TAKING THE FOCUS OFF OF THE INDIVIDUAL: COACH CREATED MOTIVATIONAL CLIMATES AND DISORDERED EATING IN NCAA DIVISION I FEMALE RUNNERS

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Introduction

Disordered eating is a significant problem for women in college (Anderson, 2018). According to Anderson (2018), disordered eating is, "…a range of irregular eating behaviors that may or may not warrant a diagnosis of a specific eating disorder" (para. 2). Thomas (2013) found that almost a third of female undergraduate students screened positively for an eating disorder and that 90% of the first-year female undergraduates worried about the 'freshman 15'. While ideas like the 'freshman 15' might seem harmless, disordered eating is a serious health concern. Research shows disordered eating can lead to significant side effects such as cardiorespiratory complications and even sudden death (Jáuregui-Garrido & Jáuregui-Lobera, 2012). With this in mind, although participation in sport has many health benefits, female collegiate athletes can be at risk because of the significant prevalence of disordered eating that has been connected to them (Beals & Hill, 2006; Greenleaf et al. 2009). Even though these women were at risk before athletic participation in college, it has been found that certain aspects of the athletic environment can also make athletes more vulnerable to disordered eating (Arthur-Cameselle et al., 2017; Arthur-Cameselle & Quatromoni, 2011; Stirling & Kerr, 2012).

Many studies have been conducted that specifically examine factors that lead to disordered eating in female athletes (Arthur-Cameselle et al., 2017; Arthur-Cameselle & Quatromoni, 2011; Stirling & Kerr, 2012). While there were some factors that were not necessarily sport specific such as perfectionism, low self-esteem, and lack of control, there were also factors that are directly related to sport (Arthur-Cameselle et al., 2017; Arthur-Cameselle & Quatromoni, 2011; Stirling & Kerr, 2012). For instance, in a qualitative study conducted by Stirling and Kerr (2012), the authors found that hyper-competitiveness and perceived performance advantage were noted by female athletes as vulnerabilities that they believe affected

their disordered eating. It was also found by Coker-Cranney and Reel (2015) that coach-related weight pressure and coach-athlete relationships also affected disordered eating habits in some female athletes depending on the sport. Although the number of studies focusing on female athlete disordered eating factors is extensive, most studies have focused on how coaches directly affect disordered eating with weight related comments or how the athlete individually makes themselves vulnerable, rather than how coaches indirectly contribute to disordered eating through the sporting environment they create, especially in terms of the athlete's perceived coach created motivational climates. Additionally, it has been found that certain female athletes are more at risk than others to adapt disordered eating based on the sport they perform, such as gymnasts, dancers, and runners (de Oliveira et al., 2017; Kong & Harris, 2015; Picard, 1999). However, most of the studies are just focused on gymnasts and dancers (Cardoso et al., 2021; de Bruin et al., 2009; Kong & Harris, 2015; Nordin-Bates et al., 2016). The purpose of this study is to explore the relationship between NCAA Division I female runners' coach created motivational climate and the runner's vulnerability to disordered eating habits.

Literature Review

Current Research

Motivational climates are a significant aspect of the sport environment that coaches create for their athletes. It has been found that these climates can affect anything from perceived competence to self-efficacy and activity enjoyment, thus showing a broad range of effects (Kavussanu & Roberts, 1996). In spite of this, there is very little research that has been conducted that directly connects perceived coach created motivational climates and disordered eating in athletes, although both are heavily studied topics. Only one study examining the relationship between these two variables could be found, in which de Bruin, et al. (2009) focused on how perceived coach created motivational climate, as well as athlete goal orientations, related to initiating factors of disordered eating in gymnasts and dancers. Miller and Fry (2018) examined how perceived motivational climates related to body esteem and social physique anxiety. Scoffer et al. (2012) attempted to evaluate the relationship between athlete goal orientations and disordered eating behaviors. Although these studies provide insightful findings, other studies that examine the role that sport performance pressure, perfectionism and self-esteem play in an athlete's experience lay the foundation for this research.

Sport Performance Pressure

Due to the significant prevalence of disordered eating within female athletes, researchers have begun to focus on how the sport environment negatively impacts an athlete's eating (Beals & Hill, 2006; Greenleaf et al. 2009). Specifically, sport performance pressure can be considered in two different ways. First, it has been found that female athletes believe that in order to improve in their sport performance, they must look a certain way or be a certain body build (Arthur-Cameselle & Quatromoni, 2011; Arthur-Cameselle et al., 2017; Stirling & Kerr, 2012).

This belief was suggested in the study conducted by Arthur-Cameselle et al. (2017) when one of their participants, who was a female athlete, mentioned, “It never was intended to be an eating problem. . .it came from such a genuine hard-working place. It sounds weird, but it really was just to get better at soccer” (p. 208). In this specific example, the belief that a soccer player needs to be fast and have good agility to be successful, which can only happen if the player is thin, comes to fruition. Similarly, in the study conducted by Stirling and Kerr (2012), “image related advantages” in their sport were highlighted by participants as a vulnerability that led to their eating disorder (p. 267). In this case, the female athletes were in sports, such as gymnastics or dance, in which successful performance corresponds with a certain score that some view as dependent on how thin they look.

