

MATERNAL ATTITUDES AND BEHAVIORS AND WEIGHT CONCERNS OF
GYMNASTS

by

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Weight concerns are highly prevalent for adolescent female aesthetic sport athletes, particularly gymnasts, and these concerns can have detrimental effects on overall health and well-being. Though the cause of these weight concerns is unknown, they may be associated with performance-related pressures associated with the competitive nature of gymnastics. Therefore, it is important for research to examine factors that may potentially contribute to these potential performance-related (drive for thinness and performance) and non-sport (maternal anti-fat attitudes and behaviors) risk factors. **Purpose:** The aim of this study was to examine mothers' and daughters' body mass index (BMI), non-sport and performance-related maternal attitudes and behaviors, and autonomy support with weight concerns and athlete engagement of gymnasts. **Methods:** 30 mother-daughter dyads were recruited to participate in the research study. Mothers completed a demographic survey, the Implicit Anti-Fat Attitudes Test, the Anti-Fat Attitudes questionnaire, the Comprehensive Feeding Practices questionnaire, and Drive for Thinness questionnaires. Daughters completed a sport-specific Drive for Thinness questionnaire, the Perceived Parental Autonomy Support scale, the Perceived Autonomy Support Scale for Exercise Settings, and the Athlete Engagement questionnaire. Pearson *r* correlations were conducted to determine associations between BMI, non-sport and performance-related maternal

attitudes and behaviors, and autonomy support with daughters' weight concerns and engagement.

Results: Mothers in this study had an average age of 44.4 ± 4.6 years, and the average age of daughters was 12.77 ± 0.97 years. All of the mothers reported having a college degree or higher, and 67% reported that they were former athletes. The average BMI for mothers was 25.41 ± 4.94 kg/m². The average BMI for daughters, 18.84 ± 2.59 kg/m², was classified as normal weight for adolescents. Scores from the questionnaires displayed that the mothers had moderate explicit (fear of fat: $M=4.97 \pm 2.05$, willpower: $M=5.82 \pm 0.99$) and implicit anti-fat attitudes ($d=0.44 \pm 0.40$), personal drive for thinness ($M=2.38 \pm 0.79$), and restrictive feeding practices for health purposes ($M=3.2 \pm 1.25$). Mothers reported a low drive for thinness for their daughter ($M=1.48 \pm 0.57$). Daughters in this sample reported moderate weight concerns ($M=2.26 \pm 0.72$), high perceptions of autonomy in ($M=6.18 \pm 0.61$) and out of sport ($M=5.60 \pm 0.79$), and high levels of sport-specific well-being ($M=4.71 \pm 0.28$). There were no significant relationships between BMI and non-sport and performance-related maternal attitudes and behaviors with daughters' weight concerns and well-being. However, there was a strong significant positive association between maternal autonomy support within-sport and daughters' sport-specific well-being ($r=.61, p=.01$).

Conclusions: Weight concerns are prevalent within the aesthetic sport culture, and findings from this study suggest that BMI and certain maternal attitudes and behaviors were not associated with gymnasts' weight concerns and athlete engagement in this sample. Gymnasts in this sample reported moderate weight concerns, and it may take future research with a more representative sample to help determine where these concerns stem from. Optimistically, gymnasts in this study reported high levels of maternal autonomy support in and out of sport, which is a notable finding. Within a sport culture that has high levels of control and authority, it seems that mothers in this sample may practice autonomy-supportive behaviors to enhance their daughters' psychological

need for autonomy. Ultimately, future research needs to be conducted to identify additional variables that are associated with gymnasts' weight concerns and engagement. Future research will not only help prevent the development of weight concerns, but also aid in the education of gymnasts, coaches, and families regarding potential risk factors.

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Chapter 1. Introduction

Within today's society, female adolescents are susceptible to a variety of risk factors associated with weight concerns that may negatively affect their psychological well-being (Obeid, Buchholz, Boerner, Henderson & Norris, 2013). The prevalence of weight concerns has gradually increased over the past decades, and approximately 25% of female youth in the United States report weight concerns (Hudson, Hiripi, Pope & Kessler, 2007). Overall, the health and well-being of the female adolescent population seems to be at risk for weight concerns, however there is a portion of the female population that is at an even greater risk.

Up to 42% of females involved in aesthetic sports such as gymnastics, dance, and diving have been found to have weight concerns, and these female athletes are at risk of engaging in unhealthy weight control practices (Sundgot-Borgen & Torstveit, 2004). Weight concerns of female gymnasts can begin as young as 7 years of age and may gradually intensify throughout adolescence and continue into adulthood (Davison, Earnest, & Birch, 2002). Unlike other sports where athletes reach their peak in early to mid-adulthood, such as basketball and football, gymnasts are likely to experience their highest competitive level at a much younger age. During adolescence, gymnasts typically reach their peak performance level and become highly competitive (Halmi, 2009). The added pressure to compete and be successful at ages as young as 10 years may have detrimental effects on female gymnasts' overall well-being, and, in turn, may lead to the development of weight concerns (Evans, Rich, & Holroyd, 2004).

A variety of factors have been associated with the development of unhealthy weight concerns. For example, within the general non-athlete population, body dissatisfaction is a strong predictor of maladaptive dieting (Krentz & Warschburger, 2011). However, within the aesthetic sport population, body dissatisfaction was not found to be a predictive of disordered eating. Rather, gymnasts reported high levels of body satisfaction, therefore this issue may not be a

predictor for weight concerns in gymnasts (de Bruin, Oudejans, & Bakker, 2007). This highlights the importance of considering factors associated with weight concerns and well-being that are specific to the culture and pressures experienced by aesthetic sport athletes.

One sport-specific factor that might be associated with athlete well-being is the desire to be lean to improve performance. The gymnastics sport culture places a high emphasis on leanness and the idea that “thin is going to win” (Krentz & Warschburger, 2011). Aesthetic sport athletes, particularly gymnasts, are faced with a significant amount of pressure to be lean in order to reach peak performance levels (Reel, 2013). In gymnastics, the sport culture emphasizes body strength and flexibility to help enhance performance, and this idea may influence gymnasts to believe that “thin is going to win” (Krentz & Warschburger, 2013). Leanness, and the desire to be leaner, has been found to be a predictor of unhealthy weight concerns in gymnasts. This desire to be leaner to improve sport performance has been found to be predictive of disordered eating, the use of pathogenic methods to lose weight (de Bruin, Oudejans & Bakker, 2007), excessive weight monitoring, and heightened concern of weight loss or gain (Kerr, Berman & Souza, 2006). Therefore, it is important to understand factors associated with weight concerns among females in aesthetic sports. Gymnasts may associate thinness with heightened performance. Unlike the general population, weight concerns within the female aesthetic athlete population may stem from performance-related factors.

Social influences such as peers, coaches, and family members have also been shown to predict weight concerns for female gymnasts (Kerr et al., 2006). Personal weight concerns can be triggered by negative comments about one’s weight or body image by others. These negative comments can have a strong impact, especially when the person making the comment is an influential person in gymnasts’ lives, such as their mother or coach. Kerr et al. (2006) found that

gymnasts who received negative comments about their body from coaches or mothers had more disordered eating patterns than those who did not receive negative comments. The amount of time that gymnasts spend with their coaches is substantial, therefore it is understandable that a gymnast would value their coaches' opinion, whether it is negative or positive. However, it is their mother's opinion that is typically the most highly valued in comparison to coaches', peers', and other family members' (O'Bryan, Fishbein, & Ritchey, 2004). Maternal attitudes and beliefs have the potential to influence daughters' weight concerns in relation to performance within aesthetic sports (Francisco, Narciso, & Alarcão, 2013). These social influences, especially maternal attitudes and beliefs, can also impact the psychological well-being of gymnasts.

Outside of aesthetic sports, the role of parental attitudes, behaviors, and beliefs on children's attitudes, behaviors, and beliefs is well-documented (O'Bryan et al, 2004). A parent's beliefs and values can be demonstrated in how they raise their children and children will likely share the same attitudes as their parents (Puhl et al., 2015). Consequently, prejudices that the parents promote through their attitudes and behaviors will influence their child's perceptions (Holub, Tan & Patel, 2011). These prejudices may relate to racism, sexism, homophobia, and also weight bias (Crandall & Martinez, 1996). Parents are not immune to prejudice, and the attitudes and behaviors associated with certain prejudices have the potential to influence their children's attitudes and beliefs.

One parental bias that might be particularly relevant for understanding weight concerns and well-being among gymnasts is anti-fat bias. Individuals with an anti-fat bias have a prejudice against overweight individuals and often attribute their obesity to character flaws such as laziness, lack of self-control, and incompetence (Chambliss, Finley & Blair, 2003). These attitudes can be implicit, where individuals who have these biased opinions of heavy people are

either unaware of their biases or unwilling to report their prejudice due to self-serving bias (Schwartz, Vartainian & Nosek, 2006). Self-serving bias occurs when an individual is ashamed of their true personal opinions and they do not want others to judge them harshly based on their beliefs. On the other hand, explicit attitudes are attitudes that individuals acknowledge and can express openly through self-report measures. Prejudice, particularly weight prejudice, tends to be difficult to measure explicitly due to participant's self-serving bias, therefore researchers utilize the Implicit Attitudes Test (IAT) to measure the implicit attitudes of the selected participants (O'Brien et al., 2008). Due to the influence that maternal attitudes can have on children, it is essential to examine maternal anti-fat biases in relation to daughter's weight concerns, and well-being.

Implicit and explicit anti-fat attitudes have been measured in a variety of contexts, including how parental anti-fat attitudes influence their behaviors and attitudes in raising their children. Parental anti-fat bias has been found to influence children's anti-fat attitudes (Crandall & Martinez, 1996). Research suggests for adolescents, prejudice against heavy people were affected by mothers', but not fathers', prejudice (O'Bryan et al., 2004). Adolescents have reported that they spend more time and talk more with their mothers, and are also more likely to rely on their mothers for assistance in decision-making. Other research findings have also shown these anti-fat attitudes of children can be best predicted by the mother's own fear of fat (Holub, et al., 2011). Therefore, mother's fear of fat as well as implicit and explicit anti-fat bias in relation to daughters' weight-related concerns should be examined.

Parental anti-fat attitudes have been found to be associated with daughter's weight concerns (Davison & Birch, 2004). There were no interactions found between girl's weight status and fat stereotypes, however girls were more likely to endorse fat stereotypes when they

reported higher levels of maladaptive eating behaviors and weight concerns. Also, girls were more likely to endorse fat stereotypes when interactions with parents focused on body shape and weight loss. Based on this evidence, the impact of parental beliefs about body shape and weight may have a negative influence on aesthetic athletes who are in a sport environment that places a strong emphasis on leanness.

Parental restrictive feeding practices are positively related to parental anti-fat attitudes (Musher-Eizenman, Holub, Hauser & Young, 2007). Parents with stronger anti-fat attitudes were more likely to engage in restrictive feeding practices with their 4-6 year old children. The restrictive feeding presented in this study likely stemmed from parental concern about the child being overweight, despite the child's healthy weight status. Also, disordered eating practices such as purging and excessive dieting has been correlated with controlling feeding practices in mothers of girls, but not boys (Blissett, Meyer, & Haycraft, 2006). Despite the positive intentions of parents, restrictive feeding has been positively associated with weight concerns in children as they get older.

Though evidence shows that there has been an association between parental attitudes and daughter's weight concerns, these variables are rarely investigated within an adolescent athletic sample where disordered eating is highly prevalent. For example, one study conducted by Yamazaki and Omori (2016) found that mothers' thin-idealization was associated with the daughters' drive for thinness within a non-athletic adolescent sample. Due to the high prevalence of general weight concerns, excessive weight monitoring, and the desire to be leaner to improve sport performance within the aesthetic sport culture, variables such as maternal attitudes and behaviors should be examined.

The Self-Determination Theory incorporates the support of individuals' psychological needs in terms of competence, relatedness, and autonomy in order to enhance psychological well-being (Deci & Ryan, 1985). Of these three needs, autonomy may be particularly important in the competitive gymnastics environment. Female gymnasts report lack of autonomy due to the high levels of structure and organization within the sport culture (Tan, Bloodworth, McNamee, & Hewitt, 2012). Gymnasts are constantly critiqued and criticized by coaches, judges, and even parents, which may leave them to feel as though they have a lack of control within their practice and home environment. Also, in research conducted by Blusewicz (2008), a positive correlation was found between the perception of within-sport control for adolescent aesthetic sport participants and a greater perceived family control environment. Therefore, these adolescent aesthetic athletes reported that their autonomy was thwarted in their home environment. The lack of autonomy experienced by these young gymnasts in their sport and at home may be associated with weight concerns.

Specifically, the extent to which gymnasts perceive autonomy support from their mothers in sport as well as in their home environment may be associated with weight-related concerns. Based on previous research, since leanness is emphasized in the aesthetic sport culture, parents tend to reinforce the importance of being thin (Francisco et al., 2013). This emphasis on leanness from both parents and coaches may decrease the athletes' perception of an autonomy-supportive environment and may increase the likelihood of the athlete to become more concerned about their weight. Conversely, previous research has shown that a lack of autonomy support was associated with body image concerns (Thorgersen-Ntoumani, Ntoumanis, & Nikitaras, 2010), and disordered eating (van der Kaap-Deeder et al., 2014). Therefore, maternal autonomy-support

is essential to be evaluated in order to examine potential relationships between gymnasts' perception of maternal autonomy-support and their weight concerns.

