EFFECT OF CARBOHYDRATE AND CARBOHYDRATE-PROTEIN SUPPLEMENTATION ON POWER PERFORMANCE IN COLLEGIATE FOOTBALL PLAYERS PERFORMING A SIMULATED GAME TASK

A Thesis

by

GLENDA ELANE CRAWFORD

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

December 2005

Major Subject: Nutrition

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Approved by:

Chair of Committee,	Stephen F. Crouse
Committee Members,	Jenna D. Anding
	Robert B. Armstrong
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ABSTRACT

Effect of Carbohydrate and Carbohydrate-Protein Supplementation on Power Performance in Collegiate Football Players Performing a Simulated Game Task. (December 2005)

Glenda Elane Crawford, B.S., Angelo State University

Chair of Advisory Committee: Dr. Stephen F. Crouse

Research has shown conflicting results involving the efficacy of carbohydrate-protein beverages on athletic performance. Purpose: To examine whether or not power output during the latter stages in a series of repeated maximal or near maximal effort anaerobic exercise bouts simulating a football game task was altered when consuming a carbohydrate-protein (CP) beverage versus either a carbohydrate-only (C) beverage or a placebo (P). Methods: Eighteen collegiate male football players participated in this investigation. The subjects' mean age, height, weight, and percent body fat were 20yr, 180.4cm, 92.4kg, and 12%, respectively. The experimental exercise sessions were completed by each athlete on three separate occasions, spaced one week apart. Subjects were asked to perform a series of maximal-effort weighted sled-pushes, which simulated a game-type activity over two halves of a football game separated by a 20-minute simulated halftime recovery period. Maximal muscle power was assessed through the use of a series of maximal jump-and-reach tests. The experimental beverages were administered during the first 5 minutes of halftime. Water was permitted *ad libitum* throughout each exercise session. The experimental beverages used included; 1) a commercially available flavored aspartame-sweetened P beverage, Crystal Light, (300 ml, 5 kcal), 2) a commercially available C beverage, Gatorade Energy Drink®, (300 ml, 67.5 g CHO, 270 kcal), and 3) a commercially available CP beverage, Gatorade Nutrition Shake®, (243 ml diluted with water to 300 ml, 45 g CHO, 15 g Protein, 270 kcal). All beverages were randomly assigned and each player received all three beverages. An analysis of covariance (ANCOVA) was used to determine if differences existed in power output between the experimental beverages. Results: The Least Square Mean (LSM) for jump-power was significantly higher after C compared to CP (1587.36 watts vs. 1577.42 watts, respectively; $p=0.0095$). The LSM jump-power after the P beverage was also lower than after the C beverage (1582.52), but was not statistically significant. Conclusions: These data suggest that average power output over a series of high-intensity anaerobic exercise bouts, which simulate football game tasks, is greatest after consuming a C beverage during the halftime break compared with consuming a CP or P beverage.

DEDICATION

To my parents, for everything.

ACKNOWLEDGMENTS

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CHAPTER I

INTRODUCTION

Athletics and organized sporting events are widely popular across the globe. These events are the driving force behind a multi-billion dollar industry. Everyone involved is interested in optimal performance by the athlete, regardless of the sport or level of competition. Many factors must be taken into consideration when striving for the greatest attainable effort by the athlete. Some factors are not in the control of the athlete, but others may be manipulated to achieve the desired outcome. These factors may include, but are not limited to, environmental conditions, equipment, physical health, emotional well-being, and physical training.

Of the various factors that may influence an athlete's performance, one of the most easily regulated is the athlete's nutritional status. In fact, the American College of Sports Medicine, American Dietetic Association, and Dietitian of Canada state that "physical activity, athletic performance, and recovery from exercise are enhanced by optimal nutrition" (1). Additionally, they acknowledge that optimal physical performance relies heavily upon the individual's ability to maintain fluid balance during the activity (1). Controlling what the athlete consumes before, during, and after athletic competitions has become one of the primary focuses for many people involved in sports today. While paying special attention to the association between the food consumed and the ensuing performance of the athlete is not a new or revolutionary idea, much attention has been placed on this interaction in recent years. Much research has been devoted to

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This thesis follows the style of *Medicine & Science in Sports & Exercise.*

the development of diets and products designed for consumption prior to competition to elicit the highest quality performance, during competition to maintain the highest level of performance over the greatest length of time, and after competition to help the body recover and return to peak performance as quickly as possible.

Many athletes engage in athletic activities, both competitive and practice, that are of long duration, lasting an hour or more. Many of these activities are described best as "endurance" activities, meaning they are aerobic in nature. Additionally, other athletes engage in more anaerobic activities, which require high power outputs. While anaerobic in nature, these activities may require short but repeated bouts of maximal or near maximal power with minimal recovery periods between these repeated bouts performed over minutes to hours. Those athletes that perform bouts of exercise at moderate to high-intensity rely heavily upon muscle glycogen as a fuel source. It has been well noted that muscle glycogen may be substantially reduced or depleted during endurance exercise (5, 29, 30, 38, 63). It has also been documented that muscle glycogen is a primary fuel source during anaerobic activity (29, 38). Single bouts of anaerobic activity as short as six and 30 seconds may elicit decreases in muscle glycogen content of up to a 16% and 32% respectively (38). The glycogen content of muscle has been shown to decline with increased work load (50) and work bouts (27). Additionally, it has been documented that fast-twitch muscle fibers may experience the greatest decline in muscle glycogen content during high-intensity anaerobic exercise bouts (27, 50).

Considering the importance of muscle glycogen to performance, it is not surprising that the interest of researchers has turned to the content of supplements used to prevent glycogen depletion and the effects thereof. The importance of carbohydrate intake for maintaining blood-glucose levels during exercise and replacing muscle glycogen during bouts of prolonged physical activity is well documented in literature (1, 5, 29, 30, 38, 63). Intake of carbohydrate before (29), during (19, 29, 46, 64), and after prolonged (36) exercise has been shown to be beneficial to performance. The need for proper hydration combined with the beneficial nature of carbohydrate intake has led to the development and widespread use of carbohydrate-containing beverages for use by athletes.

Most recently, researchers have begun to look at the effects of adding protein to carbohydrate-containing beverages. Both power and endurance athletes have demonstrated improvements in performance and recovery with the ingestion of supplemental protein alone (54). Much of the research done on the effects of beverages containing both carbohydrate and protein has focused on athletes ingesting them after prolonged exercise. There are a number of studies that found that ingestion of a carbohydrate-protein supplement enhanced muscle glycogen recovery when compared to carbohydrate-only and/or placebo beverages (4, 30, 31, 48, 56, 61, 63, 66, 67). However, there are also several studies that report no benefit to muscle glycogen recovery with such beverages (17, 33, 43, 60). Some of the latest studies have also begun to look at the effects of ingesting these carbohydrate-protein beverages during prolonged physical activity. The majority of these studies have shown an increase in time to fatigue and endurance performance with the ingestion of a carbohydrate-protein beverage during prolonged aerobic exercise (32, 44, 51, 54). There is no literature on the effects of consumption of such beverages during anaerobic activities consisting of repeated maximal or near maximal effort exercise bouts, which simulate a football game task.

Since it is known that athletes engaging in both aerobic and anaerobic activities are susceptible to decreased muscle glycogen content and that ingestion of a carbohydrate-protein beverage may help attenuate such loss, it is not unreasonable to suggest that both types of athletes may benefit by consuming such a beverage. The lack of information on the effects of carbohydrate-protein beverages for anaerobic athletes engaging in repeated maximal or near-maximal effort exercise bouts necessitates investigation into the matter.

Purpose of Study

The purpose of this study was to examine whether or not power output during the latter stages in a series of repeated maximal or near maximal effort anaerobic exercise bouts simulating a football game task was altered when consuming a carbohydrate-protein beverage versus either a carbohydrate-only beverage or a placebo. Furthermore, this study was designed to test frequently used and commercially available beverage products as the experimental beverages during a realistic game-like situation.

Null Hypothesis

It was hypothesized that there would be no significant difference in muscular power output during the latter stages in a series of repeated maximal or near maximal effort anaerobic exercise bouts simulating a football game task among athletes ingesting placebo, carbohydrate-only, and carbohydrate-protein beverages.

Rationale for Hypothesis

Research has shown that both power and endurance athletes have improved performance and recovery with the ingestion of supplemental protein (55). Likewise, studies on the intake of carbohydrates during prolonged physical activity have provided evidence of improved performance, measured as either increased time to fatigue or increased ability to maintain power output during exercise (29, 46, 64). Additionally, several studies have shown that ingestion of a combined carbohydrate-protein beverage during endurance exercise produces an improvement in endurance capacity or time to fatigue over carbohydrate-only and/or placebo beverages (32, 44, 51, 54). From these findings, it was expected that power athletes engaging in anaerobic activities consisting of repeated maximal or near maximal effort exercise bouts, which simulate a football game task, would exhibit greater ability to maintain power output when ingesting a carbohydrate-only or carbohydrate-protein beverage compared to a placebo. Furthermore, it was anticipated that these athletes would also show the greatest ability to maintain power output when ingesting a carbohydrate-protein beverage compared to either a carbohydrate-only beverage or placebo.

Limitations

This investigation was limited by the following:

1. Small sample size (n=14).
2. Findings are specific to collegiate male football players age 19-22.
3. Self-reported compliance with and no assessment of pre-exercise diet.
4. Variable environmental conditions due to outdoor exercise.

5. Single administration of experimental beverage halfway through the exercise session.

6. Use of commercially available products of specific nutrient composition, Gatorade Energy Drink®, and Gatorade Nutrition Shake®, as experimental beverages.

7. Utilization of vertical jump as measure of power output.

Significance of Study

Over the past decade, numerous studies have been conducted that examine the effects of combined carbohydrate-protein supplement ingestion in the hours after exercise. These studies, primarily utilizing endurance athletes, have revealed conflicting results. Additionally, more recent studies have focused on the effects of carbohydrate-protein supplement ingestion during prolonged exercise. All of these studies have been performed on endurance athletes, and have also presented conflicting results. This study is unique in that, to our knowledge, it is the first investigation to examine the effectiveness of a carbohydrate-protein supplement ingested during an anaerobic activity consisting of repeated maximal or near maximal effort exercise bouts, which simulated a football game task, on the performance capacity of power athletes. Furthermore, it was conducted under realistic game-type conditions. Another primary consideration made during the design of this study was to utilize commercially available beverages that are frequently consumed by athletes as the experimental beverages. The information gained from this study will allow for a clearer understanding of the ideal content of short-term recovery beverages for anaerobic athletes that perform repeated exercise bouts of maximal or near-maximal effort.

Review of Literature

Introduction

The relationship between physical performance and human nutrition is not a new concept. In fact, decades of research have been devoted to investigation of that link. The interrelationship of physical activity and diet is defined by the need of optimal nutrition for optimal performance (21). It has been well documented that nutrition has significant beneficial effects on exercise performance (1, 11, 16, 38, 39). In their position statement, the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine, acknowledge that "physical activity, athletic performance, and recovery from exercise are enhanced by optimal nutrition" (1). Some of the general physiological functions that researchers have claimed are enhanced by manipulation of dietary intake include strength and power; endurance, energy supply, and recovery; hydration; flexibility; and tissue growth (52).

With these purported benefits, athletes at all performance levels are now giving special attention to their dietary intake. A survey of division I college athletes demonstrated that the majority of them recognize the role that nutrition plays in athletic performance (3). Many athletes alter their dietary intake or augment it with the use of bars, beverages, supplements, diet aids, herbal preparations, and ergogenic aids in hopes of optimizing performance (1). In fact, a survey of 236 collegiate athletes revealed that 88% of them were using at least one nutritional supplement (15). In light of these numbers, it is easy to understand the continued interest by researchers to identify the optimal dietary strategy for athletes, specifically focusing on hydration and macronutrient (carbohydrate, protein, and fat) intake.

Muscular Fatigue

Many athletes engage in athletic activities, both competitive and practice, that are of long duration, lasting an hour or more. Many of these activities are described best as "endurance" activities, meaning they are aerobic in nature. Additionally, there are other athletes that engage in more anaerobic, or "power" type, activities. While anaerobic in nature, these activities may require repeated bouts of exercise of high power output and may, overall, be of long duration (some lasting up to several hours). A decline in performance is especially noticeable during these prolonged bouts of activity.

The specific cause of decline in physical performance is often elusive. This may be due, in part, to several possible culprits. These may include, but are not limited to, psychological factors, fatigue of the central nervous system, environmental conditions, or a host of physiological conditions that may disrupt the proper function of the muscle. The term "muscular fatigue" has become a popular phrase used to describe a multifaceted phenomenon. In its most basic definition, muscular fatigue is "a failure to maintain the required or expected force or power output" (25, 53).

Muscular fatigue may be the result of one of many different physiological impairments or a combination of two or more of them. Some of these include actual damage to muscle tissue, substrate depletion, or disruption of calcium uptake and release (25). However, it has been well documented that nutrition can play a vital role in preventing or minimizing the effects of many such physiological impairments, thereby decreasing muscular fatigue and enhancing physical performance (1).

One substrate, muscle glycogen, is especially important to physical performance. Those athletes that perform bouts of exercise at moderate to high-intensity rely heavily upon muscle glycogen as a fuel source. It has been well noted that muscle glycogen may be substantially reduced or depleted during endurance exercise (5, 29, 30, 38, 63). It has also been documented that muscle glycogen is a primary fuel source during anaerobic activity (29, 38). Single bouts of anaerobic activity as short as 6 seconds in duration may elicit up to a 16% decrease in muscle glycogen content (38). The glycogen content of muscle has been shown to decline with increased work load (50) and work bouts (27).

The Role of Hydration

Optimal physical performance relies heavily upon the individual's ability to maintain fluid balance (1). Years of research have demonstrated that athletic performance can be compromised with dehydration (18). A negative influence on performance has been identified in athletes with dehydration of as little as 1% to 2% of their body weight (18). Specifically, research has shown that dehydration significantly decreases blood flow to exercising muscles (28). Such fluid losses not only impair power production, but also predispose the athlete to heat injury (22). Additionally, severe dehydration (fluid losses of more than 6% to 7% of body weight) can be potentially life-threatening (1, 41). Furthermore, ineffective rehydration after exercise may negatively impact performance during subsequent bouts of physical activity (41).

To ensure optimal performance, individuals should be well-hydrated prior to beginning any physical activity. It is recommended that generous amounts of fluid be consumed in the 24 hours before any exercise session (1). Furthermore, individuals are advised to consume approximately 500 to 600 mL of fluid 2-3 hours before exercise and an additional 200 to 300 mL of fluid in the 20 to 30 minutes preceding the exercise bout (18). This intake should help prevent or delay the onset of dehydration.

Fluid intake during the course of the exercise session plays just as an important role in the prevention of dehydration and the accompanying detrimental effects on physical performance. Recommendations to maintain hydration status during exercise focus on maintaining fluid balance; that is, ingestion of fluid in an amount equal to that lost (1). However, the exact quantity of fluid lost may be difficult, if not impossible, to determine. Therefore, it is suggested that individuals should consume 200 to 300 mL of fluid every 10 to 20 minutes throughout the course of the exercise session (18).

Furthermore, to ensure proper rehydration, the aim of post-exercise fluid consumption should be to ameliorate any fluid loss that accumulated during the exercise bout (18). Most experts agree that the best way to ensure adequate rehydration is for the individual to consume up to 150% of the weight lost during the exercise bout (1). Ideally, this repletion should occur within the 2 hours immediately following the physical activity to ensure proper rehydration within 4 to 6 hours post-exercise (18).

Finally, the composition of the fluids ingested before, during, and after exercise also plays a vital role in optimal hydration and, consequently, physical performance. While water is universally recognized for its role in hydration, the addition of other substances has also been shown to be of importance. The addition of electrolytes and macronutrients to fluids has been shown to be beneficial to performance and hydration status (1, 18). The recommended amounts of water, macronutrients, and electrolytes for athletes to ingest are based upon their effectiveness in attenuation of fatigue and hydration-related illnesses (22).

Fat

Fat is an important component of the diet of all individuals. Dietary fat provides energy, fat-soluble vitamins, and essential fatty acids (1). The recommended fat content of the average individual's diet is a moderate 20% to 35% of overall daily caloric intake (37). Due to the caloric density of fat, it is often a point of focus when attempting to control weight or body composition. For this reason, many athletes have tried to modify their diets in an effort to lower their fat intake. However, studies show that there is no benefit to restricting dietary fat intake lower than the percentages recommended for the general population (1).

When compared to the availability of other macronutrients in the body, fat stores appear to be an attractive source of fuel. Protein stores are found in abundance in the form of muscle but, considering the deleterious effect to muscle mass, utilization of these stores as fuel for exercise is not appealing to athletes. Carbohydrate stores are also available in the body. However, these are present in limited quantity. Thus, it would appear that utilizing the copious fat stores for energy during exercise is an appealing alternative.

Depending on the intensity and duration of aerobic exercise, all of the macronutrients may used as fuel for the body. Studies have shown that fat supplies almost 50% of the energy needed in the body during light intensity exercise (37). It has also been shown that fat becomes increasingly available for use as an energy source after exercising at a sustained moderate intensity for a prolonged period of time (37). However, the body increasingly relies on carbohydrate as the primary fuel as exercise intensity and oxygen consumption increases (37).

Increasing dietary intake of fat during exercise has been considered an avenue for increasing its use as fuel by the body during prolonged bouts of exercise. Jeukendrup et al. (34) reported that medium-chain triglycerides could potentially serve as a source of fuel in addition to glycerol during physical activity. They found that medium-chain triglycerides displayed a high metabolic availability during the final hour of exercise (34). Similarly, other studies have shown that increased ingestion of fat enhances the ability of the body to utilize it as a fuel source (37). Others have even found an elevation in maximal aerobic capacity and increased time-to-exhaustion with increased intake of dietary fat (37).

Conversely, there are also numerous studies to date that found no effect, decreased performance, or increased rate of perceived exertion with increased fat intake during exercise (37). Additionally, the ingestion of fat directly before or during physical activity may slow gastric emptying or cause gastrointestinal distress (1). Even Jeukendrup et al. (34) noted that the gastrointestinal tract was able to tolerate only small quantities of medium-chain triglycerides, which severely limits their ability to substantially contribute to energy expenditure during endurance exercise. The conflicting results of research on the subject and the complexity of fat metabolism during exercise (52), combined with the known long-term negative effects of high-fat diets on health, have led experts to agree that there is also no benefit to athletes consuming a diet high in fat (1).

Protein

As far back as the times of the ancient Greeks, there are reports of athletes consuming high-protein diets in an effort to optimize athletic performance. Substantial evidence supports increased protein requirements with heavy training (40). Therefore, many experts recommend greater protein intake by athletes when compared to their sedentary counterparts (1). Both power and endurance athletes have demonstrated improvements in performance and recovery with the ingestion of supplemental protein (55).

For years, strength athletes have focused on protein intake in an effort to increase muscle mass. Tipton et al. (57, 58, 59) reported that the ingestion of oral amino acids after resistance exercise resulted in a shift from net muscle protein degradation to net muscle protein synthesis. Likewise, Volek (62) noted that the ingestion of essential amino acids before and after resistance exercise stimulates the transport of amino acids into skeletal muscle and protein synthesis. The current recommendation for strength athletes is 1.6 to 1.7 grams of protein per kilogram of body weight each day.

Additionally, moderate-intensity exercise of long duration has been noted to increase the rate of amino acid oxidation (8). While this increase in oxidation may not significantly contribute to the overall fuel supply to working muscles during exercise, it may, in effect, spare blood glucose for use by the central nervous system (8). The current recommended intake for endurance athletes is 1.2 to 1.4 grams of protein per kilogram of body weight per day.

The specific type and/or form of protein to be ingested have also been an issue of debate in numerous studies. In studies of whey proteins and casein, both forms resulted in positive whole-body protein balance (59). However, the anabolic response to casein appeared to be superior to whey proteins (59). Still, due to their digestive properties, amino acids from casein appear more slowly than from whey protein (59). Considering studies showing that net muscle protein synthesis occurs with ingestion of essential amino acids, it has been assumed that non-essential amino acids are not necessary for net muscle protein synthesis (59). Additionally, studies have shown that, while large doses of specific amino acids (arginine, ornithine, and lysine) may result in an increase in the circulating growth hormone and insulin concentration, these specific amino acids do not elicit changes in muscle function or lean body mass (40).

While current literature suggests that individuals who participate in heavy training and exercise may need increased protein intake, experts insist that such recommended intakes can easily be met through diet alone and that protein or amino acid supplements are largely unnecessary (1). Maughan (40) suggests that the use of protein supplements may potentially be of benefit in instances where athletes having little nutritional knowledge but need to increase their protein intake without substantially increasing their fat intake. Finally, Tipton and Wolfe (59) state that the current method of suggesting a particular amount of protein per day for an individual may be too simplistic. Considering the need for further research and the complexity involved, it may be necessary to also account for timing of ingestion in relation to exercise and/or ingestion of other nutrients, the type of protein, and the composition of the amino acids when suggesting protein intake by physically active individuals.

Carbohydrate

While there is a long history of athletes tailoring their diets around protein content, the past century has ushered in an increased interest in carbohydrate intake and the effects it has on physical performance. As early as 1939, there was conclusive evidence that exercise performance is enhanced with increased dietary intake of carbohydrates (5, 29). Further confirmation of this came with studies by Bergström et al. (5) in the 1960's, who showed that the muscular fatigue associated with depletion of muscle glycogen stores can be attenuated by carbohydrate consumption. These findings have, in effect, become the foundation for a large majority of the research on the interaction of diet and exercise.

Carbohydrate intake is important for maintaining blood-glucose levels during exercise and replacing muscle glycogen during bouts of prolonged physical activity (1). Carbohydrate intake before and during physical activity, and in the recovery periods between exercise bouts provides many options for increasing the carbohydrates available in the body for use in enhancing performance (14). The optimal timing of carbohydrate intake has been of interest to researchers for years and has led to the employment various intake tactics by athletes (9).

Prior to prolonged exercise bouts, many athletes engage in carbohydrate loading. This concept is derived from the classic studies of the previous century, which demonstrated longer exercise time to fatigue when subjects consumed a high-carbohydrate diet for several days prior to exercise (29). The process of carbohydrate loading involves both the consumption of a high carbohydrate diet and the tapering of training activities in the days preceding an event to ensure high muscle glycogen concentration (9). This increased glycogen reserve can then compensate for any increase in glycogen utilization (29). While most studies extol the benefits of this practice, there are some that report no increase in exercise performance after carbohydrate loading (29). However, it is plausible that these conflicting results may be due to the selection of an activity that is not limited by glycogen availability.

In addition to intake before exercise, post-exercise ingestion of carbohydrate also plays a role in optimal performance. Extensive research has shown that carbohydrate intake after exercise significantly affects recovery and post-exercise carbohydrate balance (36). In fact, in a classic study, three days of a fat and protein diet post-exercise resulted in only a 50% resynthesis of initial muscle glycogen, compared to three days of a carbohydrate diet, which increased the concentration of muscle glycogen to levels exceeding the normal range (5). To ensure recovery and replace muscle glycogen for subsequent exercise bouts, experts recommend ingesting 1.5 grams of carbohydrate per kilogram of body weight within the first 30 minutes post-exercise and again every 2 hours for 4 to 6 hours after physical activity (1).

