a sense of control that may counter the ‘helpless’ response of chronic hyperactivity in the HPA axis (Hass-Cohen, 2008b) which has been shown to be the case in AN (Connan et al, 2003). So, art therapy can help to mediate the hyper sensitive stress response in AN in a variety of ways: making sense of automatic emotion by integrating cortical meaning-making through art imagery, by desensitizing fear responses to certain imagery or materials, by engaging the positive effects of the trusting relationship on the nervous system through the activity of the polyvagal nerve throughout these endeavors and by exploring and understanding the stress response invoked by the art therapy situation itself.

Art Therapy, Hemispheric Integration and AN

The following discussion will present findings on the hemispheric lateralization of ‘approach’ and ‘avoidant’ emotions in the brain, assuming that the avoidant/withdrawal spectrum of emotions relate to the submissive traits of AN. As well, findings pertaining to the lateralization of problems involved in AN will be integrated with contributions from art therapy towards potential integration of hemispheric lateralization.

Distinctions in function between the right and left hemispheres have been the subject of debate for many years. Generally, popular views supported a left ‘thinking’ brain and a right ‘feeling’ brain, or a left/analytical and right/spatial. While it has been shown that both thinking and feeling occur on both sides of the brain, there are still lateralized trends that support more nuanced emotional processing distinctions between the right and left hemispheres. “The right hemisphere is described as more emotional, avoidant-oriented, intuitive and non-verbal, whereas the left hemisphere is more

sequential, problem-solving oriented, positive, approach oriented and is lateralized for language” (Hass-Cohen, 2008a, p. 35, citing Carter, 1998; Goulven & Tzourio-Mazoyer, 2003; Harmon-Jones, 2007). What is important here is that the right hemisphere has been connected through experimental study with avoidant emotions and the left hemisphere is linked to approach emotions, both within the frontal lobes, suggesting a relationship to submissive and dominant emotions and behavioral strategies (Demaree et al., 2005). This is relevant to evolutionary theory as the *motivational* basis of any emotion was the most important aspect to survival, as behaviors themselves are the most likely candidates for natural selection (Demaree et al., 2005; Weisfeld, 2002). While an older theory of emotion, called the circumplex model, took into account the two dimensions of valence (positive or negative) and arousal (intensity), a third dimension of dominance has been integrated to characterize whether the emotion implies a subjective sense of being in control or being controlled. This distinction, labeled the ‘approach-withdrawal model’ was shown to add specificity and clarity to a large number of emotions that eluded description using only two dimensions. For example both fear and anger may be described as both negative in valence and high in intensity but the approach/avoidant (dominance/submission) distinction separates them. Other examples include the distinction between emotions like anger, hostility and contempt from sadness, shyness and shame. There is considerable overlap between the ‘positively valenced’ and approach emotions of the left hemisphere and the ‘negatively valenced’ and avoidant emotions of the right hemisphere but not always. For example sadness, fear and shame are considered both ‘negative’ and avoidant but emotions like happiness and self-confidence can be considered both positive and approach emotions in that they are

experienced as rewarding and also stimulate behaviors of approach (Demaree et al., 2005).

These findings are relevant to anorexia due to the high prevalence of submissive feelings and behaviors in this clientele, including high levels of shame and feelings of inferiority (Connan et al., 2003; Goss & Allan, 2010; Skarderud, 2007; Troop et al., 2003; Troop & Baker, 2008). Also the finding that the right amygdala, associated with ‘negative’ emotional experience such as fear responses, is hyperactive in people with anorexia (Joos et al., 2011), is another indication of disorder-related lateralization. Art therapy may provide hemispheric integration through its unique integration of automatic processes and analytic language. By labeling and discussing spontaneous, ‘automatic’ art work, the more automatic, avoidant emotions of the right hemisphere may be integrated with the analytic, conscious, language processes of the left hemisphere (Hass-Cohen, 2008a). Art making itself may activate both sides of the brain in terms of avoidant/approach responses. It is possible that in a fearful client, who’s right frontal avoidant areas are activated, the left frontal ‘approach’ regions would be activated to help relieve the emotional avoidance (Hass-Cohen, 2008b). As we will see in the next section, creativity itself is associated with novelty-seeking and exploratory behavior (Chavez-Eakle, 2007), suggesting approach emotions, so the act of engaging creatively alone could balance the right avoidant responses.