In regards to maternal anti-fat attitudes, no current research has been found to find an association between autonomy-support and the presence of anti-fat bias. Due to the lack of information regarding this subject, maternal anti-fat attitudes should be examined to determine if there is a possible association with a lack of autonomy-support. Autonomy-support could be another factor to consider when discussing maternal attitudes and weight concerns of young gymnasts.

Evidence has shown that maternal attitudes and beliefs have been associated with weight concerns of females, however these attitudes need to be examined in an aesthetic athlete population (Davison & Birch, 2002). Francisco et al. (2013) examined parental influence within an aesthetic sport sample of 227 adolescent athletes. Results displayed that parental influences, such as concern with child's thinness and parental weight teasing, predicted athletes' weight concerns, despite the athlete's low BMI. This finding shows that certain parental attitudes and behaviors have the potential to influence their child's dieting behaviors and weight concerns. Despite the significant value of this finding, it does not examine how the child's sport-specific well-being could be affected by parental beliefs. If studies are measuring variables such as dietary behaviors and weight concerns, sport-specific well-being, or more specifically, athlete engagement, should be included as an outcome measure for an adolescent athletic population. These weight concerns can negatively affect an individual's engagement and well-being in sport, therefore athlete engagement should be included as an outcome measure (Thorgersen-Ntoumani et al., 2010).

These pressures within aesthetic sport environments that young gymnasts face have the potential to psychologically, emotionally, and physically harm these individuals. If certain maternal attitudes, such as drive for thinness and anti-fat attitudes, have the potential to influence weight concerns of gymnasts, then these specific attitudes need to be identified.

Ideally, identifying the factors that are contributing to the high prevalence of weight concerns of gymnasts will help educate gymnasts, parents, and their coaches on factors that may contribute to weight concerns among gymnasts. By creating awareness to these potentially detrimental risk factors, perhaps these unhealthy behaviors can be reduced in the future. Also, examining these relationships can potentially show positive practices for dietary habits by gymnasts from their mother's positive influence. Either way, the overall well-being and engagement of these gymnasts needs to be taken into consideration and these variables should be examined closely to possibly prevent harmful habits from occurring. If an association between certain maternal attitudes and gymnasts' attitudes and behaviors is found, it would be important to educate both the mothers and their gymnasts. It is important for mothers to be aware as to what personal attitudes and beliefs can negatively impact their daughters' weight concerns. Conversely, it may also be beneficial for gymnasts to be aware of specific attitudes that may heighten weight concerns. The gymnasts' overall well-being is the primary concern and it should be protected.

Purpose 1

The first purpose of this study is to examine the associations between maternal and daughter body mass index with non-sport (implicit and explicit anti-fat attitudes, and personal drive for thinness) and performance-related (maternal drive for thinness for their daughter) maternal attitudes and behaviors (restrictive feeding practices) and daughters' weight concerns and athlete engagement.

Purpose 2

The second purpose of this study is to examine the association between non-sport (implicit and explicit anti-fat attitudes, and personal drive for thinness) and performance-related (maternal drive for thinness for their daughter) maternal attitudes and maternal restrictive feeding practices with daughters' weight concerns and athlete engagement.

Purpose 3

The third purpose of this study is to examine the relationship between daughters' perception of autonomy support (within a sport-environment and within the relationship with their mother) with drive for thinness and athlete engagement.

Hypotheses

Body mass index will be negatively associated with anti-fat attitudes and drive for thinness, positively associated with restrictive feeding, and negatively associated with daughters' weight concerns and well-being. Maternal anti-fat bias, restrictive feeding, and drive for thinness will be positively associated with weight concerns and drive for thinness in gymnasts and negatively associated with daughters' athlete engagement. Autonomy support within sport and

within the relationship between mother and daughter will be positively associated with overall daughters' athlete engagement and negatively associated with drive for thinness and weight concerns.

Chapter 2. Review of the Literature

The prevalence of weight concerns in female gymnasts is an important issue facing the gymnastics community. Due to the significant influence that mother's attitudes and behaviors have on their daughters, it is important to examine how non-sport and performance-related maternal attitudes and behaviors may be associated with daughter's weight concerns and athlete engagement. Also, in regards to the Self-Determination Theory, research has shown that the psychological need for autonomy is associated with weight concerns and well-being. Therefore, these potential relationships will be evaluated within the current research study. This review of literature will assess internal risk factors of weight concerns, irregular dietary patterns of gymnasts, impact of social influences on weight concerns, anti-fat attitudes and behaviors, parental anti-fat attitudes and their influence on children, and the potential consequences of a lack of autonomy support.

Internal Risk Factors of Weight Concerns

There is not a singular cause as to why weight concerns develop, and there are major differences in these predictors between the general and aesthetic sport population. Though the prevalence of weight concerns is alarmingly high for the general population, it has been found that 42% of females involved in aesthetic sports such as gymnastics, dance, and diving met the criteria for having serious weight concerns (Sundgot-Boregen & Torstveit, 2004). Based on this information, it can be assumed that close to half of the aesthetic sport female athletes either are engaging, or have engaged, in unhealthy dietary behaviors that stem from weight concerns. Despite the high prevalence in both the gymnast and non-athletic female adolescent populations, differences have been found between the potential risk factors of disordered eating.

Van Durme, Goossens, and Braet (2012) sampled 68 adolescent female aesthetic sport athletes to assess eating pathology and compare the results to the general population. They found that the aesthetic sports athletes scored higher than the general population in drive for thinness, bulimia, and weight and shape concern. One of the only measures the athletes scored lower in was body dissatisfaction.

One prominent risk factor of weight concerns that has been displayed in non-athletes is body dissatisfaction, where the general dislike of one's appearance can be associated with the development of eating disorders (Shisslak & Crago, 2001). However, for the athletic population, body dissatisfaction has not been found to be a significant risk factor for weight concerns (Krentz & Warschburger, 2011). In contrast to other athletes and the general population, gymnasts have reported higher levels of body satisfaction and also demonstrated a positive perception of their overall appearance and body image (de Bruin et al., 2007).

With body dissatisfaction being a less-concerning issue for gymnasts in regards to their weight concerns, the risk factors may be more performance-related. Successful performance in gymnastics is based on the evaluation and critique of judges who have a standard of "perfection" that they abide by (Reel, 2013). In competitive gymnastics, perfection can be reached with a flawless routine and an overall score of a perfect "10.0" from the judges. This strive for perfection may have the power to influence gymnasts to partake in extraordinary measures in order to enhance performance (Krentz & Warschburger, 2013).

Gymnastics requires a lean body shape in order to properly execute the required skills on all four of the competitive apparatuses, therefore some athletes may over-emphasize the importance of leanness in order to enhance their performance. Krentz and Warschburger (2013) found that if gymnasts believe that, "thin is going to win," they will likely desire to be leaner

than they already are. This desire to be leaner to improve sports performance has been shown to be predictive of weight concerns, and also engaging in unhealthy dieting as well.

Due to the differences in predictors of weight concerns found between the general and aesthetic athlete female population, it is important to not only acknowledge the difference between populations, but also assess these populations differently. The internal risk factor of body dissatisfaction has been found to be a significant risk factor for the general population, but not for the aesthetic sport population (de Bruin et al., 2007). Instead, the aesthetic sport population seems to have performance-related risk factors that are more concerning. Drive for thinness and performance has been found to be a significant risk factor to predict weight concerns in gymnasts, therefore it should be assessed within an aesthetic athlete population (Krentz and Warschburger, 2011).

Weight Concerns of Gymnasts

In the aesthetic sport population, weight concerns can begin at a very young age in comparison to other sports. Davison et al. (2002) found that girls, who were between the ages of 5 and 7, participating in aesthetic sports reported higher weight concerns than girls in non-aesthetic sports. The highest weight concern was found at age 7 for girls in aesthetic sports. These weight concerns at young ages may result from the emphasis on leanness for performance within the aesthetic sport culture (Reel, 2013).

Weight concerns may begin at a young age for athletes, however these concerns may become more problematic as they age. In a sample of 204 female athletes, 54.4% reported being dissatisfied with their current weight and 88.2% of those athletes desired to lose weight (Greenleaf, Petrie, Carter & Reel, 2009). The result of these concerns may lead to overtraining,

pathogenic eating, and excessive exercising outside of practice sessions (Anderson & Petrie, 2012). Indeed, previous studies have highlighted the prevalence of dieting and other weight-related practices among gymnasts.

Within the sport of competitive artistic gymnastics, research by de Bruin et al. (2007) has shown that female gymnasts are more likely to diet in comparison to their female counterparts in the general population. Participants in this study included 153 adolescent girls, with 68 of them being gymnasts and the other 85 were non-athletes. All the participants were measured on their dieting behaviors, which included moderation of food intake or pathogenic methods such as fasting, forced vomiting, or taking diet pills. Gymnasts were shown to diet more frequently, and were also more likely to use a pathogenic method to lose weight. Despite the unhealthy, and also unsafe, manner of these dietary practices, some gymnasts will go to extreme circumstances to lose weight.

Cross-sectional research conducted by Nickols-Richardson (1999) has also shown that in regards to dietary intake, female gymnasts are deficient in consuming various nutrients. Specifically, in comparison to the national recommendations, female gymnasts were deficient in kilocalories, calcium, and iron. These nutrient deficiencies may be a result of maladaptive dietary behaviors due to weight concerns.

Regulation of food intake can also be accompanied by excessive weight-monitoring as well (Kerr et al., 2006). Gymnasts have reported that they will weigh themselves on a daily basis, and systematically record their weight in order to keep track of any weight gain or loss. This method of weight-monitoring may be self-regulated, but in some cases, coaches and parents may implement weight control practices to their gymnasts for sports-enhancement purposes.

The culture of aesthetic sports may have a prominent role in weight concerns for athletes. Though some factors may be performance-related, gymnasts are likely to be influenced by individuals in their social networks as well.

Impact of Social Influences on Weight Concerns

Individuals are in control of what and how much they eat, yet there may be external influences that have an effect on one's weight management. Specifically, gymnasts are part of a social environment that includes their peers, coaches, siblings (if any), and parents. Due to their social interactions, all of these individuals have the potential to positively or negatively impact a gymnast's thoughts, feelings, and behaviors (Kerr et al., 2006). With the significant amount of time a gymnast spends with these individuals, especially their coaches and parents, they may be influenced more by other's beliefs, rather than their own personal beliefs (Reel, 2013).

When an athlete is motivated and determined to be successful, they are likely to consider what their coaches and parents believe is best with the utmost importance. For example Kerr et al. (2006) did a study that included both current and retired gymnasts, parents, and coaches to examine their perspectives on weight concerns in gymnasts. The results of this study showed that gymnasts were significantly more likely to believe they needed to lose weight if they received or heard a negative comment from their coach or parent about their bodies. Also, 40% of the retired gymnasts in the study reported that they were told to lose weight by a coach at some point during their gymnastics career. Both retired and current gymnasts further stated that there was a need for education for the coaches, parents, and athletes regarding proper nutrition and weight control practices. This study illustrates that gymnasts are influenced by negative comments from their parents and coaches, and these comments may increase gymnasts' concern about their weight.

Another study focusing on the parental influences that may be a factor of a gymnasts' weight concerns has shown that critical comments from parents does not depend on the gymnast's BMI, but are more likely to stem from the aesthetic sport's culture (Francisco et al., 2013). Results found that compared to the general population, direct parental influences was the only significant family variable that predicted weight concerns of the athletic participants. In a sport where leanness is emphasized, parents reinforce the importance of being thin, and this may result in negative comments directed toward their athlete. Critical comments from parents about weight have been associated with weight concerns in gymnasts (Kerr et al. 2006).

The drive for thinness, or the concept, "thin is going to win", has also been evaluated as a predictor for weight concerns within the aesthetic athlete population. One study in particular examined mothers' standards of "thin-idealization" and female adolescents' drive for thinness from a sample of 104 mother-daughter dyads (Yamazaki & Omori, 2016). The results found that the mothers' attitudes and behaviors concerning body shape and weight had a moderate positive correlation with their childrens' thin-idealization ($r=.58, p<.01$). This finding suggests that mothers' perception of ideal shape and weight may influence their daughters' desire to lose weight, which further displays how impressionable daughters are to their mothers' opinions.

Previous research has shown that there is as association with maternal attitudes and beliefs and their daughter's weight concerns (Davison & Birch, 2004). However, further research will be evaluated in order to find evidence about how parental attitudes, specifically anti-fat attitudes, may be associated with their daughters' weight concerns.

Anti-Fat Attitudes and Behaviors

The stigmatization of overweight individuals is highly prevalent in today's society, where the prejudice against heavy individuals can be equated with other prejudices such as racism, sexism, and homophobia (Crandall & Martinez, 1996). These anti-fat biases can be attributed to the belief that being overweight is associated with negative character assessments such as a lack of self-discipline and motivation, and incompetence (Chambliss et al., 2003). Anti-fat biases are not only present in American citizens, but they have been found to be consistent on a global level. However, there has been variations found between whether these individual's attitudes are implicit or explicit (Puhl et al., 2015).

Implicit anti-fat attitudes are attitudes that individuals are unwilling or unable to report, while explicit attitudes are attitudes that individuals acknowledge and report through self-report measures (Schwartz et al., 2006). If the participant has an implicit anti-fat attitude, he/she likely knows that their prejudice is immoral, therefore they prefer to keep their opinions to themselves so they are not judged harshly by others. On the other hand, the participant may also have a particular bias without even being aware of it. Though these negative attitudes and perceptions of overweight people are still present, individuals may not want others to be aware of their anti-fat biases or be unaware that they have a bias, therefore this attitude must be measured using an implicit attitude test (IAT) (O'Brien et al., 2008).