Similarly, there have been numerous studies on the intake of carbohydrates during prolonged physical activity. These studies, overwhelmingly, show improved performance, measured as either increased time to fatigue or increased ability to maintain power output during exercise (29, 46, 64). Coggan and Coyle (19) found that carbohydrate ingestion during prolonged activity resulted in a delay of fatigue by 45 minutes. Specifically, the benefits have been shown to be the result of enhanced capability to resynthesize ATP, the maintenance of blood glucose, or the sparing of muscle glycogen (19, 64). Additionally, Winnick et al. (64) found that carbohydrate feedings during intermittent high-intensity exercise was beneficial to both the peripheral and central nervous system function late in exercise. Moreover, Coyle et al. (24) found that carbohydrate availability can directly regulate the oxidation of fat during exercise. Furthermore, Coyle et al. (23) found that, although hyperglycemia does not alter the utilization of muscle glycogen during prolonged exercise, it does elevate carbohydrate oxidation.

The Role of Carbohydrate in Hydration

The effects of ingestion of carbohydrate during prolonged exercise have largely been from the perspective of fluid intake and replacement. This only makes sense when considering that the primary nutritional goals during exercise are to replace fluid loss and provide carbohydrate to help maintain blood glucose levels (1). Yaspelkis and Ivy (65) concluded that a carbohydrate supplemented beverage was as effective at regulating body temperature and fluid balance as water. They also noted that, at the same time, this carbohydrate beverage successfully reduced the rate of muscle glycogen decline during low-intensity exercise in the heat (65). Likewise, Nicholas et al. (46) found that, with the ingestion of a carbohydrate-electrolyte beverage, athletes experienced a 22% reduction in muscle glycogen reduction. Furthermore, Menzel et al. (42) found that, in high school football players, maximal muscular power decline over repeated exercise bouts was attenuated by the addition of carbohydrate to their fluid replacement beverage consumed *ad libidum* throughout a single practice session.

The Carbohydrate-Protein Combination

The documented positive effects of protein ingestion on net muscle protein synthesis in athletes are well known. Likewise, the benefits of carbohydrate and carbohydrate beverage intake on glycogen status in the body of athletes are widely recognized. Over the course of the past decade or so, an interest in studying the effects of ingesting a beverage consisting of a combination of carbohydrate and protein has developed. While the number of studies on this topic is limited, there appears to be some argument that the combination of these macronutrients is favorable for certain athletes (2). However, this topic is not without debate at this time.

Due to the nature of the benefits incurred by carbohydrate intake, there is very limited literature on the effects of carbohydrate-protein supplementation for resistance, or anaerobic, athletes who are typically not limited by glycogen depletion during exercise. Nonetheless, in 2000, Rasmussen et al. (49) found that an oral amino acid-carbohydrate supplement increased muscle protein anabolism and synthesis when ingested after resistance exercise. Similarly, in a study by Miller et al. (45), it was found that the combined effect of carbohydrate-protein ingestion after resistance exercise on net muscle protein synthesis was approximately equal to the sum of the independent effects of either given alone. Most recently, Børsheim et al. (7) reported that, after resistance exercise, a mixture of whey protein, amino acids, and carbohydrate stimulated net muscle protein synthesis to a greater extent than carbohydrate alone. While there is not a vast amount of research on the efficacy of carbohydrate-protein supplementation for resistance athletes, the existing studies suggest that further probing of the subject is merited.

The effects of a combined carbohydrate-protein supplement have received more attention among endurance, or aerobic, athletes who engage in glycogen-depleting prolonged exercise bouts. The majority of studies in this area have focused on the potential effects to recovery from exhaustive exercise when the supplemental carbohydrate-protein beverage is administered upon completion of the exercise bout (4, 6, 17, 30, 31, 33, 43, 48, 56, 60, 61, 63, 66, 67). A number of these studies found that ingestion of a carbohydrate-protein supplement enhanced muscle glycogen recovery when compared to carbohydrate-only and/or placebo beverages (4, 30, 31, 48, 56, 61, 63, 66, 67). However, there are also several studies that report no benefit to muscle glycogen recovery with such beverages (17, 33, 43, 60). Furthermore, Niles et al. (48) additionally report that the recovery of endurance capacity during a second bout of exercise is enhanced by ingestion of a carbohydrate-protein supplement. Conversely, a study by Betts et al. (6) found no difference in endurance capacity during subsequent exercise between individuals consuming carbohydrate-only and carbohydrate-protein beverages. Interestingly enough, while Millard-Stafford et al. (43) did not report any benefit to muscle glycogen recovery with their carbohydrate-protein supplement, they did find a significantly lower rating of muscle soreness by athletes who consumed the carbohydrate-protein beverage.

A thorough search of the existing literature reveals a more limited number of studies that looked at the effects of carbohydrate-protein supplementation on performance and recovery when ingested during the activity session (20, 32, 35, 44, 51, 54). In a study on the ability of a carbohydrate-protein beverage consumed during endurance to prevent muscular catabolism, Colombani et al. (20) found no benefit over a carbohydrate-only beverage. However, Koopman et al. (35) have noted that the combined ingestion of protein with carbohydrate resulted in a positive or less-negative protein balance during ultra-endurance exercise. Similarly, Romano et al. (51) and Saunders et al. (54) have reported a decrease in muscle damage during endurance exercise with the ingestion of a carbohydrate-protein beverage. They (51, 54), along with Ivy et al. (32) and Miller et al.

(44), have also found that ingestion of a carbohydrate-protein beverage during endurance exercise produces an improvement in endurance capacity or time to fatigue over carbohydrate-only and/or placebo beverages.

Overall, there seems to be a growing amount of data in support of carbohydrate-protein supplements over carbohydrate-only beverages. Nonetheless, there continues to be much debate on the subject. Many contend that the results from various studies are impossible to compare due to the vastly differing quantities of carbohydrate and protein found in the many experimental beverages used or the methods used for beverage administration. There has been some argument that simply a higher carbohydrate or caloric content may be responsible for the benefits to performance and recovery seen with the consumption of carbohydrate-protein beverages (33). While these are plausible arguments, others have demonstrated that carbohydrate-protein beverages still provide additional benefits over their isocarbohydrate and isocaloric carbohydrate-only counterparts (31, 54). Additionally, while some argue that carbohydrate-protein supplements have increased benefits, there is still no clear evidence of what the underlying mechanism for this proposed benefit might be. Several studies have shown an increased or synergistic insulin response resulting in higher plasma insulin levels after exercise with the consumption of carbohydrate-protein beverages (33, 63, 67). Nonetheless, several recent investigations have found no increase in the insulin response with the consumption of a carbohydrate-protein beverage (31, 32, 66). Some other potential mechanisms recently proposed by Ivy et al. for the benefits seen with the consumption of carbohydrate-protein beverages are sparing or improved efficiency in the use of muscle glycogen, maintenance of plasma amino acids and their potential role in central fatigue, and an increase in the precursors available for the anapleroic reactions that aid in the retention of Krebs cycle intermediates (32). Additionally, another advantage of adding protein to carbohydrate recovery beverages that has been proposed is the stimulation of protein accretion, which is achieved by the stimulation of protein synthesis by amino acids and the inhibition of insulin's postexercise degradation of protein (63). Since there is still no definitive explanation for the benefits that appear to be associated with the ingestion of carbohydrate-protein beverages, it is certain that these issues will continue to be debated for some time. Meanwhile, the quest for a beverage with the "perfect" nutrient composition for optimal endurance performance continues.

Finally, it only makes sense to address the type of exercise that lies between strictly resistance training and absolute endurance exercise. Some activities such as football are more anaerobic in nature but are comprised of a series of short burst of power over an extended period of time. Like individuals participating in resistance training, these athletes may benefit from protein supplementation. However, these individuals may also be affected by glycogen depletion when engaging in activities that continue over an extended time period and could benefit from carbohydrate supplementation as well. A combined carbohydrate-protein beverage could potentially be of benefit to individuals participating in such activities. Unfortunately, no research on this particular subject currently exists.

Summary

The link between nutrition and physical performance has been well established over the years. Performance may be enhanced with an optimal diet. Hydration and the intake of macronutrients should be the primary focus of individuals engaging in physical activity. The ideal dietary intake is dictated by numerous factors, including the environment, the type of physical activity, the duration of the exercise bout, and the timing of ingestion as it relates to performance.

A major source of fuel for athletes, both aerobic and anaerobic, during prolonged activity is muscle glycogen. A decline in muscle glycogen availability may have significant effects on athletic performance. Both carbohydrate-only beverages and carbohydrate-protein beverages have been shown to help prevent the depletion of and assist in the recovery of muscle glycogen stores for some athletes, particularly those of an aerobic nature. Overall, there is a limited amount of data on the efficacy of carbohydrate-protein beverages. Additionally, there are conflicting opinions among the researchers involved. Furthermore, there are no data describing the effects of carbohydrate-protein beverages for athletes of an anaerobic nature. If there is some benefit of carbohydrate-protein beverages to the performance of aerobic athletes, it would be beneficial to know if anaerobic athletes might also experience the same benefits.

CHAPTER II

RECOVERY BEVERAGES AND POWER PERFORMANCE

Introduction

There are various factors that may influence an athlete's performance, including nutritional status. In their position statement on Nutrition and Athletic Performance, the American College of Sports Medicine, American Dietetic Association, and Dietitians of Canada state that "physical activity, athletic performance, and recovery from exercise are enhanced by optimal nutrition" (1). Controlling what the athlete consumes before, during, and after competition has become an important component of athletic training. Much research has been devoted to the development of diets and products designed for consumption 1) prior to competition to elicit the highest quality performance; 2) during competition to maintain the highest level of performance over the greatest length of time, and 3) after competition to help the body recover and return to peak performance as quickly as possible.

Many athletes engage in athletic activities, both competitive and practice, that are of long duration, lasting an hour or more. Many of these activities are described best as "endurance" activities and are aerobic in nature. Additionally, other athletes engage in more anaerobic, or "power" type, activities. While anaerobic in nature, these activities may require short repeated bouts of maximal or near maximal power and may, overall, be of long duration (some lasting up to several hours). Those athletes who perform bouts of exercise at moderate to high-intensity rely heavily upon muscle glycogen as a fuel source. It has been well noted that muscle glycogen may be substantially reduced or depleted during endurance exercise (5, 29, 30, 38, 63). It has also been documented that muscle glycogen is a primary fuel source during anaerobic activity (29, 38). Single bouts of anaerobic activity as short as six and 30 seconds may elicit decreases in muscle glycogen content of up to a 16% and 32% respectively (38). The glycogen content of muscle has been shown to decline with increased work load (50) and work bouts (27). Additionally, It has been documented that, specifically, fast-twitch muscle fibers may experience the greatest decline in muscle glycogen content during high-intensity anaerobic exercise bouts (27, 50).

Considering the importance of muscle glycogen to performance, it is not surprising that the interest of researchers has turned to the content of supplements used to blunt the process and effects of glycogen depletion. The importance of carbohydrate intake for maintaining blood-glucose levels during exercise and replacing muscle glycogen during bouts of prolonged physical activity is well documented in literature (1, 5, 29, 30, 38, 63). Intake of carbohydrate before (29), during (19, 29, 46, 64), and after prolonged (36) exercise has been shown to be beneficial to performance. The need for proper hydration combined with the beneficial nature of carbohydrate intake has led to the development and widespread use of carbohydrate-containing beverages for use by athletes.

Most recently, researchers have begun to investigate the effects of adding protein to carbohydrate-containing beverages. Both power and endurance athletes have demonstrated improvements in performance and recovery with the ingestion of supplemental protein alone (54). Much of the research done on the effects of beverages containing both carbohydrate and protein has focused on athletes ingesting them during and after endurance exercise. In a number of studies, ingestion of a carbohydrate-protein supplement enhanced muscle glycogen recovery after exercise when compared to carbohydrate-only and/or placebo beverages (4, 30, 31, 48, 56, 61, 63, 66, 67). However, there are also several studies that report no benefit to muscle glycogen recovery with such beverages (17, 33, 43, 60). Some of the latest studies have also begun to look at the effects of ingesting these carbohydrate-protein beverages during prolonged physical activity. The majority of these studies have shown an increase in time to fatigue and endurance performance with the ingestion of a carbohydrate-protein beverage during prolonged aerobic exercise (32, 44, 51, 54). Currently, to our knowledge, there is no published literature on the effects of consumption of such beverages during an anaerobic activity consisting of repeated maximal or near maximal effort exercise bouts, which simulated an American football game task.

Since it is known that athletes engaging in both aerobic and anaerobic activities are susceptible to decreased muscle glycogen content and that ingestion of a carbohydrate-protein beverage may help attenuate such loss, it is not unreasonable to suggest that both types of athletes may benefit by consuming such a beverage. The lack of information on the effects of carbohydrate-protein beverages for athletes engaging in anaerobic activities consisting of repeated maximal or near maximal effort exercise bouts necessitates investigation into the matter.

Therefore, the purpose of this study was to examine whether or not power output during the latter stages in a series of repeated maximal or near maximal effort anaerobic exercise bouts simulating a football game task was altered when consuming a carbohydrate-protein beverage versus either a carbohydrate-only beverage or a placebo. We tested the hypothesis that muscular power during football game tasks would be better preserved by ingestion of a commercially available carbohydrate-protein beverage, Gatorade Nutrition Shake®, compared to a commercially available carbohydrate-only beverage, Gatorade Energy Drink®, or placebo. It was also the intent of this research endeavor to study the potential benefits of frequently used commercially-available products during a realistic game-type setting.

Methods

Subjects

Eighteen Texas A&M University football players were recruited to participate as subjects in this study. Subjects ranged in age from 19 to 22 years of age. All experimental testing was performed during the players' normal conditioning workout times and was completed over a 5-week period in June and July, 2004. Characteristics of subjects are presented in Table 1. The final number of subjects utilized for all analyses was 14. Four subjects failed to fully complete all portions of the study; one dropped out, two were due to injury/illness, and one was unable to complete a testing session due to a scheduling conflict. Subjects were informed of all possible risks involved in the study and signed an informed consent previously approved by the Texas A&M University Institutional Review Board for Use of Human Subjects in Research.

Pre- and Post-Testing Data Collection

Each player's height, weight, standing reach, body composition determined by hydrostatic weighing and skinfold methods, 300 yd shuttle time, and VO_{2peak} by treadmill testing was measured at the beginning and end of the study. Each player was also asked to provide a urine sample prior to all testing procedures. This urine sample was tested for glucose and used to screen players for possible diabetes. All pre-testing was completed in the week prior to the first sled push session and all post-testing procedures were completed within the week following the third and final sled push session. At least one day of recovery was given between testing days. Height, weight, standing reach, body composition determined by hydrostatic weighing, and VO_{2peak} were measured on the first day. 300 yd shuttle time was measured on the second day.

TABLE 1. Pre- and post-testing subject characteristics (n=14).

	Pre-Testing		Post-Testing	
Variable	**Mean**	**Std Dev**	**Mean**	**Std Dev**
Age (years)	20	1	20	1
Height (cm)	179	5	179	5
Weight (kg)	89.0	10.5	90.0	10.5
Standing Reach (cm)	232	6	232	6
Body Fat % (Hydro)	12.1	4.9	11.3	5.0
Body Fat % (Skinfold)	10.8	3.9	10.8	3.8
VO_{2peak} (mL/kg/min)	48.16	4.69	45.63	6.29
300-yard Shuttle (sec)	49.8	3.5	50.7	2.7

Demographic Measurements, Body Composition, and Aerobic Capacity Measurements

Subject height and standing reach were measured to the nearest centimeter and subject weight was measured to the nearest one half kilogram. Body weight was measured weekly throughout the experiment. Body composition was determined utilizing both the skin caliper and the hydrostatic weighing techniques (12, 26). Peak oxygen consumption was determined by indirect, open-circuit calorimetry (MedGraphics® CPX/D) while the subject exercised to fatigue on a motorized treadmill during a Bruce protocol (13). Two of three criteria were used to determine VO_{2peak}: a plateau in oxygen consumption (a rise of less than 2 ml/kg/min during the final minute of the test), a respiratory exchange ratio of greater than 1.15, and/or a heart rate within 10 beats of the maximum rate as predicted by age (220 minus the age of the subject) (47). Resting and exercise heart rate measures were collected throughout the VO_{2peak} testing procedure with Polar® heart rate monitors.

Game Simulation Testing

Within one week of pre-testing measures, the athletes were asked to perform a series of maximal-effort weighted sled-pushes for 10 yards on the artificial turf of the indoor or outdoor football practice field at Texas A&M University. The sled was initially weighted to approximate the weight of an opponent at any particular playing position; e.g., the sled weight for offensive linemen was approximately the weight of opposing defensive linemen (Figure 1). Thus, the sled-push exercises were designed to approximate a football game task. A standard warm-up routine preceded all exercise measurements. Subsequent to the warm-up, each athlete completed a series of sled-push exercises executed in such a manner so as to simulate game-type activity over two halves of a football game separated by a 20-minute simulated halftime recovery period. Each simulated game half consisted of 4 sets of 8 repetitions of maximal effort sled-pushes, with 8 minutes of rest between each set. Every sled-push repetition was 10 yards in length, and timed using a hand-held stop-watch. Each sled-push repetition was timed to ensure that they were similar in length to the average time for a single play during an actual football game. The work/rest duration of each repetition was timed using a 50-second turnover clock.

Figure 1 – Weighted sled-push task depiction.

The critical measure of maximal muscle power and fatigue for each athlete was obtained by a series of maximal jump-and-reach tests (Vertec® vertical jump device, Sports Imports®, Columbus, OH). Vertical jump height was determined by taking the difference between the subject's measured jump height and their measured standing reach. This vertical jump height was then used to calculate lower-body power utilizing the Lewis formula (10). This is a familiar task for all football athletes at Texas A&M University, since the coaching staff routinely makes this measure on each athlete throughout the training season. Maximal vertical jump was measured ten times per experimental session; after the warm-up prior to the beginning of set one of the sled-push exercise, upon completion of each of the four sets of pushes included in the first half of exercise, immediately following the 20-minute simulated halftime, and upon completion of each of the four sets of pushes included in the second half of exercise. Each athlete's vertical jump measure was then converted to power (10). A depiction of the simulated game task is presented in Figure 2.

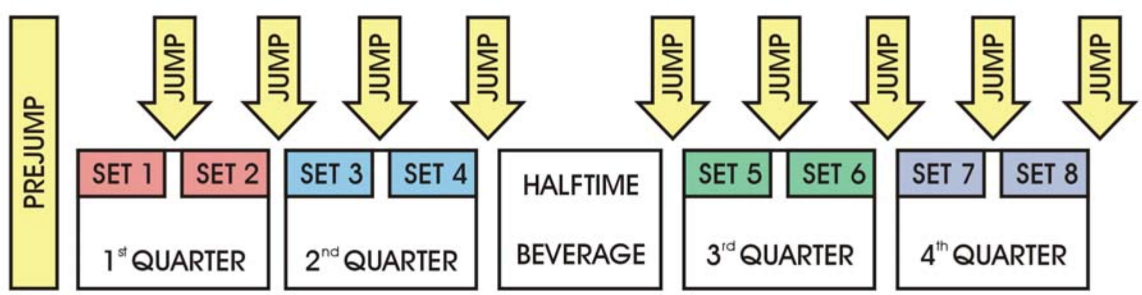

Figure 2 - Simulated game task experimental design.

The experimental sled-push game-simulated exercise sessions were completed by each athlete on three separate occasions spaced one week apart. The weight placed on the sled varied among players, trials, and weeks. This was necessary to ensure that sled push times were consistent with the approximate time of a single play during an actual football game, approximately 4 seconds. Due to variable environmental conditions, the coefficient of friction between the artificial turf surface and the sled continuously changed throughout the testing sessions. The changing coefficient of friction resulted in alterations of the degree of difficulty for each sled push for each subject. The range of sled push times for this experiment was 2.89 seconds to 23.03 seconds and the average time for a single sled push was 4.39 seconds. The range of heart rates for this experiment was 111 beats per minute (bpm) to 200 bpm and the average heart rate for a single set of sled pushes was 160 bpm. Heart rate elevated above 170 bpm or 85% of estimated maximal heart rate (220 bpm minus age in years), prolonged sled push time, and/or an inability to complete the 10-yard sled push were used as indices for the necessary changes in weight to the sled.

Water was provided to each athlete between sled-push sets *ad libitum*. All water consumption throughout the game task was measured and recorded. The experimental Gatorade® beverages or placebo of equal volume were administered during the first 5 minutes of the 20-minute simulated halftime recovery period. The beverages used included; 1) a commercially available flavored aspartame-sweetened placebo, Crystal Light, 2) a commercially available carbohydrate beverage, Gatorade Thirst Quencher® (300 ml, 67.5 g CHO, 270 kcal), and 3) a commercially available nutrition shake, Gatorade Nutrition Shake® (243 ml diluted with water to 300 ml, 45 g CHO, 15 g

Protein, 270 kcal). All beverages were randomly assigned each week and each player received all three beverages.

Time-of-day was controlled between the three experimental exercise sessions. Athletes were given suggestions for composition and timing of pre-exercise meals. Athletes were asked to give a verbal confirmation of compliance to suggested diet before each experimental session. Within one week of completion of experimental testing, all baseline measures, including each player's height, weight, body composition determined by hydrostatic weighing, 300 yd shuttle time, and VO_{2peak} by treadmill testing were measured a second and final time.

Data Analysis

All performance data were analyzed using a two-way repeated-measures analysis of covariance (ANCOVA) for beverage x jump trial. Covariance analysis was used to correct for an unpredicted difference in initial power output before any beverage was administered. Adjusting for any discrepancies in power output prior to the commencement of the testing session was utilized in order to reduce the error term variability and all the study to be more powerful for comparing treatment effects. A single covariate, the pre-half jump, was used for the jump trials in each half. Duncan's new multiple range test was utilized for post hoc analyses of significant ANCOVA results. Significant differences between means were determined by Least Square Means analysis. A student's *t*-test for paired observations was used to compare differences in pre- and post-testing data, power output for jump trials of each beverage tested, and water consumption between beverages. Differences of $P < 0.05$ were considered significant. One hundred percent participation was required for data to be included in the final statistical analysis. Of the initial eighteen subjects, fourteen subjects fully met this requirement.

Results

A simple bar graph of the mean power scores by beverage of the first jump prior to the onset of exercise in each half suggested a difference in the initial power scores for the three experimental beverages. These data are presented in Figure 3. A one-way ANOVA of the initial pre-half jumps revealed no significant difference in mean power by beverage (P=0.72 for both halves).

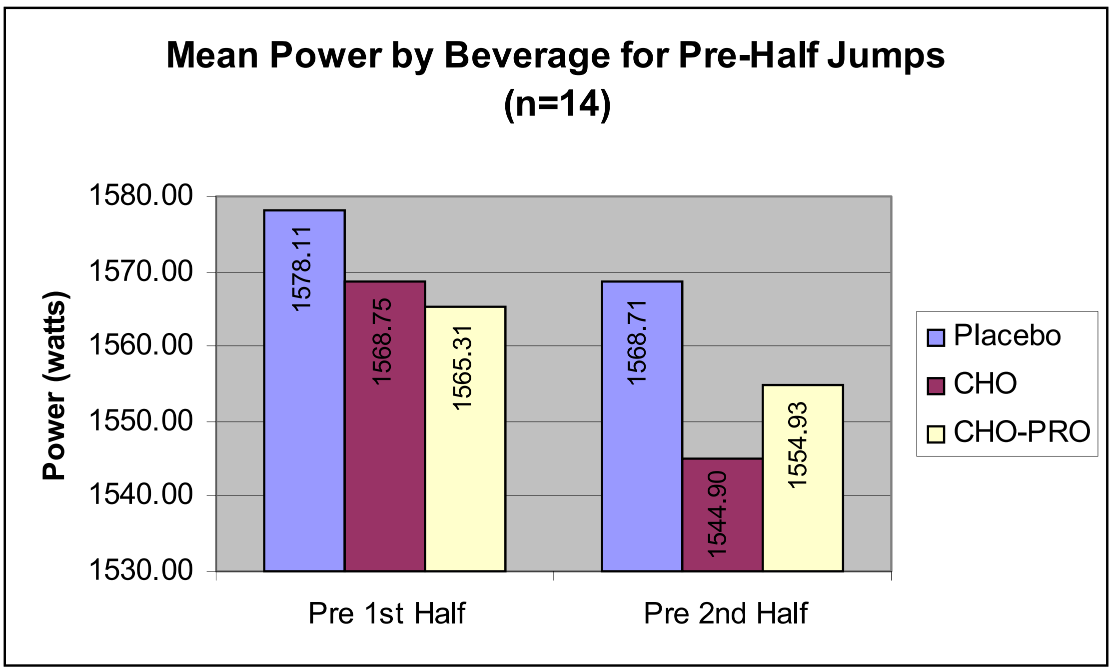

Figure 3 - Plot of mean powers by beverage for pre-half jumps (n = 14).