McNamee (2003) developed a brain-based art therapy protocol, called ‘bilateral art’ with the goal of hemispheric integration. In this unique treatment, a client is asked to think of a conflict or problem that is characterized by a binary, for example two conflicting beliefs or a polarity between how someone feels versus how they would like to feel. The client is asked to use both hands in drawing and is given a sheet of paper

divided down the middle. The first hand draws one side of the conflict and the other hand draws the other side, being directed by intuitive impulses of which hand wants to draw what for instance. After the drawing is complete, the client is gently encouraged to explore or trace with touch alone or to trace with a pen, pencil or marker the contours of the drawing with the opposite hand. Then both hands are used together to trace each side. An additional feature is that the client would be asked to rate their belief in the cognition on a scale of 1 to 7, before and after the bilateral art experience to monitor changes. McNamee (2003) presented positive results in behavioral and emotional change in a case study. A more formalized study involving the use of the bilateral art protocol showed positive results. Among 16 subjects, there were changes in the scaled beliefs from pre to post intervention. The strength of the belief in the positive element stayed the same in 3 cases and increased in all 13 of the cases and all 16 cases showed a decrease in the belief of the negative element. Positive behavioral and emotional change as assessed through both observation and self-report occurred in the majority of the cases (McNamee, 2006). While the author recognized that without neuroimaging study, it was impossible to say whether actual hemispheric integration was occurring, positive improvements for the clients is encouraging for the use of this technique. This technique is especially recommended for people who ‘know’ a positive belief to be true but can’t seem to ‘feel’ the truth of it (McNamee, 2006). Referring back to the polarized relationship of the inner bully/victim or internal dominant/submissive self as seen in Gilbert (2000) and applied to people with AN, the bilateral art technique could be used for this polarized struggle to promote integration and well being. The relationships between inner compassionate figure and victimized self or compassionate figure and bully could be explored in this way as well.

Art Therapy, Cognitive Style and AN

This final sub-section involves a discussion of how practice in creative thinking, within the context of art therapy, could help to counterbalance certain persistent cognitive styles in AN. As has been previously noted, people with AN have high rates of behavioral inhibition, which has been connected to ‘harm-avoidance’. From an evolutionary and ethological perspective, when one is experiencing chronic submissive stress, the opportunities for fight or flight are non-existent so the nervous system adapts by decreasing sympathetic tone and inhibiting action-oriented impulses (Connan et al., 2003). Studies have shown that people with AN have a dysregulation in serotonin activity. The overactivity of this neurohormone is associated with the temperamental trait of harm avoidance, which has been shown to exist in higher numbers in AN than in controls during illness but also after recovery, implying it is a pre-disposing trait rather than an effect of the illness (Kaye, 2008). This temperamental and neurological trait is associated with excessive control of impulse, reduced social spontaneity, perfectionism and behavioral inhibition (Kaye, 2008). In molecular and genetic studies of creativity, it has been found that the behavioral trait of harm-avoidance, regulated by the serotonin transporter gene, is negatively correlated with the creativity index (a reliable and valid scale measuring a diverse range of psychological aptitudes that measure creative thinking such as fluency, originality, elaboration, abstraction and premature closure resistance) (Chavez-Eakle, 2007). Harm-avoidance is considered to be the opposite of novelty-seeking, which is a trait highly correlated with creativity. Novelty seeking is associated with exploratory excitability and seeking of new situations and sensations, mediated by dopamine activity (Chavez-Eakle, 2007). This may suggest that someone who is prone to behavioral inhibition and harm-avoidance may benefit from engaging in creative tasks.

Since harm avoidance scores low with highly creative people (Chavez-Eakle), the assumption is made here that flexing creative muscles so to speak, or strengthening neural pathways involved in creative thinking or production could increase and reinforce exploratory behaviors and alleviate behavioral inhibition and harm-avoidance in AN.

A related area of relevance is the neurological underpinnings of creative thinking. In the same way that people with AN are behaviorally restricted, they are also more likely to have a less flexible cognitive style. Studies have shown that people with AN have a reduced capacity for *set-shifting*, which “allows for the adaptation of behavior in line with changing demands of the environment” (Kaye, 2008, p. 123). They have enhanced abilities to attend to detail and logical analysis but less capacity for global strategies (Kaye, 2008). There is a current general consensus among scientists studying creativity and the brain that creativity emerges from not one distinct brain area but through the interaction of cognitive, emotional and social processes (Vartanian & Goel, 2007). These authors studied the neural correlates of creative cognition including processes such as divergent thinking, hypothesis generation, and set shifting (lateral transformations). In terms of hemispheric lateralization and creative thinking, they presented research showing that instead of linguistic/left vs. spatial/right divisions, it is whether a *cognitive strategy* is routine or novel that engages the left vs. right prefrontal cortex (PFC). Specifically, *veridical* decision-making is activated when searching for the one correct response. It occurs when a person accesses patterns from the environment to solve a problem and engages the left PFC. *Adaptive* decision-making is when there are no previously encountered environmental patterns that can guide a response. There is not one correct solution and personal preferences and agency become more important as a choice is made from many possible solutions. This type of thinking was connected to the