The IAT has been used to measure anti-fat bias in a variety of contexts, including measuring healthcare professionals, teachers, future employers, and parents as well (Musher-eizenman et al. 2007). Musher-eizenman et al. (2007) examined the implicit anti-fat attitudes displayed by healthcare professionals. They found that healthcare professionals who had strong implicit anti-fat attitudes rated their overweight patients as having lower self-esteem, worse

health and prognoses, and being less sexually attractive than patients who were not overweight, despite having the medical evidence to prove these statements. Though they reported strong implicit attitudes, they displayed no anti-fat bias in the explicit measures. Therefore, it is essential to include both implicit and explicit measures when assessing certain biases, such as anti-fat attitudes.

Anti-fat biases have also been displayed by curricular and physical education teachers. In a study conducted by De Caroli and Sagone (2014), researchers sampled 70 curricular teachers and 70 physical education teachers and assessed their anti-fat biases by using the Anti-Fat Attitudes (AFAS) and Dislike of Fat People Scale (DFPS). The research analysis discovered that curricular teachers expressed higher levels of dislike of fat people than other teachers, and physical education teachers associated negative traits (weakness, laziness, hunger, and rejection by others) to fat people. Though educators are supposed to treat all students fairly without judgment on personal appearance, the presence of an anti-fat bias may influence teachers to associate overweight students with negative characteristics. Along with these negative associations, some teachers may have a general dislike of overweight students that may lead them to be treated poorly. Similarly, parents who had implicit anti-fat biases may treat overweight individuals poorly as well.

Parental Anti-Fat Attitudes and their Influence on Children

Anti-fat prejudice in parents has the potential to influence their behaviors involving their children's diet and weight. In a study measuring the predictors of fat stereotypes among girls who are 9 years of age and their parents, girls were more likely to endorse fat stereotypes when interactions with parents focused on body shape and weight loss (Davison & Birch, 2004). Girls

were also more likely to endorse fat stereotypes when they perceived their mothers as having high personal weight concerns. Results also found that there were no links between the mothers' and fathers' BMI and their fat stereotypes, which is contradictory to what other research has suggested (Crandall, 1995). However, these results illustrate that even the overweight parents were just as likely to endorse fat stereotypes as the leaner parents involved in the sample.

Research suggests that when parents demonstrate an importance on appearance and weight, girls are more likely to practice unhealthy dietary behaviors and also display a prejudice against overweight people (Shisslak & Crago, 2001). The emphasis on being thin and scrutinizing overweight individuals is potentially increasing the risk for girls to not only develop weight concerns, but also develop a discrimination of heavy people who are undeserving of the negative attitudes against them.

As for children's anti-fat attitudes, Holub et al. (2011) found that the mother's own fear of fat was the best predictor of children's anti-fat attitudes. This finding suggests that these attitudes stem from their mother's concern about their own weight, and they likely discuss their weight concerns and dieting behavior in front of their children. Children can take their mother's weight concerns and associate them with a general idea that being overweight is "bad", therefore developing an anti-fat bias from their mother's fear of fat.

Parental anti-fat bias involves prejudice against overweight individuals, however what are the circumstances if their own child is overweight? Kenrick, Shapiro and Neuberg (2013) conducted a study involving how parents feel about their overweight children. Research showed that parents attributed negative fat stereotypes to their own heavyweight children similar to how they would feel about heavyweight strangers. These negative attributes about their children included being lazy and lacking self-control. Anti-fat bias may also affect how parents treat their

overweight children in the future. A study demonstrated this by showing that parents are less likely to fund their daughter's college education if they were fatter than average girls (Crandall, 1995). It can be determined that parental anti-fat bias does not only affect their child's beliefs and own prejudice, but also how they treat and perceive their children as well.

Restrictive eating is another consequence of parental anti-fat bias. In a study conducted by Musher-eizenman et al. (2007), parents of children who were between the ages of 4-6 were measured on their concern about their child being overweight by using the Child Feeding Questionnaire and additional items related to the current and future weight of their child. Restrictive feeding practices were also measured from the Comprehensive Feeding Practice Questionnaire, and their anti-fat attitudes were also evaluated. Results of this study showed that parental concern about child being overweight was related to higher restrictive feeding practices for both mothers and fathers. Another important finding to consider is that the stronger the parental anti-fat attitude, the more likely they would practice restrictive eating. More specifically, mothers' willpower beliefs were strong predictors of food restriction for both weight and health reasons. According to these findings, parental anti-fat bias may influence parent's utilization of restrictive eating practices out of fear of their child becoming overweight.

The relation between parental beliefs, such as anti-fat attitudes (Davison & Birch, 2004), drive for thinness (Yamazaki & Omori, 2016) and fear of fat (Holub et al., 2011), and behaviors such as restrictive feeding practices (Musher-eizenman et al., 2007) have been evaluated in various research studies. Specifically, maternal attitudes and behaviors have been found to influence the weight concerns of daughters. If these daughters participate in an aesthetic sport such as gymnastics, where the prevalence of weight concerns is high, then these particular maternal attitudes and behaviors should be identified. Identifying these possible risk factors may

assist in the prevention of disordered eating and weight concerns of gymnasts, which would then enhance the overall well-being of gymnasts as well.

Potential Consequences of a Lack of Autonomy Support

The Self-Determination Theory signifies a framework represented by the three psychological needs and various levels of motivation in order to enhance overall psychological well-being (Deci & Ryan, 1985). The three psychological needs are identified as competence, relatedness, and autonomy. Though all three of these needs should be supported to enhance an individual's well-being, autonomy-support has been found to be the most influential (Calvo et al., 2010).

Any individual will desire to feel in control of their life circumstances, and if an individual is autonomous, he/she will feel as though they are in complete control of the situation at hand (Deci & Ryan, 1985). However, within an environment that has high levels of external control and authoritarianism, like the gymnastics sports culture, autonomy may not be easily supported (Tan et al., 2012). In gymnastics, coaches dictate what gymnasts should and should not do throughout the entirety of practice sessions, and during competitions, judges dictate how well they performed on each apparatus. This lack of autonomy gymnasts experience throughout their athletic career may have detrimental effects on their overall well-being.

One of the negative effects associated with a lack of autonomy is sport discontinuation (Calvo, Cervello, Jimenez, Iglesias & Murcia, 2010). Within the sport of gymnastics, gymnasts begin and peak in performance at a much younger age compared to other sports (Halimi, 2009). Due to the young ages and intense training regimens, sport discontinuation is common within the sport of gymnastics, however, the lack of autonomy plays a significant role as well. In a study

conducted by Calvo et al. (2010), sport dropout was explained by lowered satisfaction of autonomy needs. When the need for autonomy was not supported, athletes were more likely to drop-out of their sport.

Thorgersen-Ntoumani et al. (2010) found that autonomy satisfaction negatively predicted body image concerns, such as drive for thinness, and indirectly, weight control behaviors as well. Therefore, if psychological needs, such as autonomy, are being met, individuals are less likely to have body image concerns. Conversely, the lack of an autonomy-supportive environment has been related to higher levels of disordered eating in both athletes and non-athletes (van der Kaap-Deeder et al., 2014).

Autonomy-support has also been related to self-esteem and motivation. For example, athletes who perceived their coaches as uninvolved and felt as though their psychological needs have not been supported were negatively affected in terms of their self-esteem (Gagne, 2003). Also, if athletes perceived a lack of autonomy support during practice sessions, the gymnasts were less autonomously motivated within the sport context. If a gymnast becomes less autonomously motivated with a lack of self-esteem, they are more likely to drop out of gymnastics and also may suffer a decrease in overall well-being (Ryska, Hohensee, Cooley, & Jones, 2002).

In a sample of aesthetic sport participants, a positive correlation has also been found between athlete perception of a greater controlled environment within-sport and a greater perceived family control environment (Blusewicz, 2008). Aesthetic sport participants already experience a lack of control in their sport environment, and it seems that they experience a lack of control at home as well. This lack of autonomy has been related to over-controlling parenting styles which has also been associated with disordered eating (Deas, Power, & Collin, 2011).

A lack of autonomy associated with disordered eating can be displayed by parents practicing restrictive eating behaviors (Loth, MacLehose, Fulkernson, Crow & Neumark-Sztainer, 2014). In a study of 2,231 adolescents and 3,431 parents, mothers were given a scale that ranged from 1 (low control) to 4 (high control) to measure food restriction. Results showed that for every one-unit increase in mothers' food restriction, the girls were 1.33 times more likely to engage in extreme weight control behaviors. Based on these findings, it seems that autonomy, or lack of, has a significant influence on behavior, including weight concerns.

These findings suggest that autonomy can be influential within a sport and personal context. If a sport-environment is not autonomy-supportive, athletes may drop-out (Calvo et al, 2010), experience a decrease in self-esteem and autonomous motivation (Gagne, 2003), and may practice unhealthy eating behaviors (van der Kaap-Deeder et al., 2014). In regards to the home-environment, if parents do not provide an autonomy-supportive environment due to their over-controlling behaviors, it may influence their children to engage in unhealthy weighing behaviors as well (Loth et al., 2014). Therefore, it is important to evaluate autonomy-support in order to potentially prevent destructive behaviors and evaluate individual's well-being.

Summary

Weight concerns are prevalent in aesthetic sports, such as gymnastics (Sundgot-Borgen & Torstveit, 2004). These behaviors can stem from a variety of factors, however the two most prominent factors that research has discovered is the emphasis of leanness to enhance performance (Krentz & Warschburger, 2011) and negative comments regarding gymnasts' weight from their coaches or parents, specifically mothers (Kerr, Berman & Souza, 2006). Mothers have been found to be more influential than fathers in regards to how their anti-fat

biases affect their children's dieting and weight concerns (Holub et al., 2011). Therefore, it can be assumed that if a mother displays a stronger anti-fat bias, then their daughters who participate in gymnastics will likely have personal weight concerns. These weight concerns also have the potential to negatively influence female gymnasts' well-being. Well-being, dieting, and weight concerns may also be influenced by the perception of autonomy-support within sport (van der Kaap-Deeder et al., 2014) and within particular relationships (Deas et al., 2011). If a female adolescent feels as though their need for autonomy is not being supported in sport and/or in relation to her mother, a decrease in well-being and an increase in unhealthy weight concerns may be displayed.

Chapter 3. Methods

Participants

Participants included 30 mother-daughter dyads living in the state of North Carolina. All daughters were on a competitive gymnastics team ranging from levels 4-10. At these levels, gymnasts typically practice ≥ 3 days per week. All gymnasts were between the ages of 12-17 years in order to evaluate a group of athletes who may be at risk for weight concerns and who were similar developmentally. To eliminate possible extraneous variables related to participating in gymnastics recreationally, gymnasts also had a minimum of three years of experience participating in gymnastics. There were no restrictions for the mothers sampled in this study other than their daughters meeting the criteria.

Measures

Demographic Questionnaire. The mothers who participated in this study completed a demographic questionnaire to assess items concerning the height, weight, and age of both the mother and daughter participants. Body mass index (BMI) was calculated for both mother and daughter participants to determine if they were classified as underweight, normal weight, overweight, or obese. Mothers also provided their occupation, household income, education level, and if they were a former athlete.

Measures for Daughters:

Athlete Scale: Drive for Thinness and Performance. Daughters' drive for thinness in order to enhance performance was assessed by completing a subscale of the athlete self-report questionnaire. The 12-item Drive for Thinness and Performance subscale has been used to assess weight concerns in an athletic context. Example items included: "I would be more successful in

my sport if my body looked better,” and “I often wish I were leaner so I could perform better” (Krentz & Warschburger, 2013). All items were rated on a five-point Likert scale format, from 1 (strongly disagree) to 5 (strongly agree). Scoring involved reverse-coding the last two items of the subscale, then finding the mean score of all items. Higher scores indicate a stronger drive for thinness, while lower scores indicate a weaker drive for thinness. This scale has been found to have significant predictive ability of weight concerns, and is a reliable and valid measure of “drive for thinness and performance” ($\alpha=.91$) (Hinton & Kubas, 2005). For the current study, this measure was found to be highly reliable with a Cronbach’s alpha of .84.

Perceived Parental Autonomy Support Scale (P-PASS): This scale has 24-items that evaluated autonomy-support within six subscales: 1) Offering choice within certain limits (4-items), 2) Explaining the reasons behind the demands, rules, and limits (4-items), 3) Being aware of, accepting, and recognizing the child’s feelings (4-items), 4) Threatening to punish the child (4-items), 5) Inducing guilt and (4-items), 6) Encouraging performance goals (4-items). Items were rated on a seven-point Likert scale format (1=do not agree at all, 7=very strongly agree). Items for each subscale were averaged with higher scores indicating a stronger perception of autonomy support and lower scores indicating a weaker perception of autonomy support. This scale demonstrated acceptable reliability, with Cronbach’s alpha confirming the internal consistency of the questionnaire ($\alpha > .89$) (Mageau, Ranger, Joussemet, Moreau & Koestner, 2015). The P-PASS was modified in order to assess the daughter’s non-sport perception of maternal autonomy-supportive or unsupportive behaviors. Modification of this scale included removal of the ratings that assess perception of paternal autonomy-supportive or unsupportive behaviors in order to place the child’s focus solely on maternal behaviors. Also, the word “parents” was replaced with “mother” on several items of the questionnaire. For example, “My

parents gave me many opportunities to make my own decisions about what I was doing.” was changed to, “My mother gave me many opportunities to make my own decisions about what I was doing.” The modification of this scale did not affect the integrity of the questionnaire and allowed researchers to assess maternal attitudes which are consistent with the purpose of the research. For scoring, reverse items were coded accordingly, each subscale mean was calculated, as well as a overall autonomy-support score. Higher scores indicate higher perceptions of maternal autonomy-support. This measure was found to be a reliable method to assess autonomy-support ($\alpha=.85$)

Perceived Autonomy Support Scale for Exercise Settings (PASSES): A sport-specific measure of maternal autonomy support was measured by using PASSES. PASSES has been used in various studies that have sampled adolescents, similar to the current research study. This 12-item scale was modified to investigate daughter’s perception of maternal autonomy support in a sport and exercise setting. Items such as, “I feel that my PE teacher provides me with choices, options, and opportunities about whether to do active sports and/or vigorous exercise in my free time.” were modified to, “I feel that my mother provides me with choices, options, and opportunities about whether to do gymnastics in my free time.” Each item was measured on a 7-point Likert scale format (1=strongly disagree, 7=strongly agree). A total mean score was calculated to determine perception of maternal autonomy-support within-sport. Higher scores indicate higher perceptions of autonomy support while lower scores indicate lower perceptions of autonomy support. A validation study conducted by Hagger et al. (2007) has confirmed the scale to be a relatively reliable measure of perceived autonomy support in sport and exercise settings ($\alpha >.67$). For the current study, a Cronbach’s alpha of .81 was reported.