However, given this apparent difference in the starting power scores among the 3 beverages during a completely randomized design, it was determined that an analysis of covariance (ANCOVA) should be employed to control for these initial differences. As expected, since no treatment beverages had yet been ingested (experimental beverages were ingested at "halftime"), the results from ANCOVA of the 1st half data showed no significant differences in power scores measured at any time during the first 4 sets of activity (the 1st half). However, a significant difference between power scores by both jump trial and beverage exists in the second half.

Regardless of the beverage consumed, there was a significant increase in measured jump-power between the pre-second half jump and all subsequent jumps, as well as between the jump after set 5 and jumps after sets 7 and 8. The Least Square Means (LSMeans) from the ANCOVA for each second half jump are plotted in Figure 4.

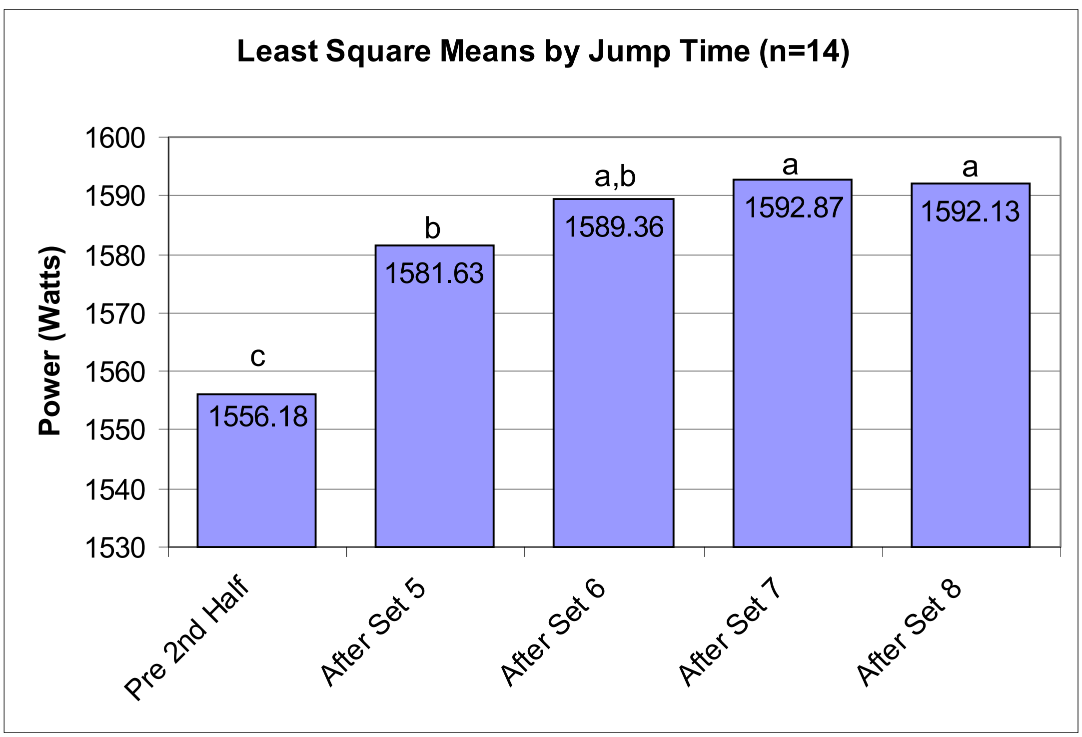

Figure 4 - Plot of Least Square Means powers for all second half jumps. Letters denote significant differences between least square mean powers during second half jumps (means with different letters are significantly different, $p < 0.05$).

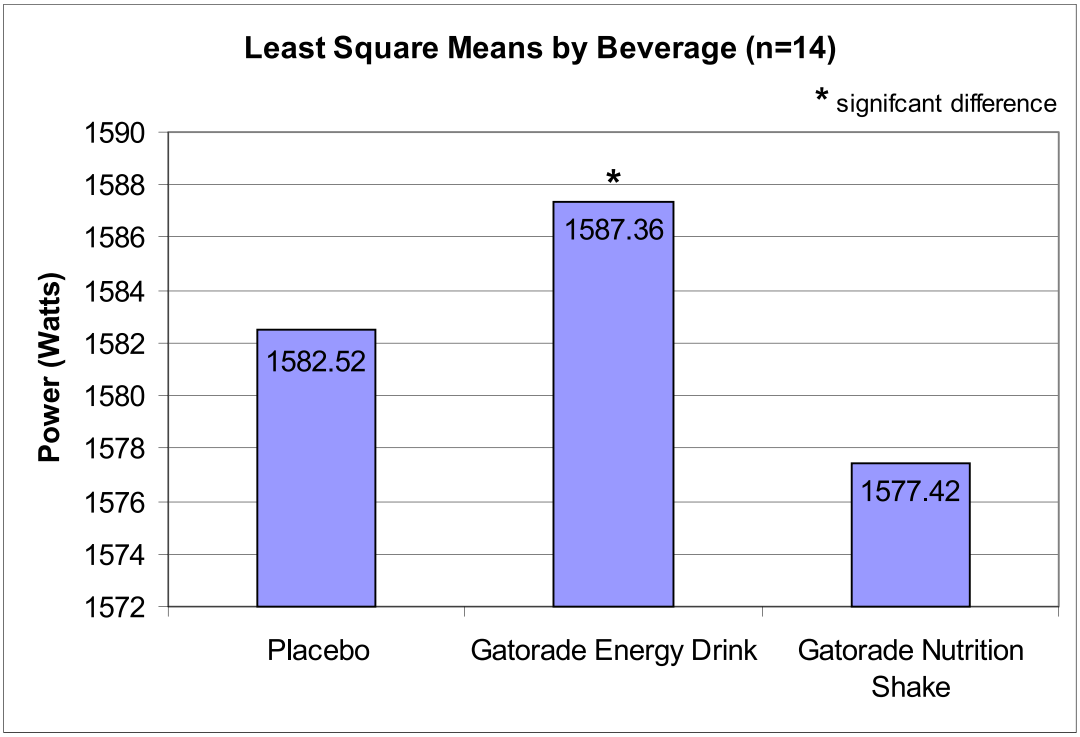

Figure 5 - Plot of Least Square Means powers for all beverages. Least Square Mean average power is significantly greater for Gatorade Energy Drink than for Gatorade Nutrition Shake (* indicates significant difference, $p < 0.05$).

We also found a significant difference in power among beverages. Our analysis by ANCOVA revealed that average jump-power for the second half was statistically significantly higher after ingesting the Gatorade Energy Drink® compared to the Gatorade Nutrition Shake®. The average jump-power after placebo was also lower than after the Gatorade Energy Drink®, but the difference was not statistically significant. The LSMeans for each beverage are plotted in Figure 5.

The LSMeans for each second half jump by beverage (placebo, Gatorade Energy Drink®, and Gatorade Nutrition Shake®, respectively) are plotted in Figure 6. Note from these figures that jump-power after the Gatorade Energy Drink® was higher compared to the other drinks following completion of sets 7 and 8, the last two sets, of the sled-push exercises. However, these differences were not statistically significant.

Analysis of pre- and post-testing data showed no significant differences observed between pre- and post-testing values for age, height, weight, standing reach, body composition, VO_{2peak}, or 300-yard shuttle time. Likewise, analysis also revealed no significant difference in water consumption among the 3 experimental beverages (Figure 7).

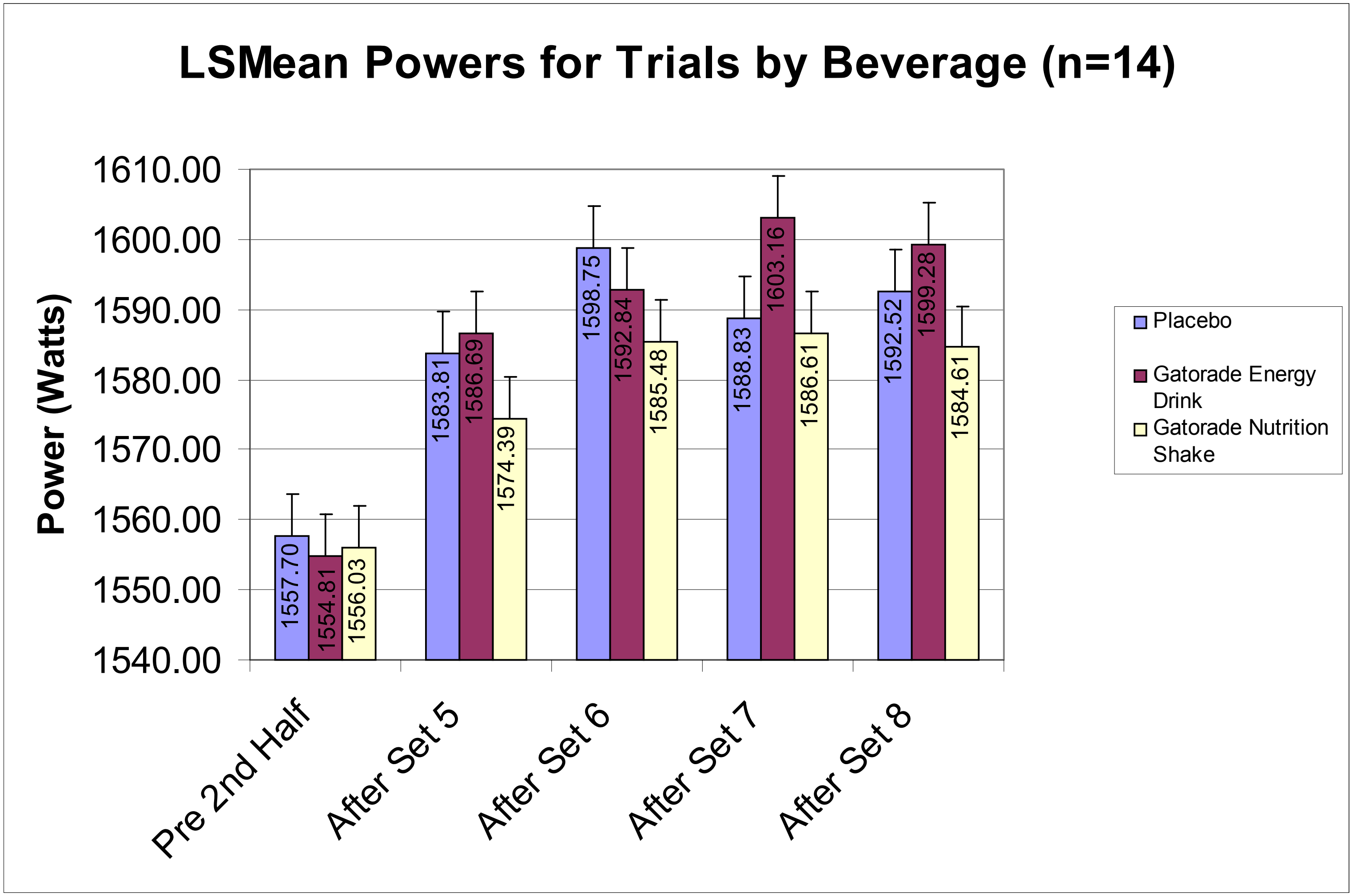

Figure 6 – Least Square Means powers for jump trials by beverage.

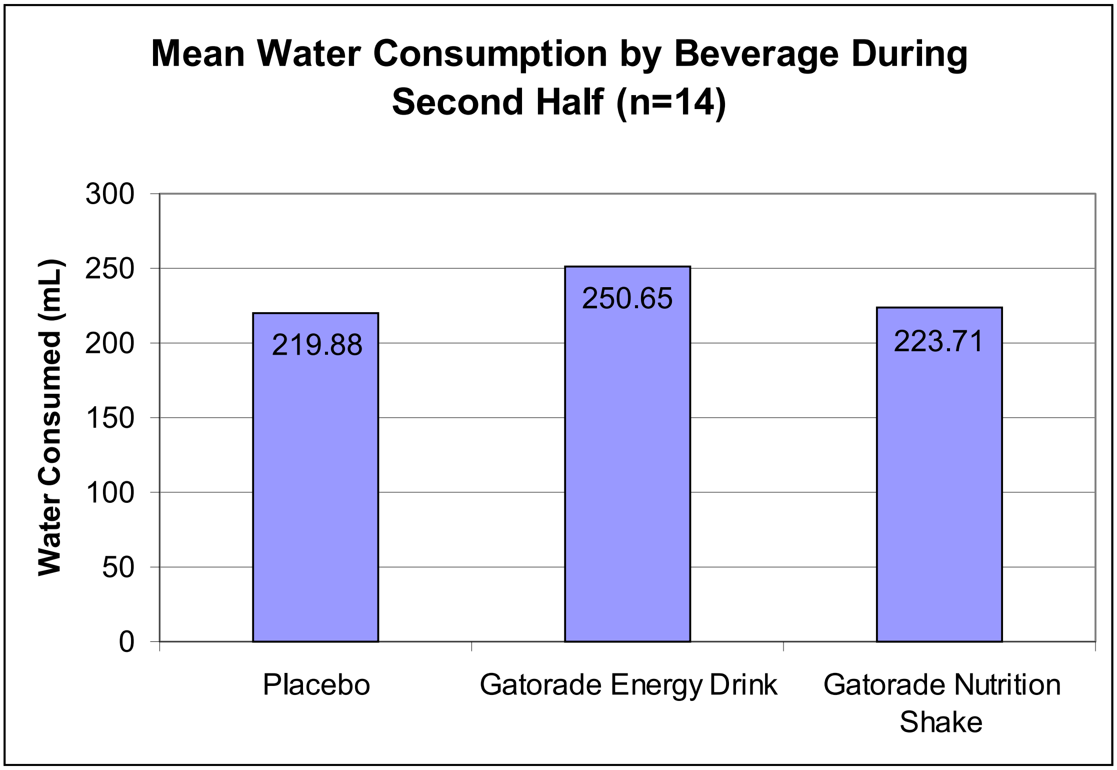

Figure 7 - Average water consumption, by beverage, for all subjects during the second half. There was no significant difference in water consumption between beverages.

Discussion

The primary finding from this study was that average power output over a series of high-intensity anaerobic exercise bouts, which simulated football game tasks, was greatest after consuming Gatorade Energy Drink® at the halftime break compared with consuming Gatorade Nutrition Shake® or placebo. Although the advantage of the energy drink was relatively small, it was statistically significant. This finding is clearly in agreement with the multitude of studies performed that demonstrate the impact that carbohydrate intake (1, 5, 14, 19, 29, 36, 46, 64). The findings of this study do not indicate any benefit to power performance due to the ingestion of Gatorade Nutrition Shake® during halftime of simulated football game task. The data obtained from this research does not support our hypothesis that muscular power during football game tasks would be better preserved by ingestion of a commercially available carbohydrate-protein beverage, Gatorade Nutrition Shake®, compared to a commercially available carbohydrate-only beverage, Gatorade Energy Drink®, or placebo.

The most recent data in carbohydrate-protein recovery beverage research, though there are some dissenting opinions (17, 33, 43, 60), primarily conclude that some benefit is derived from ingestion of such beverages by endurance athletes (4, 30, 31, 32, 35, 44, 48, 51, 54, 56, 61, 63, 66, 67). These previous findings were the basis for our hypothesis that the commercially available carbohydrate-protein beverage, Gatorade Nutrition Shake®, might provide some benefit for power output during repeated bouts of maximal or near-maximal effort anaerobic exercise. While the results of this study do not support our hypothesis, some discussion is merited.

Of primary importance, the fat content of the Gatorade Nutrition Shake® may have greatly impacted the outcome of our study. Previous studies on this matter have used experimental carbohydrate-protein beverages with no fat. However, the Gatorade Nutrition Shake® contained 8 grams of fat. Since it is known that ingestion of fat slows gastric emptying (1), it is very possible that digestion of this beverage and absorption of the nutrients it contained was slowed by its fat content. Related to this issue, digestion may have required an increase in blood flow to the visceral area, with a consequent decrease in blood flow to the working peripheral muscles. The possible shunting of blood away from the working limbs could have also influenced power output. We cannot rule out these potential confounds without further research. It is also noteworthy that the majority of our subjects found the Gatorade Nutrition Shake® to be unpalatable when consumed during strenuous exercise. We received several verbal complaints that the drink resulted in stomach upset, in some instances severe enough that the subjects reported a suppressed urge to vomit.

Another factor that potentially may have played a large role in the outcome of this study is the diet of the subjects prior to each testing session. While athletes were encouraged to follow specific guidelines when selecting and consuming their meals before each session, we were unable to control their individual intake. Additionally, the subjects were asked to consume similar meals prior to testing each week for three weeks. Furthermore, we were unable to obtain an accurate recall of dietary intake for assessment from each subject. Individual selection of pre-testing meals and self-reported compliance by the subjects could, very likely, have led to distinct differences in the subjects' nutritional and energy status prior to testing. Ultimately, without strict regulation of pre-exercise testing diet, it may be difficult to clearly identify the effects of recovery beverage ingestion. Nonetheless, this variation in nutritional status among athletes is very representative of free-living athletes in the real world.

An additional consideration to be discussed is the effect that ingestion of the experimental beverages had on the subjects' water consumption and hydration status over the course of the second half of the simulated game task. If the experimental beverage resulted in a decrease in the thirst drive leading to less water consumption and a resultant dehydration during the second half of the simulated football game, a decreased power output could result. To rule this out, we carefully measured water consumption by each athlete throughout the simulated game. As shown in figure 8, there was no significant difference in water consumption among the 3 experimental beverages. Therefore, the differences among experimental beverages did not result in any variation in water intake.

Another factor that may have influenced the outcome of this study is the timing of the experimental beverage administration. Subjects were given the experimental beverages only during the simulated halftime break. In previous studies on this issue a carbohydrate-protein recovery beverage was ingested periodically during the entire exercise bout (20, 32, 35, 44, 51, 54). Our single administration period (simulated halftime) could result in the ingestion of an insufficient quantity of the experimental beverages, or an insufficient time for the body to absorb, transport, and utilize the components of the experimental beverages. We have no data to support this speculation. Further research will be needed to discern the optimal timing and amount of beverage ingestion to optimize power preservation during football game tasks. In the present study, we cannot rule out a timing of ingestion as a factor influencing our results

Unexpectedly, the results of this study demonstrated an actual increase in power output throughout the second half of the simulated game task, regardless which experimental beverage was consumed. It is very common to see a failure to maintain the required or expected force or power output during the latter stages of prolonged exercise (25). While there could be numerous possible reasons for this, much existing data would suggest that it could be due to an appreciable decline in muscle glycogen content (5, 27, 29, 30, 38, 63). It has been documented that muscle glycogen is a primary fuel source during anaerobic activity (29, 38). Single bouts of anaerobic activity as short as six and 30 seconds may elicit decreases in muscle glycogen content of up to a 16% and 32% respectively (38). Considering that the duration and intensity of the exercise were such that a decrease in muscle glycogen would be a distinct possibility, this observation was rather surprising. While there may be underlying physiological mechanisms for this increase in power output during the latter stages of such repetitive maximal or near-maximal effort anaerobic exercise, it is also possible that the increase may be due, primarily, to psychological and behavioral aspects (25). Throughout the entire duration of each testing session, the athletes were aware of the performances of their teammates and were continuously competing against each other. Additionally, each individual subject attempted to improve their performance marks with each successive repetition. This competition among and within subjects, coupled with the psychological influence of knowing that the exercise bout was reaching its end, could have, potentially, been the force responsible for increased power output at the conclusion of the testing sessions (25). Nonetheless, much further research on this topic is necessary before any conclusions can be drawn.

In summary, our findings did not support our original hypothesis that muscular power during football game tasks would be better preserved by ingestion of Gatorade Nutrition Shake® compared to Gatorade Energy Drink® or placebo. Indeed, our findings demonstrated an increased performance benefit for power athletes who consume Gatorade Energy Drink® at a simulated halftime break from football game-tasks. Our study was not designed to address causative factors. However, it is reasonable that the nutrient composition (additional fat) of the carbohydrate-protein beverage, the content and timing of pre-exercise meals, timing of experimental beverage ingestion, or any combination of these may be contributing factors. Much further research on the subject is warranted.

CHAPTER III

CONCLUSIONS

This investigation has shown that, during a simulated game task, collegiate football players do not appear to derive benefits from the ingestion of a beverage containing carbohydrate, protein, and fat. This study has also revealed that these players achieved the greatest power output after consumption of a carbohydrate-only beverage. From these results, it can be concluded that, during an actual competition, football players would likely benefit from the consumption of a more traditional carbohydrate-only sports beverage at halftime.

Considering the limitations of this investigation (i.e. single experimental beverage administration and added fat content of carbohydrate-protein beverage) and the conflicting reports in current literature on the efficacy of carbohydrate-protein beverages, extensive further research is warranted. To my knowledge, all of the literature on such beverages has centered on their use by endurance, or aerobic, athletes. However, these athletes do not make up the entire body of competitive participants. For every aerobic athlete, there is also likely to be an aerobic counterpart. Ensuring that research takes into account effectiveness of products for both types of athletes is imperative.

Athletic competitions are an enormous part of modern culture and are a lucrative business. With so much emphasis oftentimes placed on a single bout of exercise, optimizing performance is vital. Maughan states that "When everything else is equal, nutrition can make the difference between winning and losing." (38) In a world where a few grams of protein added to a sports drink can mean so much, all avenues must be fully explored.

While the results of this investigation did not give a definite conclusion about the effectiveness of carbohydrate-protein beverages for anaerobic athletes, it has shed some light on the matter. Though much more research is needed on the subject, some advice can be given to such athletes. These athletes would benefit from consumption of a healthy, balanced diet on a daily basis (1). It is important for these athletes to ensure that they are taking in enough fuel to maintain their weight, muscle mass, and performance ability (1). This should follow in macronutrient proportion to that recommended for all healthy adults (1). Awareness of adequate carbohydrate intake before, during, and after prolonged exercise is important (14). Additionally, anaerobic athletes may have slightly greater protein needs, but these are best met via daily dietary intake rather than through the use of supplements (1). Finally, maintaining fluid balance should be of great importance to these athletes as well (18).

Recommendations

Based on the results of this investigation and the related literature on the subject, in future studies it is recommended that:

1. additional research be designed to investigate the effects of ingesting carbohydrate-protein supplements throughout a prolonged exercise bout.
2. further research be designed to investigate the effects of carbohydrate-protein supplements on anaerobic athletes.
3. further research be conducted on the effects of carbohydrate-protein beverages in an older subject population.
4. future studies include measures of muscle glycogen content.

5. further studies should use a strictly carbohydrate-protein beverage, without the inclusion of fat.

6. future investigations on the effects of carbohydrate-protein beverages ensure control of dietary intake prior to experimental testing.

