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The Association between Romantic Relationships, Self-Efficacy and Sports Self-Efficacy in Female Athletes as Measured by Salivary Cortisol

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Abstract

This study examined the difference between relationship self-efficacy and sport self-efficacy in female athletes (*n*=13) through surveys and salivary cortisol. The female athletes provided saliva samples for cortisol measurements through a baseline sample, a behavioral relationship efficacy test sample, and an athletic event sample. Results were gathered through self-reported answers to multiple surveys taken before or after playing Jenga®. The pattern of results supported the hypothesis that there is significant positive correlation between sport self-efficacy and relationship self-efficacy. We also found a significant positive correlation between relationship self-efficacy and relationship satisfaction, but only for male participants. The study's findings also provided corroboration that cortisol levels are inversely associated with sport self-efficacy and relationship self-efficacy, but that relationship failed to reach statistical significance.

Keywords: sports self-efficacy, relationship self-efficacy, relationship satisfaction, cortisol

The Association between Romantic Relationships Self-Efficacy and Sports Self-Efficacy in Female Athletes as Measured by Salivary Cortisol

Albert Bandura defined self-efficacy as "people's beliefs in their capabilities to produce desired effects by their own actions" (Bandura, 1997, p.3). Although the concept has been around for many years, the development of his theory is pivotal as it has been the foundation of hundreds of research articles and experiments. Not just specific to psychology, the self-efficacy theory has been applied to many fields such as medicine, public health, sociology, and kinesiology among others (Maddux, 2009). The relevance of self-efficacy to human development and its influences on human behavior is undeniable.

Self-efficacy is a concept that is critical to the understanding of success in everyday human life. The belief that you, yourself can accomplish something is self-efficacy (Myers, 2013). Self-efficacy is comprised of two separate branches, the first being efficacy expectations, which is "one's belief in being able to manage a behavior required for attaining certain results in a successful manner" (Arslan, 2012). The second branch is outcome expectations, which is defined as "predicting that a particular behavior will result in certain consequences" (Arslan, 2012). Furthermore, self-efficacy beliefs have been found to affect motivation, effort, and persistence. High self-efficacy has been found to be positively associated with good psychological health, the ability to cope with stressful situations, ability to interact with other people, and improved self-control (Arslan, 2012). In order to successfully accomplish a task, one must obtain the mentality that something can be done regardless of one's skill set. Often times

this attitude is developed by previous accomplishments in the same relative field of that situation (Riggio, Wesier, Valenzuela, Lui, Montes, & Heuer, 2013). With that said, motivation is the key factor in increasing self-efficacy levels (Kandemir, Ilhan, Ragip, Ozoplat, & Palanci, 2014). Now, to develop self-efficacy, people use the knowledge of their past experiences to predict future outcomes, events, and their own behavior. This is not to be mistaken with a competency predictor, but rather, it is the individual's own perception of the competency of their skills (Maddux & Gosselin, 2003).

The development of self-efficacy beliefs begin in infancy. According to the social cognitive theory as theorized by Albert Bandura (Maddux, 2009), humans have the ability to cognitively create models from past experiences and observe themselves in accordance with these cognitive models (Maddux, 2009). As a result, they are able to self-regulate. Their reactions to their environments shape the continued development of how they can influence their environments in the future (Snyder & Lopez, 2007). The growth of one's ability for specific thought creates their ability to understand cause and effect. From the understanding of cause and effect, one can comprehend that actions produce results. In infancy there is a direct correlation to understanding cause and effect and a deeper understanding of language which then leads to symbolic thought to self-awareness to personal agency (Maddux, 2009).

The key to the growth of efficacy beliefs is a responsive environment. When an infant or child attempts to manipulate or control their environment and their environment is responsive then they can take that response and grow their efficacy beliefs. This development encourages exploration and thus will continue to develop throughout one's lifetime by means of performance experiences, vicarious experiences, imagined experiences, verbal persuasion, and physiological and emotional states (Bandura, 1977; Maddux, 2009).