Athlete Engagement Questionnaire: The Athlete Engagement Questionnaire (AEQ) was used as an indicator of gymnasts' sport-specific well-being (Lonsdale, Hodge, & Jackson, 2007). This 16-item questionnaire evaluates sport-specific well-being in four dimensions: confidence, dedication, enthusiasm, and vigor. Each item is assessed on a five-point Likert scale that ranges from 1 (strongly disagree) to 5 (strongly agree). Items include, "I am determined to achieve my goals in gymnastics" to assess dedication and, "I feel excited about my gymnastics" to assess enthusiasm (Martins, Rosado, Ferreira & Biscaia, 2014). To determine sport-specific well-being, a mean score was calculated from the items with higher scores indicating high athlete engagement and lower scores indicating low athlete engagement. Correlations among the four dimensions are generally in the moderate to high range (.54 to .85) and the alpha coefficients for each subscale ranged from .84 to .89 (Martins et al., 2014). For the current study, this total scale was also shown to be a reliable measure with a Cronbach's alpha of .83. This questionnaire has been used in various research studies measuring athletes' well-being in both female and male adolescent samples.

Measures for Mothers:

Inquisit Web Weight Implicit Attitude Test (Bodies) online survey. Items on this survey assessed participants' implicit attitudes and beliefs regarding thin people and fat people. Unlike other instruments used for this study, this assessment was conducted online and timed. Implicit attitudes can be difficult to measure. In some cases, people may be unwilling to express certain attitudes and beliefs due to the scrutiny they may receive. Individuals may also be unaware of certain attitudes and beliefs they may hold. The IAT survey has the ability to measure these implicit attitudes and beliefs that participants may be unwilling or unable to

report. Items measure strength of associations between concepts (e.g., fat people, thin people) and characteristics (e.g. good, bad). The result from the Weight IAT is provided as a d-score, where higher positive d-scores indicate a stronger preference for thin people, and higher negative d-scores indicate a stronger preference for fat people. A result close to zero indicates specifies no/little preference for thin or fat people. The outcome variable that will be evaluated is the presence of an implicit anti-fat bias (Schwartz et al., 2003).

Anti-Fat Attitudes Questionnaire (AFA). Explicit anti-fat attitudes were measured using the Anti-Fat Attitudes Questionnaire (Crandall, 1995). This scale is composed of 13-items with three different subscales: Dislike (7-items), Fear of Fat (3-items), and Willpower (3-items). Each of these items are rated on a 9-point Likert scale format, from 1 (very strongly disagree) to 9 (very strongly agree). Means were calculated for each subscale to determine explicit anti-fat attitudes, with higher scores indicating a stronger explicit anti-fat attitude. Previous studies have shown that the AFA exhibits strong reliability, with an averaging value of .82. The current study found strong reliability for the Dislike ($\alpha=.80$) and Fear of Fat ($\alpha=.83$), however the Willpower subscale had low reliability ($\alpha=.26$).

Drive for Thinness Questionnaire (DFTQ). The Drive for Thinness questionnaire is a seven-item subscale of the Eating Disorder Inventory (EDI) that measures weight and dieting concern and also excessive concern of body weight. For the purpose of this study, researchers will utilize this scale to measure mothers' personal drive for thinness. Each item is measured on a 6-point Likert Scale (1=never, 6=always). "I feel extremely guilty about overeating." and "I am terrified of gaining weight." are examples of items for this measure. Scoring consisted of reverse scoring the first item, and then finding the mean score of the items. Higher scores indicated a stronger drive for thinness. This scale has been found to be reliable and valid, with a previous

research study finding a Cronbach's alpha of .84 for the females measured in the study (Galliger, Neufeld, & Musher-Eizenman, 2010). This measure was also found to be highly reliable for the current study ($\alpha=.87$).

Mothers' Beliefs: Drive for Thinness and Performance (for Daughter). Mothers' drive for thinness and performance for their daughters was assessed using a modified version of the Athlete Drive for Thinness and Performance scale. This questionnaire has 12 items rated on a Likert scale format (1=strongly disagree, 5=strongly agree). Items were modified from, "I would be more successful in my sport if my body looked better," to "My daughter would be successful in her sport if her body looked better." (Krentz & Warschburger, 2013). Another example includes, "I often wish my daughter was leaner so she could perform better." This measure has been found to be a reliable and valid measure of drive for thinness and performance (Hinton & Kubas, 2005) and has been modified in previous research studies to assess drive for thinness for the mother's perception of daughter as well (Lombardo, 2012). The last two items were reverse coded, and the mean score was calculated for all items. Higher scores indicated a stronger drive for thinness and performance for their daughter. This measure was found to be a reliable method to measure drive for thinness and performance ($\alpha=.87$).

Comprehensive Feeding Practices Scale (CFPQ). The Comprehensive Feeding Practices Scale was used to evaluate maternal restrictive feeding practices for their daughters. The comprehensive version of this questionnaire has multiple subscales to assess restrictive feeding practices, however some of the subscales have been found to be irrelevant for the current research study. For example, one of the subscales in the "emotional regulation" subscale asks, "When this child gets fussy, is giving him/her something to eat or drink the first thing you do?". This particular item, and subscale, is inappropriate for an adolescent female population.

Therefore, to focus attention to the purpose of the research, we will be evaluating restrictive feeding practices by using the environment (4 items), restriction for health (4 items), and restriction for weight control (8 items) subscales. Each item is rated on a 5-point Likert scale format (1=disagree, 5=agree). Reverse-coded items were scored accordingly, and means for each subscale were calculated. A validation study conducted by Musher-Eizenman and Holub (2007) has confirmed that this measure is a valid, reliable tool to measure parental feeding practices. The current study also found this measure to be reliable, with scores ranging from .70 to .90.

Procedures

To recruit participants, the researcher traveled to a gymnastics training center in North Carolina to present the current research study to gymnasts and their parents during practice sessions. Also, the researcher attended the North Carolina gymnastics state competition with the help of other graduate assistants to recruit participants. To recruit participants who are on a competitive level of gymnastics, the researcher confirmed with the mothers that the participants were qualified as level 4-10 gymnasts, practice at least three days per week, and have at least three years of experience. After recruitment was completed, informed consent was obtained from all participants. Since all participants were under the age of 18, we required parental consent and informed assent in order to participate in the research study.

The mother-daughter dyads were informed of the study's purpose of assessing maternal attitudes and behaviors, gymnast's weight concerns, and sport engagement. In order to promote open communication between the participants and the researchers; contact information for the research team was provided to direct any questions and/or concerns.

The mothers and gymnasts completed their questionnaires in the presence of a researcher to provide further explanation on specific items if necessary. One questionnaire, the Inquisit Weight Implicit Attitude Test, was completed by the mothers online either in the presence of the researcher, or on their own. The researcher provided the computer with the required software to complete the online portion of the survey. The mothers also completed the demographic questionnaire to assess demographic information for themselves and their daughters.

Gymnasts completed the Athlete: Drive for Thinness and Performance scale, the Parental-Perceived Autonomy Support Scale, Perceived Autonomy Support Scale for Exercise Settings, and the Athlete Engagement Questionnaire in the presence of the researcher. The mothers completed the Weight IAT, AFA, the Drive for Thinness scale, the Athlete: Drive for Thinness and Performance scale (for daughters), and the Comprehensive Feeding Practices Questionnaire with the researcher. Prior to survey completion, it was recommended that the daughters and mothers take the required surveys separately to avoid any external maternal influence. All participants were assured that all answers are completely anonymous, and it is essential that the participants answer the questions as honestly as possible. Final reports of the surveys were checked for completion, and then collected by the researcher for further evaluations and analyses.

Statistical Analysis

For the statistical analysis, mothers and daughters were paired as dyads in order to observe the potential relationship between the mother's outcome variables and the daughter's outcome variables. Data entry included giving the mother and daughter participants one

identification number with separate mother and daughter variables. This way, the data between pairs were connected and allowed researchers to run correlations between outcome variables.

Demographic information for both mothers and daughters were inputted into a spreadsheet using Microsoft Excel 2016 to determine the means and standard deviations for age, BMI, occupation, household income, education level, and athletic experience. BMI for both participants was calculated using an online BMI calculator from the Centers for Disease Control and Prevention (CDC) webpage. Scores from all questionnaires from both mother and daughter participants were inputted into the spreadsheet as well to determine the means and standard deviations from each measure.

The data were then exported into IBM SPSS Statistics 22 to conduct Pearson's r correlations between outcome variables. All significance tests were conducted at an alpha value of $p < .05$.

Chapter 4. Results

Recruitment and Demographic Information

A total of sixty-four individuals (34 mothers and 30 daughters) completed questionnaires for the current research study. For data analysis, all participants and outcome variables were required to be paired between mother and daughter. Data from four of the mother participants were excluded from data analyses because their daughters did not complete the survey. Therefore, analysis included a total of thirty mother-daughter dyads. When asked to report body mass index (BMI) for both mother and daughter, two of the mothers did not report their BMI, and there were missing data for eight of the daughters' BMI as well. All descriptive statistics from the data analyses will be presented as Mean \pm SD.

Participant Characteristics

Mothers were between the ages of 35 and 56 years ($M=44.38 \pm 4.60$). As shown in Table 1, the majority ($n=21$, 70%) of the mothers worked full-time, while 20% ($n=6$) worked part-time, and the other 10% ($n=3$) identified their occupation as "other" and listed working as a stay-at-home mom. Sixty percent ($n=18$) of the mothers reported having a household income of \$100,000 or greater, 10% ($n=3$) reported \$75,000-99,999, another 13% ($n=4$) reported \$50,000-74,999, 10% ($n=3$) chose not to answer, and two participants (7%) reported earning between \$35,000-49,999.

For educational level, all mothers reported earning a college/university degree or higher. Sixty percent ($n=18$) reported earning a college/university degree, 30% ($n=9$) earned a Master's degree, and 10% ($n=3$) earned a PhD or an equivalent form of a doctoral degree. As for their former athletic status, 67% ($n=20$) of the mothers reported that they were former athletes,

whereas the other 33% ($n=10$) listed being a non-athlete. Being involved in either cheerleading or dance was the most frequently reported athletic experience ($n=6$, 20%), and only four participants (13%) reported being former gymnasts. Aside from cheerleading, dance, and gymnastics, other previous athletic experiences included soccer, softball, track, basketball, volleyball, and swimming.

Table 1- Participant Demographics

		# of Participants	Percentage (%)
Mother Age (years)	35-39	4	13%
	40-44	10	33%
	45-49	10	33%
	50-54	4	16%
	55-60	1	3%
	N/A	1	3%
Daughter Age (years)	12-13	24	80%
	14-15	5	17%
	16	1	3%
Occupation	Full-Time	21	70%
	Part-Time	6	20%
	Other	3	10%
Household Income	\$100,000+	18	60%
	\$75,000-99,999	3	10%
	\$50,000-74,999	4	13%
	\$35,000-49,999	2	7%
	N/A	3	10%
Educational Level	College Degree	18	60%
	Master's Degree	9	30%
	PhD/equiv.	3	10%
Athletic Experience	Athlete	20	67%
	Non-Athlete	10	33%

Body mass index (BMI) was calculated for both mother and daughter participants.

Participants were classified as either underweight, normal weight, overweight, or obese based on

self-reported height and weight. The mean BMI for mothers was $25.41 \pm 4.94 \text{ kg/m}^2$. According to the National Institutes of Health (2017), for adults, a BMI (kg/m^2) less than 18.5 is classified as underweight, normal weight is between 18.5-24.9, overweight is between 25.0-29.9, and a BMI over 30 is classified as obese. Sixty-three percent ($n=19$) of the mothers were classified as normal weight, 20% ($n=6$) were classified as overweight, 10% ($n=3$) were classified as obese, and 7% ($n=2$) chose not to answer. None of the mother participants were classified as underweight.

For the daughters, the mean BMI was $18.84 \pm 2.59 \text{ kg/m}^2$. According to the National Institutes of Health (2017), if children have a BMI less than the 5th percentile for their age, they are underweight. Healthy weight is classified as having a BMI between the 5th percentile and less than the 85th percentile, overweight is in the 85th percentile and less than the 95th percentile, and greater than or equal to the 95th percentile is considered obese. Given these classifications, 57% ($n=17$) of the daughters were classified as normal weight, 13% ($n=4$) were classified as overweight, and one participant (3%) was classified as underweight. None of the daughter participants were classified as obese. More information regarding the BMI of the participants can be found in Table 2.