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APPENDIX A

INFORMED CONSENT

Informed Consent

Title of the Study: Effect of Carbohydrate and Carbohydrate-Protein Supplementation on Power Performance in Collegiate Football Players Performing a Simulated Game Task

Investigator:	**Office Phone:**
Glenda E. Crawford, B.S.	(979) 575-2846

Address of Glenda E. Crawford, Principal Investigator:

1000 E. University Dr, #102

College Station, TX 77840

I,____**,** have been informed by the investigators that I have been selected to participate in a study entitled: *Effect of Carbohydrate and Carbohydrate-Protein Supplementation on Power Performance in Collegiate Football Players Performing a Simulated Game Task.*

I understand this study will be conducted between June 1, 2004 and August 31, 2004 at the Applied Exercise Science Laboratory located in the Steed building at Texas A&M University, College Station, Texas, and at the football practice facility in the same building. Twenty men from the Texas A&M University football team will be recruited for this study.

GENERAL INFORMATION CONCERNING MY RIGHTS AS A STUDY PARTICIPANT

I have been invited to participate in a research study about the effects of carbohydrate and carbohydrate-protein supplementation on power performance in collegiate football players performing a simulated game task. I have been informed that persons who participate in research are entitled to certain rights. These rights include but are not limited to my right to:

1. Be informed of the nature and goal of the research.

The general goal of this research project is to determine whether carbohydrate or carbohydrate-protein supplementation has a greater effect on the power performance of collegiate football players during a game simulated task.

To fulfill this general goal, this project has been designed to answer the following question.

> Does supplementation of collegiate football players with carbohydrate-protein during a game simulated task have a greater effect on power performance and fatigue recovery than a placebo or carbohydrate supplementation alone?

Procedures to be Followed:

After I volunteer and give my informed consent to be a subject in this study, I understand I will be given a health history questionnaire to answer. I will be encouraged to answer these questionnaires to the best of my knowledge so that the investigators can make an accurate decision about the safety of the study for me. Following review of the questionnaire, the investigators will make a decision about allowing me to continue in the study.

As a subject, I understand that I will be asked to provide a urine sample, which will be tested for glucose to screen for diabetes. As a subject, I understand I will be tested on all the following variables one week prior to the beginning of the study and again one week following the study: percent body fat, maximal oxygen consumption (VO_2 max), vertical jump, and 300 yard shuttle time. As a subject, I will also read as well as be verbally explained the methods and procedures that will be used to determine each of the above variables. Percent body fat will be determined through the use of hydrostatic weighing. Maximal oxygen consumption will be determined by the subject exercising to volitional fatigue on a motorized treadmill. The peak oxygen uptake achieved during exercise will be recorded as VO_{2peak} (L/min).

Vertical jump will be determined by the difference in the subjects' standing reach and the highest touch during a maximal jump test. Three hundred-yard shuttle time will be measured using an electrical timing device. Body weight will also be measured to the nearest one-half pound prior to the study as well as weekly during the study.

As a subject I understand that upon completion of the pre-study testing described above I will begin the study. I understand that within one week of these baseline measures, I will be asked to perform the first series of maximal-effort weighted sled-pushes on the artificial turf surface of the indoor or outdoor football practice field at Texas A&M University. The sled will be weighted to approximate the weight of an opponent at any particular playing position; e.g., the sled weight for offensive linemen will approximate the weight of opposing defensive linemen. Thus, the sled-push exercises will be designed to approximate a football game task. A standard warm-up routine will precede all exercise measurements. Subsequent to the warm-up, each athlete will complete a series of sled-push exercises executed in such a manner so as to simulate game-type activity over two halves of a football game separated by a 20-minute simulated halftime recovery period. Each simulated game half will consist of 4 sets of 8 repetitions of maximal effort sled-pushes, with 8 minutes of rest between each set. Every sled-push repetition will be 10 yards in length, and timed using a hand-held stop-watch. The work/rest duration of each repetition will be timed using a 50-second turnover clock. I also understand that I will be asked to perform a series of maximal jump-and-reach tests. Maximal vertical jump will be measured at least four times per experimental session; after the warm-up prior to the beginning of set one of the sled-push exercise, upon completion of the first half of exercise (that is, after the fourth set of sled-push exercises), immediately following the 20-minute simulated halftime, and at the end of the experimental exercise session. I am aware that I will be asked to participate in three experimental sled-push game-simulated exercise sessions, which will be completed on three separate occasions spaced one week apart.

The week following completion of the training program, I understand that all the variables tested during pre-testing will be tested for the final time, and that this post-training testing will follow the same methods and procedures as the pre-training testing.

Discomforts or Risks to be Reasonably Expected:

I understand that the following few paragraphs give me information about the potential risks and discomforts that I may experience as a result of participating in this study. Additionally, the investigators have invited me to voice questions and concerns at any time during the course of the study so they may address these as they arise.

I understand that the risks associated with the one repetition maximum test and the graded exercise treadmill test (VO_{2peak}), the 300 yard shuttle run, and the sled-push exercise are comparable to those I face whenever I perform hard exercise that causes me to sweat and breathe heavily. These include the risk of occasional abnormal blood pressure responses, injury to joints or muscles, such as ankle, knee, or hip sprains or, rarely, fractures, muscle strains/soreness, fainting, heart problems, shortness of breath, and, in rare instances, heart attack. I have been informed that studies have shown my risk for death during this type of test is about 0.5 in 10,000, and my risk for harmful affects is about 5 to 8 in 10,000. The investigators have assured me that they will make every effort to minimize these risks by carefully reviewing my health and medical history questionnaire and evaluating my risk factors for disease. All these procedures will be done before I am allowed to exercise. If they find some physical problems that, in their judgment, make exercise risky, for my own protection they will not allow me to exercise in this study. In addition to the pretest procedures, trained exercise technicians and exercise physiologists will be in charge of conducting the test. They are trained to recognize problems in my heart or in other bodily responses to the exercise test which could be dangerous, and to stop the test if necessary. Throughout all testing procedures, the 6th edition of the American College of Sports Medicine's "Guidelines for Exercise Testing and Prescription" will be closely observed.

The vertical jump test requires that I jump to my maximal ability. I understand that there is a possibility that I may injure myself upon landing but that this risk is minimal. This test will be administered on a level Astroturf surface to decrease the risk of injury.

The body composition test requires that I be seated on a chair attached to scale in a tank of warm, shallow water (4 ft.). I will be asked to exhale all the air in my lungs and submerge myself completely. This procedure, though somewhat uncomfortable, is completed under the supervision of a trained technician and presents no more risks than swimming in an open pool under the supervision of a lifeguard.

Benefits of participation and alternative procedures:

I understand that the pre-training screening will provide valuable information to me regarding my present physical fitness status. Furthermore, blood pressure and heart rate will be monitored during the VO_{2peak} test; this will provide me with important information related to how well my heart and blood vessels function when I exercise as hard as I can. The muscular power and speed tests will provide me valuable information as well about my ability to produce muscle power and exercise at high intensity. From these tests, I can determine my strengths and weaknesses relative to my optimal physical conditioning, and make changes in my training program to improve my athletic performance. The body composition assessment will provide me with information regarding my ideal body weight and, if applicable, suggest the amount of fat that may be reasonably and safely lost or suggest the amount of weight that should be safely gained.

Compensation:

As a subject in this study, I understand I will receive the previously outlined evaluations, tests, and training at no cost to me. I will be given my individual results for; all screening procedures, the power test, the speed test, the maximal oxygen consumption test (VO_{2peak}), and the percent body fat test. These results will be made available to me upon completion of all data analysis.

Medical treatment, if any, is available to the subject during or after the experiment if complications arise.

The investigators have informed me that they will make reasonable and proper efforts to prevent physical injury to me and to insure my safety throughout all phases of this research project. However, I am well aware that, as noted above, my participation in this study is not without risk. I understand that compensation for physical injuries or adverse effects incurred as a result of participating in this research is NOT available. The investigators have informed me that they are prepared to advise me about medical treatment in case I experience adverse consequences of any of the study procedures. However, I understand that it is my responsibility to report any injuries or ill effects to one of the investigators or study supervisors as soon as possible. The investigators have also provided me with Student Health Services Dial-A-Nurse number (979-845-2822) and the Health Center number (979-845-1511). I can access this system in case I have additional questions about my medical treatment. Also, as an athlete the football athletic trainers will be available for me to counsel with in case of injury. Phone numbers where the investigators may be reached are listed in the heading of this form.

Questions concerning the research and the procedures involved:

I understand that should I volunteer for this study; the procedures will be discussed with me in detail by one of the investigators. If I have any questions about the research or about my rights as a subject, the investigators have invited me to ask them. I am aware that if I have any questions later, I am invited to contact one of the investigators listed in the heading of this form.

Be instructed that consent to participate in the research may be withdrawn at any time, and that I may discontinue participation without prejudice.

Participation in this research is entirely voluntary. Refusal to participate will involve no penalty of any kind from any of the investigators. If I decide to participate, I am free to withdraw my consent and discontinue participation at any time and for any reason. This will be without prejudice and any results, which were obtained up to the time of my withdrawal, will still be reported to me.

Be informed of the conditions under which my participation may be terminated by the investigator without regard to my consent.

I understand that falsification of any information provided by me to the investigators, whether verbal or written, will be grounds for termination of my participation without my consent. Furthermore, failure to comply with the schedule of the study may result in termination of my participation in this study without my consent.

I have the opportunity to decide to consent or not to consent to participate in research without the intervention of any element of force, fraud, deceit, duress, coercion, or undue influence on my decision.

My right to privacy.

I understand that I have the right to privacy. All information that is obtained in this study that can be identified with me will remain confidential, and will be stored in the laboratory of the principal investigator. All information that can be identified with me will be known only to the investigators, including members of the Athletic Strength and Conditioning staff, and to those who will be responsible for statistical analysis of the data. It may be released to another individual or physician of my choice upon my written request. The results of this study may be published in scientific journals without identifying me by name. I have been given and have read an explanation of the procedures to be followed in this study, including an identification of those, which are experimental. I have been given and have read a description of the attendant risks and discomforts that may be associated with the experimental procedures used in this study. I have been given and have read a description of the benefits that I may expect from participating in this study. I have been offered an answer to any inquiries concerning the procedures. I have been assured that steps will be taken to insure the confidentiality of my results, which will be housed in the Applied Exercise Science Laboratory. Neither my name nor any other descriptor that can identify me will be associated with the publication of the results of this study.

I understand that in the event of physical injury resulting from the research procedures described to me, there will be no financial compensation or free medical treatment offered to me.

I have not been requested to waive or release the institution, its agents or sponsors from liability for the negligence of its agents or employees. I have read and understand the explanations provided to me and voluntarily agree to participate in this study.

I understand that I will be given a copy of the entire informed consent document to keep for my own records.

Date_____________ Signature of Subject: ___________________________________

Address: ____

____

Signature of Principal Investigator: ________________________

This research has been reviewed and approved by the Institutional Review Board - Human Subjects in Research, Texas A&M University. For research related problems or questions regarding your rights, the Institutional Review Board may be contacted through Dr. Michael W. Buckley, Director of Support Services, Office of Vice President for Research at (979) 458-4067. **I understand that, in case of any further questions, I may contact one of the following individuals:**

Glenda E. Crawford, B.S. (Graduate Researcher)

1000 E. University Dr, #102

(979) 575-2846

Stephen F. Crouse, Ph.D. (Advisor)

Applied Exercise Science Laboratory

(979) 845-3997

APPENDIX B

RECOMMENDATIONS FOR PRE-EXERCISE DIETARY INTAKE

Since the sled-push exercise in this study is meant to simulate a normal football game, we are asking that you consume a "pre-game" meal similar to that eaten before a regular football game. Each of you will be participating in the sled-push at one of three times during the day; 8:00 am, 12:00 noon, or 3:00 pm. Since each of you will be working out at a different time of day, each of your pre-game meals will be consumed at different times during the day. We cannot prescribe a set meal for you to eat before performing the sled-push. No one meal will be right for everyone, but some food choices are smarter than others. The following are some general guidelines for food selection and meal planning.

Please make sure your "pre-game" meal plans follow these guidelines before each bout of sled-push exercise.

- **Eat the meal at least 3 hours before the event.**
- **Eat a meal that is high in starch / carbohydrates.**
- **Consume only moderate amounts of protein.**
- **Limit intake of fats and oils.**
- **Restrict sugary foods.**
- **Avoid foods and drinks that contain caffeine.**
- **Drink plenty of fluids before exercising.**

Please Note: If you are participating in the sled-push at 8:00 am, we recommend that you have cereal and fruit for breakfast on Wednesday or peanut butter and jelly sandwich and fruit on Tuesday night.

**The following are some examples of pre-game meals.
They are only suggestions.**

Meal 1
cereal
banana slices
milk
toast/jam
pineapple juice
water

Meal 2
poached egg
toast/jam
milk
orange juice
water

Meal 3
pancakes
applesauce
milk
grape juice
water

Meal 4
chicken noodle soup
crackers
orange
low-fat yogurt
water

Meal 5
cottage cheese/peaches
breadsticks
milk
apple juice
water

Meal 6
Turkey sandwich/lettuce
apple
milk
tomato juice
water

Meal 7
spaghetti/tomato sauce
bread
milk
orange juice
water

Meal 8
Subway Turkey Sandwich
(footlong)
Baked Lays
Lemonade
Water

APPENDIX C

RAW DATA

Table C1: Pre-testing data. All data collected within 7 days prior to beginning of experimental testing sessions.

Table C2: Post-testing data. All data collected within 7 days after the completion of experimental testing sessions.

Table C3: Data from testing session when placebo beverage was consumed. All data collected during 3 weeks of experimental testing, based on randomized beverage selection.

Table C4: Data from testing session when carbohydrate-only beverage was consumed. All data collected during 3 weeks of experimental testing, based on randomized beverage selection.

Table C5: Data from testing session when carbohydrate-protein beverage was consumed. All data collected during 3 weeks of experimental testing, based on randomized beverage selection.

TABLE C1. Pre-testing data.

Subject #	Age (yrs)	Height (in)	Weight (lb)	Standing Reach (in)	Urine Analysis	300 Yard Shuttle (sec)	Hydrostatics Body Fat % 1	2	3	average
1	21	73	219	96.5	negative	48.09	16.27	15.12	15.12	15.50
2	19	68	182.5	89.5	negative	46.28	7.71	6.84	7.33	7.29
3	21	68	166	87	negative	46.015	3.87	4.91	3.94	4.24
4	22	70	199	92	negative	50.465	10.63	10.78	11.43	10.95
5	20	71	195	92	negative	48.37	6.09	13.93	10.61	10.21
6	21	68	165.5	89.5	negative	50.55	11.2	9.94	10.16	10.43
7	19	76	293	99	negative	55.39	20.43	21.9	22.22	21.52
8	22	72	236	94.5	negative	54.78	27.77	20.28	20.4	22.82
9	20	71	200.5	90	negative	47.4	11.66	11.13	11.34	11.38
10	21	70	205.5	91.25	negative	48.075	10.72	10.73		10.73
11	21	71	189.25	93	negative	49.39	13.07	11.89		12.48
12	19	71	213	89.5	negative	52.895	17.09	17.01	16.5	16.87
13	20	71.5	169	92.5	negative	43.495	8.12	9.86	8.81	8.93
14	21	69	217	91	negative	54.68	19.93	20.49		20.21
15	19	74	253	99.5	negative	55.43	19.41	19.12	20.24	19.59
16	20	76	234	98.5	negative	50.62	13.02	13.36		13.19
17	20	69	218.25	89.5	negative	54.5	23.02	22.06	22.99	22.69
18	19	72	179	91	negative	54.055	10.28	8.64	9	9.31

TABLE C1. Continued.

	Skinfolds										
	Chest			Abs			Thigh			Body	Body Fat
Subject #	1	2	average	1	2	average	1	2	average	Density	%
1	8	8.5	8.25	21	21	21	9	9	9	1.074694	10.59613
2	4	5.5	4.75	14	14.5	14.25	11.5	9.5	10.5	1.081494	7.700118
3	4	4.5	4.25	7	7.5	7.25	6	7	6.5	1.089612	4.289984
4	4	4.5	4.25	11.5	12	11.75	11	9	10	1.083305	6.935196
5	8	7	7.5	18.5	18	18.25	7.5	7.5	7.5	1.078513	8.965207
6	4	6	5	13	13	13	9	8	8.5	1.083191	6.983265
7	6	6.5	6.25	32	31	31.5	24	23	23.5	1.059857	17.04435
8	7	6	6.5	30	31	30.5	26	25	25.5	1.058298	17.73195
9	10	10	10	16	15	15.5	12	14	13	1.074776	10.56123
10	7	9	8	25	23	24	14	15	14.5	1.068993	13.05276
11	11	10	10.5	16	16.5	16.25	16	16	16	1.071557	11.94451
12	4	5.5	4.75	24.5	23.5	24	24.5	26	25.25	1.064513	15.00128
13	4.5	4.5	4.5	15	16	15.5	15	14	14.5	1.077615	9.34762
14	5	5	5	28	29	28.5	20	20	20	1.064326	15.08318
15	16	17	16.5	36	38	37	14	14.5	14.25	1.055825	18.82788
16	8	7.5	7.75	29	27	28	16	18	17	1.065076	14.75571
17	7	8	7.5	37.5	35.5	36.5	17	18	17.5	1.059442	17.22729
18	5	5	5	19	18	18.5	11	11	11	1.077873	9.237926

TABLE C1. Continued.

			Graded Exercise Data							
			Calculated				Measured VO2 MAX			
Subject #	Treadmill Number	Peak HR (bpm)	Total Time (min)	Total Time (sec)	Total Time (min)	VO2 MAX (mL/kg/min)	VO2 MAX (mL/kg/min)	VO2 mL/min	VCO2 mL/min
1	1	187	12	42	12.70	45.45	44.61	4430	5570
2	2	182	13	55	13.92	50.61	49.5	4095	5130
3	1	191	12	45	12.75	45.66	46.2	3480	4210
4	2	180	15	42	15.70	57.88	57.4	5182	5228
5	1	186	15	2	15.03	55.22	52.8	4670	6040
6	1	180	14	10	14.17	51.66	48.5	3640	4850
7	2	182	11	15	11.25	39.28	40.4	5367	6798
8	2	194	12	6	12.10	42.89	46.8	5006	5676
9	1	188	14	2	14.03	51.10	49	4450	5810
10	2	180	13	13	13.22	47.65	48.2	4489	5005
11	1	196	13	28	13.47	48.71	50.7	4350	5730
12	1	208	12	29	12.48	44.52	42.7	41.2	55.5
13	1	196	13	0	13.00	46.73	46.4	3560	4860
14	1	201	12	1	12.02	42.53	41.1	4060	5310
15	1	182	12	10	12.17	43.17	41.1	4720	6300
16	1	187	12	7	12.12	42.96	41.1	4360	5680
17	2	194	12	10	12.17	43.17	47.3	4686	5662
18	2	193	13	44	13.73	49.84	53.8	4368	5278

TABLE C2. Post-testing data.

Subject #	Age (yrs)	Height (in)	Weight (lb)	Standing Reach (in)	Urine Analysis	300 Yard Shuttle (sec)	Hydrostatics Body Fat % 1	2	3	average
2	19	68	188.5	89.5	negative	47.98	6.82	8.01	7.38	7.40
3	21	68	170	87	negative	48.05	2.69	2.23	2.99	2.64
4	22	70	199	92	negative	51.08	7.29	8.62	8.69	8.20
5	20	71	194.25	92	negative	46.475	12.09	11.44	11.94	11.82
6	21	68	165	89.5	negative	48.53	7.04	7.42	8.46	7.64
8	22	72	234	94.5	negative	53.18	19.05	20.5	20.53	20.03
9	20	71	203	90	negative	49.825	12.17	13.88		13.03
10	21	70	203	91.25	negative	48.36	8.55	10.18	11.73	10.15
11	21	71	190.5	93	negative	51.825	7.9	9.6	10.5	9.33
12	19	71	214	89.5	negative	52.085	17.15	18.41	18.2	17.92
13	20	71.5	172.25	92.5	negative	50.485	10.23	10.54	10.45	10.41
14	21	69	224	91	negative	56.555	19.49	19.49	20.31	19.76
15	19	74	245	99.5	negative	54.345	16.58	15.89	16.6	16.36
16	20	76	237	98.5	negative	51.875	11.81	11.95	11.68	11.81
18	19	72	178	91	negative	53.135	8.93	8.7	8.02	8.55

TABLE C2. Continued.

	Skinfolds										
	Chest			Abs			Thigh			Body	Body Fat
Subject #	1	2	average	1	2	average	1	2	average	Density	%
2	5	5	5	17	17	17	11	10	10.5	1.079312	8.625643
3	5.5	6	5.75	9.5	9	9.25	6	7	6.5	1.08694	5.406859
4	5	5	5	12.5	13	12.75	9	11	10	1.082008	7.482596
5	8	9	8.5	19	19	19	8	9	8.5	1.076544	9.804538
6	5	5	5	13	12.5	12.75	8	8	8	1.083748	6.748258
8	5	5	5	28	32	30	20	20	20	1.063089	15.62436
9	5	5	5	16.5	17	16.75	15	16	15.5	1.075658	10.18364
10	5	4.5	4.75	20	20	20	10	10	10	1.077179	9.533706
11	4	4.5	4.25	18	17	17.5	12	13	12.5	1.077537	9.380967
12	6	6	6	36	36	36	28	28.5	28.25	1.05431	19.50146
13	4	3.5	3.75	17	17	17	12	13	12.5	1.078513	8.965207
14	5	4.5	4.75	31	32	31.5	11	10	10.5	1.068823	13.12614
15	6	5	5.5	37	36	36.5	12	12	12	1.064513	15.00128
16	9	8	8.5	26	27	26.5	14.5	16	15.25	1.06673	14.03476
18	12	12	12	19	18.5	18.75	15	15.5	15.25	1.069847	12.68307

TABLE C2. Continued.

			Graded Exercise Data						
			Calculated				Measured VO2 MAX		
Subject #	Treadmill Number	Peak HR (bpm)	Total Time (min)	(sec)	Total Time (min)	VO2 MAX (mL/kg/min)	VO2 MAX (mL/kg/min)	VO2 mL/min	VCO2 mL/min
2	2	199	15	2	15.03333	55.22493	56.5	4834	5940
3	1	190	13	1	13.01667	46.79905	44.7	3530	4584
4	1	183	14	3	14.05	51.17152	46.7	4215	5643
5	1	184	16	2	16.03333	59.16776	55.3	4887	6394
6	1	180	14	31	14.51667	53.11258	49.6	3713	4818
8	2	193	10	34	10.56667	36.42694	42.4	4504	4698
9	2	197	13	41	13.68333	49.62928	52.4	4826	5872
10	2	188	13	33	13.55	49.06551	40.2	3704	2867
11	1	201	13	33	13.55	49.06551	47.9	4143	5380
12	1	200	12	31	12.51667	44.66493	42.4	4213	5609
13	1	198	12	23	12.38333	44.0955	41.4	3250	4180
14	2	174	9	2	9.033333	30.29957	35.2	3571	4084
15	1	180	13	4	13.06667	47.01212	43	4773	6453
16	1	184	11	0	11	38.23	38.1	4119	5388
18	1	194	13	48	13.8	50.12138	46	3760	5018

TABLE C3. Data from testing session when placebo beverage was consumed.