The concept of self-efficacy has also generated a wealth of research in the field of romantic relationships. Specifically, when it comes to the development of self-efficacy of relationships, it is crucial to remember that self-efficacy beliefs are not the same as outcome expectancies (Bandura, 1997). It is a compilation of skills and one's belief in their ability to hone those skills to achieve a desired goal (Maddux, 2009). Our own "self" and how we perceive that self is based off "our own and others' patterns of social cognition, emotion, and action as they occur in patterns of situations" (p.337). As a result, who we are comes from our interactions with others and will continue to develop and change as interactions continue to occur (Maddux, 2009). This idea is the foundation of the development of relationship self-efficacy. In theory, relationship self-efficacy should be analogous to self-efficacy only on a more specific level because one's beliefs of success or lack thereof, in the certain context will translate accordingly. Arguably relationship self-efficacy is a critical component in order to have success in romantic relationships and to achieve high relationship satisfaction (Shurts & Myers, 2012). A study by Shurts and Myers (2012) has shown that indeed when students are in a relationship their relationship self-efficacy is higher when compared to students that are not in a relationship.

Through multiple studies it has been demonstrated that there is a strong association between high self-efficacy in romantic relationships and positive relationship outcomes (Riggio et al., 2013). Furthermore other studies have also shown that there is a link between greater efficacy expectation and more positive attributions about how a partner behaves in relationships. Those same efficacy expectations have also been proven to have a positive effect on relationship satisfaction in married couples over a long period of time (Riggio et al., 2013). The ability to effectively resolve romantic relationship conflicts stems from the general efficacy beliefs of resolving conflict; the people that exhibit these beliefs also tend to have more "persistence in

solving problems in relationships" (Riggio et al., 2013). This will contribute to the overall quality and success of a romantic relationship as manifested through happiness, reward, feelings of satisfaction, and warmth. Efficacy expectations in the context of a romantic relationship are able to predict the success of that relationship in years to come (Riggio et al., 2013). Furthermore, there is evidence that couples with high levels of shyness tend to also have low levels of relationship self-efficacy and as a result experience marital problems and thus have low marital satisfaction (Baker & McNulty, 2010).

In addition to romantic relationships, sport performance also can be put into the context of self-efficacy, known as sport self-efficacy. As described by Maddux (2009), performance experiences are one of the sources of development for self-efficacy. In sports, Vancouver (2001) proved the hypothesis that performance experiences were a "strong positive predictor of efficacy beliefs" (Beattie, Fakehy, &Woodman, 2014). In order for efficacy beliefs to even be relevant in a sports environment, the task at hand must be one of challenge. When that was the case, there was a strong positive correlation between self-efficacy and performance improvement.

As it relates to sport psychology, both self-efficacy and self-confidence are used synonymously (Papaioannou, 2014). General self-efficacy is defined as a "person's judgements of his or her capabilities to organize and execute courses of actions required to attain designated types of performance" (Kremer, Moran, & Walker, 2011).

Similarly, sport self-efficacy is defined in the same way except it is in the context of sport performance. Just as self-efficacy is developed through their surrounding environment and then determine whether or not they are capable of successfully accomplishing the task at hand, so it applies to sport efficacy the same way. For example, one's self-efficacy belief might be to run a

mile in less than five minutes. They might believe that they will accomplish that task because they have done it before and that is referred to as performance accomplishments, (Papaioannou, 2014). This person may have watched someone run a mile in less than five minutes or read about it and that is known as vicarious experience. Also, someone of credibility or even themselves may have verbally persuaded them that they are capable. Finally, their physiological state, dependent on fitness, fatigue, and pain, will influence their sport self-efficacy (Papaioannou, 2014).