The second way in which sport performance can be highlighted in the study of disordered eating is through the idea that elite athletes, or athletes at higher levels of competition, are at a higher risk to develop disordered eating (Kong & Harris, 2015; Picard, 1999). As athletes move into higher levels of competition, their performance becomes more high stakes due to things such as maintaining a scholarship or getting paid a salary, which leaves little room for error. On top of this, the pool of competitors that these athletes are competing against for a spot on a roster also becomes more skilled. This can make personal performance even more important. In order to be successful, an athlete must focus on their own performance and how to become better, which can create pressure for that athlete. A specific finding in which this connection became clear was in the study conducted by Picard (1999) which found that Division I athletes had a more significant drive for thinness than Division III athletes, but the Division I non-athletes and Division III non-athletes did not have this relationship. This suggests that the level of competition may play a role in the disordered eating habits for these athletes, rather than the individual institutions.

The current study focuses on competitive female collegiate runners due to the unique performance expectations that may influence runners to be more susceptible to disordered eating. Overall, researchers have found that athletes in sports that are defined as 'lean' such as gymnastics, dance, and running where performance requirements include keeping a lean physique, are more susceptible to disordered eating than sports that would be defined as 'non-lean' such as basketball and softball (de Oliviera et al., 2017; Kong & Harris, 2015; Picard, 1999). These findings may emphasize the importance of sport performance pressure as a contribution to disordered eating in female athletes due to the fact that in lean sports, athletes are expected to look a certain way in order to successfully compete. When discussing competitive runners in particular, a participant in the study conducted by Stirling and Kerr (2012) stated, "I think a lot of people just compare. Like you see the other cross-country runners, and they're so skinny-you just wanna do whatever you can to be better than them" (p. 269). With this in mind, the dominant narrative in competitive female running environments can be that thinness and successful performance go hand in hand which can be detrimental. Along with this, the motivational climates that coaches create can add to this narrative by emphasizing performance and winning over everything else.

The motivational climate a coach creates in a sporting environment can play a significant role in how an athlete understands success and the importance of performance. According to Duda (2001), a motivational climate is an "…individuals' composite views concerning the situationally emphasized goal structures operating in an achievement setting" (p. 144). Motivational climate can be broken down into two specific types: task-involving and ego-involving. In a task-involving motivational climate, the emphasis for athletes is on personal growth and effort while thinking of achievement in sport (Duda & Balaguer, 2007). While ego-

involving motivational climates emphasize the importance of performance, specifically performing better than others (Duda & Balaguer, 2007). For example, if a coach chooses to implement an ego-involving motivational climate, an athlete might feel more inclined to adapt disordered eating habits in order to help define her success by comparing her performance with others. Ego-involving athletes may be willing to do whatever it takes, even putting their health at risk, to perform successfully and compare favorably to everyone. Disordered eating may even be viewed as a form of training for some female runners (Arthur-Cameselle & Quantrmoni, 2011). In addition, a coach created motivational climate that emphasizes perfectionism can also be detrimental to an athlete's healthy eating habits.

Perfectionism

Perfectionism plays a significant role in disordered eating. Specifically for female athletes, it has been found that perfectionism is a vulnerability related to onset of eating disorders (Arthur-Cameselle & Quantrmoni, 2011; Arthur-Cameselle et al., 2017; Schwarz et al., 2005; Stirling & Kerr, 2012). Whether the study conducted was qualitative or quantitative the results remained the same and truly emphasized the importance of perfectionism in female athlete disordered eating. It was even found by Krane et al. (2001) that perfectionism can predict social physique anxiety which can be connected to disordered eating as well. Overall, it seems as though most female athletes believe two things when it comes to perfectionism feeding into their disordered eating. First of all, they believe that their general need to be perfect made them feel like they needed to look a certain way or fit a certain body build (Arthur-Cameselle & Quantrmoni, 2011; Arthur-Cameselle et al., 2017; Stirling & Kerr, 2012). This belief became especially clear for female athletes in comparison to non-athletes, in the study conducted by Stirling and Kerr (2012) in which one of their participants stated,

> I think the major difference is that someone who's a student athlete is usually somewhat of a perfectionist. It's in the way you play, you always want to be the best. My personality allows me to accomplish certain things [in sport], but it also makes me want to look a certain way (p. 268).

From here, one can see that female athletes specifically have a general perfectionism, that may be related to the nature of participating in sport, that leads them to want to have the 'perfect' body.

The second common belief that was found throughout the studies with female athletes was that in order to feel a sense of accomplishment, they needed to see how many pounds they could lose once they decided to lose weight (Arthur-Cameselle & Quantrmoni, 2011; Stirling & Kerr, 2012). For clarity on this belief, a participant in the study conducted by Arthur-Cameselle and Quantrmoni (2011) stated, "The less I could eat through a day, the more successful I am. That was my thinking . . . if I could make it to dinner and just eat salad at dinner, oh that was great" (p. 9). With this in mind, it seems as though for female athletes, losing weight just became another number-based goal that they felt they needed to accomplish in order to be personally successful. As an athlete, these types of goals where one is trying to reach a certain measurement are relatively common and if the idea of success is misconstrued in the athlete's environment, such as in the example above, this can be detrimental to the athlete. Building off of this idea, a fear of failure or not accomplishing these goals also became a significant finding in the study conducted by Stirling and Kerr (2012) in which one of their participants noted, "Within myself I have set standards, so if my standard was to eat this today and I ate more that and fell short of that standard, I failed. I'm a failure . . . for me success in a day means achieving this [in training] and not eating that" (p. 268). That being said, how a female athlete perceives the ideas of both

success and failure in their athletic environment could be key contributors to disordered eating for them. Moving forward, while these findings do angle perfectionism as an internal vulnerability that each athlete deals with on their own, it could be argued that it is actually more externally related through the idea of perceived motivational climates that coaches create.