			Jump Height									
Subject #	Ht (in)	Wt (lb)	1 Pre 1st Half	2 After Set 1	3 After Set 2	4 After Set 3	5 After Set 4	6 Pre 2nd Half	7 After Set 5	8 After Set 6	9 After Set 7	10 After Set 8
1	73	219	121	122.5	121	120.5	120.5	120	121.5	120	121.5	121.5
2	68	192	113	114	114.5	115	114	112.5	114	114	113.5	113.5
3	68	166	116.5	116	117	116	117	116	117	117	117	117.5
4	70	199	117.5	118.5	118.5	117	119	118	119	119.5	120	119.5
5	71	192	118.5	119	119.5	119.5	119.5	118	119	118.5	119.5	118
6	68	165.5	112.5	112	112	112	112.5	111	114	112	112	113.5
7	76	293	120	120	113.5	119.5	117.5	118.5	118.5	118.5	120	119.5
8	72	230	119	120	120	119.5	119.5	119	119	120	120.5	119.5
9	71	200.5	115	116	116.5	115.5	115	115.5	115	116	116	115.5
10	70	201	118	119	119.5	118.5	118.5	117	118.5	119	118.5	118.5
11	71	191	118.5	117	116	117	119	117.5	120	120	120	120
12	71	212	112	113	113	114	113	112.5	114	114	115	116
13	71.5	171	116	116	116.5	117	117	115.5	116.5	116.5	116	117
14	69	220	115	116	116	115.5	116	115	116	115.5	116	115.5
15	74	253	118.5	119	118	118.5	118	119	119	119	120	119.5
16	76	234	125.5	124	126	125	123	123.5	124	124.5	121.5	125
17	69	211	110.5	110	110.5			109.5	110	110	110	110
18	72	179	116.5	116.5	116.5	117	117	116	116	116	115.5	115.5

TABLE C3. Continued.

	Vertical Jump Height (meters)									
	1	2	3	4	5	6	7	8	9	10
Subject #	Pre 1st Half	After Set 1	After Set 2	After Set 3	After Set 4	Pre 2nd Half	After Set 5	After Set 6	After Set 7	After Set 8
1	0.6223	0.6604	0.6223	0.6096	0.6096	0.5969	0.635	0.5969	0.635	0.635
2	0.5969	0.6223	0.635	0.6477	0.6223	0.5842	0.6223	0.6223	0.6096	0.6096
3	0.7493	0.7366	0.762	0.7366	0.762	0.7366	0.762	0.762	0.762	0.7747
4	0.6477	0.6731	0.6731	0.635	0.6858	0.6604	0.6858	0.6985	0.7112	0.6985
5	0.6731	0.6858	0.6985	0.6985	0.6985	0.6604	0.6858	0.6731	0.6985	0.6604
6	0.5842	0.5715	0.5715	0.5715	0.5842	0.5461	0.6223	0.5715	0.5715	0.6096
7	0.5334	0.5334	0.3683	0.5207	0.4699	0.4953	0.4953	0.4953	0.5334	0.5207
8	0.6223	0.6477	0.6477	0.635	0.635	0.6223	0.6223	0.6477	0.6604	0.635
9	0.635	0.6604	0.6731	0.6477	0.635	0.6477	0.635	0.6604	0.6604	0.6477
10	0.67945	0.70485	0.71755	0.69215	0.69215	0.65405	0.69215	0.70485	0.69215	0.69215
11	0.6477	0.6096	0.5842	0.6096	0.6604	0.6223	0.6858	0.6858	0.6858	0.6858
12	0.5715	0.5969	0.5969	0.6223	0.5969	0.5842	0.6223	0.6223	0.6477	0.6731
13	0.5969	0.5969	0.6096	0.6223	0.6223	0.5842	0.6096	0.6096	0.5969	0.6223
14	0.6096	0.635	0.635	0.6223	0.635	0.6096	0.635	0.6223	0.635	0.6223
15	0.4826	0.4953	0.4699	0.4826	0.4699	0.4953	0.4953	0.4953	0.5207	0.508
16	0.6858	0.6477	0.6985	0.6731	0.6223	0.635	0.6477	0.6604	0.5842	0.6731
17	0.5334	0.5207	0.5334			0.508	0.5207	0.5207	0.5207	0.5207
18	0.6477	0.6477	0.6477	0.6604	0.6604	0.635	0.635	0.635	0.6223	0.6223

TABLE C3. Continued.

	Power - kg m / s									
	1	2	3	4	5	6	7	8	9	10
Subject #	Pre 1st Half	After Set 1	After Set 2	After Set 3	After Set 4	Pre 2nd Half	After Set 5	After Set 6	After Set 7	After Set 8
1	173.1817	178.4044	173.1817	171.4054	171.4054	169.6106	174.9399	169.6106	174.9399	174.9399
2	148.6997	151.8305	153.372	154.8981	151.8305	147.1093	151.8305	151.8305	150.2733	150.2733
3	144.0436	142.8177	145.2592	142.8177	145.2592	142.8177	145.2592	145.2592	145.2592	146.4647
4	160.5455	163.6631	163.6631	158.9637	165.1999	162.1118	165.1999	166.7225	168.2314	166.7225
5	157.9061	159.3889	160.8579	160.8579	160.8579	156.4094	159.3889	157.9061	160.8579	156.4094
6	126.8051	125.4192	125.4192	125.4192	126.8051	122.6005	130.8748	125.4192	125.4192	129.5324
7	214.5123	214.5123	178.2488	211.9432	201.3392	206.7092	206.7092	206.7092	214.5123	211.9432
8	181.8803	185.5551	185.5551	183.7269	183.7269	181.8803	181.8803	185.5551	187.3654	183.7269
9	160.1619	163.3337	164.8968	161.7556	160.1619	161.7556	160.1619	163.3337	163.3337	161.7556
10	166.0859	169.1618	170.679	167.6309	167.6309	162.9519	167.6309	169.1618	167.6309	167.6309
11	154.0914	149.4906	146.3431	149.4906	155.5947	151.0398	158.5587	158.5587	158.5587	158.5587
12	160.6579	164.1892	164.1892	167.6462	164.1892	162.4331	167.6462	167.6462	171.0334	174.3547
13	132.4357	132.4357	133.8371	135.2241	135.2241	131.0192	133.8371	133.8371	132.4357	135.2241
14	172.1881	175.7388	175.7388	173.9725	175.7388	172.1881	175.7388	173.9725	175.7388	173.9725
15	176.1863	178.4895	173.8526	176.1863	173.8526	178.4895	178.4895	178.4895	183.0089	180.7634
16	194.2552	188.7821	196.0456	192.4481	185.0435	186.9221	188.7821	190.6239	179.2894	192.4481
17	154.4781	152.628	154.4781			150.7552	152.628	152.628	152.628	152.628
18	144.4102	144.4102	144.4102	145.8192	145.8192	142.9874	142.9874	142.9874	141.5503	141.5503

TABLE C3. Continued.

	Power - Watts									
Subject #	1 Pre 1st Half	2 After Set 1	3 After Set 2	4 After Set 3	5 After Set 4	6 Pre 2nd Half	7 After Set 5	8 After Set 6	9 After Set 7	10 After Set 8
1	1697.86	1749.063	1697.86	1680.446	1680.446	1662.849	1715.098	1662.849	1715.098	1715.098
2	1457.84	1488.535	1503.647	1518.609	1488.535	1442.248	1488.535	1488.535	1473.267	1473.267
3	1412.192	1400.173	1424.11	1400.173	1424.11	1400.173	1424.11	1424.11	1424.11	1435.928
4	1573.975	1604.541	1604.541	1558.468	1619.607	1589.331	1619.607	1634.535	1649.327	1634.535
5	1548.099	1562.636	1577.038	1577.038	1577.038	1533.425	1562.636	1548.099	1577.038	1533.425
6	1243.187	1229.6	1229.6	1229.6	1243.187	1201.965	1283.086	1229.6	1229.6	1269.926
7	2103.061	2103.061	1747.537	2077.874	1973.914	2026.561	2026.561	2026.561	2103.061	2077.874
8	1783.141	1819.167	1819.167	1801.244	1801.244	1783.141	1783.141	1819.167	1836.916	1801.244
9	1570.215	1601.311	1616.635	1585.839	1570.215	1585.839	1570.215	1601.311	1601.311	1585.839
10	1628.293	1658.45	1673.324	1643.441	1643.441	1597.568	1643.441	1658.45	1643.441	1643.441
11	1510.7	1465.594	1434.736	1465.594	1525.439	1480.782	1554.497	1554.497	1554.497	1554.497
12	1575.077	1609.698	1609.698	1643.59	1609.698	1592.482	1643.59	1643.59	1676.798	1709.36
13	1298.389	1298.389	1312.129	1325.726	1325.726	1284.502	1312.129	1312.129	1298.389	1325.726
14	1688.119	1722.929	1722.929	1705.613	1722.929	1688.119	1722.929	1705.613	1722.929	1705.613
15	1727.317	1749.897	1704.438	1727.317	1704.438	1749.897	1749.897	1749.897	1794.205	1772.19
16	1904.463	1850.805	1922.016	1886.746	1814.152	1832.57	1850.805	1868.862	1757.739	1886.746
17	1514.491	1496.353	1514.491			1477.992	1496.353	1496.353	1496.353	1496.353
18	1415.787	1415.787	1415.787	1429.6	1429.6	1401.838	1401.838	1401.838	1387.749	1387.749

TABLE C3. Continued

	Water Consumed (mL)						
Subject #	1 After Set 1	2 After Set 2	3 After Set 3	4 Halftime	5 After Set5	6 After Set 6	7 After Set 7
1	190	345	312.5	240	85	140	125
2	0	135	195	240	95	60	200
3	200	450	275	400	260	275	340
4	200	100	380	92.5	135	137.5	245
5	367.5	100	210	550	90	100	135
6	140	120	240	525	180	200	275
7	190	305	562.5	357.5	210	178	297
8	300	170	240	790	170	235	220
9	200	135	235		332.5	320	295
10	65	130	195	110	135	100	75
11	512.5	180	410	290	342.5	530	437.5
12	172.5	190	160	405	275	290	210
13	105	155	180	215	120	160	190
14	145	230	110	115	210	145	225
15	225	190	140	685	275	200	275
16	366	346	425	200	400	310	365
17	215	325	0	205	130	125	233
18	45	135	90	45	75	45	200

TABLE C4. Data from testing session when carbohydrate-only beverage was consumed.

			Jump Height									
Subject #	Ht (in)	Wt (lb)	1 Pre 1st Half	2 After Set 1	3 After Set 2	4 After Set 3	5 After Set 4	6 Pre 2nd Half	7 After Set 5	8 After Set 6	9 After Set 7	10 After Set 8
1	73	219	121.5	123	123	121.5	121.5	120.5	122	123	123	122.5
2	68	182.5	113	114.5	115	114	114	113	113.5	113	114.5	113.5
3	68	169	116	117.5	118.5	117.5	117	114.5	116.5	116	116.5	116.5
4	70	199.8	118	119.5	119.5	120	120	117.5	118.5	119.5	119.5	120
5	71	195	117	116	115	114.5	116	116	118.5	118.5	119.5	120.5
6	68	166.8	111	113.5	114	112.5	113.5	111.5	113.5	112.5	113	113
8	72	236	119	118	119	119.5	119.5	118.5	119.5	119.5	120	118.5
9	71	202	115.5	114	114.5	115	115	115	115	116	116.5	116
10	70	205.5	117.5	117	117	117	116.5	115.5	116.5	117.5	117	116.5
11	71	187	118.5	118	118	118.5	118.5	118	119.5	119	119	119.5
12	71	214.3	114.5	113.5	114.5	115	113.5	112.5	113.5	114.5	114	115
13	71.5	169	115	113.5	113.5	112	113	113.5	114	114	114	115
14	69	217	113	114.5	115	114.5	113.5	114	114.5	114	114.5	114.5
15	74	253	117.5	118.5	118.5	117.5	117.5	116.5	118	118	118.5	118
16	76	234	125.5	127	126	125.5	125	125.5	125	125.5	126	125
17	69	211	109	109	109	109	108.5	108.5	108.5	109	108.5	109.5
18	72	179	114.5	116	115.5	117	115.5	114	115.5	115.5	115.5	115.5

TABLE C4. Continued.

	Vertical Jump Height (meters)									
	1	2	3	4	5	6	7	8	9	10
Subject #	Pre 1st Half	After Set 1	After Set 2	After Set 3	After Set 4	Pre 2nd Half	After Set 5	After Set 6	After Set 7	After Set 8
1	0.635	0.6731	0.6731	0.635	0.635	0.6096	0.6477	0.6731	0.6731	0.6604
2	0.5969	0.635	0.6477	0.6223	0.6223	0.5969	0.6096	0.5969	0.635	0.6096
3	0.7366	0.7747	0.8001	0.7747	0.762	0.6985	0.7493	0.7366	0.7493	0.7493
4	0.6604	0.6985	0.6985	0.7112	0.7112	0.6477	0.6731	0.6985	0.6985	0.7112
5	0.635	0.6096	0.5842	0.5715	0.6096	0.6096	0.6731	0.6731	0.6985	0.7239
6	0.5461	0.6096	0.6223	0.5842	0.6096	0.5588	0.6096	0.5842	0.5969	0.5969
8	0.6223	0.5969	0.6223	0.635	0.635	0.6096	0.635	0.635	0.6477	0.6096
9	0.6477	0.6096	0.6223	0.635	0.635	0.635	0.635	0.6604	0.6731	0.6604
10	0.66675	0.65405	0.65405	0.65405	0.64135	0.61595	0.64135	0.66675	0.65405	0.64135
11	0.6477	0.635	0.635	0.6477	0.6477	0.635	0.6731	0.6604	0.6604	0.6731
12	0.635	0.6096	0.635	0.6477	0.6096	0.5842	0.6096	0.635	0.6223	0.6477
13	0.5715	0.5334	0.5334	0.4953	0.5207	0.5334	0.5461	0.5461	0.5461	0.5715
14	0.5588	0.5969	0.6096	0.5969	0.5715	0.5842	0.5969	0.5842	0.5969	0.5969
15	0.4572	0.4826	0.4826	0.4572	0.4572	0.4318	0.4699	0.4699	0.4826	0.4699
16	0.6858	0.7239	0.6985	0.6858	0.6731	0.6858	0.6731	0.6858	0.6985	0.6731
17	0.4953	0.4953	0.4953	0.4953	0.4826	0.4826	0.4826	0.4953	0.4826	0.508
18	0.5969	0.635	0.6223	0.6604	0.6223	0.5842	0.6223	0.6223	0.6223	0.6223

TABLE C4. Continued.

	Power - kg m / s									
Subject #	1 Pre 1st Half	2 After Set 1	3 After Set 2	4 After Set 3	5 After Set 4	6 Pre 2nd Half	7 After Set 5	8 After Set 6	9 After Set 7	10 After Set 8
1	174.9399	180.1117	180.1117	174.9399	174.9399	171.4054	176.6807	180.1117	180.1117	178.4044
2	141.3421	145.7833	147.2339	144.3181	144.3181	141.3421	142.8379	141.3421	145.7833	142.8379
3	145.3987	149.1116	151.5364	149.1116	147.8843	141.5885	146.6468	145.3987	146.6468	146.6468
4	162.7635	167.3928	167.3928	168.9077	168.9077	161.1909	164.3211	167.3928	167.3928	168.9077
5	155.7684	152.6213	149.4078	147.7749	152.6213	152.6213	160.3734	160.3734	163.3713	166.3152
6	123.5635	130.5499	131.9028	127.8012	130.5499	124.992	130.5499	127.8012	129.1828	129.1828
8	186.625	182.7767	186.625	188.5198	188.5198	184.7109	188.5198	188.5198	190.3956	184.7109
9	162.9657	158.1	159.7384	161.3601	161.3601	161.3601	161.3601	164.5557	166.1304	164.5557
10	168.2098	166.6001	166.6001	166.6001	164.9747	161.6749	164.9747	168.2098	166.6001	164.9747
11	150.8643	149.3779	149.3779	150.8643	150.8643	149.3779	153.794	152.3362	152.3362	153.794
12	171.1855	167.7269	171.1855	172.8889	167.7269	164.1954	167.7269	171.1855	169.465	172.8889
13	128.0716	123.7289	123.7289	119.2282	122.2471	123.7289	125.1932	125.1932	125.1932	128.0716
14	162.6095	168.0616	169.8401	168.0616	164.447	166.2641	168.0616	166.2641	168.0616	168.0616
15	171.4872	176.1863	176.1863	171.4872	171.4872	166.6556	173.8526	173.8526	176.1863	173.8526
16	194.2552	199.5782	196.0456	194.2552	192.4481	194.2552	192.4481	194.2552	196.0456	192.4481
17	148.8588	148.8588	148.8588	148.8588	146.938	146.938	146.938	148.8588	146.938	150.7552
18	138.6315	142.9874	141.5503	145.8192	141.5503	137.1487	141.5503	141.5503	141.5503	141.5503

TABLE C4. Continued.

	Power - Watts									
	1	2	3	4	5	6	7	8	9	10
Subject #	Pre 1st Half	After Set 1	After Set 2	After Set 3	After Set 4	Pre 2nd Half	After Set 5	After Set 6	After Set 7	After Set 8
1	1715.098	1765.801	1765.801	1715.098	1715.098	1680.446	1732.164	1765.801	1765.801	1749.063
2	1385.707	1429.248	1443.47	1414.883	1414.883	1385.707	1400.371	1385.707	1429.248	1400.371
3	1425.478	1461.879	1485.651	1461.879	1449.847	1388.122	1437.714	1425.478	1437.714	1437.714
4	1595.721	1641.106	1641.106	1655.958	1655.958	1580.303	1610.991	1641.106	1641.106	1655.958
5	1527.142	1496.287	1464.783	1448.774	1496.287	1496.287	1572.289	1572.289	1601.68	1630.541
6	1211.407	1279.901	1293.165	1252.953	1279.901	1225.412	1279.901	1252.953	1266.498	1266.498
8	1829.657	1791.928	1829.657	1848.233	1848.233	1810.891	1848.233	1848.233	1866.624	1810.891
9	1597.703	1550	1566.063	1581.962	1581.962	1581.962	1581.962	1613.291	1628.73	1613.291
10	1649.116	1633.335	1633.335	1633.335	1617.399	1585.048	1617.399	1649.116	1633.335	1617.399
11	1479.062	1464.49	1464.49	1479.062	1479.062	1464.49	1507.784	1493.492	1493.492	1507.784
12	1678.289	1644.381	1678.289	1694.989	1644.381	1609.759	1644.381	1678.289	1661.422	1694.989
13	1255.604	1213.029	1213.029	1168.904	1198.501	1213.029	1227.385	1227.385	1227.385	1255.604
14	1594.211	1647.663	1665.099	1647.663	1612.225	1630.04	1647.663	1630.04	1647.663	1647.663
15	1681.247	1727.317	1727.317	1681.247	1681.247	1633.878	1704.438	1704.438	1727.317	1704.438
16	1904.463	1956.649	1922.016	1904.463	1886.746	1904.463	1886.746	1904.463	1922.016	1886.746
17	1459.4	1459.4	1459.4	1459.4	1440.569	1440.569	1440.569	1459.4	1440.569	1477.992
18	1359.132	1401.838	1387.749	1429.6	1387.749	1344.595	1387.749	1387.749	1387.749	1387.749

TABLE C4. Continued.

	Water Consumed (mL)						
	1	2	3	4	5	6	7
Subject #	After Set 1	After Set 2	After Set 3	Halftime	After Set5	After Set 6	After Set 7
1	250	260	135	240	125	200	165
2	0	25	25	260	250	525	750
3	215	320	225	380	175	235	225
4	285	355	200	190	55	90	205
5	260	155	147.5	170	130	225	245
6	70	0	190	105	80	25	85
8	371	160	325	220	340	275	170
9	272.5	290	230	150	190	215	145
10	0	140	225	225	75	365	240
11	765	360	40	60	345	55	265
12	190	255	185	80	230	125	325
13	270	450	340	150	280	335	355
14	360	450	320	375	235	340	400
15	182.5	131.5	160	407.5	140	120	200
16	420	260	267.5	485	255	307.5	305
17	300	170	25	257.5	185	140	135
18	257.5	230	105	80	300	275	210

TABLE C5. Data from testing session when carbohydrate-protein beverage was consumed.

			Jump Height									
	Ht	Wt	1	2	3	4	5	6	7	8	9	10
Name	(in)	(lb)	Pre 1st Half	After Set 1	After Set 2	After Set 3	After Set 4	Pre 2nd Half	After Set 5	After Set 6	After Set 7	After Set 8
2	68	182	112.5	113.5	113.5	114	114	113	113	112.5	113	113.5
3	68	172	116.5	117.5	118	118	117.5	117	118.5	118	117.5	118
4	70	199	116	118	118	118.5	117	117.5	117.5	118	118.5	118
5	71	195	118	119	117.5	119.5	118.5	117	117.5	118.5	118	117.5
6	68	165.3	112	113	113	114	113.5	111.5	113	113.5		
8	72	235.8	119	120.5	121	121	121	119.5	121	120.5	120.5	120.5
9	71	198	115.5	116	116	115.5	115.5	114	115.5	115.5	115.5	115.5
10	70	206.3	116	116	117	117	117	115.5	116	117	117	116
11	71	189.25	117	117	118	118	117.5	117	117.5	118	117.5	117
12	71	213	112	112	110.5	111.5	111.5	111.5	111.5	112.5	112.5	113.5
13	71.5	171	114.5	115.5	115	115	115	114	114.5	115	116	116
14	69	220	113.5	115.5	115.5	116	116	115	116	115.5	115.5	115.5
15	74	256	119	118.5	118	118.5	119	117.5	118	119	119	118.5
16	76	234.4	126.5	127	127	125.5	127	125	125	125	125	124.5
17	69	218.25	109	109	110	108	108.5	108	108.5	107.5	108	108.5
18	72	179	114.5	112	114	115	115	113	113	114	114	115

TABLE C5. Continued.

	Vertical Jump Height (meters)									
	1	2	3	4	5	6	7	8	9	10
Name	Pre 1st Half	After Set 1	After Set 2	After Set 3	After Set 4	Pre 2nd Half	After Set 5	After Set 6	After Set 7	After Set 8
2	0.5842	0.6096	0.6096	0.6223	0.6223	0.5969	0.5969	0.5842	0.5969	0.6096
3	0.7493	0.7747	0.7874	0.7874	0.7747	0.762	0.8001	0.7874	0.7747	0.7874
4	0.6096	0.6604	0.6604	0.6731	0.635	0.6477	0.6477	0.6604	0.6731	0.6604
5	0.6604	0.6858	0.6477	0.6985	0.6731	0.635	0.6477	0.6731	0.6604	0.6477
6	0.5715	0.5969	0.5969	0.6223	0.6096	0.5588	0.5969	0.6096		
8	0.6223	0.6604	0.6731	0.6731	0.6731	0.635	0.6731	0.6604	0.6604	0.6604
9	0.6477	0.6604	0.6604	0.6477	0.6477	0.6096	0.6477	0.6477	0.6477	0.6477
10	0.62865	0.62865	0.65405	0.65405	0.65405	0.61595	0.62865	0.65405	0.65405	0.62865
11	0.6096	0.6096	0.635	0.635	0.6223	0.6096	0.6223	0.635	0.6223	0.6096
12	0.5715	0.5715	0.5334	0.5588	0.5588	0.5588	0.5588	0.5842	0.5842	0.6096
13	0.5588	0.5842	0.5715	0.5715	0.5715	0.5461	0.5588	0.5715	0.5969	0.5969
14	0.5715	0.6223	0.6223	0.635	0.635	0.6096	0.635	0.6223	0.6223	0.6223
15	0.4953	0.4826	0.4699	0.4826	0.4953	0.4572	0.4699	0.4953	0.4953	0.4826
16	0.7112	0.7239	0.7239	0.6858	0.7239	0.6731	0.6731	0.6731	0.6731	0.6604
17	0.4953	0.4953	0.5207	0.4699	0.4826	0.4699	0.4826	0.4572	0.4699	0.4826
18	0.5969	0.5334	0.5842	0.6096	0.6096	0.5588	0.5588	0.5842	0.5842	0.6096

TABLE C5. Continued.

