Assessing the Impact of Coaching Feedback Strategies on the Motivation and Performance of Elite Athletes

Zachary Hall Mastrich

Thesis submitted to the faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of

Master of Science
In
Psychology

E S Geller, Chair
Neil M. Hauenstein
Jorge I. Hernandez

October 4th 2019
Blacksburg, Virginia

Keywords: Sport Psychology, Feedback, Motivation, Performance, Behavior

Assessing the Impact of Coaching Feedback Strategies on
the Motivation and Performance of Elite Athletes

Zachary Hall Mastrich

ABSTRACT

Research has consistently found that the type of feedback coaches provide their players with has a substantial impact on both the motivation and the performance of these athletes. Further, several studies have found that athletes' motivation predicts sport performance. In order to optimize the performance of their athletes, coaches need to understand how various feedback strategies impact motivation and performance. The present study examined the relationship between coaching feedback, athletes' motivation, and athletic performance from the perspective of self-determination theory. Feedback style was conceptualized in four categories: behavior-based corrective feedback, behavior-based supportive feedback, person-based corrective feedback, and person-based supportive feedback. Athlete motivation was conceptualized as intrinsic and extrinsic. Participants included 169 NCAA athletes (56.2% male) from Division I and III colleges and universities in the United States. This sample includes 35 golfers, 50 basketball players, and 84 baseball/softball players. All participants completed a survey reporting their perception of their coaches' feedback style and their motivation. The commonly recorded individual performance statistics were used as the outcome measure. A factor analysis confirmed the four-factor structure of the perceived feedback scale and structural equation modeling was used to test the relationship between feedback, motivation, and performance. The results revealed that athletes perceive a) more supportive than corrective feedback, b) that corrective feedback was more behavior-based than person-based, and c) that supportive feedback was more person-based than behavior-based. Additionally, Supportive person-based (β = -.22) and corrective person-based feedback (β = .18) were linked with intrinsic motivation. Both intrinsic (β = .13) and extrinsic motivation (β = .82) were related to athletic performance. Corrective person-based feedback had a significant indirect effect on performance through the mediation of intrinsic motivation (β = -.10). The findings from this study can inform coaches to use more supportive and less corrective person-based feedback to increase motivation and performance.

Assessing the Impact of Coaching Feedback Strategies on
the Motivation and Performance of Elite Athletes

Zachary Hall Mastrich

GENERAL AUDIENCE ABSTRACT

Research has consistently found that the type of feedback coaches provide their players with has a substantial impact on both the motivation and the performance of these athletes. Further, several studies have found that athletes' motivation predicts sport performance. In order to optimize the performance of their athletes, coaches need to understand how various feedback strategies impact motivation and performance. This study examined the relationship between coaching feedback, athletes' motivation, and athletic performance. Feedback style was conceptualized in four categories: behavior-based corrective feedback which is delivered after a negative performance and focuses on behavior, behavior-based supportive feedback which is delivered after a positive performance and focuses on specific behavior, person-based corrective feedback which is delivered after an undesirable performance and targets the individual, and person-based supportive feedback which is delivered after a negative performance and focuses on the individual. Participants included 169 NCAA athletes (56.2% male) from Division I and III colleges and universities in the United States. This sample includes 35 golfers, 50 basketball players, and 84 baseball/softball players. All participants completed a survey reporting their perception of their coaches' feedback style and their motivation. The commonly recorded individual performance statistics were used as the outcome measure. The results revealed that athletes perceive a) more supportive than corrective feedback, b) that corrective feedback was more behavior-based than person-based, and c) that supportive feedback was more person-based than behavior-based. Additionally, Supportive person-based and corrective person-based feedback were linked with intrinsic motivation. Both intrinsic and extrinsic motivation were related to athletic performance. Corrective person-based feedback had a significant indirect effect on performance through the mediation of intrinsic. The findings from this study can inform coaches to use more supportive and less corrective person-based feedback to increase motivation and performance.

Contents

Chapter 1

Introduction

In competitive sports, the differences in skill and ability between teams are so small that athletes and coaches are constantly looking for ways to increase the effectiveness of their team and get a leg up on the competition. One way to do this is to increase the beneficial impact of coaching. Coaches can have a remarkable influence on the performance of both individual players and the team as a whole. The feedback coaches provide their athletes is one way to progress their team toward greater success. Research has consistently found that the type of feedback coaches give their players has a substantial impact on both the motivation and the performance of their athletes (Amerose & Horn, 2000, Gillet et al., 2010, Vallerand, 1983). In order to optimize the performance of their athletes, coaches need to understand how various feedback strategies impact motivation and performance. This study examined the relationship between coaching feedback, athletes' motivation, and athletic performance from the perspective of self-determination theory.

1.2 Self-Determination Theory

1.2.1 Need Satisfaction. Self-determination theory (SDT) is essentially a humanistic theory, presuming that human motivation and behavior are shaped by the satisfaction of three basic psychological needs–the needs for competence, autonomy, and relatedness (Cerasoli, Nicklin, & Nassrelgrgawi, 2016; Deci & Ryan, 2000). These needs are considered psychological "nourishment"–beneficial for psychological growth and well-being. According to Deci and Ryan

(2000), all three of these needs must be met in order for an individual to have optimal psychological health.

The need for competence reflects the desire to demonstrate and improve one's performance (Cerasoli, 2016). The need for autonomy reflects volition–the natural desire to organize experiences and behavior in order to make behavior consistent with one's sense of self (Deci & Ryan, 2000). In essence, the need for autonomy is the psychological need to experience personal choice in one's actions and to feel free to decide one's behaviors (Cerasoli et al., 2016).

The need for relatedness reflects people's innate desire to feel connected with significant others, to feel as if other people care for them, and to care for others (Blanchard et al., 2009; Deci & Ryan, 2000). While everyone has these three needs, the extent to which these needs are satisfied varies as a function of situational and behavioral consequences that enable their satisfaction (Cerasoli et al., 2016; Geller, 2016).

1.2.2 Intrinsic vs. Extrinsic Motivation. Intrinsic motivation (also referred to as self-motivation) occurs when an individual engages in a behavior for the pleasure or natural consequences of the task (Pelletier, Fortier, Vallerand, & Briere, 2001). Several aspects of performing the task can naturally reinforce the behavior. The motivation comes from the natural fun, pleasure, and satisfaction the individual achieves from engaging in the behavior. Greater satisfaction of the three psychological needs will increase intrinsic motivation.

In contrast, extrinsic motivation occurs when an individual engages in a behavior for external reasons, such as to meet a goal that was set by an external source, to achieve a positive consequence (e.g., an external reward), or to avoid a negative consequence (Amorose & Anderson-Butcher, 2007). In many activities, such as sport, individuals are both intrinsically and extrinsically motivated.

1.3 Feedback

1.3.1 Supportive and Corrective Feedback. The present study is only concerned with task-specific feedback, which is provided with regard to a specific task or behavior. Feedback is information given to individuals after they perform a behavior, delivered to influence the frequency and/or the quality of that behavior (Geller, 2016, 2018a). Supportive feedback aims to confirm and support correct or desirable behavior. In contrast, corrective feedback informs the recipient of non-optimal behavior and indicates how behavior needs to be altered in order to improve and achieve a goal (Bloom & Hautaluoma, 1987). Some authors have referred to these two types of feedback as positive and negative feedback or promotion-oriented and change-oriented feedback (Bloom & Hautaluoma 1987; Vallerand, 1983). However, "supportive" and "corrective" are preferred terms because they most accurately reflect the objective of the two types of feedback–to support or correct a designated behavior. Positive and negative are not preferred terms because the outcomes of both supportive feedback and corrective feedback can be positive or negative (Carpentier & Mageau, 2013).

From the perspective of the coach, it is more pleasant to give supportive feedback than corrective feedback. Fisher (1979) found that supervisors who gave more corrective than supportive feedback thought their subordinates liked them less than supervisors who delivered more supportive feedback. Plus, supervisors expected their subordinates' reactions to be less favorable when they gave corrective feedback compared to giving supportive feedback. In fact, when supervisors provide corrective feedback to low-performers, they often distort the feedback in order to make the interaction less negative (Fisher, 1979).

Both supportive and corrective feedback are delivered to improve the behavior of the feedback recipient. Supportive feedback influences behavior by pinpointing desired behavior and

encouraging individuals to maintain or increase the frequency of that behavior (Geller, 2018a). Corrective feedback provides information about an individual's actual behavior compared to his or her desired behavior and provides an athlete with information to improve his or her future performance. Also, corrective feedback should guide athletes by giving specific direction for behavioral improvement by focusing on specific changes that need to be made for improved performance in the future (Geller, 2018a; Weinberg & Gould, 2011).

1.3.2 Behavioral vs. Non-Behavioral Feedback. A major distinction to consider when examining feedback is whether the feedback is behavior-based. Feedback is behavior-based when it targets a specific behavior, whereas non-behavior-based feedback is more general and might target something other than the behavior (e.g., an individual's ability or self-esteem). Non-behavior-based feedback is referred to as person-based in this document because the feedback connects to a person's internal disposition or confidence rather than a designated behavior. Person-based feedback is more general, and can cause the receiver to attribute the comments to his/her personality. Geller (2018a) suggests that feedback is less effective when it is not focused on behavior.

Feedback that is not behavior-based may influence the self-esteem of the performer. This can create an ego-oriented situation that puts the individual's self-esteem on the line. As a result, the individual may feel as if s/he cannot choose one's own actions and feel forced to act and strive for goals depicted by the coach (Ryan, 1982). This is not meant to suggest that person-based supportive feedback is undesirable, as supportive feedback can boost self-esteem and need satisfaction, but only that supportive feedback should be more behavior-based than person-based so it recognizes behavior and can enhance intrinsic motivation.

Feedback should also focus on behavior because person-related statements can influence individuals to associate their performance with their self-worth (Carpentier & Mageau, 2013). While person-based corrective feedback can clearly be harmful to an individuals' self-esteem, person-related supportive feedback may actually boost self-esteem. However, person-based supportive feedback can influence individuals' to associate their self-worth with their performance. Hence a poor performance in the future may be detrimental to self-esteem. Butler (1987) found that performance and motivation among 5th and 6th grade students were both superior when feedback was behavior-based, compared to when feedback was person-based. In general, behavior-based feedback is preferred over person-based feedback.

The current measurement of feedback in sports research is lacking. Some research used behavioral coding (Carter & Geller, 2017) or experimental feedback manipulations (Vallerand, 1983), which are strong ways to evaluate coaching feedback. However, many studies measure athletes' perceptions of their coaches' feedback with surveys, and the surveys used are inconsistent across studies. It seems that each study uses their own survey, developed to address their niche research question (Black & Weiss, 1992, Carpentier & Mageau, 2013, Moratidis et al., 2010). For instance, Carpentier and Mageau (2013) developed a questionnaire to measure athletes' perceptions of their coaches' feedback, which assessed corrective-feedback that was delivered in an autonomy supportive manner. Similarly, Mouratidis et al. (2010) created a survey that assessed corrective feedback only. While some of these measures are good for their purpose. They only assess a small aspect of the feedback that coaches can provide to athletes. The present study will introduce a perceived coaching feedback questionnaire that is a comprehensive assessment of athletes' perceptions of coaches task specific feedback behaviors.

1.4 Coaching Behavior and Motivation

It has been found that coaching style influences athletes' motivation. For example, a study of hockey players found that intrinsic motivation varied as a function of feedback from coaches. More specifically, the authors found that higher frequencies of supportive feedback were associated with the highest levels of intrinsic motivation among athletes (Vallerand, 1983). Amorose and Horn (2000) found that when college athletes perceived their coaches' behaviors to be democratic, instructive, and based on specific information (i.e., behavior-based) they reported higher intrinsic motivation than when coaches displayed autocratic, ignoring, and punishment-oriented behaviors.

In addition, Gagne, Ryan, and Bargman (2003) found that increased motivation among youth athletes was linked to autonomy support–acknowledging athletes' feelings and views, and including them in the decision-making process. Autonomy-supportive corrective feedback provides a rationale, considers the athletes' perspective, provides choices of corrective solutions, and avoides a controlling communication style (Carpentier & Mageau, 2013). For example, coaches' autonomy support was found to be positively linked to motivation among judo athletes (Gillet, Vallerand, Armoura, & Baldes, 2010). Similarly, Mouratidis, Vansteenkiste, Lens, and Sideridis (2008) found that supportive feedback predicted several outcomes among young athletes, including perceived competence, vitality, intention to participate and overall well-being, with intrinsic and internalized extrinsic motivation as mediators.

Amorose and Anderson-Butcher (2007) found that coaches' autonomy-supportive feedback influenced the self-reported motivational orientation of athletes as mediated by competence, autonomy, and a sense of relatedness. Thus, common sense and empirical research indicate that the feedback behaviors of a coach can have a significant influence on athletes. More

specifically, the type of feedback coaches provide athletes can greatly impact both their motivation and their behavior. From a SDT perspective, feedback that satisfies one's needs for competence, autonomy, and relatedness should lead to higher intrinsic motivation.

1.5 Motivation and Performance

Many studies have revealed a strong link between motivation and performance. Grant and Sonnetag (2010) reported that when individuals are more intrinsically motivated they experience less emotional exhaustion, which enables better job performance. In a meta-analysis, Cerasoli, Nicklin, and Ford (2014) found that intrinsic motivation is a medium-to-strong predictor of performance across 183 studies. They also found that intrinsic motivation predicted more unique variance in performance quality than did extrinsic motivation through incentives.