right PFC as evidenced by study subjects with brain lesions on both sides (Goldberg et al., 1994 as cited in Vartanian & Goel, 2007). Functional MRI studies were conducted investigating the neural correlates of hypothesis generation. It was presumed that an important aspect of creativity is the generation of multiple hypotheses in response to a problem (divergent thinking). Conclusions from these studies were that creative thinking involves set shifts or lateral transformations, that help to widen the problem space or range of potential solutions. Calling on the neural mechanism of learning, that repeated practice of a certain type of mental activity will strengthen and solidify neural pathways through increased speed and number of synaptic connections (Bishop, 1995 as cited in Hass-Cohen, 2008a), it is suggested here that a particular type of art *as* therapy for people with AN, involving the generation of multiple constructions from the same materials for instance, could help increase the flexibility of thinking, which could benefit the rigid, obsessional thought patterns that are trait-related features of AN (Kaye, 2008).

Conclusion

My research has explored several different areas of study; evolutionary psychology and psychotherapy, theories of anorexia, cognitive behavioral therapy, therapeutic mental imagery, art therapy and evolutionary theories of art and neuroscience. The core of this study, like the eye of a hurricane, has gathered around certain character traits with evolutionary underpinnings found to be high in anorexia. These are the traits of high levels of shame, self-criticism and self-directed hostility, submissiveness, harm-avoidance, behavioral inhibition and chronic negative self-evaluations. None of these individual character traits are considered pathological and are likely widely dispersed in the general population but may play a significant role in anorexia nervosa when they are experienced together at high levels. The constellation of these traits paints the picture of

an individual who is extremely sensitive and fearful both on an interpersonal and intrapersonal level.

Art therapy, within an evolutionary framework, for people with anorexia, would focus on strengthening neural pathways involved in self-compassion through practice, and simultaneously reducing the strength of the entrenched intra-psychoic dominant submissive social hierarchy as well as interpersonal submissive tendencies. Making use of neuroplasticity, in that neural circuitry can be re-organized and re-routed, the primary aim of art therapy approaching AN within an evolutionary framework would be the use of art making's inherent engagement of multi-sensory, kinesthetic, symbolic, cognitive, memory and emotional neurological centers to stimulate new pathways while decreasing the strength of hyperactive survival-based emotional and behavioral strategies. This theory proposes that the therapeutic relationship could be considered a reflection of the client's interpersonal tendencies and would be used towards the primary goals of creating awareness of and reducing submissive tendencies, while fortifying self-compassion and empathy. Essentially, art therapy using this framework with people with AN would be based on overcoming evolutionary patterns using art making within a therapeutic relationship. What follows is a look at how each of the major divisions of this study relate to this evolutionary theory of art therapy, potentially informing an art therapist's practice with clients with anorexia.

The investigation of Gilbert's (1997, 2000, 2010) theories on SAHP and the nature of shame, the internalized 'social mentalities' and Compassion-Focused Therapy (CFT), have been instrumental in this study and have shaped its direction and content. An approach from an evolutionary theory of art therapy with AN would involve gathering information on the presence and nature of the intra-psychoic power struggles manifested

by the 'social mentalities' as well as a sensitivity to social rank within the client's interpersonal life. This approach would involve the concretization and personification through art making of the three main intra-psychic figures; the internal dominant, submissive and caring figures developed through mental imagery. Three-dimensional work could be beneficial such as the creation of dolls, sculptures, figurines or other constructions because the client could manipulate them in space, but two-dimensional imagery would also be sufficient. The client's repeated interaction or potential play with their characters could be instrumental in re-organizing ingrained mental discourses created by the internalization of evolved strategies for dominance and submission. This dynamic could be gradually replaced with an internal compassionate discourse. Since automatic responses to the social cues of body language, tone of voice and affective quality may have become internalized creating vulnerability to self-critical inner speech (Gilbert, 2000), the use of play with one's own art creations involving varied rhythmic motions, speech patterns and emotional tones could help in the practice of self-compassion and the reduction in strength of the intra-psychic hierarchy. The importance in this kind of interaction would be its rehearsal and practice, until it started to resonate more fully with the client. The actual creation of the figures by the client with art materials would be a means of investing them with a sense of personal expression, meaning and imagery.

The importance of practice or rehearsal inherent in this evolutionary approach to art therapy for people with AN has been contributed by investigations into neuroscience, which has shown the capacities of the brain to change in response to the strengthening of less used neural pathways. Neuroscience also suggests the capacity of art making within a caring, mirroring relationship to increase self-empathy/compassion. The section on

empathy in this study suggests that art making within therapy provides several modes of information about a client. The client is creating art, speaking, making choices about art materials, moving with unique bodily rhythms and responding to the therapist. All these modalities stimulate the mirror neuron system of the therapist, who may then provide a well-rounded empathic reflection through words and an art response. Interpersonal work between client and therapist is integral to this mode of art therapy. Self-knowledge and self-empathy can be stimulated through shared drawings and the co-construction of meaning of client art works. An important initial phase of therapy would be the assessment of a client's interpersonal tendencies, such as a need to predict and accommodate the presumed desires of the therapist, suggesting submissive tendencies.