Name	Power - kg m / s 1 Pre 1st Half	2 After Set 1	3 After Set 2	4 After Set 3	5 After Set 4	6 Pre 2nd Half	7 After Set 5	8 After Set 6	9 After Set 7	10 After Set 8
2	139.4473	142.4465	142.4465	143.9227	143.9227	140.9549	140.9549	139.4473	140.9549	142.4465
3	149.25	151.7586	152.9974	152.9974	151.7586	150.5095	154.2264	152.9974	151.7586	152.9974
4	155.752	162.1118	162.1118	163.6631	158.9637	160.5455	160.5455	162.1118	163.6631	162.1118
5	158.8533	161.8793	157.3184	163.3713	160.3734	155.7684	157.3184	160.3734	158.8533	157.3184
6	125.2677	128.0211	128.0211	130.7166	129.3759	123.868	128.0211	129.3759		
8	186.4669	192.0903	193.9285	193.9285	193.9285	188.36	193.9285	192.0903	192.0903	192.0903
9	159.7387	161.2972	161.2972	159.7387	159.7387	154.9693	159.7387	159.7387	159.7387	159.7387
10	163.969	163.969	167.2487	167.2487	167.2487	162.3043	163.969	167.2487	167.2487	163.969
11	148.1209	148.1209	151.1753	151.1753	149.6559	148.1209	149.6559	151.1753	149.6559	148.1209
12	161.4157	161.4157	155.9424	159.6121	159.6121	159.6121	159.6121	163.1993	163.1993	166.7094
13	128.1393	131.0192	129.5872	129.5872	129.5872	126.6748	128.1393	129.5872	132.4357	132.4357
14	166.7204	173.9725	173.9725	175.7388	175.7388	172.1881	175.7388	173.9725	173.9725	173.9725
15	180.606	178.2755	175.9141	178.2755	180.606	173.5206	175.9141	180.606	180.606	178.2755
16	198.1579	199.9194	199.9194	194.5872	199.9194	192.7771	192.7771	192.7771	192.7771	190.9498
17	153.9737	153.9737	157.8723	149.9737	151.9868	149.9737	151.9868	147.9331	149.9737	151.9868
18	138.6315	131.0502	137.1487	140.0985	140.0985	134.1341	134.1341	137.1487	137.1487	140.0985

TABLE C5. Continued.

	Power - Watts									
	1	2	3	4	5	6	7	8	9	10
Name	Pre 1st Half	After Set 1	After Set 2	After Set 3	After Set 4	Pre 2nd Half	After Set 5	After Set 6	After Set 7	After Set 8
2	1367.131	1396.535	1396.535	1411.007	1411.007	1381.911	1381.911	1367.131	1381.911	1396.535
3	1463.235	1487.829	1499.975	1499.975	1487.829	1475.583	1512.023	1499.975	1487.829	1499.975
4	1526.98	1589.331	1589.331	1604.541	1558.468	1573.975	1573.975	1589.331	1604.541	1589.331
5	1557.385	1587.052	1542.337	1601.68	1572.289	1527.142	1542.337	1572.289	1557.385	1542.337
6	1228.114	1255.109	1255.109	1281.535	1268.391	1214.392	1255.109	1268.391		
8	1828.107	1883.238	1901.26	1901.26	1901.26	1846.667	1901.26	1883.238	1883.238	1883.238
9	1566.066	1581.345	1581.345	1566.066	1566.066	1519.307	1566.066	1566.066	1566.066	1566.066
10	1607.539	1607.539	1639.693	1639.693	1639.693	1591.218	1607.539	1639.693	1639.693	1607.539
11	1452.166	1452.166	1482.111	1482.111	1467.215	1452.166	1467.215	1482.111	1467.215	1452.166
12	1582.507	1582.507	1528.847	1564.825	1564.825	1564.825	1564.825	1599.994	1599.994	1634.406
13	1256.268	1284.502	1270.463	1270.463	1270.463	1241.91	1256.268	1270.463	1298.389	1298.389
14	1634.514	1705.613	1705.613	1722.929	1722.929	1688.119	1722.929	1705.613	1705.613	1705.613
15	1770.647	1747.799	1724.648	1747.799	1770.647	1701.183	1724.648	1770.647	1770.647	1747.799
16	1942.725	1959.994	1959.994	1907.718	1959.994	1889.971	1889.971	1889.971	1889.971	1872.057
17	1509.546	1509.546	1547.768	1470.33	1490.067	1470.33	1490.067	1450.325	1470.33	1490.067
18	1359.132	1284.805	1344.595	1373.515	1373.515	1315.04	1315.04	1344.595	1344.595	1373.515

TABLE C5. Continued.

	Water Consumed (mL)						
Name	1 After Set 1	2 After Set 2	3 After Set 3	4 Halftime	5 After Set5	6 After Set 6	7 After Set 7
2	330	370	310	275	282.5	315	317.5
3	135	125	95	55	123	55	85
4	415	405	435	297.5	25	44	65
5	300	112.5	257.5	500	140	195	215
6	290	330	300	210	70	90	
8	192.5	290	165	190	265	185	150
9	180	270	160	235	155	220	190
10	325	385	250	395	205	350	205
11	710	485	552.5	795	445	560	975
12	50	205	230	327.5	157	223	256
13	160	255	410	85	235	305	320
14	455	182.5	425	260	165	210	280
15	150	215	190	335	130	190	185
16		350	330	395	100	325	235
17	85	40	110	475	145	150	220
18	200	165	412.5	300	70	86	157