The relationship between motivation and performance has been demonstrated in a sport setting as well. A study of the men's basketball team at Eastern Kentucky University found that athletes' motivation was significantly related to both practice and game performance (Pope, 2017). Generally, the results of empirical research have consistently indicated that performance, from the classroom and the workplace to the athletic field, improves as a function of both intrinsic and extrinsic motivation.

1.6 The feedback, motivation, and performance relationship

Research supports the mediating role of motivation in the feedback-performance relationship. A study by Charbonneau, Barling, and Kelloway (2001) supported a model that included motivation as the mediating mechanism in the relationship between transformational leadership (a leadership style characterized by charisma and inspiration) and sport performance. In their discussion, the authors hypothesized that verbal feedback mediated the relationship between transformational leadership and motivation, lending support to motivation as a mediator

between feedback and performance. Such research supports the premise that feedback can enhance motivation, which in turn improves performance.

One relatively recent study of this model was conducted by Carpentier and Mageau (2013) who examined athletes receiving more autonomy-supportive corrective feedback– "providing rationales to explain why behaviors should be changed, considering athletes' perspective, providing choices of solutions, and avoiding the use of a controlling communication style"(Carpentier & Mageau, 2013, p.424)–demonstrated higher levels of motivation, as well as improved sport performance. This study provided strong support for motivation as a mediating mechanism in the relationship between feedback and performance among athletes.

1.7 Traditional Measurement of Performance in Sport Psychology Research

It is critical to distinguish between individual behavior, individual performance, and team performance. In sport, examining behavior involves evaluating the technique and mechanics of an athlete at the individual behavioral level. In contrast, individual performance is the outcome of a process that varies as a function of behavioral, dispositional, and situational factors (Geller, 2018b). Individual performance reflects the outcome of an individual's sport-related task, which includes the individual's behavior. However, individual performance is subject to non-behavioral factors as well, such as the individual's dispositional skill level, the performance of the opponent, the individuals' motivation, and the behavior of other team members.

An example of an individual performance measure in sport is one's shooting percentage in basketball. This statistic is influenced by the behavior of the individual, the skill of the individual, the actions of teammates, and the actions of the opposing team. In sport, individual performance is commonly recorded with statistics. Finally, examining the outcome of team

performance involves examining the end result at a more macro level, which is typically the frequency of wins and losses. The present study focused on individual performance.

In sport psychology research, individual sport performance is frequently measured by coaches' subjective ratings of their athletes' performance. This is exemplified in several previously-mentioned studies. For instance, Charbonneau et al. (2001) measured individual sport performance by having coaches respond to two questions about their athletes' estimated performance and estimated improvement throughout the season. Carpentier and Mageau (2013) examined the mediating role of motivation in the feedback-performance relationship, assessing performance by asking coaches to subjectively rate the extent to which each athlete improved since the beginning of the season.

Limitations of subjective ratings of athletes' performance are revealed in research on performance appraisals in industry. Most performance appraisals involve supervisors' subjective ratings of employees (DeNisi & Murphy, 2017). This is also true in sport research. However, supervisors' subjective ratings of subordinates may not be the most accurate measure of performance and are not procedurally just–the assessment process may not be fair to all subordinates (Helsin & VandeWalle, 2011).

1.8 The Current Study

The present study was designed to further the understanding of the impact of supportive and corrective feedback on the motivation and performance of competitive athletes. This study examined the comparative effects of behavior-based versus person-based feedback that is supportive versus corrective. Very few studies have examined both supportive and corrective feedback in a sport context. Further, the author found no studies in the sport domain that distinguished between behavior-based and person-based feedback. The present study introduced

a comprehensive questionnaire to assess athletes' perceptions of the frequency of their coaches' feedback including the distinction between supportive and corrective, and behavior-based and person-based feedback. In addition, very few studies have assessed athletic performance with objective indices.

This research incorporated the above-mentioned components to examine the relationship between feedback and performance, as mediated by both intrinsic and extrinsic motivation. Figure 1 depicts the hypothesized model for the present study. This model shows a direct link between supportive and corrective person-based and supportive and corrective behavior-based feedback, and performance. Additionally, there are indirect paths between supportive and corrective person-based feedback and performance with intrinsic and extrinsic motivation as the mediating mechanisms. Person-based feedback targets the individual, as opposed to the behavior, which is why this model involves a link between both person-based feedback styles and intrinsic and extrinsic motivation, whereas behavior-based feedback should affect performance directly by addressing the specific behaviors underpinning the performance.

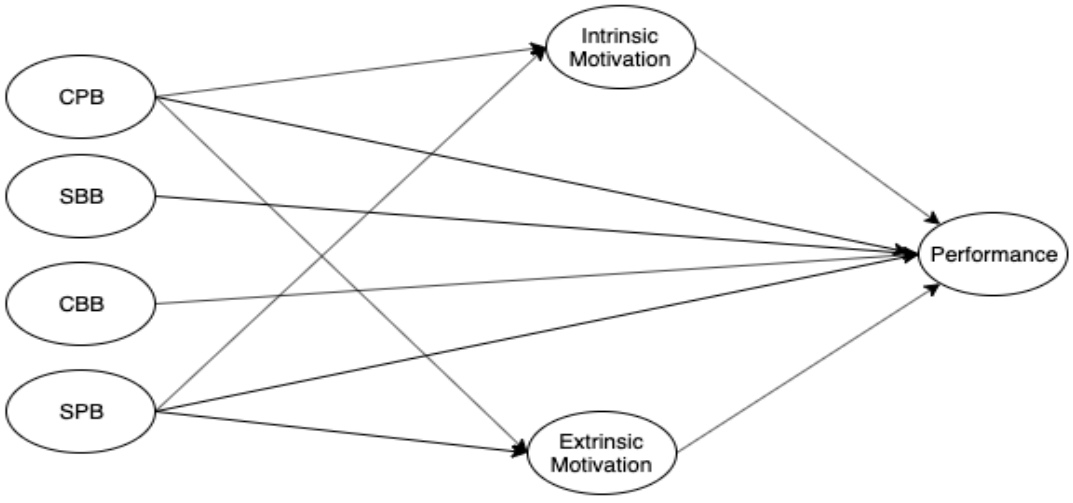

Figure 1. The proposed model.

Note: CPB = corrective person-based feedback, SBB = supportive behavior-based feedback, CBB = corrective behavior-based feedback, SPB = supportive person-based feedback, performance = individual athletic performance.

An examination of a similar model was conducted by Carpentier and Mageau (2013). These authors found that when athletes received more autonomy-supportive corrective feedback (e.g., "My coach often suggests many ideas for correcting my mistakes and lets me choose the one I prefer") they reported increased intrinsic and extrinsic motivation, well-being, self-esteem, as well as satisfaction of their needs for autonomy, relatedness, and competence. They also found that this type of corrective feedback linked directly to the athletes' performance and was negatively associated with negative affect and emotion. However, that study only measured corrective feedback; it did not distinguish between behavior-based and person-based feedback, and it assessed athletes' performance with a one-time, self-report performance appraisal from the athletes' coach.

The proposed study expanded and improved upon the research by Carpentier and Mageau (2013) by: a) incorporating supportive feedback in addition to corrective feedback, b) adding the behavior-based versus person-based distinction, and c) using an objective measure of athletic performance. Thus, this research systematically studied relationships between coaching feedback and athletes' performance, as well as the mediating role of intrinsic and extrinsic motivation.

Chapter 2

Review of Literature

Competitive sports have emerged into a multi-billion dollar industry worldwide. For this reason, researchers have become increasingly interested in studying the human dynamics of sport. One burgeoning area of research is coaches' feedback–information given to an athlete following the performance of a behavior in order to improve the quality and/or effectiveness of subsequent behaviors (Geller, 2018a,b). This is not to be confused with feedforward, which occurs when information is given to an individual before a target behavior in order to provide direction and/or encouragement. Supportive feedback is delivered after a desirable behavior to increase the frequency of that behavior, whereas corrective feedback is given after a non-desirable behavior and indicates a need for change in the target behavior (Bloom & Hautaluoma, 1987).

Behavior-based feedback focuses on specific behavior(s), while person-based feedback is more vague and does not target a particular behavior (Geller, 2018b). These types of feedback strategies have been given several different labels in sport psychology research. Feedback that is supportive versus corrective and behavior-based versus person-based should have differential outcomes among athletes. If coaches gain an understanding of the impact of different feedback techniques on their athletes, they could be more effective in leading their individual athletes and their team toward more successful performance. This study examined the relationship between four different coaching-feedback styles (i.e., supportive vs. corrective, and behavior-based vs. person-based) and the motivation and performance of athletes from the perspective of SDT.

2.2 Self-Determination Theory

2.2.1 Need Satisfaction. Self-determination theory (SDT) is a humanism-based theory initially developed by Edward Deci and Richard Ryan (Cerasoli et al., 2016; Deci & Ryan, 2000; 1985). According to SDT, human motivation can be understood by acknowledging peoples' innate psychological needs: the needs for competence, autonomy, and relatedness (Deci & Ryan, 2000). Deci and Ryan (2000) refer to these needs as psychological nourishment that are presumed to be key for psychological growth and human well-being. It is assumed these three needs are inherent necessities rather than learned motives.

Psychological needs can be identified by observing the consequences driving an individuals' behavior–attempting to gain positive consequences in situations that enable the satisfaction of a need or the avoidance of negative consequences. According to Deci and Ryan (2000), an individual must satisfy all three needs in order to maximize psychological health and well-being–one or two are not enough. When a psychological need is not satisfied, people focus their effort on satisfying that need, much like a physiological need (e.g., hunger). Although the psychological needs of SDT share similarities with physiological needs, there are distinctions.

Competence reflects an individual's desire to improve and demonstrate worthwhile abilities or skills (Cerasoli et al., 2016). This refers to the need to perceive that our behavior is effective and that we have adequate ability to perform worthwhile behavior (Amorose & Anderson-Butcher, 2007). Satisfying one's need for competence has been linked to higher intrinsic motivation (Deci & Ryan, 2000).

The need for autonomy refers to an individual's volition–the desire to be in control of one's actions (Blanchard, Amoit, Perreault, Vallerand, & Provencher, 2009; Deci & Ryan, 2000). In order to satisfy the need for autonomy, people must perceive that they have choice in

the behaviors they perform to achieve a goal (i.e., behavioral options). People also need their behaviors to be aligned with their sense of self, which is unlikely to occur without the perception of choice. Essentially, the need for autonomy reflects people's need to experience freedom and choice (Deci & Ryan, 2000).

The psychological need for relatedness refers to an individual's desire to be connected to other people, to love and care for others, and to be loved and cared for (Deci & Ryan, 2000). It reflects the desire to be valued, respected, and appreciated by other people (Cerasoli et al., 2016). The need for relatedness is also referred to in Maslow's Hierarchy of Needs as the need for social approval or a sense of belonging (Maslow, 1971). For all three of these psychological needs, perception matters. There is no objective way to determine if needs are being met; They are subject to the perceptions of the individual.

2.2.2 Intrinsic vs. Extrinsic Motivation. Intrinsic and extrinsic motivation are key concepts in SDT. Intrinsic motivation is also referred to as self-motivation and has slightly different definitions from a humanistic perspective than from a behaviorist perspective. The humanistic definition of intrinsic motivation is that an individual engages in a behavior for the sake of the task and the motivation comes from the natural fun, pleasure, interest, and satisfaction the individual achieves from engaging in the behavior (Amorose & Anderson-Butcher, 2007; Deci & Ryan, 1985; Pelletier et al., 2001). Behaviorists define intrinsic motivation as motivation from the natural consequences experienced when performing the behavior (positive reinforcement) (Geller, 2018).

Indeed, the humanists and behaviorists are referring to the same concept but focusing on different aspects. The humanist describes the internal pleasure as the motivational factor, whereas the behaviorist refers to the natural reinforcers (the external and observable

consequences) that cause the internal enjoyment in the behavior. The pleasure is the interpretation of the natural consequence one gets from an activity.

In contrast, extrinsic motivation occurs when an individual engages in a behavior for external reasons (Amorose & Anderson-Butcher, 2007). These external consequences can be the achievement of a goal that was set by someone else, the acquisition an external positive consequence (a reward), or the avoidance of a negative consequence (a penalty). Extrinsic motivation is caused by anything other than the natural interest and positive consequences experienced from the activity itself (Deci & Ryan, 1985). When extrinsic rewards are introduced to a task that is already intrinsically motivating, people tend to feel controlled by the rewards and shift their motivation from intrinsic to extrinsic (Deci & Ryan, 2000).

2.3 Feedback

Feedback is information given to an individual after emitting a behavior that is delivered in order to influence the frequency and/or the quality of the behavior (Geller, 2018a,b). Feedback is manifested as supportive or corrective. Supportive feedback confirms the occurrence of a desirable behavior, whereas corrective feedback informs the recipient that his or her behavior is inadequate and can be improved. These types of feedback have been referred to as positive and negative feedback or promotion-oriented and change-oriented, respectively in the sport psychology literature.