An evolutionary framework in art therapy for people with AN, proposes that an important goal is the understanding and modification of the client's stress response. Since submission stress, stemming from feelings of inferiority and low social rank, may be the primary form of stress leading to the development and maintenance of AN (Connan et al., 2003), interpersonal stress between client and therapist, potentially aroused by the novel therapeutic situation may be a useful tool. Being asked to make art in front of a relative stranger may elicit interpersonal fears that can be discussed and understood. In this way, among others such as discussing artwork about explicitly stressful interpersonal themes, the amygdala's hair-trigger fear response may become desensitized. This would involve cortical exploration of primitive interpersonal fears with the hopes of making sense of these automatic, survival-based reactions. The client's gradual acceptance of the safety, trust and care present in the relationship would be an important goal in order to potentially stimulate the pro-affiliation mechanisms of the polyvagal nerve and the reduction in strength of the social hierarchy pathways.

The inclusion of the hemispheric lateralization of avoidant/submissive vs. approach/dominant emotions could contribute to the practice of this new mode of art therapy with people with AN. Exploratory behavior (approach responses) such as selecting new materials and taking risks in the art making could be encouraged, while remaining reliant on the safety of the same art media (avoidant responses) could be gently explored for its subjective meanings. In addition to techniques like McNamee's (2003, 2006) bilateral art protocol, this could help integrate the imbalance in people with AN towards avoidant responses.

Similarly, the investigation of cognitive styles suggests that an evolutionary approach to AN might include the encouragement of exploratory behavior and novelty-seeking through art making and its associated creative risks could help to relieve the entrenched fear-based survival strategies of harm-avoidance and behavioral inhibition. Art therapy from this perspective with a client with AN, may involve taking the same materials and transforming them into multiple configurations in order to practice set-shifting, hypothesis generation and creative thinking. This could prepare the way for the rehearsal of compassionate thoughts and feelings towards the self, an entirely different mental domain from the internal social hierarchy of dominance and submission.

And finally, the discussion of Dissanayake's (2006, 2007) evolutionary theory of the function of art proposes the potential need for the development of self-compassion and the reduction of the intra-psychic social hierarchy in art therapy for a person with AN. That art potentially evolved to foster social cohesion in order to ward off fears of the unknown, suggests that art's 'mechanism of mutuality' could help to ease fears of social exclusion that is at the core of shame and self-rebuke (Gilbert, 1997). The element of ritual could be an important factor integrated into art therapy practice with people with

AN. Making an ordinary object special through adornment or modification in a weekly ritual could not only make the endeavor of therapy sacred and meaningful, but could also summon up the archaic, ceremonial functions of art to provide relief from anxiety and create a feeling of belonging and social inclusion.

At the core of this new evolutionary approach to art therapy for people with AN, are intra-psychoic power struggles, made powerful by adaptive pressures. This would be a practice-based art therapy where trying on new modes of thought and behavior would be central. Further research could involve the development and implementation of an evolutionary art therapy treatment plan, using feedback from clients to shape and enrich the program. Also the focus on the ubiquitous character traits of high levels of shame, self-criticism and submissiveness suggests applications to other populations such as depression and anxiety disorders.

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Identifying conflicts of anorexia nervosa as manifested in the art therapy process. Dafna Rehaviah-Hanauer, M.A.C.T. ATR. 1. Psychosomatic Department, Sheba Medical Center, Tel-Hashomer, Israel. Art therapy has specific qualities that make it very suitable for treatment and discussion of anorexia nervosa. It does not depend on verbal interaction in order for therapy to take place and thus allows the patient to express unconscious and unintegrated internal materials without immediately activating defense mechanisms against this content (Rubin, 1987; Schaverien, 1996). The non-verbal nature of art therapy goes beyond the oppositional and defense mechanisms. In many cases the anorexia nervosa patient is resistant to therapy of any type. Anorexia nervosa (AN) is a life-threatening condition, with significant risk of death due to cardiac abnormalities. Aim. The aim of this study was to investigate for QTc interval or heart rate (HR) abnormalities in AN patients and any correlation between BMI, HR and QTc interval at baseline and at completion of treatment. Material and methods. 30 patients (29 females, 1 male) aged 16 to 45 years with a diagnosis of AN were retrospectively analyzed from January 2012 to September 2014. An ECG, biochemical tests, BMI and clinical assessment were performed on admission. ECG and BMI were also repeated. Keating C. Theoretical perspective on anorexia nervosa: The conflict of reward. *Neurosci Biobehav Rev.* 2010;34:73-9.