APPENDIX D

STATISTICAL CODE

```
DATA GATOR;
INPUT SUBJNUM ID $ AGE BEVERAGE $ TMPOINT TRIALNUM POWER HEIGHT WEIGHT
SKFAT HYDFAT VO2M VCO2 SHUTTLE TEMP HUMID FSTHAV  SNDHAV FSTHPEAK
SNDHPEAK FSCORE_P SSCORE_P PKGMSEC SPTIME SPCOV1 SPCOV2;
CARDS;
1   WillA   21  .   1   1   .   73  219 10.5961291  15.50   44.61
5570    48.09   .   .   .   .   .   . . . . . . .
1   WillA   21  P   2   1   15455.20432 73  219 .   .   .   .   .   80
91  .   .   .   . 173.18 . 173.18 . . .
1   WillA   21  P   2   2   15678.66466 73  219 .   .   .   .   .   80
91  .   .   .   . 173.18 . 178.40 4.81 4.81 .
1   WillA   21  P   2   3   15455.20432 73  219 .   .   .   .   .   80
91  .   .   .   . 173.18 . 173.18 5.01 4.81 .
1   WillA   21  P   2   4   15379.99607 73  219 .   .   .   .   .   80
91  .   .   .   . 173.18 . 171.41 5.48 4.81 .
1   WillA   21  P   2   5   15379.99607 73  219 .   .   .   .   .   80
91  .   .   .   . 173.18 . 171.41 5.08 4.81 .
1   WillA   21  P   2   6   15304.41824 73  219 .   .   .   .   .   80
91  .   .   .   . . 169.61 169.61 . . .
1   WillA   21  P   2   7   15530.04837 73  219 .   .   .   .   .   80
91  .   .   .   . . 169.61 174.94 5.02 . 5.02
1   WillA   21  P   2   8   15304.41824 73  219 .   .   .   .   .   80
91  .   .   .   . . 169.61 169.61 5.17 . 5.02
1   WillA   21  P   2   9   15530.04837 73  219 .   .   .   .   .   80
91  .   .   .   . . 169.61 174.94 4.92 . 5.02
1   WillA   21  P   2   10  15530.04837 73  219.0   .   .   .   .   .
80  91  173.52 172.81 178.40 174.94 . 169.61 174.94 3.90 . 5.02
1   WillA   21  G   3   1   15304.41824 73  219.0   .   .   .   .   .
81  100 .   .   .   . 174.94 . 174.94 . . .
1   WillA   21  G   3   2   15752.44701 73  219.0   .   .   .   .   .
81  100 .   .   .   . 174.94 . 180.11 3.81 3.81 .
1   WillA   21  G   3   3   15752.44701 73  219.0   .   .   .   .   .
81  100 .   .   .   . 174.94 . 180.11 3.51 3.81 .
1   WillA   21  G   3   4   15530.04837 73  219.0   .   .   .   .   .
81  100 .   .   .   . 174.94 . 174.94 3.61 3.81 .
1   WillA   21  G   3   5   15530.04837 73  219.0   .   .   .   .   .
81  100 .   .   .   . 174.94 . 174.94 3.25 3.81 .
1   WillA   21  G   3   6   15379.99607 73  219.0   .   .   .   .   .
81  100 .   .   .   . . 171.41 171.41 . . .
1   WillA   21  G   3   7   15604.53344 73  219.0   .   .   .   .   .
81  100 .   .   .   . . 171.41 176.68 3.05 . 3.05
1   WillA   21  G   3   8   15752.44701 73  219.0   .   .   .   .   .
81  100 .   .   .   . . 171.41 180.11 3.13 . 3.05
1   WillA   21  G   3   9   15752.44701 73  219.0   .   .   .   .   .
81  100 .   .   .   . . 171.41 180.11 3.23 . 3.05
1   WillA   21  G   3   10  15678.66466 73  219.0   .   .   .   .   .
81  100 177.01 177.34 180.11 180.11 . 171.41 178.40 3.09 . 3.05
1   WillA   21  .   4
1   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
2   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
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```
1   WillA   21  .   4
3   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
4   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
5   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
6   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
7   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
8   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
9   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   4
10  .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
1   WillA   21  .   5
1   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
2   DavidA  19  .   1   1   .   68  182.5   7.700117934 7.293333333
49.5    5130    46.28   .   .   .   .   .   . . . . . . .
2   DavidA  19  G   2   1   8700.091528 68  182.5   .   .   .   .   .
83  85  .   .   .   . 141.34 . 141.34 . . .
2   DavidA  19  G   2   2   8973.459246 68  182.5   .   .   .   .   .
83  85  .   .   .   . 141.34 . 145.78 4.27 4.27 .
2   DavidA  19  G   2   3   9062.749597 68  182.5   .   .   .   .   .
83  85  .   .   .   . 141.34 . 147.23 3.61 4.27 .
2   DavidA  19  G   2   4   8883.271437 68  182.5   .   .   .   .   .
83  85  .   .   .   . 141.34 . 144.32 3.52 4.27 .
2   DavidA  19  G   2   5   8883.271437 68  182.5   .   .   .   .   .
83  85  .   .   .   . 141.34 . 144.32 3.55 4.27 .
2   DavidA  19  G   2   6   8700.091528 68  182.5   .   .   .   .   .
83  85  .   .   .   . . 141.34 141.34 . . .
2   DavidA  19  G   2   7   8792.158552 68  182.5   .   .   .   .   .
83  85  .   .   .   . . 141.34 142.84 3.82 . 3.82
2   DavidA  19  G   2   8   8700.091528 68  182.5   .   .   .   .   .
83  85  .   .   .   . . 141.34 141.34 3.78 . 3.82
2   DavidA  19  G   2   9   8973.459246 68  182.5   .   .   .   .   .
83  85  .   .   .   . . 141.34 145.78 3.88 . 3.82
2   DavidA  19  G   2   10  8792.158552 68  182.5   .   .   .   .   .
83  85  144.60 142.83 147.23 145.78 . 141.34 142.84 3.68 . 3.82
2   DavidA  19  S   3   1   8583.458814 68  182.0   .   .   .   .   .
84  74  .   .   .   . 139.45 . 139.45 . . .
2   DavidA  19  S   3   2   8768.070447 68  182.0   .   .   .   .   .
84  74  .   .   .   . 139.45 . 142.45 4.31 4.31 .
2   DavidA  19  S   3   3   8768.070447 68  182.0   .   .   .   .   .
84  74  .   .   .   . 139.45 . 142.45 4.68 4.31 .
2   DavidA  19  S   3   4   8858.933707 68  182.0   .   .   .   .   .
84  74  .   .   .   . 139.45 . 143.92 4.29 4.31 .
2   DavidA  19  S   3   5   8858.933707 68  182.0   .   .   .   .   .
84  74  .   .   .   . 139.45 . 143.92 4.23 4.31 .
2   DavidA  19  S   3   6   8676.25566  68  182.0   .   .   .   .   .
84  74  .   .   .   . . 140.95 140.95 . . .
2   DavidA  19  S   3   7   8676.25566  68  182.0   .   .   .   .   .
84  74  .   .   .   . . 140.95 140.95 4.17 . 4.17
2   DavidA  19  S   3   8   8583.458814 68  182.0   .   .   .   .   .
84  74  .   .   .   . . 140.95 139.45 4.27 . 4.17
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2   DavidA  19  S   3   9   8676.25566  68  182.0   .   .   .   .   .
84  74  .   .   .   . . 140.95 140.95 3.57 . 4.17
2   DavidA  19  S   3   10  8768.070447 68  182.0   .   .   .   .   .
84  74  142.44 140.95 143.92 142.45 . 140.95 142.45 3.31 . 4.17
2   DavidA  19  P   4   1   9152.973004 68  192.0   .   .   .   .   .
89  89  .   .   .   . 148.70 . 148.70 . . .
2   DavidA  19  P   4   2   9345.688306 68  192.0   .   .   .   .   .
89  89  .   .   .   . 148.70 . 151.83 4.03 4.03 .
2   DavidA  19  P   4   3   9440.570823 68  192.0   .   .   .   .   .
89  89  .   .   .   . 148.70 . 153.37 4.32 4.03 .
2   DavidA  19  P   4   4   9534.509165 68  192.0   .   .   .   .   .
89  89  .   .   .   . 148.70 . 154.90 4.09 4.03 .
2   DavidA  19  P   4   5   9345.688306 68  192.0   .   .   .   .   .
89  89  .   .   .   . 148.70 . 151.83 3.79 4.03 .
2   DavidA  19  P   4   6   9055.07743  68  192.0   .   .   .   .   .
89  89  .   .   .   . . 147.11 147.11 . . .
2   DavidA  19  P   4   7   9345.688306 68  192.0   .   .   .   .   .
89  89  .   .   .   . . 147.11 151.83 3.94 . 3.94
2   DavidA  19  P   4   8   9345.688306 68  192.0   .   .   .   .   .
89  89  .   .   .   . . 147.11 151.83 3.40 . 3.94
2   DavidA  19  P   4   9   9249.832559 68  192.0   .   .   .   .   .
89  89  .   .   .   . . 147.11 150.27 3.45 . 3.94
2   DavidA  19  P   4   10  9249.832559 68  192.0   .   .   .   .   .
89  89  152.13 150.26 154.90 151.83 . 147.11 150.27 3.51 . 3.94
2   DavidA  19  .   5   1   .   68  188.5   8.625643483 7.40    56.5
5940    47.98   .   .   .   .   .   . . . . . . .
3   TreyB   21  .   1   1   .   68  166.0   4.289984218 4.24    46.2
4210    46.015  .   .   .   .   .   . . . . . . .
3   TreyB   21  P   2   1   8866.375449 68  166.0   .   .   .   .   .
83  85  .   .   .   . 144.04 . 144.04 . . .
3   TreyB   21  P   2   2   8790.915562 68  166.0   .   .   .   .   .
83  85  .   .   .   . 144.04 . 142.82 4.59 4.59 .
3   TreyB   21  P   2   3   8941.198509 68  166.0   .   .   .   .   .
83  85  .   .   .   . 144.04 . 145.26 4.04 4.59 .
3   TreyB   21  P   2   4   8790.915562 68  166.0   .   .   .   .   .
83  85  .   .   .   . 144.04 . 142.82 3.84 4.59 .
3   TreyB   21  P   2   5   8941.198509 68  166.0   .   .   .   .   .
83  85  .   .   .   . 144.04 . 145.26 3.88 4.59 .
3   TreyB   21  P   2   6   8790.915562 68  166.0   .   .   .   .   .
83  85  .   .   .   . . 142.82 142.82 . . .
3   TreyB   21  P   2   7   8941.198509 68  166.0   .   .   .   .   .
83  85  .   .   .   . . 142.82 145.26 4.00 . 4.00
3   TreyB   21  P   2   8   8941.198509 68  166.0   .   .   .   .   .
83  85  .   .   .   . . 142.82 145.26 4.00 . 4.00
3   TreyB   21  P   2   9   8941.198509 68  166.0   .   .   .   .   .
83  85  .   .   .   . . 142.82 145.26 4.00 . 4.00
3   TreyB   21  P   2   10  9015.400599 68  166.0   .   .   .   .   .
83  85  144.04 145.01 145.26 146.46 . 142.82 146.46 3.87 . 4.00
3   TreyB   21  G   3   1   8949.78753  68  169.0   .   .   .   .   .
84  74  .   .   .   . 145.40 . 145.40 . . .
3   TreyB   21  G   3   2   9178.329525 68  169.0   .   .   .   .   .
84  74  .   .   .   . 145.40 . 149.11 4.16 4.16 .
3   TreyB   21  G   3   3   9327.580442 68  169.0   .   .   .   .   .
84  74  .   .   .   . 145.40 . 151.54 3.97 4.16 .

3   TreyB   21  G   3   4   9178.329525 68  169.0   .   .   .   .   .
84  74  .   .   .   . 145.40 . 149.11 3.99 4.16 .
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3   TreyB   21  G   3   5   9102.786434 68  169.0   .    .    .    .    .
84  74  .   .   .   . 145.40 . 147.88 4.13 4.16 .
3   TreyB   21  G   3   6   8715.254488 68  169.0   .    .    .    .    .
84  74  .   .   .   . . 141.59 141.59 . . .
3   TreyB   21  G   3   7   9026.61115  68  169.0   .    .    .    .    .
84  74  .   .   .   . . 141.59 146.65 4.41 . 4.41
3   TreyB   21  G   3   8   8949.78753  68  169.0   .    .    .    .    .
84  74  .   .   .   . . 141.59 145.40 4.68 . 4.41
3   TreyB   21  G   3   9   9026.61115  68  169.0   .    .    .    .    .
84  74  .   .   .   . . 141.59 146.65 3.82 . 4.41
3   TreyB   21  G   3   10  9026.61115  68  169.0   .    .    .    .    .
84  74  148.16 145.39 151.54 156.65 . 141.59 146.65 4.05 . 4.41
3   TreyB   21  S   4   1   9186.846851 68  172.0   .    .    .    .    .
89  89  .   .   .   . 149.25 . 149.25 . . .
3   TreyB   21  S   4   2   9341.258452 68  172.0   .    .    .    .    .
89  89  .   .   .   . 149.25 . 151.76 4.22 4.22 .
3   TreyB   21  S   4   3   9417.514888 68  172.0   .    .    .    .    .
89  89  .   .   .   . 149.25 . 153.00 4.15 4.22 .
3   TreyB   21  S   4   4   9417.514888 68  172.0   .    .    .    .    .
89  89  .   .   .   . 149.25 . 153.00 4.14 4.22 .
3   TreyB   21  S   4   5   9341.258452 68  172.0   .    .    .    .    .
89  89  .   .   .   . 149.25 . 151.76 4.12 4.22 .
3   TreyB   21  S   4   6   9264.374359 68  172.0   .    .    .    .    .
89  89  .   .   .   . . 150.51 150.51 . . .
3   TreyB   21  S   4   7   9493.158793 68  172.0   .    .    .    .    .
89  89  .   .   .   . . 150.51 154.23 3.79 . 3.79
3   TreyB   21  S   4   8   9417.514888 68  172.0   .    .    .    .    .
89  89  .   .   .   . . 150.51 153.00 3.87 . 3.79
3   TreyB   21  S   4   9   9341.258452 68  172.0   .    .    .    .    .
89  89  .   .   .   . . 150.51 151.76 3.91 . 3.79
3   TreyB   21  S   4   10  9417.514888 68  172.0   .    .    .    .    .
89  89  151.75 152.50 153.00 154.23 . 150.51 153.00 3.91 . 3.79
3   TreyB   21  .   5   1   .   68  170.0   5.406859338 2.636666667
44.7    4584    48.05   .   .   .   .   .   . . . . . . .
4   EvanC   22  .   1   1   .   70  199.0   6.93519625  10.94666667
57.4    5228    50.465  .   .   .   .   .   . . . . . . .
4   EvanC   22  S   2   1   9587.066038 70  199.0   .    .    .    .    .
84  89  .   .   .   . 155.75 . 155.75 . . .
4   EvanC   22  S   2   2   9978.534703 70  199.0   .    .    .    .    .
84  89  .   .   .   . 155.75 . 162.11 5.61 5.61 .
4   EvanC   22  S   2   3   9978.534703 70  199.0   .    .    .    .    .
84  89  .   .   .   . 155.75 . 162.11 7.75 5.61 .
4   EvanC   22  S   2   4   10074.02525 70  199.0   .    .    .    .    .
84  89  .   .   .   . 155.75 . 163.66 5.28 5.61 .
4   EvanC   22  S   2   5   9784.758301 70  199.0   .    .    .    .    .
84  89  .   .   .   . 155.75 . 158.96 3.66 5.61 .
4   EvanC   22  S   2   6   9882.121478 70  199.0   .    .    .    .    .
84  89  .   .   .   . . 160.55 160.55 . . .
4   EvanC   22  S   2   7   9882.121478 70  199.0   .    .    .    .    .
84  89  .   .   .   . . 160.55 160.55 5.33 . 5.33
4   EvanC   22  S   2   8   9978.534703 70  199.0   .    .    .    .    .
84  89  .   .   .   . . 160.55 162.11 5.12 . 5.33
4   EvanC   22  S   2   9   10074.02525 70  199.0   .    .    .    .    .
84  89  .   .   .   . . 160.55 163.66 4.52 . 5.33
4   EvanC   22  S   2   10  10074.02525 70  199.0   .    .    .    .    .
84  89  160.52 161.80 163.66 163.66 . 160.55 162.11 4.19 . 5.33
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4   EvanC   22  P   3   1   9882.121478 70  199.0   .   .   .   .   .
79  100 .   .   .   . 160.55 . 160.55 . . .
4   EvanC   22  P   3   2   10074.02525 70  199.0   .   .   .   .   .
79  100 .   .   .   . 160.55 . 163.66 4.06 4.06 .
4   EvanC   22  P   3   3   10074.02525 70  199.0   .   .   .   .   .
79  100 .   .   .   . 160.55 . 163.66 4.00 4.06 .
4   EvanC   22  P   3   4   9784.758301 70  199.0   .   .   .   .   .
79  100 .   .   .   . 160.55 . 158.96 3.96 4.06 .
4   EvanC   22  P   3   5   10168.61911 70  199.0   .   .   .   .   .
79  100 .   .   .   . 160.55 . 165.20 4.08 4.06 .
4   EvanC   22  P   3   6   9978.534703 70  199.0   .   .   .   .   .
79  100 .   .   .   . . 162.11 162.11 . . .
4   EvanC   22  P   3   7   10168.61911 70  199.0   .   .   .   .   .
79  100 .   .   .   . . 162.11 165.20 3.87 . 3.87
4   EvanC   22  P   3   8   10262.34108 70  199.0   .   .   .   .   .
79  100 .   .   .   . . 162.11 166.72 3.79 . 3.87
4   EvanC   22  P   3   9   10355.21484 70  199.0   .   .   .   .   .
79  100 .   .   .   . . 162.11 168.23 3.76 . 3.87
4   EvanC   22  P   3   10  10262.34108 70  199.0   .   .   .   .   .
79  100 162.11 165.80 165.20 168.21 . 162.11 166.72 3.48 . 3.87
4   EvanC   22  G   4   1   10018.64942 70  199.8   .   .   .   .   .
89  72  .   .   .   . 162.76 . 162.76 . . .
4   EvanC   22  G   4   2   10303.59673 70  199.8   .   .   .   .   .
89  72  .   .   .   . 162.76 . 167.39 4.52 4.52 .
4   EvanC   22  G   4   3   10303.59673 70  199.8   .   .   .   .   .
89  72  .   .   .   . 162.76 . 167.39 4.29 4.52 .
4   EvanC   22  G   4   4   10396.84385 70  199.8   .   .   .   .   .
89  72  .   .   .   . 162.76 . 168.91 4.27 4.52 .
4   EvanC   22  G   4   5   10396.84385 70  199.8   .   .   .   .   .
89  72  .   .   .   . 162.76 . 168.91 4.75 4.52 .
4   EvanC   22  G   4   6   9921.8486   70  199.8   .   .   .   .   .
89  72  .   .   .   . . 161.19 161.19 . . .
4   EvanC   22  G   4   7   10114.52384 70  199.8   .   .   .   .   .
89  72  .   .   .   . . 161.19 164.32 4.17 . 4.17
4   EvanC   22  G   4   8   10303.59673 70  199.8   .   .   .   .   .
89  72  .   .   .   . . 161.19 167.39 3.46 . 4.17
4   EvanC   22  G   4   9   10303.59673 70  199.8   .   .   .   .   .
89  72  .   .   .   . . 161.19 167.39 3.16 . 4.17
4   EvanC   22  G   4   10  10396.84385 70  199.8   .   .   .   .   .
89  72  167.07 165.84 168.91 168.91 . 161.19 168.91 3.26 . 4.17
4   EvanC   22  .   5   1   .   70  199.0   7.482595733 8.2 46.7
5643    51.08   .   .   .   .   .   . . . . . . .
5   ChrisC  20  .   1   1   .   71  195.0   8.965207308 10.21   52.8
6040    48.37   .   .   .   .   .   . . . . . . .
5   ChrisC  20  S   2   1   9777.961141 71  195.0   .   .   .   .   .
80  91  .   .   .   . 158.85 . 158.85 . . .
5   ChrisC  20  S   2   2   9964.224756 71  195.0   .   .   .   .   .
80  91  .   .   .   . 158.85 . 161.88 5.06 5.06 .
5   ChrisC  20  S   2   3   9683.485871 71  195.0   .   .   .   .   .
80  91  .   .   .   . 158.85 . 157.32 5.02 5.06 .

5   ChrisC  20  S   2   4   10056.06287 71  195.0   .   .   .   .   .
80  91  .   .   .   . 158.85 . 163.37 4.71 5.06 .
5   ChrisC  20  S   2   5   9871.532279 71  195.0   .   .   .   .   .
80  91  .   .   .   . 158.85 . 160.37 4.36 5.06 .
5   ChrisC  20  S   2   6   9588.079742 71  195.0   .   .   .   .   .
80  91  .   .   .   . . 155.77 155.77 . . .
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5   ChrisC  20  S   2   7   9683.485871 71  195.0   .   .   .   .   .
80  91  .   .   .   . . 155.77 157.32 4.59 . 4.59
5   ChrisC  20  S   2   8   9871.532279 71  195.0   .   .   .   .   .
80  91  .   .   .   . . 155.77 160.37 4.98 . 4.59
5   ChrisC  20  S   2   9   9777.961141 71  195.0   .   .   .   .   .
80  91  .   .   .   . . 155.77 158.85 4.88 . 4.59
5   ChrisC  20  S   2   10  9683.485871 71  195.0   .   .   .   .   .
80  91  160.36 157.93 163.37 160.37 . 155.77 157.32 4.65 . 4.59
5   ChrisC  20  P   3   1   9719.662552 71  192.0   .   .   .   .   .
81  100 .   .   .   . 157.91 . 157.91 . . .
5   ChrisC  20  P   3   2   9810.928991 71  192.0   .   .   .   .   .
81  100 .   .   .   . 157.91 . 159.39 4.52 4.52 .
5   ChrisC  20  P   3   3   9901.354211 71  192.0   .   .   .   .   .
81  100 .   .   .   . 157.91 . 160.86 3.98 4.52 .
5   ChrisC  20  P   3   4   9901.354211 71  192.0   .   .   .   .   .
81  100 .   .   .   . 157.91 . 160.86 4.02 4.52 .
5   ChrisC  20  P   3   5   9901.354211 71  192.0   .   .   .   .   .
81  100 .   .   .   . 157.91 . 160.86 3.88 4.52 .
5   ChrisC  20  P   3   6   9627.530969 71  192.0   .   .   .   .   .
81  100 .   .   .   . . 156.41 156.41 . . .
5   ChrisC  20  P   3   7   9810.928991 71  192.0   .   .   .   .   .
81  100 .   .   .   . . 156.41 159.39 3.37 . 3.37
5   ChrisC  20  P   3   8   9719.662552 71  192.0   .   .   .   .   .
81  100 .   .   .   . . 156.41 157.91 3.59 . 3.37
5   ChrisC  20  P   3   9   9901.354211 71  192.0   .   .   .   .   .
81  100 .   .   .   . . 156.41 160.86 3.58 . 3.37
5   ChrisC  20  P   3   10  9627.530969 71  192.0   .   .   .   .   .
81  100 159.97 158.19 160.86 160.86 . 156.41 156.41 3.55 . 3.37
5   ChrisC  20  G   4   1   9588.079742 71  195.0   .   .   .   .   .
81  100 .   .   .   . 155.77 . 155.77 . . .
5   ChrisC  20  G   4   2   9394.361193 71  195.0   .   .   .   .   .
81  100 .   .   .   . 155.77 . 152.62 6.08 6.08 .
5   ChrisC  20  G   4   3   9196.563015 71  195.0   .   .   .   .   .
81  100 .   .   .   . 155.77 . 149.41 7.15 6.08 .
5   ChrisC  20  G   4   4   9096.051112 71  195.0   .   .   .   .   .
81  100 .   .   .   . 155.77 . 147.77 5.84 6.08 .
5   ChrisC  20  G   4   5   9394.361193 71  195.0   .   .   .   .   .
81  100 .   .   .   . 155.77 . 152.62 5.97 6.08 .
5   ChrisC  20  G   4   6   9394.361193 71  195.0   .   .   .   .   .
81  100 .   .   .   . . 152.62 152.62 . . .
5   ChrisC  20  G   4   7   9871.532279 71  195.0   .   .   .   .   .
81  100 .   .   .   . . 152.62 160.37 5.03 . 5.03
5   ChrisC  20  G   4   8   9871.532279 71  195.0   .   .   .   .   .
81  100 .   .   .   . . 152.62 160.37 4.32 . 5.03
5   ChrisC  20  G   4   9   10056.06287 71  195.0   .   .   .   .   .
81  100 .   .   .   . . 152.62 163.37 4.59 . 5.03
5   ChrisC  20  G   4   10  10237.26777 71  195.0   .   .   .   .   .
81  100 151.64 160.61 155.77 166.32 . 152.62 166.32 4.28 . 5.03
5   ChrisC  20  .   5   1   .   71  194.3   9.804537556 11.82333333
55.3    6394    46.475  .   .   .   .   .   . . . . . . .
6   JayD    21  .   1   1   .   68  165.5   6.983265134 10.43333333
48.5    4850    50.55   .   .   .   .   .   . . . . . . .
6   JayD    21  P   2   1   7805.288098 68  165.5   .   .   .   .   .
83  85  .   .   .   . 126.81 . 126.81 . . .
6   JayD    21  P   2   2   7719.981841 68  165.5   .   .   .   .   .
83  85  .   .   .   . 126.81 . 125.42 4.92 4.92 .
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6   JayD    21  P   2   3   7719.981841 68  165.5   .   .   .   .   .
83  85  .   .   .   . 126.81 . 125.42 4.89 4.92 .
6   JayD    21  P   2   4   7719.981841 68  165.5   .   .   .   .   .
83  85  .   .   .   . 126.81 . 125.42 4.37 4.92 .
6   JayD    21  P   2   5   7805.288098 68  165.5   .   .   .   .   .
83  85  .   .   .   . 126.81 . 126.81 4.37 4.92 .
6   JayD    21  P   2   6   7546.476947 68  165.5   .   .   .   .   .
83  85  .   .   .   . . 122.60 122.60 . . .
6   JayD    21  P   2   7   8055.788618 68  165.5   .   .   .   .   .
83  85  .   .   .   . . 122.60 130.87 4.44 . 4.44
6   JayD    21  P   2   8   7719.981841 68  165.5   .   .   .   .   .
83  85  .   .   .   . . 122.60 125.42 4.48 . 4.44
6   JayD    21  P   2   9   7719.981841 68  165.5   .   .   .   .   .
83  85  .   .   .   . . 122.60 125.42 4.41 . 4.44
6   JayD    21  P   2   10  7973.162961 68  165.5   .   .   .   .   .
83  85  125.97 126.77 126.81 130.87 . 122.60 129.53 4.28 . 4.44
6   JayD    21  S   3   1   7710.652558 68  165.3   .   .   .   .   .
84  74  .   .   .   . 125.27 . 125.27 . . .
6   JayD    21  S   3   2   7880.137696 68  165.3   .   .   .   .   .
84  74  .   .   .   . 125.27 . 128.02 4.59 4.59 .
6   JayD    21  S   3   3   7880.137696 68  165.3   .   .   .   .   .
84  74  .   .   .   . 125.27 . 128.02 4.43 4.59 .
6   JayD    21  S   3   4   8046.053526 68  165.3   .   .   .   .   .
84  74  .   .   .   . 125.27 . 130.72 4.52 4.59 .
6   JayD    21  S   3   5   7963.527719 68  165.3   .   .   .   .   .
84  74  .   .   .   . 125.27 . 129.38 4.52 4.59 .
6   JayD    21  S   3   6   7624.497311 68  165.3   .   .   .   .   .
84  74  .   .   .   . . 123.87 123.87 . . .
6   JayD    21  S   3   7   7880.137696 68  165.3   .   .   .   .   .
84  74  .   .   .   . . 123.87 128.02 4.55 . 4.55
6   JayD    21  S   3   8   7963.527719 68  165.3   .   .   .   .   .
84  74  .   .   .   . . 123.87 129.38 5.00 . 4.55
6   JayD    21  S   3   9   .   68  165.3   .   .   .   .   .   84
74  .   .   .   . . 123.87 . . . .
6   JayD    21  S   3   10  .   68  165.3   .   .   .   .   .   84  74
128.28 127.09 130.72 129.38 . 123.87 . . . .
6   JayD    21  G   4   1   7605.754409 68  166.8   .   .   .   .   .
89  89  .   .   .   . 123.56 . 123.56 . . .
6   JayD    21  G   4   2   8035.792036 68  166.8   .   .   .   .   .
89  89  .   .   .   . 123.56 . 130.55 4.70 4.70 .
6   JayD    21  G   4   3   8119.066716 68  166.8   .   .   .   .   .
89  89  .   .   .   . 123.56 . 131.90 5.38 4.70 .
6   JayD    21  G   4   4   7866.598518 68  166.8   .   .   .   .   .
89  89  .   .   .   . 123.56 . 127.80 5.18 4.70 .
6   JayD    21  G   4   5   8035.792036 68  166.8   .   .   .   .   .
89  89  .   .   .   . 123.56 . 130.55 4.75 4.70 .
6   JayD    21  G   4   6   7693.685127 68  166.8   .   .   .   .   .
89  89  .   .   .   . . 124.99 124.99 . . .
6   JayD    21  G   4   7   8035.792036 68  166.8   .   .   .   .   .
89  89  .   .   .   . . 124.99 130.55 4.56 . 4.56
6   JayD    21  G   4   8   7866.598518 68  166.8   .   .   .   .   .
89  89  .   .   .   . . 124.99 127.80 4.07 . 4.56
6   JayD    21  G   4   9   7951.645298 68  166.8   .   .   .   .   .
89  89  .   .   .   . . 124.99 129.18 3.93 . 4.56
6   JayD    21  G   4   10  7951.645298 68  166.8   .   .   .   .   .
89  89  128.87 128.34 131.90 130.55 . 124.99 129.18 4.05 . 4.56
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6   JayD    21  .   5   1   .   68  165.0   6.748258284 7.64    49.6
4818    48.53   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   1   1   .   76  293.0   17.04434829 21.51666667
40.4    6798    55.39   .   .   .   .   .   . . . . . . .
7   KirkE   19  P   2   1   13203.96272 76  293.0   .   .   .   .   .
84  89  .   .   .   . 214.51 . 214.51 . . .
7   KirkE   19  P   2   2   13203.96272 76  293.0   .   .   .   .   .
84  89  .   .   .   . 214.51 . 214.51 5.17 5.17 .
7   KirkE   19  P   2   3   10971.81922 76  293.0   .   .   .   .   .
84  89  .   .   .   . 214.51 . 178.25 10.73 5.17 .
7   KirkE   19  P   2   4   13045.82572 76  293.0   .   .   .   .   .
84  89  .   .   .   . 214.51 . 211.94 6.29 5.17 .
7   KirkE   19  P   2   5   12393.11576 76  293.0   .   .   .   .   .
84  89  .   .   .   . 214.51 . 201.34 4.75 5.17 .
7   KirkE   19  P   2   6   12723.65684 76  293.0   .   .   .   .   .
84  89  .   .   .   . . 206.71 206.71 . . .
7   KirkE   19  P   2   7   12723.65684 76  293.0   .   .   .   .   .
84  89  .   .   .   . . 206.71 206.71 4.47 . 4.47
7   KirkE   19  P   2   8   12723.65684 76  293.0   .   .   .   .   .
84  89  .   .   .   . . 206.71 206.71 4.75 . 4.47
7   KirkE   19  P   2   9   13203.96272 76  293.0   .   .   .   .   .
84  89  .   .   .   . . 206.71 214.51 4.61 . 4.47
7   KirkE   19  P   2   10  13203.96272 76  293.0   .   .   .   .   .
84  89  204.11 209.32 214.51 214.51 . 206.71 211.94 3.67 . 4.47
7   KirkE   19  .   3   1   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   2   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   3   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   4   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   5   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   6   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   7   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   8   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   9   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   3   10  .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   1   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   2   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   3   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   4   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   5   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   6   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
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7   KirkE   19  .   4   7   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   8   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   9   .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   4   10  .   76