How an athlete interprets their own physiological arousal can determine their level of success. Included in physiological information is the "autonomic arousal that is associated with fear and self-doubt" (Papaioannou, 2014). If the athlete is experiencing feelings of nervousness, or autonomic arousal, that fear and self-doubt can be translated into getting excited or "pumped up" for the event. More specifically, with the autonomic arousal comes stress and with stress comes the secretion of cortisol. The effect that cortisol has on the body is increased heart rate, increased blood pressure, among others (Heaney et al., 2014). According to Bandura (1997), cortisol levels in the body may be affected by efficacy beliefs. Depending on how self-efficacious one is, it is theorized that there is an inverse correlation with cortisol levels. For instance, if someone has high self-efficacy beliefs to run a sub five minute mile, when it comes time to run, in theory that runner will have lower levels of cortisol in their blood prior to the race. (Cieslak, Benight, Luszczynska, & Laudenslager, (2011). The same is true for the counter.

Individual response to stress is also inextricably linked to their self-efficacy levels because self-efficacy produces a sense of control that results in the production of catecholamines and neuroendocrines (O'Leary & Brown, 1995). In comparison to the popular definition of stress being a "time pressure", meaning that if there is a lack of adequate time to accomplish a task or

multiple tasks then someone becomes stressed; in scientific terms, stress triggers a physiological response, also known as the "stress response" (Lupien, 2013). The brain will initiate a domino effect of hormone releasing when it determines that a situation is stressful. It begins by activating the hypothalamic-pituitary-adrenal axis whereby neurons in the hypothalamus will then release the corticotropin-releasing hormone. When the corticotropin-releasing hormone is released then the ensuing secretion of a hormone called the adrenocorticotropin hormone is released. This hormone is released by the pituitary gland, which along with the hypothalamus is also located in the brain. The adrenocorticotropin hormone will travel through the blood until it has located the adrenal glands, located superiorly to the kidneys. Once it reaches the adrenal gland, it triggers the release of the stress hormones (Lupien, 2013).

Cortisol is a hormone that plays a major role in the human body's stress response. Cortisol has an effect of the body by "enhancing vascular activity, suspending nonessential functions, inhibiting the inflammatory process, suppressing the immune system, inhibiting the actions of insulin, and increasing energy availability" (Heaney et al., 2014). This hormone displays a diurnal rhythm, so that there are higher levels of it in the beginning of the day and steadily decreases as the day progresses. The normal progression of this rhythm has been linked to both psychological and physiological health (Heaney et al., 2014). Even though cortisol follows the circadian rhythm, if there is a stressful event that takes place cortisol will rise independent of the rhythm (Miller, Chen, & Zhou, 2007).

Historically, cortisol has been assessed testing specifically blood cortisol levels. However, further research has found that cortisol levels can be measured through saliva samples. Since invasive procedures, like drawing blood, can in itself create a stressful situation for the participant, salivary samples for cortisol measures are preferred (Lupien, 2013). The cortisol

level that is gleaned from a saliva sample is the result of the fraction of cortisol that is unbound to a carrier protein. When the free fraction of cortisol crosses the blood-brain barrier, it will then bind to various receptors in brain structures. The structures that it binds to are associated with emotional processing, learning, and memory (Lupien, 2013).

In summary, extant research has repeatedly demonstrated the importance of self-efficacy. Yet, there are no studies that directly compare the relationship between different domains of self-efficacy specifically the association between sport self-efficacy and relationship self-efficacy. Based on the above research, we predict that self-efficacy will be inversely related to cortisol levels. High relationship self-efficacy has been linked to ability to resolve conflict, thus resulting in higher relationship satisfaction; in addition, high sport self-efficacy has been linked to successful athletic performance. Furthermore, even though many studies have suggested that relationship self-efficacy is crucial for relationship satisfaction, to our knowledge no study has used physiological measures to test stress responses to a relationship dilemma. Therefore, the purpose of this present research is to address these oversights and assess sport self-efficacy and relationship self-efficacy in a sample of female college athletes by using salivary cortisol. Specifically, based on extant research I advance the following hypotheses:

Hypothesis 1: There will be a significant positive correlation between sport self-efficacy and relationship self-efficacy.

Hypothesis 2: There will also be a significant positive correlation between relationship self-efficacy and relationship satisfaction for both our female and male participants.

Hypothesis 3: Cortisol levels will be inversely associated with sport self-efficacy.

Hypothesis 4: Relationship self-efficacy will have an inverse association with cortisol levels.