2.3.1 Supportive feedback. Supportive feedback is delivered after a desirable behavior (Geller, 2018a,b). The aim of supportive feedback is to confirm and support desired behaviors in order to maintain or increase the frequency of these behaviors (Carpentier & Mageau, 2013). Research has found a direct relation between supportive feedback and intrinsic motivation among male hockey players (Vallerand, 1983). Deci and Ryan (2000) found supportive feedback

to increase perceived competence and thus intrinsic motivation. This finding has been supported by research in a sport setting. For example, Amorose and Anderson-Butcher (2000) found a direct relation between supportive feedback and higher intrinsic motivation among Division I college athletes. In addition, Weinberg and Gould (2011) reported that supportive feedback can help reduce the loss of intrinsic motivation after a defeat in competition.

From the coaches' point of view, it is more pleasant to give supportive feedback than corrective feedback. Fisher (1997) found that supervisors who gave more corrective feedback to their subordinates thought their subordinates liked them less than supervisors who gave more supportive feedback. Also, supervisors expected their subordinates' reactions to the feedback to be more negative following corrective feedback, compared to supportive feedback. A key finding of that study was that when supervisors gave corrective feedback to low performers, they often distorted the feedback in order to make the interaction less negative and uncomfortable.

2.3.2 Corrective Feedback. Corrective feedback is given after an undesirable behavior and indicates that the targeted behavior has room for improvement (Carpentier & Mageau, 2013). Research has found a positive correlation between the amount of corrective feedback received and athletic performance (Carpentier & Mageau, 2013). However, some researchers have found corrective feedback to reduce intrinsic motivation (Deci & Ryan, 2000). But this may not be the case if the corrective feedback is delivered well and based on behavior. Carpentier and Mageau (2013) and Mouratidis et al. (2010) found that corrective feedback can still increase motivation if it is delivered properly and in a way that supports the autonomy of the feedback receiver by providing a choice of future behaviors. To expand on these findings, Carpentier and Mageau (2013) conducted a study of athletes and concluded that when corrective feedback is

delivered properly and in an autonomy-supportive way, it can increase the motivation and performance of the athlete.

Supportive and corrective feedback are both intended to influence the behavior of the feedback recipient. Supportive feedback influences behavior by pinpointing desired behaviors and encouraging individuals to maintain or increase the frequency of these behavior (Geller, 2018a,b). On the other hand, corrective feedback provides information on how to improve a target behavior in the future. This suggests that the actual behavior of the individual does not meet a desirable standard. Corrective feedback provides individuals with information to enable improved behavior and performance by providing a specific course of action that can lead to performance improvement. This is done by focusing on specific changes needed to improve future performance (Weinberg & Gould, 2011).

2.3.3 Behavioral vs. Non-Behavioral Feedback. An important distinction regarding feedback, regardless of whether it is supportive or corrective, is whether the feedback is behavior-based or person-based. Behavior-based feedback targets a specific behavior, whereas person-based feedback is more general and targets a person's attitude or disposition (DePasquale & Geller, 1999).

Because person-based feedback does not target a behavior, it can be perceived as reflecting something other than an individual's behavior, such as his/her ability or self-esteem. An example of supportive person-based feedback is "Nice job," and an example of corrective person-based feedback is "Come on, what was that? You can do better". Person-based feedback can lead the recipient to attribute the comments to his/her personality or ability and it may affect the persons self-esteem, self-efficacy, or intrinsic motivation. This can create an ego-oriented situation in which the self-esteem of the individual is constantly on the line. This can drive

individuals to try to self-enhance, which can be beneficial but it can be accompanied with a feeling of not being able to choose one's own actions and feeling forced to act specifically as the coach wants (Ryan, 1982). This can reduce the athletes' perceived autonomy.

With supportive feedback, the self-esteem and self-efficacy of the individual can be augmented. However, this may cause individuals to associate the feedback they received with their self-worth (Ryan, 1982). A boost in self-esteem can depreciate significantly following corrective feedback and may be detrimental to self-motivation. Therefore, while supportive person-based feedback is largely beneficial, there is a slight risk that even this positive approach can lead to a negative consequence in the long run.

In general, behavior-based feedback is preferred over person-based feedback if the objective is to improve athletic performance. Geller (2018b) indicated that feedback is not as effective at influencing performance when it is not focused on specific behavior. He also emphasized that it is important to separate the behavior from the person when both giving and receiving feedback. An example of supportive behavior-based feedback is, "Nice job rotating your hips and keeping your weight back," and an example of corrective behavior-based feedback is, "Make sure to keep your shoulders level next time".

Butler (1987) studied four categories of feedback (including behavior-based and person-based) given to 5th and 6th grade students after completing several cognitive tasks. The results revealed that task performance tended to be superior when the feedback was task-involved (i.e., behavior-based) compared to when feedback was ego-involved (i.e., person-based). Another study conducted with athletes found that ego-involvement from the coach (person-based feedback) was linked to lower motivation among the athletes (Amorose & Anderson-Butcher, 2015).

In addition, Amorose and Horn (2000) examined the relationship between college athletes' perceptions of their coaches' behavior and their intrinsic motivation, and found that athletes reported higher intrinsic motivation when they perceived their coaches' feedback to be more behavioral-based. Therefore, behavior-based feedback is generally preferred over person-based feedback if the objective is behavioral improvement, which fuels motivation and performance improvement. Feedback can be given to athletes independent of a specific behavior but the present study focused on task-specific feedback provided following a specific behavior.

2.4 History of Research on Coaching Feedback

The research on coaching feedback has been rather disjointed. Over the past 40 years many researchers have derived and applied different categorizations of the feedback that coaches provide their athletes. However, much of this research has been conducted independently of other studies of coaching-feedback strategies, leading the research on coaching feedback to be quite fragmented and inconsistent in the sport psychology literature.

2.4.1 The Coaching Behavior Assessment System. Some of the earliest research on coaching feedback was conducted by Smith, Smoll, and Hunt (1977) who observed and coded coaches' behaviors in order to determine the classes of behaviors coaches perform to influence their athletes. They used their observations to develop the Coaching Behavior Assessment System (CBAS), which is comprised of 12 categories of coaches' behaviors that are either reactive (i.e., immediate responses to player or team behaviors), or spontaneous (i.e., initiated by the coach and are not reactions to any particular behavior).

Verbal reactive behaviors are essentially feedback. An example of a reactive behavior category in the CBAS is "Mistake-Contingent Technical Instruction," which occurs when a coach tells a player how to correct a mistake after they made it, such as "Keep your elbow tucked

in on the free-throw next time". The CBAS has been used to code the behaviors of coaches or is applied in survey form to measure athletes' and coaches' perceptions of the frequencies of particular types of coaching behaviors.

Black and Weiss (1992) used a survey version of the CBAS to examine how athletes' perceptions of their coaches' feedback behavior affected perceived success, competence, enjoyment, and preferences for challenging activities among competitive swimmers. The researchers found that more positive outcomes were associated with coaches giving more frequent feedback after desirable behavior (i.e., supportive feedback), and more frequent encouragement paired with information following undesirable behavior (i.e., behavior-based corrective feedback).

Amorose and Horn (2000) used the CBAS to measure athletes' perceptions of their coaches' feedback when measuring the link between coaching feedback style and the intrinsic motivation of the athletes. The researchers found that supportive, behavior-based feedback was directly related to higher intrinsic motivation among athletes.

The CBAS has also been used to code observed behaviors of coaches. One study used the CBAS to code the behaviors of Division I college wrestling coaches to determine which coaching behaviors were used more frequently and which of these behaviors were associated with perceived coaching effectiveness (Carter & Geller, 2017). Results of this study indicated that coach's general encouragement behaviors were positively related to perceived coaching effectiveness and punishment was negatively associated with effectiveness in providing technical instruction. This behavioral study also found that coaches gave more corrective than supportive feedback; and when corrective feedback was given it was more often behavior-based than person-based, but supportive feedback was more often person-based than behavior-based.

2.4.2 Positive and negative feedback. Shortly after the development of the CBAS (Smith et al., 1997), other researchers categorized coaching feedback as positive or negative feedback as a means to describe supportive and corrective feedback, respectively. Positive feedback refers to feedback delivered after a desirable behavior, such as "That was a great swing," whereas negative feedback is delivered after an undesirable behavior to improve subsequent behavior (e.g., "You need to keep your weight back next time").

Vallerand (1983) assessed the amount of positive verbal feedback hockey coaches gave their athletes. The authors used the term positive feedback because it is likely to foster intrinsic motivation. The results indicated that more positive verbal feedback was associated with higher self-reported intrinsic motivation and higher self-perceived competence among athletes.

A more recent study assessed the impact of positive feedback on athletes' perceived well-being, performance, and intention to participate in the future, and found that positive feedback predicted each of the previously mentioned outcomes (Mouratidis, Vansteenkiste, Lens, & Sideridis, 2008). Another study examined how athletes' intrinsic motivation relates to gender, scholarship status, and perception of coaches' behavior, and used positive verbal feedback as a category of coaching behavior (Amorose & Horn, 2000). This study found that athletes with higher intrinsic motivation perceived their coaches to give higher frequencies of positive, behavior-based feedback.

In addition, Bloom and Hautaluoma (1987) studied the impact of supportive and corrective feedback using the terms positive and negative feedback. In this study, subjects read scenarios in which a supervisor gave feedback to a subordinate and were instructed to imagine that they were the subordinates and to report their reactions to the feedback. The results indicated that positive feedback was linked to positive affect, while negative feedback was linked to

neutral affect. The researchers used the terms positive and negative in their study to reflect the expected valence associated with each type of feedback.

2.4.3 Theoretical perspectives. It is useful to understand feedback from SDT as well as from other theoretical perspectives. The distinction between person-based and behavior-based feedback aligns with Kulger and DeNisi's (1996) Feedback Intervention Theory (FIT), which states that feedback can target the task, the self (self-esteem), or the individual's motivation. Behavior-based feedback should target the task, while person-based feedback may target the self or the individual's motivation depending on the delivery of the feedback. From a control-theory perspective, a discrepancy between an individual's goal and the feedback s/he receives about his/her actions while striving to achieve the goal motivates the individual to reduce that discrepancy (Kluger & DeNisi, 1996). This discrepancy is referred to as a negative feedback gap. Individuals can reduce this discrepancy in various ways, such as changing the target behavior or changing the standard.

However, from a goal-setting perspective, when there is a discrepancy between the actual behavior and the goal, people's motivation tends to come from the desire to achieve the goal rather than reduce the discrepancy (Kluger & DeNisi, 1996). Regardless of the theoretical perspective, these researchers refer to supportive and corrective feedback as positive and negative feedback, respectively. Supportive and corrective feedback are preferred terms because the results of both types of feedback can be positive or negative (Carpentier & Mageau, 2013).

2.4.4 Autonomy supportive and controlling feedback. More recently, feedback has been defined in yet another way. Researchers conceptualize feedback as being either autonomy supportive or controlling. Autonomy-supportive feedback gives the athletes a perception of choice, acknowledges their views and feelings, and includes them in decision-making (e.g., "I

feel that my coach provides me with choices, options, and opportunities," Hagger, 2007). Plus, autonomy-supportive feedback involves: a) providing a rationale for decisions, b) considering the athletes' perspective, c) providing choices of solutions, and d) avoiding a controlling communication style (Carpentier & Mageau, 2013). In contrast, controlling feedback gives the athletes little perceived control following a coaches' instruction for future behaviors (e.g., "My coach tells me exactly what to do").

Another way to understand autonomy support from a humanistic perspective is to consider that it is nondirective, whereas controlling feedback is directive. Nondirective feedback involves empathic listening to understand the other person's views before providing feedback, whereas directive feedback is more top-down and authoritarian (Geller, 2018b).

Amorose and Anderson-Butcher (2007) examined whether coaching behaviors supported the autonomy of their athletes. This study did not examine feedback directly but assessed general coaching behaviors, which included feedback, as well as non-verbal communication. Autonomy-supportive coaching behaviors were assessed with a Likert-scale survey including items such as, "I feel that my coach provides me choices and options" (Amorose & Anderson-Butcher, 2007, p. 660). This domain of research took off in the coaching feedback literature and led to more studies that measured the perception of coaching feedback as autonomy-supportive or controlling.

One study categorized coaches' communication styles as autonomy-supportive versus controlling when delivering corrective feedback in order to examine which style would be linked to certain outcomes among athletes (Mouratidis, Lens, & Vansteenkiste, 2010). The results of this survey-based research indicated that, compared to a controlling communication style, an

autonomy-supportive style by the coach was directly linked to future intentions to persist at the sport, as well as enhanced well-being, and correlated negatively with ill-being.

Another study found that when negative (corrective) feedback was delivered in an autonomy-supportive vs. a controlling way, athletes reported higher motivation, well-being, self-esteem and performance (Carpentier & Mageau, 2013). These conceptualizations of feedback were primarily used to define feedback after a non-desirable behavior (i.e., corrective feedback). Examining feedback as autonomy-supportive versus controlling reflects both the content of the message and the method of delivery.

2.4.5 Change-Oriented vs. Promotion-Oriented Feedback. Another feedback distinction in the sport psychology literature is change-oriented versus promotion-oriented feedback. Change-oriented feedback is delivered after an undesirable behavior, indicating that the behavior is inadequate and needs to be modified (e.g., "You need to keep your balance next time"). Promotion-oriented feedback is delivered after a desirable behavior and is aimed at confirming and supporting desirable behaviors, such as "Great job keeping your back-swing slow and controlled" (Carpentier & Mageau, 2013).