Simply put, perfectionism is a commonly studied consequence of perceived motivational climates. While there still are a lot of different questions that researchers have about this relationship, there are studies that have been conducted with athletes that bring to light two important ideas. First of all, while there is a relationship between motivational climates and perfectionism, depending on the study, different types of motivational climates are correlated with perfectionism. For instance, in a study done by de Bruin et al. (2009) they found that ego-involving motivational climates had a moderate relationship with perfectionism, while in a study conducted by Nordin-Bates et al. (2014), they found that task-involving motivational climates predicted higher perfectionistic striving while the ego-involving climates did not. This may have to do with the fact that some athletes' perfectionism is more internally related while others is more externally based, but within these studies it is unclear. It might seem as though there isn't a strong enough connection to come to the conclusion that a certain perceived motivational climate may affect perfectionism in an athlete. That is until one takes a deeper look into the multidimensional nature of perfectionism, which makes all the difference.

The second idea that came to light is that studies have found that motivational climates can be an important factor in whether an athlete has maladaptive or adaptive perfectionism (Appleton et al., 2011; Dunn et al. 2002; Lemyre et al., 2008; Ommundsen et al., 2005). The studies mentioned prior did not take this into consideration, which might be why the results varied. Overall, it was found that ego-involving motivational climates had a positive relationship

with maladaptive perfectionism while task-involving motivational climates had a positive relationship with adaptive perfectionism in athletes. The one exception to this was in the study by Dunn et al. (2002) when a positive relationship was found between ego-involving goal orientations of athletes and maladaptive perfectionism. However, it has been found that motivational climates can dictate an athletes' goal orientations as explained by Duda and Balaguer (2007), which is why this study was mentioned. Due to these findings, it could be said that due to the fact that ego-involving motivational climates emphasize comparative performance over anything else, athletes in these environments believe that they need to perform without a flaw in order to succeed and could react poorly if this does not occur because of the standards set for them. Since it is known that ego-involving motivational climates can contribute to an athlete's maladaptive perfectionism, which is a vulnerability of disordered eating in female athletes, a connection between coach created motivational climates and female athlete disordered eating can be made. In a similar fashion, athlete low self-esteem can be used to connect the two concepts.

Low Self-Esteem

Low self-esteem has continued to be found in studies with a focus on disordered eating factors. For female athletes in particular, it has been made clear through previous research that low self-esteem is a risk factor for disordered eating (Arthur-Cameselle & Quatromoni, 2011; Milligan & Pritchard, 2006; Petrie et al., 2009; Pritchard et al., 2007). Throughout this literature, two different perceptions of low self-esteem arose which are important to keep in mind. Overall, it was found that the self-esteem that athletes are feeling can be in a more general sense or in a body specific sense. With that being said, in the research already conducted, it was found that general low self-esteem was a factor that was related to disordered eating in female athletes

(Arthur-Cameselle & Quatromoni, 2011; Milligan & Pritchard, 2006; Petrie et al., 2009; Pritchard et al., 2007). The authors decided to use the Rosenberg Self-Esteem Scale to test the participants levels of self-esteem, which is used to measure general self-esteem (Rosenberg, 1965). Thus, when the researchers found that the variable of low self-esteem was significant to their participant's disordered eating, they were really discussing general low self-esteem rather than sport specific or body self-esteem (Milligan & Pritchard, 2006; Petrie et al., 2009; Pritchard et al., 2007). Although this was the dominant finding, in the study conducted by Arthur-Cameselle and Quatromoni (2011), their participants mentioned during their interviews that their low self-esteem negatively affected their body image, with one of them even mentioning how she compared herself to others because of it by saying, "I was not necessarily the fattest, but the other girls on the team were really skinny" (p. 7). With each of these types of low self-esteem in mind that act as vulnerabilities of disordered eating for female athletes, the fact that perceived motivational climates created by an athlete's coach can build or hinder self-esteem creates a significant connection moving forward.

It has been found by previous research that different perceived motivational climates are corelated with different amounts of self-esteem. Generally, it has been found that ego-involving climates have a significant relationship with low self-esteem specifically (de Bruin et al., 2009; Reinboth & Duda, 2004; Ryska, 2001). In particular, there are two different ways that these findings came about. First of all, a majority of the studies simply found a direct connection between ego-involving motivational climates and low self-esteem (de Bruin et al., 2009; Reinboth & Duda, 2004). Notably, these researchers decided to use scales that measured general self-esteem; however, a connection can be made with body image specific self-esteem as well. In particular, when body comparisons are involved, like in the experience mentioned previously in

the study conducted by Arthur-Cameselle and Quatromoni (2011), the connection becomes clear. In a perceived ego-involving motivational climate, in order to consider themselves as successful, an athlete relies on their performances being better than everyone else. Comparison is a key component of a perceived ego-involving motivational climate in order to keep up with competition and if an athlete believes that body shape is an important component of competition then low body self-esteem may occur.

The second way that the connection between perceived ego-involving motivational climates and low self-esteem occurred was through the use of athlete goal orientations (Ryska, 2001). As mentioned previously, it was found that perceived motivational climates can dictate an athletes' goal orientations as explained by Duda and Balaguer (2007). Ryska (2001) found that ego orientations, which can be dictated by perceived ego-involving motivational climates, were related to low self-esteem. Taking all of these findings into consideration, since it is known that ego-involving motivational climates can contribute to an athlete's low self-esteem, which is a vulnerability of disordered eating in female athletes, a connection between coach created motivational climates and female athlete disordered eating can be made. Now that a significant relationship between perceived motivational climates and disordered eating has been made in the three previous sections, a focus on which athletes should be in this study is explored in more depth.