In addition, the associations between self-esteem and self-efficacy and the correlation between relationship skills, as coded by an observer, and relationship satisfaction and self-efficacy will be examined.

Methods

Participants

The current study used convenience sampling. The participants were all female college athletes currently enrolled at Gardner-Webb University (*n*=13) who were in a committed relationship and were recruited through word of mouth. In addition, their male partners (*n*=13) also participated in the relationship portion of this study. The mean age of female participants was 20.15 (*SD*=0.9). The mean age of male participants was 20.77 (*SD*=0.7). The mean of relationship length was 11.12 months (*SD*=12.39). Participants received and signed an Informed Consent upon arrival.

Apparatus

A stopwatch was used to keep the time. Hasbro's Jenga®, a tower of wooden blocks, was used for the Relationship Efficacy testing portion of the study. The female participant verbally instructed the male participant which loose blocks to pull out and stack them on top of the tower without toppling it. The players had three minutes to stack the tower as high as possible. Players were warned with 30 seconds left and then 10 seconds left on the timer.

Procedure and Materials

Couples were assigned times to come to the lab and perform the relationship efficacy test portion of the experiment. The Relationship Efficacy Test consisted of a set of surveys for the female athletes and a set of surveys for the male partner. The female survey set included a sports Self-efficacy survey, a Relationship Efficacy survey, a Relationship Satisfaction survey, and a General Self-esteem survey. The male survey set only included a relationship efficacy survey and a Relationship Satisfaction survey. The female athlete participants were the main focus of the study.

Sport Efficacy Survey (SES). The Sport Efficacy Survey (Byl & Naydenova, 2015), is a 17-question survey on a five point Likert-type measurement, which assessed efficacy beliefs in the participants' sport. Questions included "When I compete, I am certain that I will achieve my goals" and "I avoid facing difficulties in my sport".

Relationship Efficacy Survey (RES). The relationship efficacy survey (Byl & Naydenova, 2015), is a 17-question survey on a five point Likert-type measurement ranging from Strongly Disagree (SD) to Strongly Agree (SA). The RES assessed efficacy beliefs in the participants' relationship. Questions included, "When I set important goals for my relationship, I rarely achieve them" and "I feel insecure about my ability to be successful in my relationship."

Relationship Satisfaction Survey. Satisfaction in the relationship was reported through the use of the Quality in Marriage Index (QMI; Norton, 1983), which was rewritten for dating relationships for the purposes of the present study. The QMI is a relationship satisfaction survey consisting of a five-item which are verbally anchored in a seven point Likert-type coding measurement ranging from Strongly Disagree (SD) to Strongly Agree (SA). Questions included "My relationship partner with my partner is very stable" and "Our relationship is very strong".

General Satisfaction Survey. The General satisfaction with life was assessed using a ten-item survey, five point Likert-type scale measuring self-esteem (Rosenberg, 1965). Questions included "On the whole, I am satisfied with myself" and "I certainly feel useless at times".

Physiological Assessment

Cortisol sampling. All saliva samples that were taken were strictly from the female athletes. Saliva samples were taken using the SalivaBio Oral Swabs provided by Salimetrics®. Before every SalivaBio Oral Swab the participants were instructed not to eat or drink for 30 minutes prior to coming in for testing. To begin the process of the SalivaBio Oral Swab, the protective packaging was peeled and the SalivaBio Oral Swab was removed. The SalivaBio Oral Swab was then placed directly under the tongue of the participant for approximately one minute and thirty seconds and then placed in a storage tube. The cap was securely placed on the storage tube, labeled according to the test and the participant number, and immediately placed on ice to ultimately be stored in a freezer at -20°C. Within 3-4 weeks the saliva samples were sent off to the Salimetrics® lab for the cortisol duplicate assay. They were sent overnight on dry ice in a Styrofoam container (Salimetrics Instruction, 2015; Lupien, 2013). As soon as the saliva samples were received, they were stored in a freezer and prepped for enzyme immunoassay; which utilizes enzymes along with antibodies to determine the cortisol levels of each sample. The addition of an enzymatic reactive substrate to the saliva produced a color change that was then measured in units of optical density. The unknown saliva concentrations (µg/dL) were compared to known concentrations (µg/dL) and established a calibration curve.