Table 2- BMI

		# of Participants	Percentage (%)	Mean \pm SD
Mother BMI (kg/m^2)	<18.5 (underweight)	0	0%	$25.41 \pm 4.94 \text{ kg/m}^2$
	18.5-24.9 (normal)	19	63%	
	25.0-29.9 (overweight)	6	20%	
	>30 (obese)	3	10%	
	N/A	2	7%	
Daughter BMI Classification	<5 th percentile (underweight)	1	3%	$18.84 \pm 2.59 \text{ kg/m}^2$
	5 th -85 th (normal weight)	17	57%	
	85 th -95 th (overweight)	4	13%	
	>95 th (obese)	0	0%	
	N/A	8	27%	

To describe the sample, means and standard deviations for all study variables were examined and are shown Table 3. For the explicit anti-fat attitudes, mother attitudes varied across the dislike, fear of fat, and willpower subscales. Overall, mothers did not have a strong dislike of obese individuals ($M = 2.44 \pm 1.02$ on a 1 (very strongly disagree) to 9 (very strongly agree scale)). However, mean scores on the fear of fat ($M=4.97 \pm 2.05$) and willpower ($M=5.82 \pm 0.99$) subscales were in the moderate range. These results indicate that the mothers have a moderate personal fear of fat and may be likely to believe that people are overweight due to problems with self-control. In regards to the maternal implicit anti-fat attitudes measure (Weight IAT), the mean score was $d=0.44 (\pm 0.40)$, which indicates a moderate preference for thin people.

The mothers generally agreed that they provide their daughters with healthy food options in the household ($M=3.55 \pm 1.00$) on a 1 (strongly disagree) and 5 (strongly agree) scale. In addition, they reported moderately high scores on dietary restriction for health reasons in their daughter ($M=3.20 \pm 1.25$) but moderately low scores on restricting food for weight control in their daughters ($M=1.57 \pm 0.58$) on the same scale. Based on this information, mothers were more likely to restrict for health-related purposes rather than weight-related purposes.

The mothers' had a moderate personal drive for thinness with a mean score of 2.38 ± 0.79 on a scale ranging between 1 (low drive for thinness) and 5 (high drive for thinness). The mothers had a moderately low drive for thinness for their daughter ($M=1.48 \pm 0.57$), with scores ranging between 1 (low drive for thinness) and 5 (high drive for thinness). The daughters' had a mean score of 2.26 ± 0.72 which indicates a moderate personal drive for thinness on a scale ranging between 1 (low drive for thinness) and 5 (high drive for thinness).

Daughters reported perceptions of high autonomy support from their mothers and within their sport environment. Daughters perceived a high amount of non-sport autonomy support from

Table 3-Questionnaire Means and Standard Deviations

Questionnaire	Mean ± SD	Possible Range of Scores
AFA: Dislike subscale	2.44 ± 1.02	1 (very strongly disagree) to 9 (very strongly agree)
AFA: Fear of Fat subscale	4.97 ± 2.05	1 (very strongly disagree) to 9 (very strongly agree)
AFA: Willpower subscale	5.82 ± 0.99	1 (very strongly disagree) to 9 (very strongly agree)
CFPQ: Environment subscale	3.55 ± 1.00	1 (little healthy food options) to 5 (plenty of healthy food options)
CFPQ: Restriction for Health subscale	3.20 ± 1.25	1 (low restriction) to 5 (high restriction)
CFPQ: Restriction for Weight subscale	1.57 ± 0.58	1 (low restriction) to 5 (high restriction)
DFTQ (Mother)	2.38 ± 0.79	1 (low drive for thinness) to 5 (high drive for thinness)
Drive for Thinness (Mothers' perception of Daughter)	1.48 ± 0.57	1 (low drive for thinness) to 5 (high drive for thinness)
Weight IAT	0.43 ± 0.40	+1.00 (strong preference for thin people) to -1.00 (strong preference for overweight people)
Drive for Thinness (Daughter)	2.26 ± 0.72	1 (low drive for thinness) to 5 (high drive for thinness)
Non-Sport Autonomy Support (Total Score)	5.60 ± 0.79	1 (do not agree at all) to 7 (very strongly agree)
Offering choice within certain limits	5.88 ± 0.94	
Explaining the reasons behind demands, rules, and limits	5.32 ± 1.43	
Being aware of, accepting, and recognizing child's feelings	5.48 ± 1.45	
Threatening to punish the child	4.69 ± 1.44	
Inducing guilt	6.38 ± 0.83	
Encouraging performance goals	5.60 ± 0.79	
Sport-Related Autonomy Support	6.18 ± 0.61	1 (low autonomy support) and 7 (high autonomy support)
Athlete Engagement	4.71 ± 0.28	1 (low well-being) to 5 (high well-being)

their mothers ($M=5.60 \pm 0.79$) on a scale ranging from 1 (do not agree at all) and 7 (very strongly agree). In terms of the general autonomy-support subscales, the daughters reported high perceptions of autonomy for all subscales, except for the “Threaten to Punish Child” subscale, where they reported moderate autonomy support ($M=4.69 \pm 1.44$). This indicates that daughters in this sample seem to acknowledge that their mothers provide consequences for their actions, but still report high levels of general autonomy-support overall. Compared to overall autonomy, daughters reported higher autonomy support from their mothers in gymnastics with a mean score of 6.18 ± 0.61 on a seven-point Likert scale.

Daughters had high levels of well-being within their sport environment ($M=4.7 \pm 0.28$) assessed through gymnastics engagement with scores ranging from 1 (low levels of well-being within sport) and 5 (high levels of well-being within sport). High levels of sport-specific engagement indicate that gymnasts in this sample feel confident, motivated, and enjoy their sport experience.

A correlational analysis was used to describe relationships between maternal variables for this study. As shown in Table 4, a moderate negative relationship existed between implicit anti-fat attitudes and restrictive eating for weight purposes ($r= -.39, p=.05$). This finding indicates that strong maternal implicit anti-fat attitudes are associated with less restrictive feeding practices for daughters’ weight. There were no statistically significant correlations found between implicit anti-fat attitudes and providing healthy food options within the home environment or restrictive feeding for health purposes. Maternal implicit anti-fat attitudes had a moderately strong negative correlation with mothers’ performance-related drive for thinness for their daughter ($r= -.51, p=0.01$). This indicates that strong implicit anti-fat attitudes may be associated with lower levels of mothers’ drive for thinness and performance for their daughter.

Table 4- Correlational Matrix of Outcome Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Mothers' BMI	–														
2. Daughters' BMI	.61**	–													
3. M. Implicit Anti-Fat Attitudes	-.52**	-.58**	–												
4. M. Explicit Anti-Fat Attitudes: Dislike	-.03	-.07	.24	–											
5. M. Explicit Anti-Fat Attitudes: Fear of Fat	.11	-.20	.08	.07	–										
6. M. Explicit Anti-Fat Attitudes: Willpower	.10	.44*	-.07	.36*	-.18	–									
7. M. Restrict. Feeding Practices: Environ.	-.22	-.16	.05	.26	-.18	.19	–								
8. M. Restrictive Feeding for Health	.12	.23	-.20	.11	-.01	-.00	-.05	–							
9. M. Restrictive Feeding for Weight	.50**	.53*	-.39*	.13	.13	.26	-.07	.62**	–						
10. M. Drive for Thinness	.25	-.09	-.15	.19	.73**	-.28	-.15	-.01	.23	–					
11. M. Drive for Thinness (for daughter)	.57**	.52*	-.51**	.22	.06	.53**	.10	.18	.55**	.16	–				
12. D. Drive for Thinness	-.08	.20	.17	.05	.07	.01	-.09	.16	.29	.13	.14	–			
13. Autonomy b/w Mother & Daughter	.13	-.17	-.12	-.03	.18	.14	.01	-.16	-.08	.18	.14	-.24	–		
14. Sport-Specific Autonomy	.15	-.07	.09	.18	.24	.28	.25	.02	.14	.17	.22	-.15	.49**	–	
15. D. Engagement	-.08	-.18	.06	.07	-.24	.17	.28	.32	.07	-.22	.00	-.03	.18	.61**	–

*Correlation is significant at the 0.05 level (2-tailed), **Correlation is significant at the 0.01 level (2-tailed)

Maternal explicit anti-fat attitudes (fear of fat) had a strong positive correlation with their personal drive for thinness ($r=.73$ $p=.01$). This result can be interpreted as strong maternal explicit anti-fat attitudes (fear of fat) are associated with a strong drive for thinness for that individual. Maternal explicit anti-fat attitudes (willpower) and mothers' drive for thinness for their daughter had a moderate positive correlation ($r=.53$, $p=.01$). Therefore, stronger maternal anti-fat attitudes regarding willpower may be associated with a stronger drive for thinness for their daughters.

Maternal anti-fat attitudes had significant relationships with multiple variables that were evaluated. Findings show that strong implicit anti-fat attitudes may be associated with lower restrictive feeding practices for weight, whereas strong implicit anti-fat attitudes may be associated with a lower drive for thinness for their daughters. As for explicit anti-fat attitudes, strong maternal explicit anti-fat attitudes, specifically fear of fat and willpower, indicate a strong personal drive for thinness and drive for thinness for their daughters. There was also a positive relationship between maternal fear of fat and their personal drive for thinness. Therefore, these maternal variables may be important to examine when evaluating certain anti-fat attitudes and behaviors.

Body Mass Index: Maternal Attitudes and Behaviors, Weight Concerns, and Sport-Specific Well-Being

Body mass index for the dyads was analyzed for potential associations with the maternal anti-fat attitudes, restrictive feeding practices, drive for thinness for both mother and daughter, and daughters' perceptions of autonomy support and engagement. As shown in Table 5, there was a moderately strong positive correlation ($r=.61$, $p=.01$) between the mother and daughters'

BMI. Maternal BMI had a moderately strong negative correlation with implicit anti-fat attitudes ($r = -.52, p = .01$), a moderately strong positive association with restrictive feeding for weight ($r = .50, p = .01$), and maternal drive for thinness for their daughter ($r = .57, p = .01$). These findings indicate if the mother has a lower BMI, then they are more likely to have a stronger implicit anti-fat attitude. Also, if the mother has a higher BMI, they are more likely to restrict their daughters' feeding for weight purposes and have a stronger drive for thinness for their daughter.

Table 5- BMI and Outcome Variables

	Mothers' BMI	Daughters' BMI
Mothers' BMI	-	.61**
Daughters' BMI	.61**	-
Anti-Fat Attitudes: Dislike	-.03	-.07
Anti-Fat Attitudes: Fear of Fat	.11	-.20
Anti-Fat Attitudes: Willpower	.10	.44*
Mothers' Implicit Anti-Fat Attitudes	-.52**	-.58**
Restriction for Health	.12	.23
Restriction for Weight	.50**	.53*
Mothers' Personal Drive for Thinness	.25	-.09
Mothers' Performance-Related Drive for Thinness for Daughter	.57**	.52*
Daughters' Performance-Related Drive for Thinness	-.08	.20
Daughter's Athlete Engagement	-.08	-.18

*Correlation is significant at the 0.05 level (2-tailed)

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

Daughters' BMI had a moderately strong negative association with maternal implicit anti-fat attitudes ($r = -.58, p = .01$), which indicates that if the daughter has a lower BMI then the mother is more likely to have a stronger preference for thin people. Daughter BMI also had a moderately strong positive correlation with maternal explicit anti-fat attitudes regarding willpower ($r = .44, p = .01$), maternal restriction for weight ($r = .53, p = .05$), and maternal drive

for thinness for their daughter ($r=.52, p = .01$). Therefore, based on these findings, if the daughters' BMI is higher, their mothers are more likely to believe that individuals are overweight due to issues with self-control and they likely have a stronger drive for thinness for their daughters. Also, mothers were more likely to restrict their daughters' feeding for weight purposes if their daughters' BMI was higher. No significant relationships were found between BMI and daughters' personal weight concerns and well-being.

These findings show that mother and daughter BMI has a positive association with mothers' restrictive feeding practices for their daughters' weight, but not for health purposes. Results also found that mothers who have a lower BMI are more likely to have stronger implicit anti-fat attitudes and a stronger drive for thinness for their daughter. In relation to the daughters' sport-specific well-being and weight concerns, mother and daughter BMI did not have a significant relationship with these outcome variables.

Non-Sport and Performance-Related Maternal Attitudes and Behaviors related to Daughters' Weight Concerns and Sport-Specific Well-Being

Correlational analyses were used to examine the association between maternal non-sport (implicit and explicit anti-fat attitudes, and personal drive for thinness) and performance-related (drive for thinness for daughter) maternal attitudes and maternal restrictive feeding practices with daughters' weight concerns and sport-specific well-being.

Maternal implicit and explicit anti-fat attitudes were not significantly associated with daughters' weight concerns or sport-specific well-being, as shown in Table 6. As for non-sport behaviors (restrictive feeding practices), there were no statistically significant relationships between restrictive feeding practices and daughters' weight concerns or sport-specific well-being

either. Therefore, these non-sport maternal attitudes and behaviors may not have an association with daughters' weight concerns or sport-specific well-being.

Performance-related attitudes (mothers' drive for thinness for their daughter) were not statistically associated with daughters' weight concerns or well-being, as shown in Table 6. Therefore, maternal performance-related attitudes may not be related to gymnasts' weight concerns in this sample.