Overlooking Runners

As was mentioned previously, athletes in different sports are more at risk for disordered eating than others. In terms of which sports specifically are included in this group, most studies look at aesthetic sports such as gymnastics and dance, endurance sports such as running and rowing, and some studies even include sports with weight limitations such as wrestling (de

Oliveira et al., 2017; Kong & Harris, 2015; Picard, 1999). The dominant narrative here that is important to note is that since there is such a significant relationship between their performances and a certain body weight, they are more at risk of taking part in disordered eating. With an emphasis on aesthetic and endurance athletes in the studies mentioned previously, it would make sense if these athletes were the dominant focus when looking at studies that want to explore disordered eating habits in female athletes; however aesthetic sports on their own are the main focus in the literature right now that dives deeper into this topic. For some, this statement may seem incorrect because there are studies that focus on female runners' disordered eating specifically in most library databases, but these studies overwhelmingly focus on one thing: the Female Triad (Barrack et al., 2021; Pollock et al., 2010; Rauh et al., 2010a, 2010b; Thompson, 2007). Therefore, the overwhelming literature about female runners and disordered eating focus on just the prevalence of disordered eating along with osteoporosis and menstrual dysfunction rather than factors that contribute to certain eating habits or female runners' personal experiences with disordered eating. This has left a gap in the current literature. Contrary to this however, studies about female aesthetic athletes and disordered eating have been proven to be more in-depth and applicable for these athletes moving forward.

A search of the literature found that gymnasts, dancers and figure skaters are heavily researched (Cardoso et al., 2021; de Bruin et al., 2009; Kong & Harris, 2015; Nordin-Bates et al., 2016; Scoffier et al., 2012). These studies show a wide array of information about these types of athletes' disordered eating and how to help them moving forward. Whether that is in terms of how their motivational climates and goal orientations affect their disordered eating or just initiating factors of the eating habits in general and predictors. This is not to say that there haven't been interesting findings related to competitive female runners in more general studies of

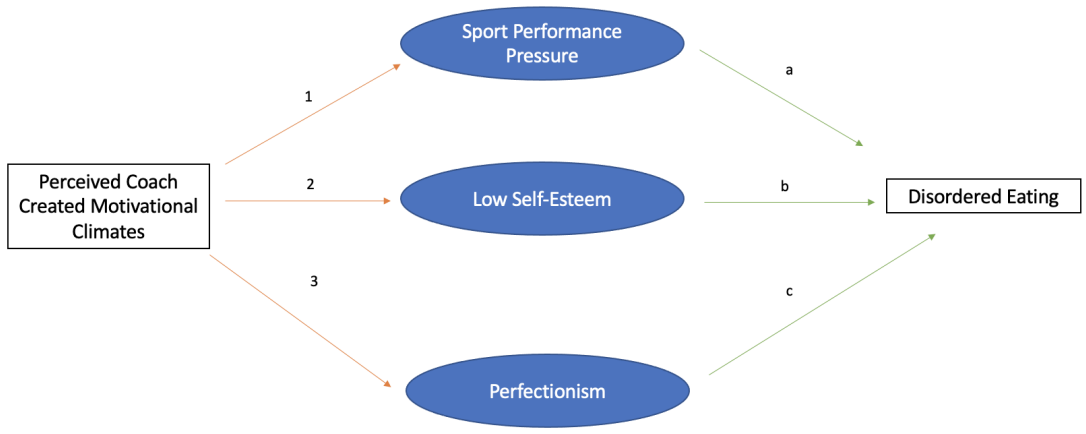
disordered eating. For instance, in a study conducted by Arthur-Camesele and Quatromoni (2011) one of the participants who was a competitive female runner made an interesting connection between sport performance pressure, media manipulation, and disordered eating specifically when she stated, “I had just started running more intensely, was following the media knowledge at the time about fat free foods and what was healthy… I just wanted to be a good runner” (p. 8). With this in mind, filling this gap created by an overemphasis on aesthetic athletes is explained.

Integration of Previous Concepts

The findings that were previously mentioned in this review lay the foundation for this study. This research proposes there is a connection between perceived coach created motivational climate and disordered eating. Examining the influence of sport performance pressure, perfectionism, and low self-esteem (as seen in Figure 1) is beyond the scope of this study, however these concepts were included in the review of literature to demonstrate the possible ways these variables are connected. Specifically, it is hypothesized that female NCAA Division I runners that perceive their coach created motivational climate as more ego-involving will be more at risk to adapt disordered eating compared to athletes that perceived their coach created motivational climate as more task-involving.

Figure 1

Connection Between Two Variables of Study



1: (Duda & Balaguer, 2007; Roberts, 2021)
2: (de Bruin et al., 2009; Reinboth & Duda, 2004; Ryska, 2001)
3: (Appleton et al., 2011; de Bruin et al., 2009; Dunn et al., 2002; Lemyre et al., 2008; Nordin-Bates et al., 2014; Ommundsen et al., 2005)
a: (Arthur-Cameselle & Quatromoni, 2011; Arthur-Cameselle et al., 2017; Kong & Harris, 2015; Picard, 1999; Stirling & Kerr, 2012)
b: (Arthur-Cameselle & Quatromoni, 2011; Milligan & Pritchard, 2006; Petrie et al., 2009; Pritchard et al., 2007)
c: (Arthur-Cameselle & Quatromoni, 2011; Arthur-Cameselle et al., 2017; Krane et al., 2001; Schwartz et al., 2005; Stirling & Kerr, 2012)