Obviously, promotion-oriented and change-oriented feedback are synonymous with supportive and corrective verbal feedback, respectively. Carpentier and Mageau (2014) referred to corrective feedback as change-oriented feedback. In their study, the researchers examined whether the coaches' passion and the athletes' motivation could predict the quality and quantity of change-oriented feedback delivered by the coach. The researchers found that obsessively passionate coaches provided more change-oriented feedback. They used the term change-oriented feedback because it indicates the behavior is undesirable and needs to be altered.

A related study examined when change-oriented feedback enhances the motivation, well-being, and performance of athletes (Carpentier & Mageau, 2013). The researchers found that the delivery of corrective feedback predicted athletes' outcomes above and beyond the quantity of the feedback they received. A follow-up study that used the terms change-oriented and promotion-oriented feedback examined the link between the quality and quantity of these types of feedback and the perceived motivation and self-confidence of athletes (Carpentier & Mageau, 2016). The researchers controlled for supportive feedback, referring to it as promotion-oriented feedback because it encourages more of the observed behavior. Findings from this study indicated that autonomy-supportive change-oriented feedback was positively related to self-reported confidence, motivation, and need satisfaction among athletes.

As mentioned above, some research has categorized feedback as both promotion-oriented and change-oriented as well as autonomy-supportive and controlling feedback in the same study (Carpentier & Mageau, 2013, Carpentier & Mageau, 2016). This conceptualization of feedback indicates that the amount of autonomy support can vary within both promotion-oriented and change-oriented feedback styles.

2.4.6 Supportive and corrective feedback. The preferred terms to distinguish feedback are supportive and corrective feedback. Supportive feedback refers to feedback given following a desirable behavior in order to influence the athlete to continue the target behavior. This type of feedback has also been referred to as promotion-oriented or positive feedback in the sport psychology literature.

On the other hand, corrective feedback refers to feedback given following an undesirable behavior in order to improve that behavior. This feedback has also been called change-oriented and negative feedback. Supportive and corrective are the preferred terms because they accurately

reflect the objectives of each type of feedback–to support or correct a target behavior (Geller, 2018a,b). Autonomy-supportive and controlling feedback styles focus on how the feedback is delivered beyond the content of the message, and therefore these categorizations were not be examined in the present study.

2.5 Coaching Feedback and Motivation

Research has found that coaches' behaviors (including feedback) influence athletes' motivation. For example, Vallerand (1983) studied male hockey players whereby participants completed a decision-making task and received varying amounts of supportive feedback or no feedback during the task. The results revealed that supportive feedback in general influenced higher intrinsic motivation than no feedback. In addition, the more often the athletes received supportive feedback, the higher their reported intrinsic motivation.

Amorose and Horn (2000) examined the relationship between college athletes' perceptions of their coaches' behavior and their intrinsic motivation (among other outcomes). The results: Athletes reported higher intrinsic motivation when they perceived their coaches' behaviors to be supportive, democratic, instructive, and based on specific information (i.e., behavior-based) compared to athletes' perceptions of coaches with autocratic, punitive, or ignoring behaviors.

Carpentier and Mageau (2014) found a direct relation between the frequency of corrective feedback from coaches and higher motivation among athletes, as measured by athletes' perceptions of coaching feedback and coaches' perceptions of athletes' motivation. In addition, Gagne, Ryan, and Bargman (2003) examined the relationship between the perceived coaching support of female gymnasts and need satisfaction, motivation, and well-being; and demonstrated a link between autonomy support from coaches and higher intrinsic and extrinsic

motivation among athletes. Similarly, Gillet, Vallerand, Amoura, and Baldes (2010) found that autonomy support from coaches was positively linked to both intrinsic and extrinsic motivation among athletes, as well as to their performance. That study examined athletes' perceptions of their coach, their perceived intrinsic and extrinsic motivation, and their performance in a judo competition.

Further support for the effect of coaching behaviors on the motivation of athletes was evidenced in two studies by Mouratidis, Vansteenkiste, Lens, and Sideridis (2008). The first study involved students in a middle-school gym class completing a shuttle-run task. The second study, involved competitive student athletes and a subjective performance assessment from their coach. The findings from both of these studies indicated that supportive feedback predicted perceived competence, vitality, greater intention to participate, and the well-being among young athletes.

Amorose and Anderson-Butcher (2007) measured athletes' perceptions of their coach, their own intrinsic and extrinsic motivation, as well as their perceptions of competence, autonomy, and relatedness among high-school and college athletes in the Midwestern United States. The results indicated that when the coaching style was perceived by the athletes as more autonomy-supportive, it was linked to perceived competence, autonomy, and relatedness, which correlated directly with the athletes' intrinsic and extrinsic motivation.

Mouratidis, Lens, and Vansteenkiste (2010) examined the relationship between corrective feedback and well-being and motivation, and found autonomy-supportive corrective feedback to be directly related to both the intrinsic and extrinsic motivation of athletes. Bottom line: Much research has shown that the behaviors of a coach, especially the feedback they deliver, significantly influence the motivation of their athletes.

2.6 Motivation and Performance

Many studies have found that motivation influences athletes' performance. Grant and Sonnetag (2010) found that self-reported intrinsic motivation correlated negatively with emotional exhaustion, which certainly affects task performance. Cerasoli, Nicklin, and Ford (2014) conducted a meta-analysis on intrinsic motivation, incentives, and performance. Since incentives are an external factor leading to extrinsic motivation, their study examined both intrinsic and extrinsic motivation. Their review indicated that motivation is a medium-to-strong predictor of performance across studies. They also found that intrinsic motivation predicted more unique variance in the quality of performance than did incentives (i.e., extrinsic motivation). Moreover, the relationship between motivation and performance was the strongest in work and sport settings, compared to school settings.

The link between motivation and performance in a sport setting was demonstrated in a recent study of the Eastern Kentucky University men's basketball team (Pope, 2017). As expected, the athletes' motivation correlated directly with both better subjective practice performance and better objective game performance. Gillet et al. (2010) measured the self-reported intrinsic motivation of judo athletes prior to competing in a competition, and found that intrinsic motivation predicted performance, as assessed by objective competition outcomes.

2.7 Feedback, Motivation, and Performance

Some research has supported the mediating role of motivation in the relationship between feedback and performance. For example, a study of college athletes found support for a model that included intrinsic motivation as the mediating mechanism in the relationship between the transformational leadership of coaches and athletes' sport performance (Charbonneau, Barling, & Kelloway, 2001). The authors' hypothesized that verbal feedback mediates the relationship

between transformational leadership and motivation, suggesting that motivation may mediate the relationship between feedback and performance.

Gillett et al. (2010) found that self-reported perceived autonomy support from the coach related positively to the perceived intrinsic and extrinsic motivation of judo athletes, as well as to athletic performance, measured by the outcomes of a judo competition. While this study did not measure feedback from coaches specifically, feedback is a significant component of the autonomy support athletes receive from their coach. Therefore, this study lends some support to motivation mediating the relationship between coaching feedback and athletic performance.

Carpentier and Mageau (2013) studied the mediating role of motivation in the feedback–performance relationship by giving athletes a survey after a training session with their coach. The survey assessed athletes' perception of the quality and quantity of their coaches' corrective feedback, as well as their own perceived intrinsic and extrinsic motivation. These researchers assessed "autonomy-supportive change-oriented feedback," which is essentially corrective feedback delivered to support the autonomy of the athlete. To measure performance, they asked coaches to rate the performance improvement of the athletes. The findings revealed a direct correlation between the frequency of corrective feedback and athletes' self-reported intrinsic and extrinsic motivation. In addition, the more autonomy-supportive corrective feedback from the coaches, the higher the subjective ratings of the athletes' performance. This study, along with other previous research, supports motivation as the mediator between feedback and performance.

From the perspective of SDT, feedback that satisfies an individual's need for competence, autonomy, and relatedness will lead to higher intrinsic motivation, and in turn, superior performance from that individual (Deci & Ryan, 2000). However, possible reasons for this presumed connection between feedback, motivation, and performance can be considered

from other theoretical perspectives. From the perspective of goal-setting theory, feedback influences individuals to set specific goals to improve, causes people to raise their goals after achieving a particular performance goal, or inform individuals that their current effort is not sufficient to achieve their goals and motivates them to increase their effort (Latham & Yulk, 1975; Locke & Latham, 2006). From this perspective, goal-setting is the motivational mediator between feedback and performance. This is similar to the model proposed by SDT, but with a different explanation because individuals must have relatively high motivation in order to set goals and adjust their goals following relative feedback.

Similarly, from the perspective of feedback theory, corrective feedback reveals a discrepancy between desired and actual behavior, which is expected to motivate individuals to reduce this discrepancy and improve their future behavior (Kluger & DeNisi, 1996). This provides a different explanation for the increase in motivation following feedback than that provided by SDT and goal-setting theory.

Additionally, from a regulatory-fit perspective, if the feedback provided by the coach matches the orientation of the athlete–a promotion or prevention orientation–then the athlete will be more motivated than when the feedback does not match the athletes' orientation (Higgins, Idson, Freitas, Spiegel, & Molden, 2003). Thus, a variety of theoretical perspectives can explain the same phenomenon: That coaching feedback influences the motivation of athletes and in turn, their athletic performance.

2.8 Athletic Performance

2.8.1 Behavior, individual performance, and team performance. It is crucial to distinguish between behavior, individual performance, and team performance, especially in sports. In a sport context, examining behavior involves evaluating the technique and observable

mechanics of an athlete at a behavior-specific level. For example, in a softball context, behaviors include a level batting swing, appropriate hip rotation, and balance. Behavior in a sport context is often cumbersome to measure because it involves detailed coding of the athletes' movements.

In contrast, individual performance is the outcomes of a process that involves behavioral, dispositional, and situational factors. While individual performance involves a variety of behaviors, it also includes the dispositional skill level and attitude of the athlete, as well as the context of the behavior (Geller, 2018a). In other words, individual performance reflects how well athletes perform at their sport-specific tasks. To continue with the softball example, using runs batted in (RBIs) as an individual performance measure includes the above-mentioned behavior of the batter swinging. However, the RBI statistic is influenced by the dispositional talent and person-state of the batter, the performance of the opposing pitcher, the batter's motivation, and the number of runners on base. Individual performance is more commonly measured than behavior in a sport context and is frequently recorded by coaches and staff. It is also highly valued in sport because athletes are typically evaluated on their individual performance.

Finally, examining team outcomes involves a consideration of the end result at a big-picture, macro level. This is often done by examining wins and losses, or team rankings. Thus, the performance of a team is determined by much more than what individuals can control with their behavior. These outcome measures are important but do not necessarily relate closely to individual behavior or performance. The present study used individual performance as the performance measure.

2.8.2 Traditional measurement of athletic performance. In sport psychology research, it is common to measure individual sport performance with subjective ratings by the coach. This was evidenced in several studies referenced above. For instance, Charbonneau et al. (2001)

measured individual athletic performance by asking coaches to: a) rate the athletes' performance in both training and competition, b) rate the athletes' improvement, and c) rank each athlete compared to other members of the team. In another example, Carpentier and Mageau (2013) assessed performance by asking coaches to subjectively rate the extent to which each athlete had improved technically, tactically, physically, and psychologically over the course of the season.

Gillet el al. (2010) did apply an objective performance measure in their research. The official rankings from a judo event were used to measure performance. While the rankings from an event indicate the individual performance of an athlete, a more accurate measure could have been used, such as points-for and points-against each athlete throughout an event.

The limitations of subjective performance ratings of athletes are evident in the research of performance appraisals by work supervisors. DeNisi and Murphy (2017) found that the majority of performance appraisals in the workplace consist of subjective ratings. This is the case in sport research as well. Unfortunately, subjective ratings of subordinates may not accurately measure performance because they are often not procedurally just.

Helsin and VandeWalle (2011) conducted a study of performance appraisals in the workplace and found that individual differences of managers, particularly their implicit personality theory (i.e., their stance on whether people can change), predicted the amount of procedural justice perceived by their subordinates. This suggests that the procedural justice of a performance appraisal depends on who is conducting the appraisal.

In addition, subjective performance evaluations rely too heavily on the memory of the evaluator and are subject to primacy and recency effects, halo effects, leniency and severity effects, and the central tendency to remember all subordinates as average (DeNisi & Murphy, 2017). These researchers also found that the context of the performance appraisal impacts the

process and outcomes of that appraisal. Thus, it is clear that subjective ratings of performance are not the most fair nor the most accurate measures of performance.

2.9 The Current Study

The aim of the current study was to enhance the understanding of the effects of different coaching feedback strategies on the motivation and performance of athletes. This study contributed to the existing literature in several ways. First the current study introduced a comprehensive questionnaire to assess athletes' perceptions of the frequency of their coaches' feedback including the distinction between supportive and corrective, and behavior-based and person-based feedback. Second, very few studies in a sport context have examined the impact of both supportive and corrective feedback. Carpentier and Mageau (2016) included both feedback styles, but they did not examine the impact of supportive feedback. In fact, the majority of such studies only assessed corrective feedback (Mouratidis et al., 2010; Carpentier & Mageau, 2013), or assessed only supportive feedback (Mouratidis et al., 2008; Vallerand, 1982).

Also, the author found no study that examined both behavior-based and person-based feedback in a sport context. Amorose and Horn (2000) examined behavior-based feedback among athletes, but did not assess person-based feedback. Research has examined these feedback strategies in contexts other than athletics, such as the previously mentioned study by Butler (1987) in an educational context.