Table 6- Maternal Attitudes and Behaviors in relation to Daughters' Weight Concerns and Sport-Specific Well-Being

	Daughters' Weight Concerns	Daughters' Sport-Specific Well-Being
Non-Sport Attitudes		
Anti-Fat Attitudes: Dislike	.05	.07
Anti-Fat Attitudes: Fear of Fat	.07	-.24
Anti-Fat Attitudes: Willpower	.01	.17
Mothers' Implicit Anti-Fat Attitudes	.17	.06
Mothers' Personal Drive for Thinness	.13	-.22
Non-Sport Behaviors		
Restriction for Health	.16	.32
Restriction for Weight	.29	.07
Performance-Related Attitudes		
Mothers' Drive for Thinness for Daughter	.14	.00

*Correlation is significant at the 0.05 level (2-tailed)

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

The maternal general and performance-related attitudes and behaviors that were evaluated were not related to daughters' weight concerns and sport-specific well-being in this sample. Therefore, it may be important to examine other variables that may have a significant relationship with weight concerns and the sport-specific well-being of gymnasts.

Daughters' Perception of Autonomy Support in relation to Weight Concerns and Sport-Specific Well-Being

To examine the daughter's perception of autonomy support from their mothers both in and out of sport, as well as possible associations between autonomy support with weight concerns and sport-specific well-being, these variables were analyzed accordingly. A moderate positive correlation was found between maternal autonomy support within sport and out of sport ($r=.49, p=.01$). Therefore, if daughters' feel as though their mothers are autonomy-supportive within their relationship, they are likely to feel supported within-sport as well. No significant relationships were found between the general autonomy-support subscales and daughters' weight concerns and sport-specific well-being. However, there was a non-significant, yet moderate, positive correlation between the subscale: Being aware of, accepting, and recognizing the child's feelings, and daughters' sport-specific well-being ($r=.35, p>.01$).

When evaluating autonomy support with weight concerns and sport-specific well-being, only one significant positive relationship was found between athlete engagement and maternal autonomy support within-sport ($r=.61, p=.01$). Thus, gymnasts in this sample are likely to have an enhanced sense well-being if they feel as though their mothers strongly support them within-sport.

These results show that gymnasts in the sample feel as though their autonomy is supported by their mothers, both within sport and outside of sport. Also, perceptions of high autonomy support within sport were associated with high levels of athlete engagement. In regards to weight concerns, perceptions of autonomy and athlete engagement were not associated with the weight concerns of the gymnasts sampled. Table 7 displays the correlations between these outcomes variables.

Table 7-Maternal Autonomy Support in relation to Daughters' Weight Concerns and Sport-Specific Well Being

	Daughters' Weight Concerns	Daughters' Sport-Specific Well-Being
Maternal Autonomy Support (mother-daughter relationship)	-.24	.18
Offering choice within certain limits	-.27	.11
Explaining the reasons behind demands, rules, and limits	-.14	.24
Being aware of, accepting, and recognizing the child's feelings	-.07	.35
Threatening to punish the child	-.10	.14
Inducing guilt	-.14	.05
Encouraging performance goals	-.27	-.29
Maternal Autonomy Support (within-sport)	-.15	.61**

*Correlation is significant at the 0.05 level (2-tailed)

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

Conclusion

In summary, mothers in this sample were found to have a moderate preference for thin people, and this preference has been found to be negatively associated with restrictive feeding practices for their daughters' weight and maternal drive for thinness for their daughters. A strong positive association was found between maternal fear of fat and maternal drive for thinness, therefore if mothers have a strong fear of fat, they are likely to have a strong personal drive for thinness as well. Based on the correlational analyses, it can also be determined that daughters' weight concerns and sport-specific well-being were not associated with maternal non-sport and performance-related attitudes and behaviors. Lastly, daughters felt as though their mothers were supportive both within and out of sport, and sport-specific autonomy support had a positive association with daughters' sport-specific well-being

Chapter 5. Discussion

Weight concerns are highly prevalent in today's society for female adolescents, especially if they are involved in aesthetic sports, such as gymnastics (Sundgot-Borgen & Torstveit, 2004). Weight concerns in gymnasts can have detrimental effects on overall health and well-being, therefore it is important to examine potential variables that may be associated with these concerns (Krentz & Warschburger, 2011). Since gymnasts have performance-related pressures due to the competitive nature of their sport, it is important to analyze both non-sport and performance-related risk factors that may be associated with weight concerns and the sport-specific well-being of gymnasts.

Within the general population, maternal anti-fat attitudes (Musher-Eizenman et al., 2007), restrictive feeding practices, and drive for thinness (Krentz & Warschburger, 2011) have been found to be associated with daughters' weight concerns. However these variables have rarely been investigated within an aesthetic athlete sample. Also, the sport culture of gymnastics not only places a strong emphasis on leanness, but also on high levels of structure, which can lead to perceptions of low autonomy support for gymnasts (Tan et al., 2012). These perceptions of autonomy support have been found to be negatively associated with weight concerns and positively associated with gymnasts' well-being (Blusewicz, 2008). Therefore, these variables were examined in the current research study out of concern for gymnasts' well-being with hopes of preventing the development of gymnasts' weight concerns in the future. Also, gymnasts, coaches, and their families should be educated regarding potential risk factors that may have a detrimental effect on gymnasts' performance, health, and overall well-being.

To investigate potential variables associated with the weight concerns and well-being of gymnasts, there were three purposes of the current research study. The first study purpose was to

examine mothers' and daughters' BMI with non-sport maternal attitudes (implicit and explicit anti-fat attitudes and drive for thinness) and behaviors (restrictive feeding practices), and with daughters' weight concerns and sport-specific well-being. The second purpose of this study was to examine the association between non-sport (implicit and explicit anti-fat attitudes and personal drive for thinness) and performance-related (drive for thinness for daughter) maternal attitudes and behaviors (restrictive feeding practices) with daughters' weight concerns and sport-specific well-being. Lastly, the third purpose of this study was to examine the relationship between daughters' perception of maternal autonomy support (both within and out of sport) with their weight concerns and sport-specific well-being.

Body Mass Index:

When examining the association of mothers' and daughters' BMI with maternal attitudes and behaviors, and daughters' weight concerns and sport-specific well-being, the research hypothesis was partially supported. Researchers hypothesized that BMI would be negatively associated with anti-fat attitudes and drive for thinness, positively associated with restrictive feeding, and negatively associated with daughters' weight concerns and well-being. In agreement with research conducted by Devakumar et al. (2016), a positive association was found between mothers' and daughters' BMI. Since the majority of the participants' weights were classified as "healthy" according to BMI standards, it is logical that the BMIs between mothers and daughters would be similar (AHA, 2015). Also, analyses found that mothers who had a higher BMI were also more likely to restrict food from their daughters out of fear of them becoming overweight, despite their normal weight status. Not only does this support the study hypothesis, but this finding is also in accordance with research conducted by Musher-eizenmann et al. (2007), which

found that mothers with higher BMIs were more likely to practice restrictive feeding to their children for weight purposes. Though consistent with the literature, this finding remains concerning. Gymnasts typically have low body fat percentages and a high percentage of muscle-mass, therefore making them healthy and fit individuals in most cases (de Bruin et al., 2007). Based on this information, it may be an unhealthy behavior for mothers to restrict their daughters' feeding for weight purposes, especially when their daughters are athletic and healthy.

Another research finding that was supportive of the research hypothesis was that stronger maternal implicit anti-fat attitudes were associated with lower BMIs for both mothers and daughters in this sample. Previous research has found consistent findings (Davison & Birch, 2004), and these findings indicate that thinner mothers tend to have a stronger anti-fat bias, and this bias may be related to their daughters' weight as well. If mothers prefer thin individuals compared to overweight individuals, such as the mothers in this sample, they may project this preference onto their daughters unknowingly. Indeed, in this study, there was no statistically significant association between implicit and explicit anti-fat attitudes, indicating that mothers may not be aware of their attitudes towards individuals based on their weight.

Despite some of the research hypotheses being at least partially supported, others were not. The hypothesis that BMI would be negatively associated with daughters' weight concerns and well-being was not supported as no relationship was found between BMI and these variables. A possible explanation could be due to the missing BMI data for multiple participants, or because of the moderate weight concerns reported by the gymnasts in this sample. In previous studies, gymnasts reported strong personal weight concerns which coincides with the high prevalence of weight concerns for athletes in this sport (Sundgot-Borgen & Torstveit, 2004). However, the weight concerns of gymnasts in this sample were considered moderate. Though a

stronger drive for thinness was expected, a moderate drive for thinness is still concerning, especially since the majority of this sample was classified as normal weight. Due to the lack of association between BMI and weight concerns, perhaps the moderate weight concerns in this sample stemmed from an outlying variable. Or, another explanation may be that weight concerns exist regardless of actual weight and/or BMI.

Non-Sport and Performance-Related Maternal Attitudes and Behaviors:

After analyzing non-sport (implicit and explicit anti-fat attitudes and personal drive for thinness) and performance-related (drive for thinness for daughter) maternal attitudes, and maternal behaviors (restrictive feeding practices) with daughters' weight concerns and sport-specific well-being, no significant relationships were found between these variables. The lack of association between these variables was contrary to the research hypothesis which predicted maternal anti-fat attitudes, restrictive feeding, and drive for thinness would be positively associated with daughters' weight concerns and negatively associated with their sport-specific well-being. These findings were also inconsistent with previous research findings where maternal anti-fat attitudes and restrictive feeding practices were positively associated with children's weight concerns, which would also likely have a negative effect on their well-being (Musher-eizenmann et al., 2007). However, the current research study did not find a relationship between maternal anti-fat attitudes and restrictive feeding practices with their child's weight concerns or sport-specific well-being. Also, performance-related attitudes, such as maternal fear of fat and drive for thinness, have been predictive of aesthetic athlete's weight concerns as well, however this study did not find similar results (Francisco et al., 2013).

Although the current study's findings did not support the research hypothesis regarding non-sport and performance-related maternal attitudes and behaviors with the weight concerns and sport-specific well-being of their daughters, the finding that gymnasts did not have strong weight concerns may reflect positively on the culture in gymnastics for the athletes sampled. Although gymnasts did not report strong weight-related concerns, they still had moderate weight concerns which were unrelated to the maternal attitudes and behaviors assessed in the current study. Mothers in this sample may be aware of the weight concerns that gymnasts can develop and want to protect their daughters from these issues. Since weight concerns are still prevalent within the aesthetic sport culture, other variables such as other social influences or personality factors may need to be evaluated.

Autonomy Support:

Despite the high levels of structure and organization that gymnastics maintains (Blusewicz, 2008), gymnasts in this sample reported high levels of maternal autonomy support out of sport, and even higher levels of sport-specific maternal autonomy support. In turn, gymnasts also reported high levels of sport-specific well-being. Though this finding is inconsistent with the previous literature that found gymnasts perceived low autonomy support in and out of sport (Tan et al., 2012), it may be due to the characteristics of the participants sampled. For example, gymnasts in this sample had a moderate amount of weight concerns compared to strong weight concerns, and also the majority of gymnasts were normal weight and had high levels of engagement. These factors may have influenced their perceptions of autonomy support both in and out of sport.

The study hypothesis predicted that gymnasts' autonomy support within-sport and within the relationship between mother and daughter would be negatively associated with daughters' weight concerns and positively associated with sport-specific well-being, and the results somewhat supported these predictions. Gymnasts reported that they perceived their autonomy as being supported by their mothers both in and out of sport, and maternal autonomy support (within-sport) was also positively associated with gymnasts' sport-specific well-being. This indicates that gymnasts who felt their mothers supported their autonomy within their sport-endeavors were also more likely to report higher levels of sport-specific well-being. No relationship was found between the autonomy-related variables and weight concerns, which was contradictory to the research hypothesis.

In a sport atmosphere that typically has high levels of authority, structure, and organization, it is important for mothers to support their daughters' autonomy, which is what mothers in this sample did for their daughters. If this psychological need is met, it will likely enhance an individual's well-being, which was shown in this study's findings (Deci & Ryan, 1985). Since gymnasts' sport-specific well-being is a primary concern of this research study, it was promising to find that gymnasts in this sample felt as though their autonomy needs were met and their well-being was not in jeopardy. Based on these findings, perhaps autonomy-support strategies should be developed and included for gymnasts, parents, and coaches in effort to promote engagement among gymnasts.

Limitations:

This study had several limitations that should be acknowledged. Due to the age of the gymnasts in this study, there may have been self-report difficulties. Eighty percent of the

gymnasts in this study were the age of 12, and it is possible that they had trouble understanding the wording within the questionnaires. Though the researcher provided explanation if requested, some of the participants may not have asked for assistance when needed. Also, in regards to the mothers in this study, self-serving bias may have influenced some participants to be unwilling to report certain attitudes and feelings. This study examined sensitive topics, such as weight concerns and anti-fat attitudes, and it is possible that some participants did not want to give their honest responses. This limitation may have been displayed by the lack of correlation between implicit and explicit maternal anti-fat attitudes. Mothers in this sample had a moderate implicit anti-fat attitude overall, however their explicit anti-fat attitudes were not reflective of their implicit attitude. Therefore, it may be likely that the participants were either unwilling to report their explicit anti-fat attitude, or were unaware of their anti-fat attitude.

In regards to the Anti-Fat Attitudes (AFA) questionnaire, the Willpower subscale demonstrated low reliability ($\alpha=.26$), therefore findings from this subscale may not be credible. Also, typically the AFA questionnaire is scored on a scale of 0 (very strongly disagree) to 9 (very strongly agree), however the current research study scored the scale on a 1 (very strongly disagree) to 9 (very strongly agree). Therefore, scores from this item will not be directly comparable to other studies using the 0 (very strongly disagree) to 9 (very strongly agree) Likert scale format.