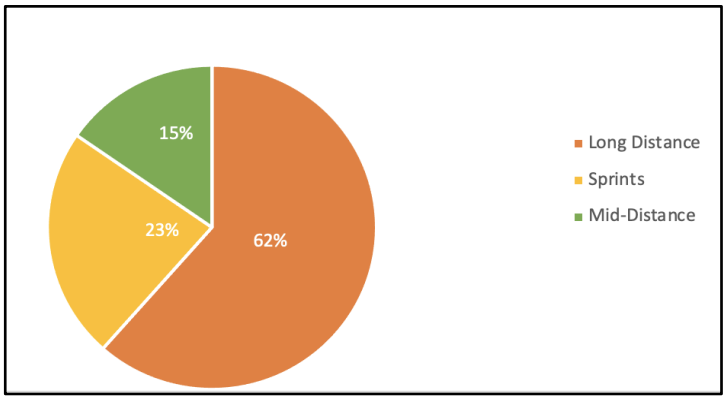
Methods

The purpose of this study is to explore the relationship between NCAA Division I female runners' coach created motivational climate and the runner's vulnerability to disordered eating habits.

Participants

NCAA Division I female runners from universities throughout the Midwestern United States, either in cross country or track events that involve running, were selected as participants (n = 23). The ages of these participants ranged from 18 to 22, and they competed in various events, although long distance athletes were represented the most in the sample (as seen in Figure 2). NCAA Division I athletes were selected specifically, due to the findings in the study conducted by Picard (1999) in which Division I female athletes were found to be most at risk for developing disordered eating compared to Division III female athletes and female non-athletes. The average years of competitive running for the group was 9.02 (SD = 2.12, range 5-13) and the average years of running at the Division I level for the group was 2.43 (SD =1.32, range 0.5-4.5). Similarly, to the study conducted by de Bruin et al. (2009), participants were not participating in any other competitive sport activities. It is also important to note that all of the participants self-identified as White, except one athlete who identified as Black.

Figure 2
Distribution of Participant Running Events



To recruit these athletes for participation in the study, three different approaches were utilized. First, members of a Midwestern University Women's Track Team sent out the survey to both their own teammates and the athletes they compete against with the use of messaging. Then the survey was posted to different social media platforms (Instagram, Twitter, Facebook, and LinkedIn) to reach out to other NCAA Division I female runners. Lastly, NCAA Division I women's cross country and track coaches in the Midwest were contacted through email to see if they were willing to distribute the survey to their athletes. Surveys were sent out starting at the end of the outdoor track season in May and continued until August. Participation was voluntary and anonymous.

Measurement

Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2). The Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2) was used in this study to measure whether a participant's perceived coach created motivational climate was task-involving or ego-involving (Newton et al., 2000). In this questionnaire, participants were asked about their agreement of certain statements in their competitive sport environment that represent either a task-involving or ego-involving motivational climate using a 5-point Likert-type scale from 1 (Strongly Disagree) to 5 (Strongly Agree) (Newton et al., 2000). An example of a task-involving statement is, "On this team, the coach wants us to try new skills" and an example of an ego-involving statement is, "On this team, the coach gets mad when a player makes a mistake" (Newton et al., 2000, p. 290). Thus, when the participants completed the survey, the type of perceived motivational climate their coach created was calculated based on which set of questions rated the highest sum of scores, task-involving or ego-involving. For each participant, the term 'coach' was defined as the coach that they spend the most time with, due to the fact that

in a track setting different coaches are assigned to different events, which suggests that the head coach might not be as influential. In a study conducted by Newton et al. (2000), the PMCSQ-2 was found to have both reliability and validity.

Eating Attitudes Test (EAT-26). The Eating Attitudes Test (EAT-26) was used in this study to measure how at risk each of the participants are for developing an eating disorder (Garner et al., 1982). In this test, participants were asked about their agreement of 26 statements about eating attitudes using a 5-point Likert-type scale ranging from 1 (Never) to 5 (Always). An example of these statements were, "I am terrified about being overweight" and "I avoid eating when I am hungry" (Garner et al., 1982, p. 878). Along with this, the participants were also asked five questions about their eating behaviors in the last six months, which may suggest disordered eating behaviors if they are present. For the EAT-26, participants that score greater than or equal to 20 could be taking part in disordered eating and may be at risk for an eating disorder. It should also be noted that the EAT-26 has been found to have validity and reliability as found in the study conducted by Garner et al. (1982).

Procedure

The participants that decided to take part in this study were invited to complete an online survey through a link in which all the data was collected. They were instructed to complete the form individually and without the presence of their coach or teammates, so that there was a better chance they were answering the questions honestly. Both the PMCSQ-2 and the EAT-26 were presented on separate pages with respective directions posted to avoid confusion, along with the consent form presented in Appendix A and a general demographic and background survey presented in Appendix B. The consent form was presented first and consented to through the use of checkboxes, or the participant was not able to continue the survey. The participants

were then prompted to fill out the demographic and background survey, the PMCSQ-2 on the next page and after that the EAT-26 on the last page. The online survey took approximately 20 minutes.

After the online survey was completed, an email was sent to participants interested in completing a follow up interview to share any other thoughts. These interviews were semi-structured and focused on getting a better understanding of the participant's experiences with different coaches and competitive environments throughout their career and how that may or may not have affected their perception of what it means to eat as a female runner. The list of guiding questions used is provided in Appendix E.