In addition, the majority of sport studies used subjective measures of athletic performance (e.g., Charbonneau et al., 2001; Carpentier & Mageau, 2013). While a few studies used objective performance indices like Gillet et al. (2010), none of these studies examined the proposed model with objective performance measures. The current study used an objective measure of individual athletic performance.

Another contribution of this research is that it examined the relationship between feedback, motivation, and performance. Only limited research has addressed this relationship in a sport context. One such study by Carpentier and Mageau (2013) examined the relationship between corrective feedback, motivation, and sport performance among athletes. Their research indicated that corrective feedback delivered in a way that supported the autonomy of the receiver was positively linked with intrinsic and extrinsic motivation, well-being, self-esteem, satisfaction of the needs for competence, autonomy, relatedness, and sport performance. However, that study did not measure supportive feedback and used a subjective measure of performance whereby the coach rated each athletes' performance.

The current research expanded upon the research by Carpentier and Mageau (2013) by incorporating supportive feedback, adding the behavior-based verses person-based distinction, and using an objective measure of sport performance. Based on previous theory and research, the following hypotheses were proposed:

Hypothesis 1: A factor analysis of the perceived coaching feedback questionnaire will reveal that a four-factor solution with the four feedback categories will demonstrate the best fit.

Hypothesis 2: Coaches will display: a) more corrective feedback than supportive feedback, b) more behavior-based corrective feedback than person-based corrective feedback, and c) more person-based supportive feedback than behavior-based supportive feedback.

Hypothesis 3: Compared to corrective person-based feedback, supportive person-based feedback will be more related to: a) higher intrinsic and extrinsic motivation, and b) better performance.

Hypothesis 4: Compared to corrective behavior-based feedback, supportive behavior-based feedback will lead to better performance.

Chapter 3

Methods

3.1 Participants

The initial sample consisted of 284 college athletes' from Division I and Division III schools. Sixty-seven participants were removed from the data set for not filling out any survey item and 47 were removed for not responding to any items other than the demographics questions. Additionally, one respondent's duplicate response was deleted yielding a final sample comprised of 169 participants. Of these participants, we only included performance metrics for 161 because they did not meet the cutoffs of 3 golf matches played, 20 minutes of basketball played, 5 at bats in baseball or softball, or more than 3 innings pitched. Descriptive statistics are shown in Table 1.

Table 1
Descriptive Statistics of the Sample

	Overall
Age in Years *M* (*SD*)	19.40 (1.23)
Gender *N* (%)	
Male	95 (56.2)
Female	74 (43.8)
Sport *N* (%)	
Golf	35 (20.7)
Basketball	50 (29.6)
Baseball/Softball	84 (49.7)
Not employed in the past year	
Years with Coach *M* (*SD*)	2.04 (1.09)
NCAA Division *N* (%)	
Division I	21 (12.4)
Division III	148 (87.6)
N	169

Thirty teams from twenty-one different colleges and universities were involved in this project. The list of participating teams can be found in Table 2. Only participants from golf, baseball, softball, and basketball teams were included because the recorded statistics from these sports are comprehensive measures of individual performance. If two teams were coached by the same person, which sometimes occurred for golf teams, then they were counted as one team for purposes of this research. Participants were recruited by contacting the coaching staff through email. Informed consent was obtained from each participant at the beginning of the survey.

Table 2
List of Teams who participated

Team	Number of Participants
Allegheny College Golf	10
Capital University Baseball	20
Clemson University Golf	2
College of Charleston Softball	16
College of Wooster Baseball	6
College of Wooster Women's Golf	4
College of Wooster Women's Basketball	2
College of Wooster Men's Basketball	3
DeSales University Women's Basketball	3
Emory and Henry Baseball	12
Emory and Henry Golf	4
Georgia Tech University Men's Golf	3
John Carroll University Men's Basketball	6
Kenyon College Men's Golf	3
Marietta College Men's Basketball	7
Moravian College Softball	11
Muskingham University Women's Basketball	7
Muhlenberg College Softball	6
Nebraska Wesleyan University Men's Golf	1
Nebraska Wesleyan University Women's Golf	1
Nebraska Wesleyan University Softball	2
Nebraska Wesleyan University Baseball	6
Nebraska Wesleyan University Women's Basketball	2
Nebraska Wesleyan University Men's Basketball	4
Ohio Northern University Women's Basketball	7
Otterbein University Men's Basketball	3
Ohio Wesleyan University Women's Basketball	2
Randolph Macon College Women's Basketball	6
Wabash College Men's Golf	6

3.2 Procedure

In order to recruit participants, the researcher contacted coaches from approximately 420 colleges and university teams in the United States through emails and phone calls. The email template can be found in Appendix A. The researcher offered to share findings with coaches to compensate them for their teams' participation. After coaches agreed to participate, they sent a Qualtrics survey link to their athletes through email. In this survey athletes assessed their perceptions of their coaches' feedback styles and reported their intrinsic and extrinsic motivation. This survey was administered no later than two weeks into the start of competition. This provided enough time for athletes familiarize themselves with their coaches' feedback style and was early enough in the season such that responses should not have been confounded with the teams' performance. The duration of the survey was approximately 10 to 15 minutes.

Athletes individual performance statistics were taken from the college/university athletics pages at the end of the regular season. These performance metrics were then paired with an identification code assigned to each participant to create a dataset with performance metrics and identification codes. This dataset was then paired with the data from the survey to create a comprehensive data set containing all relevant data for this project.

3.3 Measures

3.3.1 Coaching feedback. The feedback style of each coach was measured with a survey that assessed each athletes' perception of their coaches' feedback style. Survey items can be found in Appendix B, where the items are categorized by feedback style. The 24 items assessed the frequency of the athletes' perceptions of four different styles of coaching feedback: behavior-

based corrective, behavior-based supportive, person-based corrective, and person-based supportive. Note the items were randomized and reformatted from what is found in Appendix B.

The items from this questionnaire were created for this project. To create these items, the researchers examined the Change-Oriented Feedback Scale developed by Carpentier and Mageau (2013) and the English version of the Autonomy-Supportive Corrective-Feedback Scale developed by Mouratidis (2010). No items were taken directly from these scales but they shaped the items that were constructed. Respondents were instructed to answer each item on a seven-point Likert-scale from one (never) to seven (always).

3.3.2 Motivation. The Sport Motivation Scale (SMS), provided in Appendix C, developed by Pelletier, Fortier, Vallerand, Briere, Tuson, and Blais (1995) was used to measure the intrinsic and extrinsic motivation of the athletes. This scale incorporates a seven-point Likert response scale from one ("Does not correspond at all") to seven ("Corresponds exactly"). Five subcategories of motivation were assessed that can be grouped into intrinsic motivation, extrinsic motivation, and amotivation. Past research has found acceptable test-retest reliability, ranging from .58 to .84 and adequate internal consistency with alpha values ranging from .69 to .85 (Pelletier et al., 1995).

3.3.3 Performance. The individual performance of athletes was assessed with the end-of-season statistics provided on the respective University athletics websites.

For athletes on golf teams, the number of strokes per match was used as the performance measure. A golf match is 18 holes and golfers are scored on the number of strokes over the course of these holes.

Basketball players were assessed with a number of individual performance statistics that reflect the performance of a basketball player. The statistics used were field goal percentage,

defensive rebounds per minute, and assists per minute. These performance statistics were chosen because they have been found to be the best indicators of win percentage (Csataljay, O'Donoghue, Hughes & Dancs, 2009, Garcia, Ibáñez, De Santos, Leite, & Sampaio, 2013; Silva & Andrew, 1987).

For baseball and softball field players, the following statistics were used to assess overall performance: on-base percentage, slugging percentage, and fielding percentage. On-base percentage and slugging percentage have been found to be the best predictors of runs scored and fielding percentage is an accurate assessment of fielding performance (Moy, 2006; Schilz, Musa, Staszewski, & Siegler, 1994).

Pitchers on baseball and softball teams were assessed with walks plus hits per inning pitched (WHIP)–the ability to keep runners off base–because it has been found to be the most accurate gage of pitching ability (Moy, 2006). Pitchers were evaluated independently of field players.

3.4 Analyses

The initial analysis used the above-mentioned performance measures to assess the proposed model across all sports. Performance measures for each sport were standardized and combined to create a universal metric of performance across all sports in the sample. A factor analysis was used to test the structure of the perceived coaching feedback scale and SEM analyses were used to test the proposed model.

Chapter 4

Results

The correlations and reliabilities of the observed variables are provided in Table 3. The intrinsic and extrinsic subsets of the Sport Motivation Scale demonstrated strong reliability (.92 & .87 respectively). Additionally, each type of feedback demonstrated an α of .81 or higher, aside from the supportive behavior-based facet, which had a reliability of .52. The strongest association was between supportive behavior-based feedback and corrective behavior-based feedback (r = .81), which may indicate that coaches who used behavior-based feedback tended to use it regardless of whether they were providing supportive or corrective feedback.

Table 3
Correlations of Observed Variables

	M (SD)	Cbb	Sbb	Cpb	Spb	Intrinsic	Extrinsic	Performance
Cbb	4.95 (1.30)	(.91)						
Sbb	4.69 (1.29)	.81	(.91)					
Cpb	3.1 (1.34)	-.54	-.44	(.81)				
Spb	5.52 (1.03)	.21	.32	.12	(.52)			
Intrinsic	5.25 (1.13)	.25	.27	-.20	.14	(.92)		
Extrinsic	4.01 (1.16)	.08	.04	-.006	.09	.56	(.87)	
Performance	-	-.02	-.04	.03	-.14	-.13	-.003	1

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback, Cronbachs alpha on the diagonals, Means and Standard Deviations of feedback conditions are frequency of

perceived feedback from 1 (Never) – 7 (Very Often), No M or SD for Performance because it was group mean centered.

4.1 Feedback Scale Factor Structure. Due to a limited sample size and strong theoretical rationale for the factor structure we constructed a confirmatory factor analysis (CFA) instead of an exploratory factor analysis (EFA). A CFA confirmed the factor structure of the perceived coaching feedback scale. A four-factor model was tested with each of the four feedback conditions as factors. This model was compared to a two and a one-factor model because these could theoretically make sense: a one-factor model representing general feedback and a two-factor model representing corrective and supportive feedback. Lending support to Hypothesis 1, the four-factor model demonstrated the best model fit: $\chi_2 (246) = 521.63$, $p < .05$, RMSEA = .08, SRMR = .10, CFI = .87. Factor loadings are given in Table 4.

Table 4
Factor Loadings of Four factor CFA of Perceived Coaching Feedback Scale

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)
Cbb				
Fb1	.813			
Fb2	.839			
Fb3	.844			
Fb4	.851			
Fb5	.823			
Fb6	.614			
Cpb				
Fb7		-.021		
Fb8		-.311		
Fb9		.747		
Fb10		.662		
Fb11		.759		
Fb12		.711		
Sbb				
Fb13			.827	
Fb14			.776	
Fb15			.801	
Fb16			.808	
Fb17			.737	
Fb18			.852	

Spb	
Fb19	.810
Fb20	-.039
Fb21	.808
Fb22	-.308
Fb23	-.091
Fb24	-.051

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback.

A two-factor model was tested to examine a model with two factors representing corrective and supportive feedback, respectively. This model demonstrated worse model fit than the four-factor solution. χ_2 (251) = 689.45, $p < .05$, RMSEA = .10, SRMR = .11, CFI = .80. Similarly, a one-factor solution was tested to determine if a general feedback factor would demonstrate the best model fit. The fit of this model was also not as good as the four-factor solution, χ_2 (252) = 807.66, $p < .05$, RMSEA = .11, SRMR = .10, CFI = .75. While the fit indices of the four-factor model were not at traditionally acceptable levels, they were reasonably close (Hu & Bentler, 1999). The confidence interval for RMSEA (.072, .091) had considerable overlap with acceptable levels (<.08). All fit indices are point measures, not population values, and thus these fit indices may demonstrate true scores at acceptable values. Thus, the four-factor solution with each of the four feedback conditions demonstrated the best model fit, compared with the other theoretically possible models.

However, upon examination of the factor loadings of the four-factor solution, four items loaded negatively onto the factors rather than positively, as expected. Two of these items were in the corrective person-based feedback factor (FB7 & FB8) and two were in the supportive person-based feedback factor (FB19 & FB21). This may have occurred because of the wording of the items, which can be found in Appendix B. The FB7 and FB8 items may have had a negative loading because the wording could be interpreted as encouragement and not as a coach providing

broad, person-based corrective feedback, while other items in this factor more accurately represent corrective person-based feedback. Similarly, items FB19 and FB21 may be interpreted as more general encouragement, whereas the rest of the items in that factor may be interpreted as an apathetic acknowledgement of a desirable behavior. With these four items removed, the four-factor CFA revealed acceptable fit indices, superior to the model that included these items: χ^2 (164) = 256.37, $p < .05$, RMSEA = .06, SRMR = .07, CFI = .92 (Hu & Bentler, 1999). The four factor solution after removing these items was still superior to the two-factor solution, χ^2 (169) = 395.73, $p < .05$, RMSEA = .08, SRMR = .08, CFI = .88, and the one-factor solution, χ^2 (252) = 807.66, $p < .05$, RMSEA = .11, SRMR = .10, CFI = .75. A chi-square difference test revealed a significant difference between the four-factor and two-factor models ($p < .05$) and the four-factor and one-factor models ($p < .05$). Factor loadings can be found in Table 5.