Other limitations of this study may be selection bias and the normalcy of weight concerns within the sport of gymnastics. Selection bias may have influenced those who did not have weight concerns to participate in the research study. Also, due to the strong emphasis on leanness within the aesthetic sport culture, it is possible that gymnasts did not report weight concerns because they are unaware that their weight concerns are a problem. Some gymnasts may not be

able to distinguish between “normal” concerns and “abnormal” concerns, which would make it difficult for participants to accurately report this issue. Lastly, the sample size was relatively small (30 mothers and 30 daughters) and there were missing BMI data for some of the participants. Perhaps if the sample size was larger and the data were complete for all participants, more significant findings could have been found.

Future Directions and Practical Applications:

Weight concerns are still prevalent within the aesthetic sport culture, and therefore it is important to continue to examine variables that may be associated with these concerns. Though this study did not find a relationship between gymnasts’ weight concerns and certain maternal attitudes and behaviors, perhaps a more representative sample is necessary to determine a potential relationship between these variables. If there is no relationship between these variables, even with a more representative sample, perhaps other variables should be evaluated. For example, coaches may have a strong influence on their gymnasts, so it is possible that these variables should be evaluated for gymnasts’ coaches, instead of their mothers. Another social influence that may play a role on the development of adolescent weight concerns is peer influence. Both in and out of sport, female adolescents are likely to be influenced by their peers’ values, comments, and opinions. Therefore, perhaps adolescents’ peers should be evaluated with gymnasts’ weight concerns as well.

Also, to increase generalizability and recruit a more representative sample, gymnasts from other states should be sampled to avoid selection biases. Another option would be to find a more complete sample that is representative of the gymnasts training at a given location. It is possible that current sample was reflective of healthy attitudes and parenting practices, thus

strong weight concerns were not present. A more diverse sample may produce more significant findings.

Findings from this study can be applied to athletes, their coaches, and their families for educational purposes. Firstly, gymnasts in this study reported high levels of autonomy support and athlete engagement with moderate weight concerns. Based on these results, mothers should be aware that autonomy-supportive behaviors could enhance their daughters' well-being within gymnastics and possibly decrease weight concerns of gymnasts. Coaches should support their gymnasts' autonomy as well by providing gymnasts with choices regarding their skills, routines, and practice to help them feel more in-control within the sport environment. This study also found a positive association between mothers' BMI and restrictive feeding practices for their daughters' weight. Due to the strict practice and competition schedule of gymnasts, gymnasts are likely to be healthy. Therefore, mothers with higher BMIs should not practice restrictive feeding behaviors out of fear of their daughters becoming overweight. Gymnasts need well-balanced, fulfilling meals to perform to the best of their ability, and their food should not be restricted.

Despite the lack of relationship between certain maternal attitudes and behaviors with gymnasts' weight concerns in this study, mothers should still be aware of these concerns and how gymnastics places a strong emphasis on leanness. If mothers are aware of this drive for thinness, perhaps they can effectively cope with daughters' weight concerns, if these concerns are present. Ideally, weight concerns of gymnasts will become less prevalent through the education of gymnasts, their coaches, and their parents.

Conclusions:

This study suggests that even though certain maternal attitudes and behaviors did not have a relationship with gymnasts' weight concerns and well-being in this sample, weight concerns are still prevalent within the aesthetic sport culture. Gymnasts in this sample reported moderate weight concerns, and it may take future research to discover where these concerns develop from. This study also found that BMI may have an association with implicit maternal anti-fat attitudes and certain behaviors, such as restrictive feeding practices. As an optimistic result, gymnasts reported high levels of autonomy support from their mothers both in and out of sport and an enhanced sense of sports-specific well-being. Perhaps other mothers can utilize these autonomy-supportive behaviors to help enhance their daughters' sport-specific well-being within their sport and home environment. Ultimately, researchers can expand upon these findings to educate gymnasts, coaches, and families with the intention of preventing weight concerns in the future

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.APPENDIX A:

INSTITUTIONAL REVIEW BOARD APPROVAL LETTER



EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board Office

4N-70 Brody Medical Sciences Building · Mail Stop 682

600 Moyer Boulevard · Greenville, NC 27834

Office 252-744-2914 · Fax 252-744-2284 · www.ecu.edu/irb

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB

To: [Jaclyn Baker](#)

CC:

[Deirdre Dlugonski](#)

[Jaclyn Baker](#)

Date: 2/13/2017

Re: [UMCIRB 16-002193](#)

Maternal Anti-Fat Attitudes and Performance-Related Weight Concerns of Gymnasts

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 2/11/2017 to 2/10/2018. The research study is eligible for review under expedited category #7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Assent-Template-12-17-years-of-age 12.14.2016.doc	Consent Forms
Demographic Questionnaire.docx	Surveys and Questionnaires
Maternal Anti-Fat Attitudes and Performance-Related Weight Concerns of Gymnasts	Study Protocol or Grant Application
Questionnaire Anti Fat Attitudes.docx	Surveys and Questionnaires
Questionnaire Comprehensive Feeding Practices.docx	Surveys and Questionnaires
Questionnaire Drive for Thinness.docx	Surveys and Questionnaires
Questionnaire Modified version of the Athlete Engagement Questionnaire.docx	Surveys and Questionnaires
Questionnaire Modified version of the ATHLETE Scale.docx	Surveys and Questionnaires
Questionnaire Mother's ATHLETE scale.docx	Surveys and Questionnaires
Questionnaire Perceived Autonomy Support Scale for Exercise Settings.docx	Surveys and Questionnaires
Questionnaire P-PASSteenagers.docx	Surveys and Questionnaires
QuestionnaireHarvard IAT online survey.docx	Surveys and Questionnaires
Recruitment Email Template.docx	Recruitment Documents/Scripts
UPDATED Informed Consent Document Template No More Than Minimal Risk 12 29 2016.doc	Consent Forms

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B:
INFORMED CONSENT

East Carolina University



Informed Consent to Participate in Research

Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: Maternal Anti-Fat Attitudes and Performance-Related Weight Concerns of Gymnasts

Principal Investigator: Jaclyn Baker (Person in Charge of this Study)

Faculty Supervisors: Deirdre Dlugonski, Ph.D.

Phone: (252) 328-5266

Email: dlugonskid@ecu.edu

Thomas Raedeke, Ph.D.

Phone: (252)737-1292

Email: raedeket@ecu.edu

Institution, Department or Division: ECU, Department of Kinesiology

Address: Minges Coliseum, Greenville NC

Telephone #: (908)268-3574 (Baker)

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why am I being invited to take part in this research?

The purpose of this research is to investigate maternal attitudes and behaviors and their daughter's performance-related weight concerns and well-being in gymnastics. You and your daughter are being invited to take part in this research because you have a daughter who is between the ages of 12-17 who participates on a competitive gymnastics team. The decision to take part in this research is you and your daughter's to make. Through this research, we hope to learn if certain maternal attitudes and behaviors are associated with gymnasts' weight concerns and sport well-being. If you and your daughter volunteer to take part in this research, you will be one of about 30 mother-daughter pairs to do so

.Are there reasons I should not take part in this research?

You should not participate in this research if you do not have a daughter between the ages of 12-17 who participate in competitive gymnastics (between levels 4-10).

What other choices do I have if I do not take part in this research?

You and your daughter can choose not to participate.

Where is the research going to take place and how long will it last?

The research will be conducted at your local gymnastics training facility. You and your daughter will need to come to the gymnastics facility one time during the study. The total amount of time you will be asked to volunteer for this study is approximately 30-minutes during your one scheduled visit.

What will I be asked to do?

You will be asked to complete the following surveys:

- Weight IAT survey to assess implicit anti-fat attitudes
- Anti-Fat Attitudes Questionnaire (AFA) to assess explicit anti-fat attitudes
- Drive for Thinness Scale to assess your own weight concerns
- The ATHLETE Scale-Drive for Thinness and Performance for Daughters to assess your perception of your daughter's weight concerns
- Comprehensive Feeding Practices Scale (CFPQ) to assess your feeding practices
- Your daughter will be asked to:
 - The ATHLETE Scale-Drive for Thinness and Performance to assess performance-related weight concerns
 - Perceived Parental Autonomy Support Scale (P-PASS) to assess perception of maternal autonomy-supportive behaviors
 - Perceived Autonomy Support Scale for Exercise Settings to assess sport-specific parental autonomy support
 - Athlete Engagement Questionnaire to assess gymnasts' sport-specific well-being

What might I experience if I take part in the research?

Participation in this study is completely voluntary and refusal to participate does not have any negative consequences. Although there are minimal risks associated with completing surveys, not all risks are predictable. If you or your daughter experience any emotional discomfort when answering the survey questions or want to stop completing the questionnaire for any reason, you will be free to withdraw your consent and discontinue participation at any time. To further minimize risk, the principal investigator and/or faculty supervisors will be able to meet with you to answer any questions or concerns you or your child may have regarding the survey items. The principal investigator will also provide resources on services available in your area.

Will I be paid for taking part in this research?

We will not be able to pay you for the time you volunteer while being in this study.

Will it cost me to take part in this research?

It will not cost you any money to be part of the research.

Who will know that I took part in this research and learn personal information about me?

All responses to survey items will be kept strictly confidential. Published results will not include data from individual surveys, rather results based on the entire sample. In addition to the researchers associated with this study, the University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing you and your daughter's welfare during this research and may need to see research records that identify you.

How will you keep the information you collect about me secure? How long will you keep it?

Paper copies of the data collection sheets will be stored in a locked cabinet in the PI's office (174 Minges). Data will be entered on to an electronic database and that will be stored on a password protected computer. All hard copies of the data will be stored for seven years and then destroyed.

What if I decide I don't want to continue in this research?

You and your daughter can stop at any time after it has already started. There will be no consequences if you stop and you will not be criticized. You will not lose any benefits that you normally receive.

Who should I contact if I have questions?

The people conducting this study will be able to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator at (908)268-3574. (Monday-Saturday, between 9:00AM-6:00PM).

If you have questions about your rights as someone taking part in research, you may call the Office of Research Integrity & Compliance (ORIC) at phone number 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of the ORIC, at 252-744-1971

I have decided I want to take part in this research. What should I do now?

The person obtaining informed consent will ask you to read the following and if you agree, you should sign this form:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By signing this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

Daughter's Name

Participant's Name (PRINT)	Signature	Date
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Person Obtaining Informed Consent: I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above, and answered all of the person's questions about the research.

Person Obtaining Consent (PRINT)	Signature	Date
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**APPENDIX C:
INFORMED ASSENT**

East Carolina University



Assent Form

Things You Should Know Before You Agree To Take Part in this Research

IRB Study #16-002193

Title of Study: Maternal Anti-Fat Attitudes and Weight Concerns of Gymnasts

Person in charge of study: Jaclyn Baker

Where they work: East Carolina University

Other people who work on the study: Deirdre Dlugonski, Ph.D.

Thomas Raedeke, Ph.D.

Study contact phone number: (908)268-3574 (Baker)

Study contact E-mail Address: bakerja09@students.ecu.edu

People at ECU study ways to make people's lives better. These studies are called research. This research is trying to find out if mothers' attitudes and behaviors are related to weight concerns of gymnasts.

Your parent(s) needs to give permission for you to be in this research. You do not have to be in this research if you don't want to, even if your parent(s) has already given permission.

You may stop being in the study at any time. If you decide to stop, no one will be angry or upset with you.

Why are you doing this research study?

The reason for doing this research is to find more information about maternal attitudes and behaviors and weight concerns of gymnasts.

Why am I being asked to be in this research study?

We are asking you to take part in this research because you are a competitive gymnast in between the ages of 12-17.

How many people will take part in this study?

If you decide to be in this research, you will be one of about sixty people taking part in it.

What will happen during this study?

You will complete surveys to participate in this study. It should take up to an hour to finish the surveys. This study will take place at your gymnastics training center and will last for one visit, up to an hour long.

Who will be told the things we learn about you in this study?

The Principal Investigator (Jaclyn Baker), and her faculty supervisors (Dr. Dlugonski and Dr. Raedeke).

What are the good things that might happen?

There is little chance you will benefit from being in this research.

What are the bad things that might happen?

Sometimes things we may not like happen to people in research studies. These things may even make them feel bad. These are called “risks.” These are the risks of this study: you may become more aware of performance-related concerns you have about your gymnastics experience. You may or may not have these things happen to you. Things may also happen that the researchers do not know about right now. You should report any problems to your parents and to the researcher.

Will you get any money or gifts for being in this research study?

You will not receive any money or gifts for being in this research study.

Who should you ask if you have any questions?

If you have questions about the research, you should ask the people listed on the first page of this form. If you have other questions about your rights while you are in this research study you may call the Institutional Review Board at 252-744-2914.

If you decide to take part in this research, you should sign your name below. It means that you agree to take part in this research study.

Sign your name here if you want to be in the study **Date**

Print your name here if you want to be in the study

Signature of Person Obtaining Assent **Date**

Printed Name of Person Obtaining Assent

APPENDIX D:
QUESTIONNAIRES FOR MOTHERS

Demographics:

Please complete the following information about yourself (#1-8) and your daughter (#9-11).