Results

Survey Analysis

Twenty-three responses were collected with seven participants (30.42%) found to be at risk for disordered eating based on their EAT-26 score and four participants (17.39%) were at risk based on their responses to the eating behavior questions at the end of the survey, although their scores did not meet the requirements for risk assumption. After calculating the PMCSQ-2 scores, participants were separated into groups of either task-involving (n=21) or ego-involving (n=2) perceived coach created motivational climates, based on their highest sum of scores from the set of statements related to each motivational climate. The mean disordered eating risk score for each perceived motivational climate group were compared with each other and an independent t-test was implemented to see whether or not the two-sample means were significantly different (see Table 1). There was no significant finding for motivational climate groups, t (1) = -1.76, p = .164, despite ego-involving (M = 26.5, SD = 9.2) attaining higher scores than task-involving (M = 14.1, SD = 12.3).

Table 1
Results of Independent T-test

	Task	*Ego*
Mean	14.0952381	26.5
Variance	151.990476	84.5
Standard Deviation	12.3284418	9.19238816
Observations	21	2
Hypothesized Mean Difference	0	
df	1	
t Stat	-1.7633562	
P(T<=t) one-tail	0.16420883	

t Critical one-tail	6.31375151

Then, a correlation coefficient was computed among the task-involving motivational climate score and the ego-involving motivational climate score from the PMCSQ-2 as well as the disordered eating risk score for each participant (see Table 2). Using the Bonferroni approach to control for Type 1 error across the three correlations, a *p* value of less than .016 (.05/3=.016) was required for significance. The result of the correlational analyses presented in Table 2 shows that one out of the three correlations were statistically significant using this criteria, specifically the correlation between task and ego scores. In the case of the task-involving score and the EAT-26 score, a negative, weak relationship was found (r = -0.237), while for the ego-involving score and the EAT-26 score, a positive, weak relationship was found (r = 0.100).

Table 2
Pearson Correlation Results

		EAT-26	Task Score	Ego Score
EAT-26	Pearson Correlation	1	-.237	.100
	Sig. (2-tailed)		.276	.650
	N	23	23	23
Task Score	Pearson Correlation	-.237	1	-.664**
	Sig. (2-tailed)	.276		<.001
	N	23	23	23
Ego Score	Pearson Correlation	.100	-.664**	1
	Sig. (2-tailed)	.650	<.001	
	N	23	23	23

Taking a closer look at the participants who were considered at risk for disordered eating, either based on their EAT-26 score (*n* = 7) or their answers to the eating behavior questions (*n* =

4), unique patterns start to emerge within their PMCSQ-2 scores (as seen in Table 3). In particular, seven of these participants scored lower than the average group PMCSQ-2 Task Score (M = 69.2) and six of them scored higher than the average group PMCSQ-2 Ego Score (M = 44.5). It should also be noted that the only two participants in this study that scored higher in the ego score compared to their task score (Participant 10 and 20) were both considered at risk for disordered eating. In addition, the participant that had the smallest difference between the scores, or scored high in both task and ego (Participant 6) was also considered to be at risk.

Table 3
At Risk Participant Scores

Participant #	PMCSQ-2 Task Score	PMCSQ-2 Ego Score
5	78	24
6*	59	57
8	73	29
9*	69	24
10*	55	58
15*	72	46
16*	67	47
17	63	55
19*	69	41
20	53	61
22*	81	34

Note: * indicates a participant whose EAT-26 score was greater than or equal to 20 (at risk).

Interview Results

After the surveys were complete, two participants completed follow-up interviews to discuss this topic in more depth. Participant A was a mid/long distance runner from Eastern

Europe who self-identified as white, while Participant B was a sprinter who lived and competed throughout different states in the mid-western United States and self-identified as Black. Within both interviews, two primary ideas were discussed related to this research topic: (1) Disordered eating in runners has to do with both the coach and the individual runner herself and (2) Comparing oneself to their competition can lead to discorded eating habits throughout female runners. In reference to the first idea discussed, Participant A and B brought up how comments that coaches make can positively or negatively affect an athlete's perception of their body and how they must adjust to be a better competitor. In particular, Participant A brought up more direct comments she had heard her high school coach say such as, "If you gain more weight that's going to be more pressure on your ankles when you are running a 3k", while Participant B brought up the fact that through the use of compliments about the way that ones' body looks, a coach can indirectly make an athlete more conscious of their body image.

In reference to the second idea discussed, Participant A touched upon the fact that as a distance runner, looking up to faster runners who looked a certain way can be detrimental to a young runner. In contrast, Participant B noted that as she grew up, the sprinters that she ran against and looked up to were all muscular and looked like she did, so comparison never affected her personal eating habits although she could see how this could affect a distance runner. Specifically, Participant A discussed that when first year runners come onto her track team, to help them avoid disordered eating like teammates she had in the past, she tells them when it comes to looking up to the most successful runners on their team, "You can look up to their training and what they are doing to recover, not what they are eating and what they are ingesting because sometimes that is not enough". Thus, emphasizing the importance of athletes comparing themselves to competitors in a healthy way.