Table 5
Factor Loadings of Four factor CFA of Perceived Coaching Feedback Scale after removing four items

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)
Cbb				
Fb1	.816			
Fb2	.837			
Fb3	.843			
Fb4	.853			
Fb5	.820			
Fb6	.618			
Cpb				
Fb9		.739		
Fb10		.693		
Fb11		.761		
Fb12		.704		
Sbb				
Fb13			.823	
Fb14			.782	
Fb15			.799	
Fb16			.806	
Fb17			.737	
Fb18			.854	
Spb				

Fb20	.531
Fb22	.520
Fb23	.669
Fb24	.536

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback.

We tested a five-factor solution to determine if the four items that were deleted actually measured a general encouragement factor as we expected. This model displayed fit comparable to that of the four-factor solution, $\chi^2(242) = 348.18$, $p < .05$, RMSEA = .05, SRMR = .07, CFI = .95. However, one item (Fb7) had a low factor loading of .21, as seen in Table 6.

Table 6
Factor Loadings of Five factor CFA of Perceived Coaching Feedback Scale Including a General Encouragement Factor

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)	Factor 5 (Ge)
Cbb					
Fb1	.816				
Fb2	.839				
Fb3	.842				
Fb4	.851				
Fb5	.821				
Fb6	.616				
Cpb					
Fb9		.734			
Fb10		.674			
Fb11		.774			
Fb12		.714			
Sbb					
Fb13			.826		
Fb14			.777		
Fb15			.801		
Fb16			.808		
Fb17			.736		
Fb18			.853		
Spb					
Fb20				.524	
Fb22				.534	
Fb23				.661	
Fb24				.533	
Ge					
Fb7					.210

Fb8	.513
Fb19	.829
Fb21	.835

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback, Ge = General Encouragement

After removal of this item the model displayed very good fit, χ_2 (220) = 310.76, $p < .05$, RMSEA = .05, SRMR = .07, CFI = .96, which suggests that the perceived coaching feedback questionnaire may measure a general encouragement factor in addition to the four previously mentioned feedback styles. Although a chi-square difference test revealed that the five-factor solution is not different from the four-factor solution ($p = .53$). Table 7 Includes the factor loadings after the removal of this item.

Table 7
Factor Loadings of Five factor CFA of Perceived Coaching Feedback Scale Including a General Encouragement Factor

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)	Factor 5 (Ge)
Cbb					
Fb1	.816				
Fb2	.839				
Fb3	.842				
Fb4	.851				
Fb5	.820				
Fb6	.616				
Cpb					
Fb9		.735			
Fb10		.673			
Fb11		.774			
Fb12		.713			
Sbb					
Fb13			.826		
Fb14			.777		
Fb15			.801		
Fb16			.808		
Fb17			.736		
Fb18			.853		
Spb					
Fb20				.524	
Fb22				.535	
Fb23				.658	

	Fb24	.533	
Ge			
	Fb8		.515
	Fb19		.830
	Fb21		.837

4.2 Examining Frequencies of Perceived Feedback. In order to test the second hypothesis, a paired samples *t*-test was conducted to compare the perceived frequencies of coaches' use of each feedback style. Contrary to Hypothesis 2a, athletes perceived that their coaches used more supportive (M = 5.11, SD = .94) than corrective (M = 4.03, SD = .63) feedback, $t(168) = -16.70$, $p < .05$). In accordance with Hypothesis 2b, athletes perceived that the corrective feedback delivered by their coaches was more behavior-based (M = 4.95, SD = 1.30) than person-based (M = 3.10, SD = 1.34), $t(168) = 10.34$, $p < .05$. When coaches provided feedback after a less than optimal performance, athletes perceived that this feedback addressed the specific behavior that needed to change more often than they made general statements focused on the individual. Additionally, supportive feedback provided by coaches was found to be more person-based (M = 5.53, SD = 1.03) than behavior-based (M = 4.69, SD = 1.29), $t(168) = 7.88$, $p < .05$. This finding lends support to Hypothesis 2c.

4.3 Creating One Performance Measure. Eight participants were removed from the analyses involving performance for not meeting the criteria of at least three golf matches played, at least 20 minutes of basketball played, at least five at bats in baseball or softball, or at least three innings pitched, resulting in a sample of 161 for subsequent analyses. In order to create a single performance measure across sports, performance metrics for each sport were combined and standardized. Each performance metric for baseball and basketball were weighted equally. Literature fails to report effect sizes of each performance metric and there is little agreement as

to what predictors influence performance more than others (Csataljay et al., 2009; Garcia et al., 2013; Silva & Andrew, 1987; Moy, 2006; Schilz et al., 1994). Research has suggested that the measures included were among the most predictive, but there is no conclusive evidence that some should be weighted more than others (Garcia et al., 2013; Moy, 2006). After creating one performance metric for each sport, this metric was group-mean centered. This created one standard outcome measure across sports.

4.4 Testing the Proposed Model. In order to test the proposed model, the interclass correlation coefficients (ICC) were examined. The ICC 1's demonstrated extremely low values at the sport (.00004) and coach (.0006) levels, indicating that very little variance in performance was accounted for by the athletes' coach or by the sport. The ICC1 for sport was likely so low because sports performance metrics were group mean centered, thus the ICC1 should have been approximately zero. The most likely explanation for why the ICC1 for coach was so low is that, as seem in Table 2, there we so few athletes from each team included in this study. The average number of athletes per team was 5.6 but there were several teams with only one or two athletes. Because of this the variance in performance was likely not explained by the coach. Based on these findings, there was no need to examine a multilevel model. Therefore, structural equation modeling (SEM) with mediation was conducted to test the proposed model.

Initial findings indicated poor model fit (χ_2 (5) = 64.78, $p < .05$, CFI = .08, RMSEA = .27, SRMR = .10). However, the modification indices suggested that intrinsic and extrinsic motivation should covary in the model. Theoretically, this makes sense because both were derived from the same scale and assessed different aspects of athletes' motivation. After setting intrinsic and extrinsic motivation to covary, the model demonstrated acceptable fit: χ_2 (4) = 6.10, p = .19, CFI = .96, RMSEA = .06, SRMR = .03 (Hu & Bentler, 1999).

The final model is shown in *Figure 2* and depicts a significant β path between supportive person-based feedback and intrinsic motivation (.18). This relationship exists such that higher frequencies of supportive person-based feedback were linked with higher intrinsic motivation. There is also a link between corrective person-based feedback and intrinsic motivation (-.21), indicating an inverse relation between frequencies of corrective person-based feedback frequency and intrinsic motivation. The paths from supportive person-based (CI = .01, .36) and corrective person-based feedback (CI = -.31, -.51) to intrinsic motivation were the only in the model that were significantly different. This supports Hypothesis 3a, but lends no support to Hypotheses 3b, 3c, or 4. Additionally, the β path from extrinsic motivation (p = .08) to performance was trending towards significance.

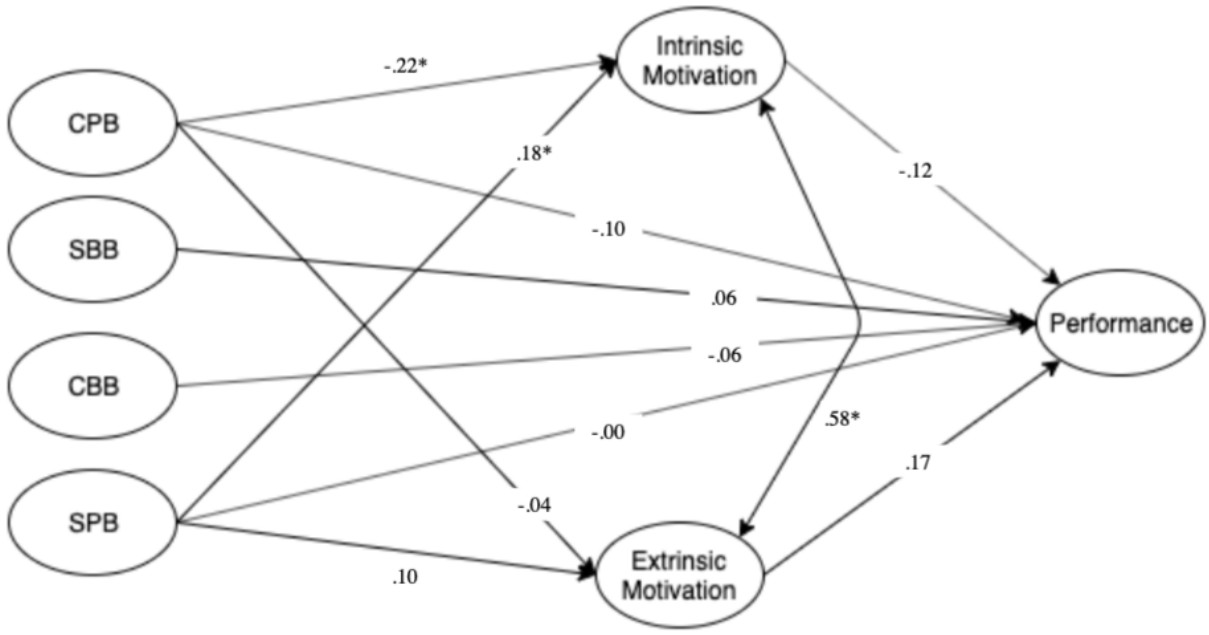

Figure 2. Path model with β values.
Note: CPB = corrective person-based feedback, SBB = supportive behavior-based feedback, CBB = corrective behavior-based feedback, SPB = supportive person-based feedback, performance = individual athletic performance.

Chapter 5

Discussion

The findings of this study have informative implications for coaches and other decision makers, even though the model failed to predict performance. An important contribution is the development of a perceived coaching feedback questionnaire. No such questionnaire exists to assess frequency of supportive behavior-based, corrective behavior-based, supportive person-based, and corrective person-based feedback. Each feedback condition demonstrated moderate to high levels of reliability and the factor structure had reasonably adequate fit indices, as shown in Table 3.

This questionnaire can contribute to future research of coaching feedback by providing a questionnaire with acceptable reliability and a solid factor structure that can assess athlete's perception of their coaches' feedback style. Additionally, this questionnaire could prove useful in applied settings for teams who want to assess athletes' perceptions of the feedback style exhibited by their coaches, especially because feedback style influences athlete's motivation and performance as discussed below. A sports organization may be interested is using this questionnaire to evaluate the use of certain feedback styles by the current coaching staff or to assess past athletes' perceptions of a coach an organization is considering hiring.

The present study also revealed very impactful and interesting findings about the frequencies of feedback styles perceived by athletes. The difference in frequency of feedback style used between corrective feedback and supportive feedback was in the opposite direct as hypothesized. Athletes perceived that their coaches provided more supportive feedback than

corrective feedback. This finding contradicts findings by Carter and Geller (2017) who observed coaches' behavior and found that coaches delivered more corrective than supportive feedback. In that study, the researchers' video-recorded and coded the feedback behaviors that coaches provided to athletes, whereas in the present study athletes reported their perceptions of the feedback style of their coach. It is possible that athletes perceive feedback styles differently than when objectively recorded by a researcher.

Amerose and Horn (2000) found that athletes with higher intrinsic motivation felt that their coaches demonstrated more positive (supportive) feedback, more behavioral-based feedback, and lower frequencies of ignoring or punishment-oriented behaviors. The sample in the present study were all elite athletes who should already be relatively high in intrinsic motivation and reported a mean intrinsic motivation score of 5.25 out of seven. It may be that the elite, motivated athletes in the present study perceived receiving more supportive feedback and less corrective feedback than an objective observer might record. It would be interesting to compare athletes' perceptions of their coaches' feedback with objective observations of the same coaches' feedback.

As hypothesized and observed by Carter and Geller (2017), elite college athletes perceived that the corrective feedback delivered by their coach was more often behavior-based than person-based. This shows that at the elite level, when an athletes' behavior is subpar, their coach delivers feedback that addresses the specific behaviors that were non-optimal. This finding is positive because if athletes demonstrates behavior that is not desirable, the feedback they receive should target that specific behavior so they can modify their behavior in future instances. If coaches deliver corrective person-based feedback in these instances, the athletes are likely to internalize the problem as something wrong with them as a person or athlete instead of viewing it

as a behavior that can be modified for a better result next time. Therefore, the fact that athletes perceived that their coaches provided more behavior-based than person-based feedback after a subpar performance was a benevolent finding.

Also supporting the objective findings of Carter and Geller (2017), the supportive feedback of coaches was perceived as person-based more often than behavior-based. Thus, when athletes perform a desirable behavior, the feedback they receive is congratulatory but often does not identify specific desirable behavior. While it is beneficial for athletes to receive supportive feedback of any kind, it appears that coaches make an assumption that the athletes know exactly what behavior is being rewarded by their praise. This may be the case at times but it is possible that an athlete is not aware of the particular behavior that is being recognized. Coaches should continue to provide athletes with supportive feedback but should attempt to make their supportive feedback behavior-based. Future research should test these findings in other contexts and examine benefits from the different feedback styles, such that, given the base differences in frequencies of feedback styles perceived by athletes, coaches could alter their feedback to improve outcomes in athletes.