Baseline sample. All female athlete participants were instructed to not eat or drink anything 30 minutes prior to sampling. The baseline SalivaBio Oral Swab sample was collected immediately after the participant signed the informed consent. The exact date and time, to the minutes, was recorded of the sampling. The SalivaBio Oral Swab was placed under the tongue of the participant for 1 minute 30 seconds, placed in the storage tube, labeled "baseline" with the corresponding participant number, and immediately put on ice in cooler to be placed in freezer (-20°C) within an hour of sampling (Salimetrics, Instruction, 2015; Lupien, 2013).

Sport saliva sampling. The female athlete participants were instructed to not eat or drink anything 30 minutes prior to sampling; however, they had to be physically prepared to perform in their subsequent athletic event (Rudolph & McAuley, 1995). The sport saliva sample was collected maximum 20 minutes prior to warm-up before competition. The exact time and date of sampling was recorded. Due to the natural circadian rhythm of cortisol levels, the collection time of the sports sample dictated the collection time of the baseline sample and the relationship sample. The SalivaBio Oral Swab was placed under the tongue of the participant for 1 minute 30 seconds, placed in the storage tube, labeled "sports" with the corresponding participant number, and immediately put on ice in cooler to be placed in freezer (-20°C) within an hour of sampling(Rudolph & McAuley, 1995).

Behavioral Relationship Efficacy Test. In addition to the saliva sampling, the Relationship Efficacy Test consisted of a Jenga® Behavioral Interaction Test. For the Jenga® Test, the female partner was instructed to strictly verbally direct her male partner which pieces to pull from the stack of wooden blocks. She could not point at or touch the wooden blocks. The male partner was instructed to follow her direction. He was allowed to communicate with her if a piece could not be moved without making the tower of wooden blocks fall over. The goal of the

Jenga® Test was to remove and stack the pieces as high as possible in three minutes. During the instructional period by the test administrator, the video camera hidden behind a one way mirror was started to record the interaction of the couple to be coded after the entirety of the test was completed. At one minute and thirty seconds into the Jenga® Test, the female participant was given a SalivaBio Oral Swab to be placed under the tongue for the remainders of the Jenga® Test. Participants were given a warning of 30 seconds remaining and ten seconds remaining in the test. After the conclusion of the three minutes for the test, the SalivaBio Oral Swab was collected, labeled "relationship" with the corresponding participant number and immediately placed on ice to later be frozen in a freezer at -20°C. The date and exact time, to the minute, of the sample collection was recorded. The camera was stopped after the conclusion of the three minutes. If the tower fell over before the three minutes was finished, the test was immediately concluded. The SalivaBio Oral Swab was still collected after one minute and thirty seconds regardless of whether or not the tower fell before the three minutes were up.

In order to control for order effects, half of the couples were randomly assigned to take the survey set before the Jenga® test while the other half of the participants were assigned to take the Jenga® test after the survey set.

Results

Descriptive Statistics

The age of all participants ranged from 17 to 23 years old (M= 20.46, SD=1.33). The length of the relationships ranged from 1-40 months (M=11.12, SD=12.39).

From a possible score of 85 on the Sport Self-Efficacy Survey (Byl & Naydenova, 2015), the female participants' scored within a range of 58 and 77(M=67.58, SD=5.93). Out of a

possible score of 85 on the Relationship Self-Efficacy Survey (Byl & Naydenova, 2015), female participants scored in the range of 49 to 78 (*M*=68.62, *SD*=8.03). The males scored within the range of 64 to 85 (*M*=72.08, *SD*=7.18). This pattern of results suggests that the men tend to report a higher relationship self-efficacy than the women. On the Relationship Satisfaction Survey using the Quality of Marriage Index (Norton, 1983) and a possible score of 35, women scored within a range of 31 to 35 (*M*=34.00, *SD*= 1.35). The men scored their relationship satisfaction within the range of 30 to 35 (*M*=33.77, *SD*=1.69). These scores suggest that women tend to report slightly higher relationship satisfaction than their male partners. Only the women took the general self-esteem survey, they scored within a range of 30 and 39 (*M*=35.33, *SD*=2.67).