Discussion

After considering the above findings of this study, it may seem as though the initial hypothesis that female NCAA Division I runners that perceive their coach created motivational climate as more ego-involving will be more at risk to adapt disordered eating compared to athletes that perceived their coach created motivational climate as more task-involving could not be supported. Considering only the lack of significance seen in the survey results, this may be true, although the small sample size should also be taken into consideration. However, the insight that was provided in the follow-up interviews, supported the original assumption to some degree. To summarize, both of these participants admitted to and discussed in detail the impact that coaches have on their athletes. Whether that was in terms of direct comments that the coaches made, as mentioned previously, or in relation to their motivation which was also discussed in both interviews, this remained true. It was also noted during both interviews how these female runners had either personally or had seen their teammates compare themselves to their competition in terms of body image to get a better understanding of how they could be more successful in their event, as was also found in the study conducted by Stirling and Kerr (2012). As was mentioned by Participant A, most of the time eating habits have very little to do with a runner's success compared to their training, however some female runners make dangerous assumptions in relation to the lack of eating that is occurring behind the scenes. With this in mind, coaches that overly emphasize competition in their team environment, may encourage their female runners to compare themselves to their competitors in an unhealthy way without even realizing it which, as Participant A noted with her past teammates, can and will lead to disordered eating. Hence, moving forward, a study including a similar survey with more

open-ended questions for clarification of experiences and a larger sample size would be recommended to ensure a better understanding of this coach-athlete relationship.

In addition, it is recommended that future studies take into consideration how three other areas of a female runners' life might make her more prone to disordered eating based on the follow-up interviews that were conducted. Participant A suggested the role that culture plays in the way that coaches approach discussing an athletes' body. In particular, she brought to light how normal it is in Eastern Europe for coaches to talk to athletes about their weight and how their body is looking by connecting these comments to training. Specifically, she noted that Eastern Europe is "very behind on everything" in comparison to the experiences she has had in the United States in which coaches are more aware of the harm that these comments can cause. In contrast, Participant B who grew up competing in the United States mentioned in reference to her coaches, "Technically they are not allowed to say you need to lose weight". Hence, calling attention to this cultural difference and how this might make disordered eating more prevalent in one culture compared to another.

Next, the role that family plays in a female runner's relationship with eating was highlighted by both of the participants and should be explored further. Participant B mentioned that growing up she was raised by parents that were both athletes and because of that she always had a healthy relationship with food and her weight like they did. Specifically, she mentioned that in her childhood home, her parents never had a scale, and they always emphasized the mindset that "Its food, I'm going to burn it off and if I don't that's ok." In comparison, Participant A noted that the fact that her grandpa was one of her running coaches always created a more tense and "strict" environment in her family that affected not only their relationship, but also her view on eating during family dinners.

Lastly, Participant A brought up a unique perspective on how team meals can affect the way that a runner perceives what she should be eating in order to be competitive. In particular, she noted, “As harmless as it sounds sometimes that can be enough to just tell someone that they are eating too much.” For instance, if one of the best runners on the team is eating less that others, this might be taken as an indication that everyone should be eating that much to be successful. In addition to just team meals, Participant A also noted that when athletes are fed at events, in her personal experience it was the European Championships, it is almost as if the servings given are seen as an expectation of how you were “supposed to eat.” Especially at these events that are some of the highest levels of competition for female runners. Thus, a safer way to approach these meals should be explored. In closing, although the hypothesis of this study was not strongly supported by the findings, other discoveries should be taken into account moving forward to ensure a healthy experience for all female runners.

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Appendix A

Participant Consent Form

Research Consent Information: Taking the Focus Off of the Individual

You are invited to participate in a research project being conducted by Sarah Redett from Miami University. The purpose of this research is to examine how coaches are indirectly affecting athlete disordered eating on their teams, specifically for NCAA Division I women runners. Links to complete this online survey have been sent out to about 100 people directly. In addition, open invitations have been posted on social networking sites such as Instagram, Facebook, and Twitter along with a platform for women runners called Strong Runner Chicks. Participation in this research is restricted to women runners that are currently competing in NCAA Division I cross country or run NCAA Division I track events on the track and field team (sprints, mid-distance, distance, hurdles).

Completing the survey should take about 20 minutes. Your participation is voluntary, you may skip questions you do not want to answer, and you may stop at any time. A foreseeable risk associated with this study is a feeling of discomfort due to the personal nature of the survey questions. One benefit of this study may be that the results could help female athletes moving forward by educating their coaches about how to create a safe and healthy environment that deters disordered eating.

The survey does not request information that would explicitly identify you. If you inadvertently include identifying information, such information will be removed from stored data. Only the researchers will have access to individual responses. Results of the survey will only be presented publicly as aggregate summaries. The research data will be retained until May of 2025.

Funding agencies or journal policies may require that individual participant data be made available to other researchers. Sharing data in this way advances the field by allowing the data to be used beyond this study. No personally identifying Information (names or identifying demographics), will be included in the shared data. Care will always be taken to ensure data that is shared outside the Miami research team would not include identification unless the subject has explicitly agreed to this. You may participate in this research without consenting to the data being shared.

If you have any questions about this research or you feel you need more information to determine whether you would like to volunteer, you can contact me at redettse@miamioh.edu or my faculty advisor Dr. Joanna Line at linejm@miamioh.edu. If you have questions or concerns about the rights of research subjects, you may contact our reviewing body: Research Ethics and Integrity Office at Miami University at (513) 529-3600 or humansubjects@miamioh.edu.

Please keep a copy of this information for future reference.

---- Thank you for your participation, Sarah Redett.

Appendix B

Demographic & Background Survey

How old are you?

How would you describe your gender?

How would you describe your race?

How long have you been running competitively?

How long have you been running competitively at the NCAA Division I level?

When you compete, what distances do you typically run?

Appendix C

Perceived Motivational Climate in Sport Questionnaire-2 (PMCSQ-2)

Instructions: Please think about how it has felt to play on your team throughout this season. What is it usually like on your team? Read the following statements carefully and respond to each in terms of how you view the typical atmosphere on your team. When the term coach is used, refer to the coach that you spend the most time with if you have more than one coach. Perceptions naturally vary from person to person, so be certain to take your time and answer as honestly as possible. Circle the number that best represents how you feel.