The examination of the proposed model from this study also provides utility. Unfortunately, this model was unable to predict performance. Yet, some findings did emerge. First, supportive person-based feedback was linked with intrinsic motivation, such that the more supportive person-based feedback athletes received, the higher their levels of intrinsic motivation. This indicates a benefit for coaches' to provide athletes with supportive person-based feedback. Teams and decision makers can use these findings to increase the amount of supportive person-based feedback that coaches provide to athletes as a means to increase the

intrinsic motivation of their athletes. This is clearly advantageous because of many benefits associated with higher levels of intrinsic motivation (Cerasoli et al., 2014; Gillet et al., 2010).

Corrective person-based feedback was also associated with intrinsic motivation, such that higher frequencies of corrective person-based feedback was related to lower levels of intrinsic motivation. This is a critical finding because it shows that this particular feedback style tends to decrease the intrinsic motivation of their athletes. If athletes receive information about a particular behavior they need to correct then they can modify that behavior for improvement. But, person-based corrective feedback provides no direction of improvement and might be associated with ability or self-worth, thereby lowering intrinsic motivation. Coaches should try to avoid delivering corrective person-based feedback to their athletes and make sure corrective feedback they deliver is behavior-based.

5.1 Contributions of the Present Study

The findings from this research are relevant for coaching training and decision-making in sport settings. One strength of this study was that the research was conducted on high-level athletes who were currently competing in NCAA varsity athletics. In addition, the performance data were collected objectively, as opposed to subjective assessments from coaches or athletes, which is common in this literature (Carpentier & Mageau, 2013; Charbonneau et al., 2001; Mouratidis et al., 2008).

While the model in the present study failed to predict performance, it did indicate that the frequency of supportive and corrective person-based feedback both impact the intrinsic motivation of athletes. Coaches can use this information to attempt to impact how their feedback styles are perceived by athletes.

An extremely important contribution of this research was the development of the perceived coaching feedback questionnaire. This measure should be used for future research and practice as a feedback scale that comprehensively measures athletes' perceptions of their coaches' feedback style. No such measure existed prior to this project and the present questionnaire demonstrated acceptable reliability and a strong factor structure.

Finally, the differences in frequencies of feedback were very interesting and demonstrated large effect sizes. The fact that higher frequencies of supportive feedback were observed than corrective should be examined in future studies to compare athletes' perceptions of coaching feedback to coaches actual feedback. Additionally, the fact that corrective feedback is more person-based, while supportive feedback is more behavior based is a very important finding in understanding how coaches feedback is perceived.

5.2 Limitations and Future Directions.

The present study was limited by the fact that the feedback and motivation questionnaires were administered cross-sectionally. Practical limitations capped the final sample size at 169 but future research should attempt to incorporate a larger sample. Multiple paths in the model were trending toward significance and it is possible these paths would have reached significance with a larger sample size, increasing the validity and utility of the results.

While athletes' perceptions of their coaches' feedback style may be more informative than the actual feedback coaches provide, future research should attempt to objectively code coaches actual feedback behaviors, when testing this model. It would be of interest to examine if athletes' perceptions of their coaches' feedback match objective observation of coaches' feedback style. Future research should also incorporate a larger sample and examine a wider range of sports to determine if these findings generalize across all sports. Also, this study only

examined task-specific feedback. Future research may want to include feedback that is more general (not in immediate response to a task or behavior) and examine the delivery of the feedback.

Additionally, the proposed model was not found to predict performance and only two paths reached significance. Future studies should test other models connecting the four feedback categories to performance. This study was limited by the fact that data in this study were nested in so many ways. The researchers accounted for nesting within team and within sport. However, athletes were also nested within school and within division.

A major issue of this study may have been that the performance criterion was not clearly defined. The present study was relatively exploratory in this domain. While past research has indicated that the performance metrics used encapsulate individual athletic performance (Csataljay et al., 2009, Garcia et al., 2013; Moy, 2006; Schilz et al., 1994; Silva & Andrew, 1987), no research has tested this at the individual level. Perhaps including other performance measures or assigning varying weights to each metric may improve the criterion. Future research should examine this criterion issue in sport feedback research.

5.3 Conclusions

Prior research has examined the impact of coaches' various feedback styles on athletes' motivation and performance. However, this was the first study to examine both supportive and corrective feedback, delivered as person-based and behavior-based. Further, very few studies have examined the impact of coaching feedback on athletic performance with objective measures of performance. Thus, the present study makes a significant contribution to the sport psychology literature by incorporating the above-mentioned elements of interpersonal coaching and by introducing the first questionnaire that examines these four feedback styles.

The findings from this study could also influence future research of athletic coaching. Coaches could be trained to know when to incorporate feedback styles such as supportive and corrective person-based feedback in order to increase the motivation and improve the performance of athletes. Elite athletes are so close in ability level that any marginal increase in motivation and performance could prove to be extremely impactful for the athletes and the team. Additionally, this research shed light on to the frequencies of feedback styles that elite level athletes perceive from their coaches. Overall, this research opened the door for future coaching feedback research and demonstrated findings that can impact athletic coaches and teams.

References

Amorose, A. J., & Horn, T. S. (2000). Intrinsic motivation: Relationships with collegiate athletes' gender, scholarship status, and perceptions of their coaches' behavior. *Journal of Sport and Exercise Psychology, 22*, 63-84.

Amorose, A. J., & Anderson-Butcher, D. (2007). Autonomy-supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport and Exercise, 8*, 654-670.

Amorose, A. J., & Anderson-Butcher, D. (2015). Exploring the independent and interactive effects of autonomy-supportive and controlling coaching behaviors on adolescent athletes' motivation for sport. *Sport, Exercise, and Performance Psychology, 4*, 206-218.

Black, S. J., & Weiss, M. R. (1992). The relationship among perceived coaching behaviors, perceptions of ability, and motivation in competitive age-group swimmers. *Journal of sport and exercise psychology, 14*, 309-325.

Blanchard, C. M., Amiot, C. E., Perreault, S., Vallerand, R. J., & Provencher, P. (2009). Cohesiveness, coach's interpersonal style and psychological needs: Their effects on self-determination and athletes' subjective well-being. *Psychology of Sport and Exercise, 10,* 545-551.

Bloom, A. J., & Hautaluoma, J. E. (1987). Effects of message valence, communicator credibility, and source anonymity on reactions to peer feedback. *The Journal of Social Psychology, 127*, 329-338.

Butler, R. (1987). Task-involving and ego-involving properties of evaluation: Effects of different feedback conditions on motivational perceptions, interest, and performance. *Journal of educational psychology, 79*, 474-482.

Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. *Psychology of Sport and Exercise, 14*, 423-435.

Carpentier, J., & Mageau, G. A. (2014). The role of coaches' passion and athletes' motivation in the prediction of change-oriented feedback quality and quantity. *Psychology of Sport and Exercise, 15*, 326-335.

Carpentier, J., & Mageau, G. A. (2016). Predicting sport experience during training: The role of change-oriented feedback in athletes' motivation, self-confidence and needs satisfaction fluctuations. *Journal of Sport and Exercise Psychology, 38*, 45-58.

Carter, D., & Geller, E. S. (2017, August). *Effects of coaching behaviors on athlete perceptions: Findings and implications for future research.* Poster presentation at the annual meeting of the American Psychological Association, Division 47, Washington, D.C.

Cerasoli, C. P., Nicklin, J. M., & Ford, M. T. (2014). Intrinsic motivation and extrinsic incentives jointly predict performance: A 40-year meta-analysis. *Psychological bulletin, 140*, 980-1010.

Cerasoli, C. P., Nicklin, J. M., & Nassrelgrgawi, A. S. (2016). Performance, incentives, and needs for autonomy, competence, and relatedness: a meta-analysis. *Motivation and Emotion, 40*, 781-813.

Cerasoli, C. P., Nicklin, J. M., & Nassrelgrgawi, A. S. (2016). Performance, incentives, and needs for autonomy, competence, and relatedness: a meta-analysis. *Motivation and Emotion, 40*, 781-813.

Charbonneau, D., Barling, J., & Kelloway, E. K. (2001). Transformational leadership and sports performance: The mediating role of intrinsic motivation 1. *Journal of Applied Social Psychology*, *31*, 1521-1534.

Csataljay, G., O'Donoghue, P., Hughes, M., & Dancs, H. (2009). Performance indicators that distinguish winning and losing teams in basketball. *International Journal of Performance Analysis in Sport*, *9*, 60-66.

Deci, E., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of research in personality*, *19*, 109-134.

Deci, E. L., & Ryan, R. M. (2000). The" what" and" why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological inquiry*, *11*, 227-268.

DeNisi, A. S., & Murphy, K. R. (2017). Performance appraisal and performance management: 100 years of progress?. *Journal of Applied Psychology*, *102*, 421-433.

DePasquale, J. P., & Geller, E. S. (1999). Critical success factors for behavior-based safety: A study of twenty industry-wide applications. *Journal of Safety Research*, *30*, 237-249.

Fisher, C. D. (1979). Transmission of positive and negative feedback to subordinates: A laboratory investigation. *Journal of Applied Psychology*, *64*, 533-540.

Gagne, M., Ryan, R., & Bergmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology*, *15*, 372-390.

García, J., Ibáñez, S. J., De Santos, R. M., Leite, N., & Sampaio, J. (2013). Identifying basketball performance indicators in regular season and playoff games. *Journal of human kinetics*, *36*, 161-168.

Geller, E. S. (2016). The psychology of self-motivation. In E. S. Geller (Ed.), *Applied psychology*: *Actively caring for people.* New York: Cambridge University Press.

Geller, E. S. (2018a). *Fifty lessons to enrich your life: Proven principles from psychological science*. Newport, VA: GellerAC4P, Inc.

Geller, E. S. (2018b). *Life lessons from psychological science: How to bring the best out of yourself and others*. Plymouth, MI: Hayden-McDaniel, LCC.

Gillet, N., Vallerand, R. J., Amoura, S., & Baldes, B. (2010). Influence of coaches' autonomy support on athletes' motivation and sport performance: A test of the hierarchical model of intrinsic and extrinsic motivation. *Psychology of Sport and Exercise*, *11*, 155-161.

Grant, A. M., & Sonnentag, S. (2010). Doing good buffers against feeling bad: Prosocial impact compensates for negative task and self-evaluations. *Organizational Behavior and Human Decision Processes*, *111*, 13-22.

Hagger, M. S., Chatzisarantis, N. L., Hein, V., Pihu, M., Soós, I., & Karsai, I. (2007). The perceived autonomy support scale for exercise settings (PASSES): Development, validity, and cross-cultural invariance in young people. *Psychology of Sport and Exercise*, *8*, 632-653.

Heslin, P. A., & VandeWalle, D. (2011). Performance appraisal procedural justice: The role of a manager's implicit person theory. *Journal of Management*, *37*, 1694-1718.

Higgins, E. T., Idson, L. C., Freitas, A. L., Spiegel, S., & Molden, D. C. (2003). Transfer of value from fit. *Journal of Personality and Social Psychology*, *84*, 1140-1153.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, *6*, 1-55.

Kluger, A. N., & DeNisi, A. (1996). The effects of feedback interventions on performance: A historical review, a meta-analysis, and a preliminary feedback intervention theory. *Psychological Bulletin, 119*, 254-284.

Latham, G. P., & Yukl, G. A. (1975). A review of research on the application of goal setting in organizations. *Academy of Management Journal, 18,* 824-845.

Locke, E. A., & Latham, G. P. (2006). New directions in goal-setting theory. *Current Directions in Psychological Science, 15*, 265-268.

Maslow, A. H. (1971). *The farther reaches of human nature*. New York: Viking.

Mouratidis, A., Vansteenkiste, M., Lens, W., & Sideridis, G. (2008). The motivating role of positive feedback in sport and physical education: Evidence for a motivational model. *Journal of Sport and Exercise Psychology*, *30,* 240-268.

Mouratidis, A., Lens, W., & Vansteenkiste, M. (2010). How you provide corrective feedback makes a difference: The motivating role of communicating in an autonomy-supporting way. *Journal of Sport and Exercise Psychology*, *32,* 619-637.

Moy, D. (2006). *Regression planes to improve the pythagorean percentage*. (Unpublished Master's thesis). University of California-Berkeley, Berkeley, Ca.

Pelletier, L. G., Tuson, K. M., Fortier, M. S., Vallerand, R. J., Briere, N. M., & Blais, M. R. (1995). Toward a new measure of intrinsic motivation, extrinsic motivation, and amotivation in sports: The Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology*, *17,* 35-53.

Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Briere, N. M. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion*, *25*, 279-306.

Pope, C, (2017). Motivation and performance in sport. *University Presentation Showcase Event.* Eastern Kentucky University Presentation Showcase Event. 18.

Schulz, R., Musa, D., Staszewski, J., & Siegler, R. S. (1994). The relationship between age and major league baseball performance: Implications for development. *Psychology and Aging*, *9*, 274.

Silva, J. M., & Andrew, J. A. (1987). An analysis of game location and basketball performance in the Atlantic Coast Conference. *International Journal of Sport Psychology, 18*, 188-204.

Smith, R. E., Smoll, F. L., & Hunt, E. (1977). A system for the behavioral assessment of athletic coaches. *Research Quarterly. American Alliance for Health, Physical Education and Recreation*, *48*, 401-407.

Vallerand, R. J. (1983). The effect of differential amounts of positive verbal feedback on the intrinsic motivation of male hockey players. *Journal of Sport Psychology*, *5*, 100-107.