Once again, only the women gave saliva samples. The minimum baseline sample was .051 µg/dL and the maximum was .436 µg/dL (*M*=.221 µg/dL, *SD*=.134). The relationship saliva samples were in the range of .048 µg/dL and .531 µg/dL (*M*=.228 µg/dL, *SD*=.159). The sport samples were in the range of .124 µg/dL and .464 µg/dL (*M*=.238 µg/dL, *SD*=.095).

Inferential Statistics

This pattern of results supported Hypothesis 1. For the women athletes, there was a strong, positive correlation between sport self-efficacy and relationship self-efficacy, r (11) = .71, p <.05. Hypothesis 2 was also supported for the male participants. Specifically, results showed that the male participants also reported a moderately strong correlation between relationship self-efficacy and relationship satisfaction, r (10) = .61, p <.05. However, this relationship did not reach significance for the female participants (r (10) =.07, *ns*). There was also no significant difference between the relationship self-efficacy of men and women, t (13) = -

1.16, p= .258. There was a positive correlation between relationship satisfaction and behavioral communication skills for our female participants, r (10) = .590, p <.05.

Hypotheses 3 and 4 were only partially supported and although the results were in the predicted direction and constituted meaningful cortisol changes, not all of them reached statistical significance. On average, the sport and relationship saliva samples reported to be higher than the baseline sample. There was no significant difference between the baseline sample and the sport sample, t (11) = -.34, *ns*. There was no significant difference between the baseline sample and the relationship sample for the total sample, t (11) = -.45, *ns*. The baseline cortisol sample was significantly, inversely correlated with general self-esteem, r (12) = -.804, p <.05. The relationship cortisol sample was also significant, inversely correlated with general self-esteem, r (12) = -.775, p<.05. The overall behavioral communication skills were negatively correlated with relationship length r (12) = -.617, p<.05.

Furthermore, in order to look directly at the differences between female athletes who were low or high on self-efficacy we split the dataset to into two groups and each participant was dummy coded depending on their sports and relationship self-efficacy levels. With this extra level of analysis, more differences emerged. For example, for athletes who were high on sports efficacy (as measured by scoring above the mean) there was a strong correlation between self-efficacy and relationship satisfaction (r = .88, p <. 05) and self-efficacy and communication skills in the relationship dilemma test, (r = .89, p <.05). This pattern of results did not reach significance for the athletes who were low in sports self-efficacy, further suggesting that self-efficacy skills spill across domains. More importantly, when the dataset was split according to participants' relationship self-efficacy, there was a significant positive change in participants' cortisol levels in the relationship dilemma scenario (t (8) = .97, p <.01) suggesting that

participants' cortisol levels significantly increased as a result of a stressful interaction with their partner but only for participants with lower self-efficacy skills.

Discussion

In conclusion, the present research has important implications for understanding the associations between relationship satisfaction, relationship self-efficacy, and sport self-efficacy. This study showed that female athletes who reported high sport self-efficacy also reported high relationship self-efficacy. This finding suggests that self-efficacy skills transcend domains and high self-efficacy tends to be applicable to different areas of one's life. In other words, if the female athlete believes in her ability to work well under pressure in her athletic event then she will feel that she can perform just as well in her romantic relationship. On the contrary, if the female athlete believes that her relationship goals are unattainable then she will likely believe something similar in regards to her sport. This proves that self-efficacy is not compartmentalized but spills over into different areas. Furthermore, the present research suggested that there is a correlation between relationship self-efficacy and their relationship satisfaction, but only for men. So it can be argued that if men believe that they have the tools to be successful in their relationship then they will be more satisfied with their romantic relationship.