1. Age _____

2. Height (inches) _____

3. Weight (pounds) _____

4. What is your current employment status?

- Full time - at least 35 hours/week
- Part time - less than 35 hours/week
- Other, please explain: _____

5. Please describe your occupation:

6. Annual Household Income

- Less than \$5,000
- \$5,001-10,000
- \$10,001-15,000
- \$15,001-24,999
- \$25,000-34,999
- \$35,000-49,999
- \$50,000-74,999
- \$75,000-99,999
- \$100,000 or greater
- I choose not to answer

7. Education

- Less than 7th grade
- 9th grade (Jr. High)
- Partial High School
- High School Graduate

- 1-3 years of College
- College/University Graduate
- Master's Degree
- PhD or Equivalent
- I choose not to answer

8. Please describe your sport background (i.e. athlete, non-athlete, former gymnast, etc.)

9. Your daughter's age

10. Your daughter's height (inches)

11. Your daughter's weight (pounds)

ANTI-FAT ATTITUDES (AFA) QUESTIONNAIRE

Instructions: Rate how strongly you agree or disagree with the following statements.

	Very strongly disagree	Strongly disagree	Disagree	Disagree somewhat	Unsure	Agree somewhat	Agree	Strongly agree	Very strongly agree
1. Few of my friends are overweight or obese.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I tend to think that people who are overweight are a little untrustworthy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Although some overweight people must be intelligent, generally I think they tend not to be.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I have a hard time taking overweight people too seriously.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Fat people make me somewhat uncomfortable.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. If I were an employer, I might avoid hiring an overweight person.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I dislike people who are overweight or obese.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. I feel disgusted with myself when I gain weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. One of the worst things that could happen to be would be if I gained 22 lbs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I worry about becoming fat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

ANTI-FAT ATTITUDES (AFA) QUESTIONNAIRE

	Very strongly disagree	Strongly disagree	Disagree	Disagree somewhat	Unsure	Agree somewhat	Agree	Strongly agree	Very strongly agree
11. People who weight too much could lose at least some part of their weight through a little exercise.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. Some people are overweight because they have no willpower.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. It is people's own fault if they are overweight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

COMPREHENSIVE FEEDING PRACTICES QUESTIONNAIRE

Instructions: Rate how strongly you agree or disagree with the following statements

	Disagree	Slightly disagree	Neutral	Slightly agree	Agree
1. Most of the food I keep in the house is health.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. I keep a lot of snack (potato chips, Doritos, cheese puffs, etc.) foods in my house.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. A variety of healthy foods are available to my child at each meal served at home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. I keep a lot of sweets (candy, ice cream, cake, pies, pastries, etc.) in my house.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. If I did not guide or regulate my child's eating, she would eat too much of her favorite foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. If I did not guide or regulate my child's eating, she would eat too many junk foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. I have to be sure that my child does not eat too much of her favorite foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8. I have to be sure that my child does not eat too many sweets (candy, ice cream, cake, pastries, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9. I have to be sure that my child does not eat too many high-fat foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10. I encourage my child to eat less so she won't get fat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

COMPREHENSIVE FEEDING PRACTICES QUESTIONNAIRE

	Disagree	Slightly disagree	Neutral	Slightly agree	Agree
11. I give my child small helpings at meals to control her weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12. If my child eats more than usual at one meal, I try to restrict her eating at the next meal.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
13. A variety of healthy foods are available to my child at each meal served at home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14. I restrict the food my child eats that might make her fat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. There are certain foods my child shouldn't eat because they will make her fat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I don't allow my child to eat between meals because I don't want her to get fat.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I often put my child on a diet to control her weight.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

DRIVE FOR THINNESS QUESTIONNAIRE

Instructions: Read each item carefully. Using the scale below, please select the number that best describes YOU and put that number in the blank provided.

- 1.= Never
- 2.= Almost Never
- 3.= Sometimes
- 4.= Fairly Often
- 5.= Always

_____ 1. I eat sweets and carbohydrates without feelings nervous.

_____ 2. I think about dieting.

_____ 3. I feel extremely guilty about overeating.

_____ 4. I am terrified of gaining weight.

_____ 5. I exaggerate or magnify the importance of weight.

_____ 6. I am preoccupied with the desire to be thinner.

_____ 7. If I gain a pound, I worry that I will keep gaining.

ATHLETE SCALE

Instructions: Read each item carefully. You will answer these questions based on how you perceive your **daughter's** drive for thinness and performance in gymnastics. Please select the number that best describes your perception of your daughter's gymnastics experience by putting the number in the blank provided.

1.= Strongly disagree

2.= Disagree

3.= Neutral

4.= Agree

5.= Strongly agree

_____ 1. My daughter would be more successful in gymnastics if her body looked better.

_____ 2. I often wish my daughter was leaner so she could perform better.

_____ 3. Because of gymnastics, my daughter is very careful not to gain weight.

_____ 4. My daughter is trying to lose weight for gymnastics.

_____ 5. My daughter trains more than is required for gymnastics to burn more calories.

_____ 6. I restrict my daughter's diet even when gymnastics is not in season.

_____ 7. I spend a lot of time thinking about how many calories my daughter has burned during practice or training each day.

_____ 8. When practice is shorter or less intense than usual, my daughter will compensate by exercising on her own or by eating less.

_____ 9. I feel guilty when my daughter's team is tapering before a big event.

_____ 10. I do not feel any pressure to change my daughter's diet.

_____ 11. My daughter is able to eat what she would like regardless of what her teammates are eating.

IMPLICIT ATTITUDES TEST

Score: _____

APPENDIX E:
QUESTIONNAIRES FOR DAUGHTERS

ATHLETE SCALE

Instructions: Read each question carefully. You will answer these questions based on what you think about your drive for thinness and performance in gymnastics. Please select the number that best describes your gymnastics experience by putting the number in the blank provided.

- 1.= Strongly disagree
- 2.= Disagree
- 3.= Neutral
- 4.= Agree
- 5.= Strongly agree

- _____ 1. I would be more successful in gymnastics if my body looked better.
- _____ 2. I often wish I were leaner so I could perform better.
- _____ 3. Because of gymnastics, I am very careful not to gain weight.
- _____ 4. I am trying to lose weight for gymnastics.
- _____ 5. I train more than is required by gymnastics to burn more calories.
- _____ 6. I restrict my diet even when gymnastics is not in season.
- _____ 7. I spend a lot of time thinking about how many calories I have burned during practice or training each day.
- _____ 8. When practice is shorter or less intense than usual, I will compensate either by exercising on my own or by eating less.
- _____ 9. I feel guilty when my team is tapering before a big event.
- _____ 10. I do not feel any pressure to change my diet.
- _____ 11. I am able to eat what I would like regardless of what my teammates are eating

YOUR PERCEPTION OF YOUR MOTHER

Please answer the following questions about your mother while you were growing up.

Using the scale below, please indicate the extent to which you agree with each of the statements regarding your mother's behaviors.

Do not agree at all 1	Hardly agree 2	Slightly agree 3	Somewhat agree 4	Agree 5	Strongly agree 6	Very strongly agree 7
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BE CAREFUL, the order of responses for your mother changes for each item.

WHEN I WAS GROWING UP ...

1. My mother gave me many opportunities to make my own decisions about what I was doing.	Mother	1	2	3	4	5	6	7
2. When my mother asked me to do something, she explained why they wanted me to do it.	Mother	1	2	3	4	5	6	7
3. When I refused to do something, my mother threatened to take away certain privileges in order to make me do it.	Mother	1	2	3	4	5	6	7
4. My point of view was very important to my mother when she made important decisions concerning me.	Mother	1	2	3	4	5	6	7
5. My mother refused to accept that I could want simply to have fun without trying to be the best.	Mother	1	2	3	4	5	6	7
6. When my mother wanted me to do something differently, they made me feel guilty.	Mother	1	2	3	4	5	6	7
7. My mother encouraged me to be myself.	Mother	1	2	3	4	5	6	7
8. Within certain limits, my mother allowed me the freedom to choose my own activities.	Mother	1	2	3	4	5	6	7
9. When I was not allowed to do something, I usually knew why.	Mother	1	2	3	4	5	6	7
10. I always had to do what my mother wanted me to do, if not, they would threaten to take away privileges.	Mother	1	2	3	4	5	6	7
11. My mother believed that, in order to succeed, I always had to be the best at what I did.	Mother	1	2	3	4	5	6	7
12. My mother made me feel guilty for anything and everything.	Mother	1	2	3	4	5	6	7

13. My mother was able to put herself in my shoes and understand my feelings.	Mother	1	2	3	4	5	6	7
14. My mother hoped that I would make choices that corresponded to my interests and preferences regardless of what theirs were.	Mother	1	2	3	4	5	6	7
15. When my mother wanted me to do something, I had to obey or else I was punished.	Mother	1	2	3	4	5	6	7
16. My mother was open to my thoughts and feelings even when they were different from hers.	Mother	1	2	3	4	5	6	7
17. In order for my mother to be proud of me, I had to be the best.	Mother	1	2	3	4	5	6	7
18. When my mother wanted me to act differently, she made me feel ashamed in order to make me change.	Mother	1	2	3	4	5	6	7
19. My mother made sure that I understood why they forbid certain things.	Mother	1	2	3	4	5	6	7
20. As soon as I didn't do exactly what my mother wanted, she threatened to punish me.	Mother	1	2	3	4	5	6	7
21. My mother used guilt to control me.	Mother	1	2	3	4	5	6	7
22. My mother insisted that I always be better than others.	Mother	1	2	3	4	5	6	7
23. When I asked why I had to do, or not do, something, my mother gave me good reasons.	Mother	1	2	3	4	5	6	7
24. My mother listened to my opinion and point of view when I disagreed with her.	Mother	1	2	3	4	5	6	7

PERCEIVED AUTONOMY SUPPORT SCALE FOR EXERCISE SETTINGS (PASSES)

Instructions: Read each question carefully. Please select the number that best describes how your mother supports or does not support your feelings and actions in gymnastics.

- 1.= Strongly disagree
- 2.= Disagree
- 3.= Somewhat disagree
- 4.= Neutral
- 5.= Somewhat agree
- 6.= Agree
- 7.= Strongly agree

_____ 1. I feel that my mother provides me with choices, options, and opportunities about whether to do gymnastics.

_____ 2. I think that my mother understands why I choose to do gymnastics.

_____ 3. My mother displays confidence in my ability to do gymnastics.

_____ 4. My mother encourages me to do gymnastics.

_____ 5. My mother listens to me about my gymnastics.

_____ 6. My mother provides me with positive feedback when I do gymnastics.

_____ 7. I am able to talk to my mother about the gymnastics I do.

_____ 8. My mother makes sure I understand why I need to do gymnastics.

_____ 9. My mother answers my questions about doing gymnastics.

_____ 10. My mother cares about the gymnastics I do.

_____ 11. I feel I am able to share my experiences in gymnastics with my mother.

_____ 12. I trust my mother's advice about the gymnastics I do.

ATHLETE ENGAGEMENT QUESTIONNAIRE

Instructions: Read each question carefully. Please select the number that best describes your gymnastics experience.

- 1.= Strongly disagree
- 2.= Disagree
- 3.= Neutral
- 4.= Agree
- 5.= Strongly agree

- _____ 1. I believe I am capable of accomplishing my goals in gymnastics.
- _____ 2. I feel capable of success in gymnastics
- _____ 3. I believe I have the skills/technique to be successful in gymnastics
- _____ 4. I am confident in my abilities in gymnastics
- _____ 5. I am dedicated to achieving my goals in gymnastics
- _____ 6. I am determined to achieve my goals in gymnastics
- _____ 7. I am devoted to gymnastics
- _____ 8. I want to work hard to achieve my goals in gymnastics
- _____ 9. I feel energized when I participate in gymnastics
- _____ 10. I feel energetic when I participate in gymnastics
- _____ 11. I feel really alive when I participate in gymnastics
- _____ 12. I feel mentally alert when I participate in gymnastics
- _____ 13. I feel excited about gymnastics
- _____ 14. I am enthusiastic about gymnastics
- _____ 15. I enjoy gymnastics
- _____ 16. I have fun in gymnastics

APPENDIX F:
RECRUITMENT EMAIL

Recruitment Email Template:

Dear (Insert Name Here),

I am contacting you today in regards to a research study that is being conducted by one of my long-term coaches, Jackie Baker. Jackie is a second year graduate student at East Carolina University, where she is studying Kinesiology with a concentration in Sport and Exercise Psychology. Jackie has been a gymnastics instructor for ten years now, six of those years being a Rose's staff member, and was a competitive gymnast for fifteen years at her gymnastics facility located in New Jersey.

Jackie has requested my assistance with her Master's Thesis Project because she is interested in recruiting both mothers and daughters (who participate in gymnastics) for her research study. The purpose of the research study is to examine certain maternal attitudes and behaviors with gymnast's performance-related attitudes, behaviors, and overall well-being. The goal of this research is to provide more information in regards to how some maternal attitudes and behaviors may influence their daughter who participates in gymnastics. Overall, the focus is gymnasts' well-being and how we can use this information to help enhance it.

In order to complete her project, Jackie is looking for at least 30 mothers and daughters to participate in the study. The gymnasts must be between the ages of 12-17 and be on a competitive gymnastics team (levels 4-10, or Silver-Diamond for the Excel program). To participate, all the participants will have to do is come in to your local facility for one visit, and complete a series of surveys. Survey completion should take no longer than one hour of your time. Jackie will administer and collect the surveys, and will be available for any and all questions and concerns. All information will be confidential and protected by an identification number and password-locked devices.

Jackie will contact you shortly to provide more details and to schedule a visit at your facility based on your approval. Any and all help would be greatly appreciated. Please feel free to contact Jackie with questions and/or concerns at any time. Her phone number is: (908)268-3574. Thank you!

Sincerely,

(Owners Name Here)