Ryan, R. M. (1982). Control and information in the intrapersonal sphere: An extension of cognitive evaluation theory. *Journal of Personality and Social Psychology*, *43*, 450-461.

Weinberg, R. S., & Gould, D. (2011). *Foundations of sport and exercise psychology* (5th ed). Champaign, IL, Human Kinetics.

Table 1
Descriptive Statistics of the Sample

	Overall
Age in Years *M* (*SD*)	19.40 (1.23)
Gender *N* (%)	
Male	95 (56.2)
Female	74 (43.8)
Sport *N* (%)	
Golf	35 (20.7)
Basketball	50 (29.6)
Baseball/Softball	84 (49.7)
Not employed in the past year	
Years with Coach *M* (*SD*)	2.04 (1.09)
NCAA Division *N* (%)	
Division I	21 (12.4)
Division III	148 (87.6)
N	169

Table 2
List of Teams who participated

Team	Number of Participants
Allegheny College Golf	10
Capital University Baseball	20
Clemson University Golf	2
College of Charleston Softball	16
College of Wooster Baseball	6
College of Wooster Women's Golf	4
College of Wooster Women's Basketball	2
College of Wooster Men's Basketball	3
DeSales University Women's Basketball	3
Emory and Henry Baseball	12
Emory and Henry Golf	4
Georgia Tech University Men's Golf	3
John Carroll University Men's Basketball	6
Kenyon College Men's Golf	3
Marietta College Men's Basketball	7
Moravian College Softball	11
Muskingham University Women's Basketball	7
Muhlenberg College Softball	6
Nebraska Wesleyan University Men's Golf	1
Nebraska Wesleyan University Women's Golf	1
Nebraska Wesleyan University Softball	2
Nebraska Wesleyan University Baseball	6
Nebraska Wesleyan University Women's Basketball	2
Nebraska Wesleyan University Men's Basketball	4
Ohio Northern University Women's Basketball	7
Otterbein University Men's Basketball	3
Ohio Wesleyan University Women's Basketball	2
Randolph Macon College Women's Basketball	6
Wabash College Men's Golf	6
William and Mary University Baseball	4

Table 3
Correlations of Observed Variables

	M (SD)	Cbb	Sbb	Cpb	Spb	Intrinsic	Extrinsic	Performance
Cbb	4.95 (1.30)	(.91)						
Sbb	4.69 (1.29)	.81	(.91)					
Cpb	3.1 (1.34)	-.54	-.44	(.81)				
Spb	5.52 (1.03)	.21	.32	.12	(.52)			
Intrinsic	5.25 (1.13)	.25	.27	-.20	.14	(.92)		
Extrinsic	4.01 (1.16)	.08	.04	-.006	.09	.56	(.87)	
Performance	-	-.02	-.04	.03	-.14	-.13	-.003	1

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback, Cronbachs alpha on the diagonals, Means and Standard Deviations of feedback conditions are frequency of perceived feedback from 1 (Never) – 7 (Very Often), No M or SD for Performance because it was group mean centered.

Table 4
Factor Loadings of Four factor CFA of Perceived Coaching Feedback Scale

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)
Cbb				
Fb1	.813			
Fb2	.839			
Fb3	.844			
Fb4	.851			
Fb5	.823			
Fb6	.614			
Cpb				
Fb7		-.021		
Fb8		-.311		
Fb9		.747		
Fb10		.662		
Fb11		.759		
Fb12		.711		
Sbb				
Fb13			.827	
Fb14			.776	
Fb15			.801	
Fb16			.808	
Fb17			.737	
Fb18			.852	
Spb				
Fb19				.810
Fb20				-.039
Fb21				.808
Fb22				-.308
Fb23				-.091
Fb24				-.051

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback.

Table 5
Factor Loadings of Four factor CFA of Perceived Coaching Feedback Scale after removing four items

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)
Cbb				
Fb1	.816			
Fb2	.837			
Fb3	.843			
Fb4	.853			
Fb5	.820			
Fb6	.618			
Cpb				
Fb9		.739		
Fb10		.693		
Fb11		.761		
Fb12		.704		
Sbb				
Fb13			.823	
Fb14			.782	
Fb15			.799	
Fb16			.806	
Fb17			.737	
Fb18			.854	
Spb				
Fb20				.531
Fb22				.520
Fb23				.669
Fb24				.536

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback.

Table 6
Factor Loadings of Five factor CFA of Perceived Coaching Feedback Scale Including a General Encouragement Factor

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)	Factor 5 (Ge)
Cbb					
Fb1	.816				
Fb2	.839				
Fb3	.842				
Fb4	.851				
Fb5	.821				
Fb6	.616				
Cpb					
Fb9		.734			
Fb10		.674			
Fb11		.774			
Fb12		.714			
Sbb					
Fb13			.826		
Fb14			.777		
Fb15			.801		
Fb16			.808		
Fb17			.736		
Fb18			.853		
Spb					
Fb20				.524	
Fb22				.534	
Fb23				.661	
Fb24				.533	
Ge					
Fb7					.210
Fb8					.513
Fb19					.829
Fb21					.835

Note: Cbb = Corrective Behavior-Based Feedback, Sbb = Supportive Behavior-Based Feedback, Cpb = Corrective Person-Based Feedback, Spb = Supportive Person-Based Feedback, Ge = General Encouragement

Table 7
Factor Loadings of Five factor CFA of Perceived Coaching Feedback Scale Including a General Encouragement Factor

Item	Factor 1 (Cbb)	Factor 2 (Cpb)	Factor 3 (Sbb)	Factor 4 (Spb)	Factor 5 (Ge)
Cbb					
Fb1	.816				
Fb2	.839				
Fb3	.842				
Fb4	.851				
Fb5	.820				
Fb6	.616				
Cpb					
Fb9		.735			
Fb10		.673			
Fb11		.774			
Fb12		.713			
Sbb					
Fb13			.826		
Fb14			.777		
Fb15			.801		
Fb16			.808		
Fb17			.736		
Fb18			.853		
Spb					
Fb20				.524	
Fb22				.535	
Fb23				.658	
Fb24				.533	
Ge					
Fb8					.515
Fb19					.830
Fb21					.837

Appendix A

Dear Coach [Insert Name],

My name is Zach Mastrich. I am currently a PhD student in Industrial/Organizational psychology at Virginia Tech, and a former collegiate athlete at the College of Wooster.

I am writing to you because I am conducting behavioral science research with Professor E. Scott. Geller on the effects of coaching feedback on athletes' motivation and performance, and I am hoping that I could survey your [Insert Sport] team as a part of this study. I understand that your priority is team success and developing your players on and off of the [field/course/court], which is why I would be as unobtrusive as possible.

All I would need is for you to email a survey to your players. The survey will only take about 10 minutes and all information collected with be kept anonymous.

Dr. Geller and I are convinced the findings from this research will be applicable to customizing the feedback coaches give their athletes in order to maximize the athletes' motivation and performance improvement. The results from this innovative project will be applicable at the youth sport level, as well as at the elite sport level, enabling coaches to bring the best out of their players.

I would look forward to sharing the results of this study with you and your coaches, which we expect to be published in a leading sports psychology journal. Please let me know if further details about our research project could be helpful when making a decision regarding our potential collaboration.

Here is the link to the survey:

https://virginiatech.qualtrics.com/jfe/form/SV_d5zh7zyycFy1N89

I look forward to hearing from you, and thank you very much for your valuable time and consideration.

Zach Mastrich

Appendix B

The 24 items in the Perceived Coaching Feedback Questionnaire, ordered according to the four coaching feedback styles. The items were randomized for the survey administration.

Participants received the following instructions: Please rate the frequency that your head coach gives the following types of feedback to you.
7-point Likert Scale (Never 1 – Very Often 7)

Corrective Behavior-based Feedback

- Fb1: When I make a mistake, my coach tells me exactly what I can do to fix it.
- Fb2: My coach gives me specific instructions on how to improve after I make an error.
- Fb3: My coach gives me specific directions on how to correct a mistake that I made.
- Fb4: My coach tells me specifically how I can improve my performance during practice or competition.
- Fb5: My coach corrects my form and technique when I mess up.
- Fb6: My coach points out specific ways to correct my sports-related behavior.

Corrective Person-based Feedback

- Fb7: When I make a mistake, my coach says things like "Come on, You can do better!"
- Fb8: After I make a mistake, my coach says things like "We'll get 'em next time".
- Fb9: When I make a mistake, my coach lets me know but doesn't tell me exactly what I did wrong.
- Fb10: My coach lets me know when I mess up but does not correct my form.
- Fb11: My coach points out our team's less-than-stellar performance without specifying what I can do to improve.
- Fb12: My coach acknowledges my errors without indicating what I can do to improve.

Supportive Behavior-based Feedback

- Fb13: After a desirable performance, my coach tells me exactly what I did well.

- Fb14: When my coach congratulates me, s/he specifies what I did that led to my success.
- Fb15: After performing well, my coach lets me know the specific actions that led to my success.
- Fb16: My coach talks about my form or technique when s/he recognizes my successful performance.
- Fb17: My coach tells me what I am doing well that contributes to my success.
- Fb18: My coach points out specific technique when I do well.

Supportive Person-based Feedback

- Fb19: After a good athletic performance, my coach says things like “Nice job” or “Great work”.
- Fb20: My coach congratulates me on a good performance without telling me exactly what I did well.
- Fb21: After my successful performance, my coach says things like “Way to go!” or “Keep it up!”
- Fb22: My coach does not address my technique or form when acknowledging my successful performance.
- Fb23: When I do well, my coach acknowledges my accomplishments but does not refer to any particular technique or behavior.
- Fb24: After a successful athletic act, my coach acknowledges my success without going into detail about what I did well.

Appendix C

The Sport Motivation Scale (SMS-28)

Using the scale below, please indicate to what extent each of the following items corresponds to one of the reasons for which you are presently practicing your sport. (1 – Does not correspond at all to 7 – Corresponds exactly)

Why do you Practice Your Sport?

1. For the pleasure I feel in living exciting experiences.
2. For the pleasure it gives me to know more about the sport that I practice.
3. I used to have good reasons for doing sport, but now I am asking myself if I should continue doing it.
4. For the pleasure of discovering new training techniques.
5. I don't know anymore; I have the impression of being incapable of succeeding in this sport.
6. Because it allows me to be well regarded by people that I know.
7. Because, in my opinion, it is one of the best ways to meet people.
8. Because I feel a lot of personal satisfaction while mastering certain difficult training techniques.
9. Because it is absolutely necessary to do sports if one wants to be in shape.
10. For the prestige of being an athlete.
11. Because it is one of the best ways I have chosen to develop other aspects of myself.
12. For the pleasure I feel while improving some of my weak points.
13. For the excitement I feel when I am really involved in the activity.
14. Because I must do sports to feel good myself.
15. For the satisfaction I experience while I am perfecting my abilities.
16. Because people around me think it is important to be in shape.
17. Because it is a good way to learn lots of things which could be useful to me in other areas of

my life.

18. For the intense emotions I feel doing a sport that I like.
19. It is not clear to me anymore; I don't really think my place is in sport.
20. For the pleasure that I feel while executing certain difficult movements.
21. Because I would feel bad if I was not taking time to do it.
22. To show others how good I am good at my sport.
23. For the pleasure that I feel while learning training techniques that I have never tried before.
24. Because it is one of the best ways to maintain good relationships with my friends.
25. Because I like the feeling of being totally immersed in the activity.
26. Because I must do sports regularly.
27. For the pleasure of discovering new performance strategies.
28. I often ask myself; I can't seem to achieve the goals that I set for myself.

Appendix D

Survey: Demographics

Q1 What is your name?

_____

Q2 What University/college do you attend?

_____

Q3 What sport do you play?

- ○ Golf (1)
- ○ Basketball (2)
- ○ Baseball/Softball (3)

Q4 If Applicable: What position do you play?

_____

Q5 How old are you?

- ○ 18 (1)
- ○ 19 (2)
- ○ 20 (3)
- ○ 21 (4)
- ○ 22 (5)
- ○ 23+ (6)

Q6 How many years have you had your current university/college head coach?

- This is the 1st year (1)
- This is the 2nd year (2)
- This is the 3rd year (3)
- This is the 4th year (4)
- This is the 5th+ year (5)

Q7 What is your academic year?

- Freshman (1)
- Sophomore (2)
- Junior (3)
- Senior (4)
- Other (fifth year/post-grad) (5)

Q8 What is your gender?

- Male (1)
- Female (2)

Q9 What is your Athletic scholarship status

- Full Athletic Scholarship (1)
- Partial Athletic Scholarship (2)
- No Athletic Scholarship (3)

Q10 Rate how much you like your current head coach?

Very Much Dislike Very Much Like

1 2 3 5 6 7

Q11 How much do you enjoy your involvement with your sport?

Very Much Dislike Very Much Like

1 2 3 5 6 7

Q12 How competent do you feel in your sport?

Not at all Competent Extremely Competent

1 2 3 5 6 7

Q13 Rate how much you agree with the following statement:

I feel like I am free to choose my actions in my sport:

Strongly Disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3		5	6	7

Q14 Rate how much you agree with the following statement:

I feel closely related to my teammates:

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3		5	6	7

Q15 Rate how much you agree with the following statement:

I feel closely related to my coaches:

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree
1	2	3		5	6	7