When comparing genders, men reported higher relationship self-efficacy than women but that difference did not reach significance. Women reported slightly higher relationship satisfaction than men but that difference was also not statistically significant. It is worth noting that in the present study relationship satisfaction levels were negatively skewed. This is consistent with relevant research in the field which has also found that relationship satisfaction levels tend to be very high in the student population which tends to limit variability and create

restriction of range. Women showed no significant correlation between relationship self-efficacy and relationship satisfaction while men did show a significant correlation. This pattern of results is also consistent with extant research that suggests that relationship self-efficacy tends to be more important to men and men tend to be more satisfied in relationships if they feel like they have good relationship skills (Miller, 2014).

The other major component of this study was analyzing cortisol levels in relation to sport self-efficacy and relationship self-efficacy. On average, both the relationship saliva samples and the sport saliva samples showed higher levels of cortisol than the baseline saliva sample. One participant's cortisol levels were entirely eliminated from the experiment due to a difference in the baseline cortisol sample of greater than three standard deviations. Furthermore, there was a significant increase in cortisol levels when participants with high and low relationship self-efficacy were directly compared.

Both the baseline cortisol levels and relationship cortisol levels were significantly, negatively correlated with general self-esteem. Therefore, if the female participant had high self-esteem then they exhibited lower stress levels. The female participant's individual self-esteem was not correlated at all with the sport cortisol levels, however, suggesting that self-esteem levels are more directly associated with relationship functioning than with sports performance.

A particularly intriguing component of this study was the utilization of a behavioral assessment of relationship functioning and communication. An observer coded the behavioral communication skills of the couples and based on the surveys between the male and female participants, there was a significant correlation with relationship satisfaction. Therefore, from a trained coder's perspective, based on a standardized behavioral communication skills grading

chart, relationship satisfaction was exemplified through the way that the partners interacted with each other. In addition, the overall behavioral communication skills were correlated with relationship length, meaning that the longer a couple was together the better they communicated with each other.

Study Limitations

With most studies come limitations and this study was not exempt. One limitation is the small size of the sample and its relative heterogeneity. The participants came from a small school with specific criteria of being an in-season athlete at the school and currently in a committed relationship.

Furthermore, the cortisol's circadian rhythm scheduling presented itself to be a complication. Due to the practice times of the athletes and the various schedules of their partners, it was difficult to perform the behavioral relationship test in accordance with the time of the sport saliva sampling. This quickly became one of the more complicated components of the study and there were compromises made with time blocks in order to even perform a behavioral relationship test at all. In addition, the saliva sample for the behavioral relationship test was taken one minute and thirty seconds into the Jenga® Test based on previous studies. Other research mentions that it takes about ten minutes for cortisol levels to peak in the saliva; therefore, waiting longer to take the relationship saliva sample may have altered the levels of cortisol obtained by the SalivaBio Oral Swab.

Although using self-report is a standard procedure in similar studies, it is not without faults. One possible limitation is that while the participants were taking the surveys, both the male and female were in the same room together. Even though they were not supposed to

converse during the process of survey taking, participants were caught looking over the shoulder of their partner at their answers. Just with the notion of being in the room of their partners, participants may have been more likely to compromise on the sincerity of their answers.

The Jenga® test in the behavioral relationship test also presented an area of restriction because of its inability to be controlled. While couples were performing the Jenga® test the tower was accidentally knocked over before the three minutes was up. The amount of cortisol released into the blood stream and thus the saliva could have been different if not for the premature destruction of the tower.

Directions for Future Research

For future research, a larger sample will be collected so as to guarantee diversity of the data pool. It would be ideal to study the male athletes as well as more female athletes.

Another variable to add to this study to test further delve into the stress component would be to measure the blood pressure and the heart rate of the athlete before their respective competition and during the behavioral relationship test.

Conclusion

In conclusion, the present study demonstrated that self-efficacy is an important component of sports success and relationship functioning. Specifically, participants with high sport self-efficacy also reported high relationship self-efficacy. More importantly, high relationship self-efficacy was associated with higher relationship satisfaction for men, better communication skills and lowered stress response to a relationship challenge.

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