Note: Each item is responded to on a 5-point Likert-type scale (1 = strongly disagree; 5 = strongly agree).

1. On this team, the coach wants us to try new skills.
2. On this team, the coach gets mad when a runner makes a mistake.
3. On this team, the coach gives most of his/her/their attention to the stars.
4. On this team, each runner contributes in some important way.
5. On this team, the coach believes that all of us are crucial to the success of the team.
6. On this team, the coach praises runners only when they outrun team-mates.
7. On this team, the coach thinks only the best runners contribute to the success of the team.
8. On this team, runners feel good when they try their best.
9. On this team, runners are taken out of a race for mistakes.
10. On this team, runners at all skill levels have an important role on the team.
11. On this team, runners help each other learn.
12. On this team, runners are encouraged to outrun the other runners.
13. On this team, the coach has his/her/their own favourites.

14. On this team, the coach makes sure runners improve on skills they' re not good at.

15. On this team, the coach yells at runners for messing up.

16. On this team, runners feel successful when they improve.

17. On this team, only the runners with the best time get praise.

18. On this team, runners are punished when they make a mistake.

19. On this team, each runner has an important role.

20. On this team, trying hard is rewarded.

21. On this team, the coach encourages runners to help each other.

22. On this team, the coach makes it clear who he/she/they thinks are the best runners.

23. On this team, runners are `psyched' when they do better than their team-mates in a race.

24. On this team, if you want to run in a race you must be one of the best runners.

25. On this team, the coach emphasizes always trying your best.

26. On this team, only the top runners `get noticed' by the coach.

27. On this team, runners are afraid to make mistakes.

28. On this team, runners are encouraged to work on their weaknesses.

29. On this team, the coach favours some runners more than others.

30. On this team, the focus is to improve each race/practice.

31. On this team, the runners really 'work together' as a team.

32. On this team, each runner feels as if they are an important team member.

33. On this team, the runners help each other get better and excel.

Appendix D

Eating Attitudes Test (EAT-26)

Instructions: This is a screening measure to help you determine whether you might have an eating disorder that needs professional attention. This screening measure is not designed to make a diagnosis of an eating disorder or take the place of a professional consultation. Please fill out the below form as accurately, honestly and completely as possible. There are no right or wrong answers. All of your responses are confidential.

Part A: Complete the following questions:

1) Height:
2) Current Weight (lbs):
3) Highest Weight (excluding pregnancy):
4) Lowest Adult Weight:
5) Ideal Weight:

Part B: Please check a response for each of the following statements as Always, Usually, Often, Sometimes, Rarely or Never.

1. Am terrified about being overweight.
2. Avoid eating when I am hungry.
3. Find myself preoccupied with food.
4. Have gone on eating binges where I feel that I may not be able to stop.
5. Cut my food into small pieces.
6. Aware of the calorie content of foods that I eat.

7. Particularly avoid food with a high carbohydrate content (i.e. bread, rice, potatoes, etc.)
8. Feel that others would prefer if I ate more.
9. Vomit after I eat.
10. Feel extremely guilty after eating.
11. Am preoccupied with a desire to be thinner.
12. Think about burning up calories when I exercise.
13. Other people think that I am too thin.
14. Am preoccupied with the thought of having fat on my body.
15. Take longer than others to eat my meals.
16. Avoid foods with sugar in them.
17. Eat diet foods.
18. Feel that food controls my life.
19. Display self-control around food.
20. Feel that others pressure me to eat.
21. Give too much time and thought to food.
22. Feel uncomfortable after eating sweets.
23. Engage in dieting behavior.
24. Like my stomach to be empty.
25. Have the impulse to vomit after meals.
26. Enjoy trying new rich foods.

Part C: Behavioral Questions. In the past 6 months have you (Never, Once a month or less, 2-3 times a month, Once a week, 2-6 times a week, Once a day or more):

A. Gone on eating binges where you feel that you may not be able to stop?

B. Ever made yourself sick (vomited) to control your weight or shape?

C. Ever used laxatives, diet pills or diuretics (water pills) to control your weight or shape?

D. Exercised more than 60 minutes a day to lose or to control your weight?

E. Lost 20 pounds or more in the past 6 months?

Reformatted from the copy created from Seattle Children's (https://www.seattlechildrens.org/globalassets/documents/healthcare-professionals/pal/ratings/eat-26-rating-scale.pdf)

Appendix E

Follow-up Interview Guiding Questions

1) Introduction Questions
    a. Where are you from?
    b. How long have you been a competitive runner, where have you competed, and what events have you completed in throughout your career?
    c. How long have you been a competitive runner at the Division I level?
2) Tell me a little bit about the coaches that you have had throughout your career.
    a. Would you say that these coaches emphasized more personal skill development and growth or performance during competition? Maybe a little bit of both?
3) What coaching environment do you feel is the most productive for runners? Or do you think it depends on the person?
    a. Do you have any examples of when a coach created what you consider a negative/detrimental environment for their athletes? What were some of the outcomes from this?
4) Moving forward in some of the more specific negative outcomes of competitively running as a female, disorder eating has become significantly prevenient.
    a. What are some of the reasons you think female runners may develop disordered eating?
        i. Do you think there are people other than the athlete that could be at fault for this?
5) Thinking back on your experiences were there certain aspects of different coaching environments that you believe could lead to an athlete wanting to take part in disordered eating as a runner?