293.0   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
7   KirkE   19  .   5
1   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . . .
8   KrisJ   22  .   1   1   .   72  236.0   17.73195217 22.81666667
46.8    5676    54.78   .   .   .   .   .   . . . . . . .
8   KrisJ   22  G   2   1   11487.40854 72  236.0   .   .   .   .   .
83  85  .   .   .   . 186.63 . 186.63 . . .
8   KrisJ   22  G   2   2   11250.52932 72  236.0   .   .   .   .   .
83  85  .   .   .   . 186.63 . 182.78 4.46 4.46 .
8   KrisJ   22  G   2   3   11487.40854 72  236.0   .   .   .   .   .
83  85  .   .   .   . 186.63 . 186.63 4.05 4.46 .
8   KrisJ   22  G   2   4   11604.03497 72  236.0   .   .   .   .   .
83  85  .   .   .   . 186.63 . 188.52 3.56 4.46 .
8   KrisJ   22  G   2   5   11604.03497 72  236.0   .   .   .   .   .
83  85  .   .   .   . 186.63 . 188.52 3.66 4.46 .
8   KrisJ   22  G   2   6   11369.58585 72  236.0   .   .   .   .   .
83  85  .   .   .   . . 184.71 184.71 . . .
8   KrisJ   22  G   2   7   11604.03497 72  236.0   .   .   .   .   .
83  85  .   .   .   . . 184.71 188.52 3.62 . 3.62
8   KrisJ   22  G   2   8   11604.03497 72  236.0   .   .   .   .   .
83  85  .   .   .   . . 184.71 188.52 3.73 . 3.62
8   KrisJ   22  G   2   9   11719.50085 72  236.0   .   .   .   .   .
83  85  .   .   .   . . 184.71 190.40 3.72 . 3.62
8   KrisJ   22  G   2   10  11369.58585 72  236.0   .   .   .   .   .
83  85  186.64 187.37 188.52 190.40 . 184.71 184.71 3.64 . 3.62
8   KrisJ   22  P   3   1   11195.35578 72  236.0   .   .   .   .   .
84  74  .   .   .   . 181.88 . 181.88 . . .
8   KrisJ   22  P   3   2   11421.54744 72  236.0   .   .   .   .   .
84  74  .   .   .   . 181.88 . 185.56 3.61 3.61 .
8   KrisJ   22  P   3   3   11421.54744 72  236.0   .   .   .   .   .
84  74  .   .   .   . 181.88 . 185.56 3.67 3.61 .
8   KrisJ   22  P   3   4   11309.01713 72  236.0   .   .   .   .   .
84  74  .   .   .   . 181.88 . 183.73 3.66 3.61 .
8   KrisJ   22  P   3   5   11309.01713 72  236.0   .   .   .   .   .
84  74  .   .   .   . 181.88 . 183.73 3.86 3.61 .
8   KrisJ   22  P   3   6   11195.35578 72  236.0   .   .   .   .   .
84  74  .   .   .   . . 181.88 181.88 . . .
8   KrisJ   22  P   3   7   11195.35578 72  236.0   .   .   .   .   .
84  74  .   .   .   . . 181.88 181.88 3.73 . 3.73
8   KrisJ   22  P   3   8   11421.54744 72  236.0   .   .   .   .   .
84  74  .   .   .   . . 181.88 185.56 3.84 . 3.73
8   KrisJ   22  P   3   9   11532.97981 72  236.0   .   .   .   .   .
84  74  .   .   .   . . 181.88 187.37 3.54 . 3.73
8   KrisJ   22  P   3   10  11309.01713 72  236.0   .   .   .   .   .
84  74  184.09 184.08 185.56 187.37 . 181.88 183.73 3.32 . 3.73
8   KrisJ   22  S   4   1   11477.67345 72  236.0   .   .   .   .   .
89  89  .   .   .   . 186.47 . 186.47 . . .
8   KrisJ   22  S   4   2   11823.81147 72  236.0   .   .   .   .   .
89  89  .   .   .   . 186.47 . 192.09 3.96 3.96 .
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8   KrisJ   22  S   4   3   11936.96057 72  236.0   .   .   .   .   .
89  89  .   .   .   . 186.47 . 193.93 3.95 3.96 .
8   KrisJ   22  S   4   4   11936.96057 72  236.0   .   .   .   .   .
89  89  .   .   .   . 186.47 . 193.93 3.75 3.96 .
8   KrisJ   22  S   4   5   11936.96057 72  236.0   .   .   .   .   .
89  89  .   .   .   . 186.47 . 193.93 3.71 3.96 .
8   KrisJ   22  S   4   6   11594.20104 72  236.0   .   .   .   .   .
89  89  .   .   .   . . 188.36 188.36 . . .
8   KrisJ   22  S   4   7   11936.96057 72  236.0   .   .   .   .   .
89  89  .   .   .   . . 188.36 193.93 3.69 . 3.69
8   KrisJ   22  S   4   8   11823.81147 72  236.0   .   .   .   .   .
89  89  .   .   .   . . 188.36 192.09 3.58 . 3.69
8   KrisJ   22  S   4   9   11823.81147 72  236.0   .   .   .   .   .
89  89  .   .   .   . . 188.36 192.09 3.79 . 3.69
8   KrisJ   22  S   4   10  11823.81147 72  236.0   .   .   .   .   .
89  89  192.07 191.71 193.93 193.93 . 188.36 192.09 3.70 . 3.69
8   KrisJ   22  .   5   1   .   72  234.0   15.62436418 20.02666667
42.4    4698    53.18   .   .   .   .   .   . . . . . . .
9   Matt    20  .   1   1   .   71  200.5   10.56123434 11.37666667 49
5810    47.4    .   .   .   .   .   . . . . . . .
9   Matt    20  P   2   1   9858.512761 71  200.5   .   .   .   .   .
80  91  .   .   .   . 160.16 . 160.16 . . .
9   Matt    20  P   2   2   10053.74979 71  200.5   .   .   .   .   .
80  91  .   .   .   . 160.16 . 163.33 4.14 4.14 .
9   Matt    20  P   2   3   10149.96011 71  200.5   .   .   .   .   .
80  91  .   .   .   . 160.16 . 164.90 4.15 4.14 .
9   Matt    20  P   2   4   9956.609831 71  200.5   .   .   .   .   .
80  91  .   .   .   . 160.16 . 161.76 4.03 4.14 .
9   Matt    20  P   2   5   9858.512761 71  200.5   .   .   .   .   .
80  91  .   .   .   . 160.16 . 160.16 4.03 4.14 .
9   Matt    20  P   2   6   9956.609831 71  200.5   .   .   .   .   .
80  91  .   .   .   . . 161.76 161.76 . . .
9   Matt    20  P   2   7   9858.512761 71  200.5   .   .   .   .   .
80  91  .   .   .   . . 161.76 160.16 4.10 . 4.10
9   Matt    20  P   2   8   10053.74979 71  200.5   .   .   .   .   .
80  91  .   .   .   . . 161.76 163.33 4.19 . 4.10
9   Matt    20  P   2   9   10053.74979 71  200.5   .   .   .   .   .
80  91  .   .   .   . . 161.76 163.33 4.19 . 4.10
9   Matt    20  P   2   10  9956.609831 71  200.5   .   .   .   .   .
80  91  162.06 162.07 164.90 163.33 . 161.76 161.76 4.05 . 4.10
9   Matt    20  S   3   1   9832.462576 71  198.0   .   .   .   .   .
81  100 .   .   .   . 159.74 . 159.74 . . .
9   Matt    20  S   3   2   9928.391312 71  198.0   .   .   .   .   .
81  100 .   .   .   . 159.74 . 161.30 3.80 3.80 .
9   Matt    20  S   3   3   9928.391312 71  198.0   .   .   .   .   .
81  100 .   .   .   . 159.74 . 161.30 3.62 3.80 .
9   Matt    20  S   3   4   9832.462576 71  198.0   .   .   .   .   .
81  100 .   .   .   . 159.74 . 159.74 3.87 3.80 .
9   Matt    20  S   3   5   9832.462576 71  198.0   .   .   .   .   .
81  100 .   .   .   . 159.74 . 159.74 3.50 3.80 .
9   Matt    20  S   3   6   9538.889826 71  198.0   .   .   .   .   .
81  100 .   .   .   . . 154.97 154.97 . . .
9   Matt    20  S   3   7   9832.462576 71  198.0   .   .   .   .   .
81  100 .   .   .   . . 154.97 159.74 3.31 . 3.31
9   Matt    20  S   3   8   9832.462576 71  198.0   .   .   .   .   .
81  100 .   .   .   . . 154.97 159.74 3.34 . 3.31
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9   Matt    20  S   3   9   9832.462576 71  198.0   .   .   .   .   .
81  100 .   .   .   . . 154.97 159.74 3.34 . 3.31
9   Matt    20  S   3   10  9832.462576 71  198.0   .   .   .   .   .
81  100 160.36 154.78 161.30 159.74 . 154.97 159.74 3.35 . 3.31
9   Matt    20  G   4   1   10031.09818 71  202.0   .   .   .   .   .
81  100 .   .   .   . 162.97 . 162.97 . . .
9   Matt    20  G   4   2   9731.594671 71  202.0   .   .   .   .   .
81  100 .   .   .   . 162.97 . 158.10 4.31 4.31 .
9   Matt    20  G   4   3   9832.442906 71  202.0   .   .   .   .   .
81  100 .   .   .   . 162.97 . 159.74 4.90 4.31 .
9   Matt    20  G   4   4   9932.26722  71  202.0   .   .   .   .   .
81  100 .   .   .   . 162.97 . 161.36 4.12 4.31 .
9   Matt    20  G   4   5   9932.26722  71  202.0   .   .   .   .   .
81  100 .   .   .   . 162.97 . 161.36 3.90 4.31 .
9   Matt    20  G   4   6   9932.26722  71  202.0   .   .   .   .   .
81  100 .   .   .   . . 161.36 161.36 . . .
9   Matt    20  G   4   7   9932.26722  71  202.0   .   .   .   .   .
81  100 .   .   .   . . 161.36 161.36 3.82 . 3.82
9   Matt    20  G   4   8   10128.96487 71  202.0   .   .   .   .   .
81  100 .   .   .   . . 161.36 164.56 3.73 . 3.82
9   Matt    20  G   4   9   10225.89498 71  202.0   .   .   .   .   .
81  100 .   .   .   . . 161.36 166.13 3.61 . 3.82
9   Matt    20  G   4   10  10128.96487 71  202.0   .   .   .   .   .
81  100 160.70 163.59 162.97 166.13 . 161.36 164.56 3.65 . 3.82
9   Matt    20  .   5   1   .   71  203.0   10.18364442 13.025  52.4
5872    49.825  .   .   .   .   .   . . . . . . . .
10  MattLar 21  .   1   1   .   70  205.5   13.0527628  10.725  48.2
5005    48.075  .   .   .   .   .   . . . . . . . .
10  MattLar 21  G   2   1   10353.88893 70  205.5   .   .   .   .   .
83  85  .   .   .   . 168.21 . 168.21 . . .
10  MattLar 21  G   2   2   10254.80637 70  205.5   .   .   .   .   .
83  85  .   .   .   . 168.21 . 166.60 4.51 4.51 .
10  MattLar 21  G   2   3   10254.80637 70  205.5   .   .   .   .   .
83  85  .   .   .   . 168.21 . 166.60 3.98 4.51 .
10  MattLar 21  G   2   4   10254.80637 70  205.5   .   .   .   .   .
83  85  .   .   .   . 168.21 . 166.60 3.95 4.51 .
10  MattLar 21  G   2   5   10154.75709 70  205.5   .   .   .   .   .
83  85  .   .   .   . 168.21 . 164.97 4.09 4.51 .
10  MattLar 21  G   2   6   9951.641427 70  205.5   .   .   .   .   .
83  85  .   .   .   . . 161.67 161.67 . . .
10  MattLar 21  G   2   7   10154.75709 70  205.5   .   .   .   .   .
83  85  .   .   .   . . 161.67 164.97 4.01 . 4.01
10  MattLar 21  G   2   8   10353.88893 70  205.5   .   .   .   .   .
83  85  .   .   .   . . 161.67 168.21 3.93 . 4.01
10  MattLar 21  G   2   9   10254.80637 70  205.5   .   .   .   .   .
83  85  .   .   .   . . 161.67 166.60 4.19 . 4.01
10  MattLar 21  G   2   10  10154.75709 70  205.5   .   .   .   .   .
83  85  166.60 165.29 168.21 168.21 . 161.67 164.97 3.69 . 4.01
10  MattLar 21  S   3   1   10092.85075 70  206.3   .   .   .   .   .
84  74  .   .   .   . 163.97 . 163.97 . . .
10  MattLar 21  S   3   2   10092.85075 70  206.3   .   .   .   .   .
84  74  .   .   .   . 163.97 . 163.97 4.25 4.25 .
10  MattLar 21  S   3   3   10294.72776 70  206.3   .   .   .   .   .
84  74  .   .   .   . 163.97 . 167.25 4.07 4.25 .
10  MattLar 21  S   3   4   10294.72776 70  206.3   .   .   .   .   .
84  74  .   .   .   . 163.97 . 167.25 3.97 4.25 .
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10  MattLar 21  S   3   5   10294.72776 70  206.3   .   .   .   .   .
84  74  .   .   .   . 163.97 . 167.25 4.16 4.25 .
10  MattLar 21  S   3   6   9990.38261  70  206.3   .   .   .   .   .
84  74  .   .   .   . . 162.30 162.30 . . .
10  MattLar 21  S   3   7   10092.85075 70  206.3   .   .   .   .   .
84  74  .   .   .   . . 162.30 163.97 4.42 . 4.42
10  MattLar 21  S   3   8   10294.72776 70  206.3   .   .   .   .   .
84  74  .   .   .   . . 162.30 167.25 4.62 . 4.42
10  MattLar 21  S   3   9   10294.72776 70  206.3   .   .   .   .   .
84  74  .   .   .   . . 162.30 167.25 4.79 . 4.42
10  MattLar 21  S   3   10  10092.85075 70  206.3   .   .   .   .   .
84  74  165.94 164.95 167.25 167.25 . 162.30 163.97 4.64 . 4.42
10  MattLar 21  P   4   1   10223.15563 70  201.0   .   .   .   .   .
89  89  .   .   .   . 166.09 . 166.09 . . .
10  MattLar 21  P   4   2   10412.48941 70  201.0   .   .   .   .   .
89  89  .   .   .   . 166.09 . 169.16 4.30 4.30 .
10  MattLar 21  P   4   3   10505.87684 70  201.0   .   .   .   .   .
89  89  .   .   .   . 166.09 . 170.68 4.26 4.30 .
10  MattLar 21  P   4   4   10318.2568  70  201.0   .   .   .   .   .
89  89  .   .   .   . 166.09 . 167.63 4.34 4.30 .
10  MattLar 21  P   4   5   10318.2568  70  201.0   .   .   .   .   .
89  89  .   .   .   . 166.09 . 167.63 4.26 4.30 .
10  MattLar 21  P   4   6   10030.24857 70  201.0   .   .   .   .   .
89  89  .   .   .   . . 162.95 162.95 . . .
10  MattLar 21  P   4   7   10318.2568  70  201.0   .   .   .   .   .
89  89  .   .   .   . . 162.95 167.63 4.42 . 4.42
10  MattLar 21  P   4   8   10412.48941 70  201.0   .   .   .   .   .
89  89  .   .   .   . . 162.95 169.16 4.07 . 4.42
10  MattLar 21  P   4   9   10318.2568  70  201.0   .   .   .   .   .
89  89  .   .   .   . . 162.95 167.63 3.89 . 4.42
10  MattLar 21  P   4   10  10318.2568  70  201.0   .   .   .   .   .
89  89  168.24 167.00 170.68 169.16 . 162.95 167.63 3.92 . 4.42
10  MattLar 21  .   5   1   .   70  203.0   9.533705579 10.15333333
40.2    2867    48.36   .   .   .   .   .   . . . . . . .
11  PeterM  21  .   1   1   .   71  189.3   11.94450969 12.48   50.7
5730    49.39   .   .   .   .   .   . . . . . . .
11  PeterM  21  S   2   1   9117.347978 71  189.3   .   .   .   .   .
80  91  .   .   .   . 148.12 . 148.12 . . .
11  PeterM  21  S   2   2   9117.347978 71  189.3   .   .   .   .   .
80  91  .   .   .   . 148.12 . 148.12 6.24 6.24 .
11  PeterM  21  S   2   3   9305.354314 71  189.3   .   .   .   .   .
80  91  .   .   .   . 148.12 . 151.18 4.99 6.24 .
11  PeterM  21  S   2   4   9305.354314 71  189.3   .   .   .   .   .
80  91  .   .   .   . 148.12 . 151.18 4.67 6.24 .
11  PeterM  21  S   2   5   9211.830791 71  189.3   .   .   .   .   .
80  91  .   .   .   . 148.12 . 149.66 4.55 6.24 .
11  PeterM  21  S   2   6   9117.347978 71  189.3   .   .   .   .   .
80  91  .   .   .   . . 148.12 148.12 . . .
11  PeterM  21  S   2   7   9211.830791 71  189.3   .   .   .   .   .
80  91  .   .   .   . . 148.12 149.66 4.58 . 4.58
11  PeterM  21  S   2   8   9305.354314 71  189.3   .   .   .   .   .
80  91  .   .   .   . . 148.12 151.18 4.78 . 4.58
11  PeterM  21  S   2   9   9211.830791 71  189.3   .   .   .   .   .
80  91  .   .   .   . . 148.12 149.66 4.68 . 4.58
11  PeterM  21  S   2   10  9117.347978 71  189.3   .   .   .   .   .
80  91  149.65 149.35 151.18 151.18 . 148.12 148.12 4.66 . 4.58
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11  PeterM  21  G   3   1   9286.214655 71  187.0   .   .   .   .   .
81  100 .   .   .   . 150.86 . 150.86 . . .
11  PeterM  21  G   3   2   9194.722625 71  187.0   .   .   .   .   .
81  100 .   .   .   . 150.86 . 149.38 4.00 4.00 .
11  PeterM  21  G   3   3   9194.722625 71  187.0   .   .   .   .   .
81  100 .   .   .   . 150.86 . 149.38 3.83 4.00 .
11  PeterM  21  G   3   4   9286.214655 71  187.0   .   .   .   .   .
81  100 .   .   .   . 150.86 . 150.86 3.77 4.00 .
11  PeterM  21  G   3   5   9286.214655 71  187.0   .   .   .   .   .
81  100 .   .   .   . 150.86 . 150.86 3.72 4.00 .
11  PeterM  21  G   3   6   9194.722625 71  187.0   .   .   .   .   .
81  100 .   .   .   . . 149.38 149.38 . . .
11  PeterM  21  G   3   7   9466.546339 71  187.0   .   .   .   .   .
81  100 .   .   .   . . 149.38 153.79 3.48 . 3.48
11  PeterM  21  G   3   8   9376.814017 71  187.0   .   .   .   .   .
81  100 .   .   .   . . 149.38 152.34 3.69 . 3.48
11  PeterM  21  G   3   9   9376.814017 71  187.0   .   .   .   .   .
81  100 .   .   .   . . 149.38 152.34 3.68 . 3.48
11  PeterM  21  G   3   10  9466.546339 71  187.0   .   .   .   .   .
81  100 150.27 152.33 150.86 153.79 . 149.38 153.79 3.57 . 3.48
11  PeterM  21  P   4   1   9484.850263 71  191.0   .   .   .   .   .
81  100 .   .   .   . 154.09 . 154.09 . . .
11  PeterM  21  P   4   2   9201.656348 71  191.0   .   .   .   .   .
81  100 .   .   .   . 154.09 . 149.49 5.06 5.06 .
11  PeterM  21  P   4   3   9007.915569 71  191.0   .   .   .   .   .
81  100 .   .   .   . 154.09 . 146.34 5.91 5.06 .
11  PeterM  21  P   4   4   9201.656348 71  191.0   .   .   .   .   .
81  100 .   .   .   . 154.09 . 149.49 4.88 5.06 .
11  PeterM  21  P   4   5   9577.387579 71  191.0   .   .   .   .   .
81  100 .   .   .   . 154.09 . 155.59 4.13 5.06 .
11  PeterM  21  P   4   6   9297.012846 71  191.0   .   .   .   .   .
81  100 .   .   .   . . 151.04 151.04 . . .
11  PeterM  21  P   4   7   9759.830402 71  191.0   .   .   .   .   .
81  100 .   .   .   . . 151.04 158.56 3.92 . 3.92
11  PeterM  21  P   4   8   9759.830402 71  191.0   .   .   .   .   .
81  100 .   .   .   . . 151.04 158.56 3.91 . 3.92
11  PeterM  21  P   4   9   9759.830402 71  191.0   .   .   .   .   .
81  100 .   .   .   . . 151.04 158.56 4.11 . 3.92
11  PeterM  21  P   4   10  9759.830402 71  191.0   .   .   .   .   .
81  100 151.00 157.05 155.59 158.56 . 151.04 158.56 4.02 . 3.92
11  PeterM  21  .   5   1   .   71  190.5   9.380966515 9.333333333
47.9    5380    51.825  .   .   .   .   .   . . . . . . .
12  AndyN   19  .   1   1   .   71  213.0   15.00127946 16.86666667
42.7    55.5    52.895  .   .   .   .   .   . . . . . . .
12  AndyN   19  S   2   1   9935.686599 71  213.0   .   .   .   .   .
84  89  .   .   .   . 161.42 . 161.42 . . .
12  AndyN   19  S   2   2   9935.686599 71  213.0   .   .   .   .   .
84  89  .   .   .   . 161.42 . 161.42 5.50 5.50 .
12  AndyN   19  S   2   3   9598.785183 71  213.0   .   .   .   .   .
84  89  .   .   .   . 161.42 . 155.94 7.93 5.50 .
12  AndyN   19  S   2   4   9824.669857 71  213.0   .   .   .   .   .
84  89  .   .   .   . 161.42 . 159.61 5.79 5.50 .
12  AndyN   19  S   2   5   9824.669857 71  213.0   .   .   .   .   .
84  89  .   .   .   . 161.42 . 159.61 3.98 5.50 .
12  AndyN   19  S   2   6   9824.669857 71  213.0   .   .   .   .   .
84  89  .   .   .   . . 159.61 159.61 . . .
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12  AndyN   19  S   2   7   9824.669857 71  213.0   .   .   .   .   .
84  89  .   .   .   . . 159.61 159.61 5.75 . 5.75
12  AndyN   19  S   2   8   10045.47652 71  213.0   .   .   .   .   .
84  89  .   .   .   . . 159.61 163.20 5.98 . 5.75
12  AndyN   19  S   2   9   10045.47652 71  213.0   .   .   .   .   .
84  89  .   .   .   . . 159.61 163.20 5.42 . 5.75
12  AndyN   19  S   2   10  10045.47652 71  213.0   .   .   .   .   .
84  89  159.60 162.47 161.42 166.71 . 159.61 166.71 4.72 . 5.75
12  AndyN   19  P   3   1   9889.040183 71  212.0   .   .   .   .   .
79  100 .   .   .   . 160.66 . 160.66 . . .
12  AndyN   19  P   3   2   10106.40769 71  212.0   .   .   .   .   .
79  100 .   .   .   . 160.66 . 164.19 4.46 4.46 .
12  AndyN   19  P   3   3   10106.40769 71  212.0   .   .   .   .   .
79  100 .   .   .   . 160.66 . 164.19 4.27 4.46 .
12  AndyN   19  P   3   4   10319.1975  71  212.0   .   .   .   .   .
79  100 .   .   .   . 160.66 . 167.65 4.31 4.46 .
12  AndyN   19  P   3   5   10106.40769 71  212.0   .   .   .   .   .
79  100 .   .   .   . 160.66 . 164.19 4.39 4.46 .
12  AndyN   19  P   3   6   9998.314663 71  212.0   .   .   .   .   .
79  100 .   .   .   . . 162.43 162.43 . . .

12  AndyN   19  P   3   7   10319.1975  71  212.0   .   .   .   .   .
79  100 .   .   .   . . 162.43 167.65 4.34 . 4.34
12  AndyN   19  P   3   8   10319.1975  71  212.0   .   .   .   .   .
79  100 .   .   .   . . 162.43 167.65 4.40 . 4.34
12  AndyN   19  P   3   9   10527.6872  71  212.0   .   .   .   .   .
79  100 .   .   .   . . 162.43 171.03 4.43 . 4.34
12  AndyN   19  P   3   10  10732.1274  71  212.0   .   .   .   .   .
79  100 164.17 168.62 167.65 174.35 . 162.43 174.35 4.37 . 4.34
12  AndyN   19  G   4   1   10537.05379 71  214.3   .   .   .   .   .
89  72  .   .   .   . 171.19 . 171.19 . . .
12  AndyN   19  G   4   2   10324.16207 71  214.3   .   .   .   .   .
89  72  .   .   .   . 171.19 . 167.73 4.70 4.70 .
12  AndyN   19  G   4   3   10537.05379 71  214.3   .   .   .   .   .
89  72  .   .   .   . 171.19 . 171.19 5.16 4.70 .
12  AndyN   19  G   4   4   10641.90268 71  214.3   .   .   .   .   .
89  72  .   .   .   . 171.19 . 172.89 4.66 4.70 .
12  AndyN   19  G   4   5   10324.16207 71  214.3   .   .   .   .   .
89  72  .   .   .   . 171.19 . 167.73 4.13 4.70 .
12  AndyN   19  G   4   6   10106.78694 71  214.3   .   .   .   .   .
89  72  .   .   .   . . 164.20 164.20 . . .
12  AndyN   19  G   4   7   10324.16207 71  214.3   .   .   .   .   .
89  72  .   .   .   . . 164.20 167.73 5.01 . 5.01
12  AndyN   19  G   4   8   10537.05379 71  214.3   .   .   .   .   .
89  72  .   .   .   . . 164.20 171.19 3.82 . 5.01
12  AndyN   19  G   4   9   10431.15106 71  214.3   .   .   .   .   .
89  72  .   .   .   . . 164.20 169.47 3.77 . 5.01
12  AndyN   19  G   4   10  10641.90268 71  214.3   .   .   .   .   .
89  72  170.14 169.09 172.89 172.89 . 164.20 172.89 3.74 . 5.01
12  AndyN   19  .   5   1   .   71  214.0   19.50145798 17.92   42.4
5609    52.085  .   .   .   .   .   . . . . . . .
13  LayneN  20  .   1   1   .   71.5    169.0   9.347619663 8.93
46.4    4860    43.495  .   .   .   .   .   . . . . . . .
13  LayneN  20  G   2   1   7883.244297 71.5
169.0   .   .   .   .   .   83  85  .   .   .   . 128.07 . 128.07 . . .
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13  LayneN  20  G   2   2   7615.937539 71.5
169.0   .   .   .   .   .   83  85  .   .   .   . 128.07 . 123.73 6.10
6.10 .
13  LayneN  20  G   2   3   7615.937539 71.5
169.0   .   .   .   .   .   83  85  .   .   .   . 128.07 . 123.73 6.54
6.10 .
13  LayneN  20  G   2   4   7338.901046 71.5
169.0   .   .   .   .   .   83  85  .   .   .   . 128.07 . 119.23 5.78
6.10 .
13  LayneN  20  G   2   5   7524.725416 71.5
169.0   .   .   .   .   .   83  85  .   .   .   . 128.07 . 122.25 5.90
6.10 .
13  LayneN  20  G   2   6   7615.937539 71.5
169.0   .   .   .   .   .   83  85  .   .   .   . . 123.73 123.73 . . .
13  LayneN  20  G   2   7   7706.070115 71.5
169.0   .   .   .   .   .    83  85  .   .   .   . . 123.73 125.19 5.54 .
5.54
13  LayneN  20  G   2   8   7706.070115 71.5
169.0   .   .   .   .   .    83  85  .   .   .   . . 123.73 125.19 5.44 .
5.54
13  LayneN  20  G   2   9   7706.070115 71.5
169.0   .   .   .   .   .    83  85  .   .   .   . . 123.73 125.19 5.54 .
5.54
13  LayneN  20  G   2   10  7883.244297 71.5
169.0   .   .   .   .   .   83  85  123.40 125.48 128.07 128.07 .
123.73 128.07 5.23 . 5.54
13  LayneN  20  S   3   1   7887.411012 71.5
171.0   .   .   .   .   .   79  100 .   .   .   . 128.14 . 128.14 . . .
13  LayneN  20  S   3   2   8064.678336 71.5
171.0   .   .   .   .   .   79  100 .   .   .   . 128.14 . 131.02 4.95
4.95 .
13  LayneN  20  S   3   3   7976.537129 71.5
171.0   .   .   .   .   .   79  100 .   .   .   . 128.14 . 129.59 4.99
4.95 .
13  LayneN  20  S   3   4   7976.537129 71.5
171.0   .   .   .   .   .   79  100 .   .   .   . 128.14 . 129.59 5.05
4.95 .
13  LayneN  20  S   3   5   7976.537129 71.5
171.0   .   .   .   .   .   79  100 .   .   .   . 128.14 . 129.59 5.40
4.95 .
13  LayneN  20  S   3   6   7797.266211 71.5
171.0   .   .   .   .   .   79  100 .   .   .   . . 126.67 126.67 . . .
13  LayneN  20  S   3   7   7887.411012 71.5
171.0   .   .   .   .   .    79  100 .   .   .   . . 126.67 128.14 5.33 .
5.33
13  LayneN  20  S   3   8   7976.537129 71.5
171.0   .   .   .   .   .    79  100 .   .   .   . . 126.67 129.59 5.46 .
5.33
13  LayneN  20  S   3   9   8151.866582 71.5
171.0   .   .   .   .   .    79  100 .   .   .   . . 126.67 132.44 5.02 .
5.33
13  LayneN  20  S   3   10  8151.866582 71.5
171.0   .   .   .   .   .   79  100 129.58 129.85 131.02 132.44 .
126.67 132.44 4.62 . 5.33
13  LayneN  20  P   4   1   8151.866582 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . 132.44 . 132.44 . . .
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13  LayneN  20  P   4   2   8151.866582 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . 132.44 . 132.44 4.28
4.28 .
13  LayneN  20  P   4   3   8238.132123 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . 132.44 . 133.84 4.14
4.28 .
13  LayneN  20  P   4   4   8323.503648 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . 132.44 . 135.22 4.09
4.28 .
13  LayneN  20  P   4   5   8323.503648 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . 132.44 . 135.22 4.03
4.28 .
13  LayneN  20  P   4   6   8064.678336 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . . 131.02 131.02 . . .
13  LayneN  20  P   4   7   8238.132123 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . . 131.02 133.84 4.19 .
4.19
13  LayneN  20  P   4   8   8238.132123 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . . 131.02 133.84 4.17 .
4.19
13  LayneN  20  P   4   9   8151.866582 71.5
171.0   .   .   .   .   .   89  89  .   .   .   . . 131.02 132.44 4.23 .
4.19
13  LayneN  20  P   4   10  8323.503648 71.5
171.0   .   .   .   .   .   89  89  133.83 133.27 135.22 135.22 .
131.02 135.22 4.22 . 4.19
13  LayneN  20  .   5   1   .   71.5    172.3   8.965207308 10.40666667
41.4    4180    50.485  .   .   .   .   .   . . . . . . .
14  RyanP   21  .   1   1   .   69  217.0   15.0831759  20.21   41.1
5310    54.68   .   .   .   .   .   . . . . . . .
14  RyanP   21  G   2   1   10009.1707  69  217.0   .   .   .   .   .
83  85  .   .   .   . 162.61 . 162.61 . . .
14  RyanP   21  G   2   2   10344.76636 69  217.0   .   .   .   .   .
83  85  .   .   .   . 162.61 . 168.06 4.67 4.67 .
14  RyanP   21  G   2   3   10454.23784 69  217.0   .   .   .   .   .
83  85  .   .   .   . 162.61 . 169.04 4.42 4.67 .
14  RyanP   21  G   2   4   10344.76636 69  217.0   .   .   .   .   .
83  85  .   .   .   . 162.61 . 168.06 4.06 4.67 .
14  RyanP   21  G   2   5   10122.27226 69  217.0   .   .   .   .   .
83  85  .   .   .   . 162.61 . 164.45 4.24 4.67 .
14  RyanP   21  G   2   6   10234.12397 69  217.0   .   .   .   .   .
83  85  .   .   .   . . 166.26 166.26 . . .
14  RyanP   21  G   2   7   10344.76636 69  217.0   .   .   .   .   .
83  85  .   .   .   . . 166.26 168.06 4.36 . 4.36
14  RyanP   21  G   2   8   10234.12397 69  217.0   .   .   .   .   .
83  85  .   .   .   . . 166.26 166.26 4.41 . 4.36
14  RyanP   21  G   2   9   10344.76636 69  217.0   .   .   .   .   .
83  85  .   .   .   . . 166.26 168.06 4.48 . 4.36
14  RyanP   21  G   2   10  10344.76636 69  217.0   .   .   .   .   .
83  85  166.60 167.34 169.84 168.06 . 166.26 168.06 4.38 . 4.36
14  RyanP   21  S   3   1   10262.21151 69  220.0   .   .   .   .   .
84  74  .   .   .   . 166.72 . 166.72 . . .
14  RyanP   21  S   3   2   10708.60118 69  220.0   .   .   .   .   .
84  74  .   .   .   . 166.72 . 173.97 4.94 4.94 .
14  RyanP   21  S   3   3   10708.60118 69  220.0   .   .   .   .   .
84  74  .   .   .   . 166.72 . 173.97 4.25 4.94 .
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14  RyanP   21  S   3   4   10817.32073 69  220.0   .   .   .   .   .
84  74  .   .   .   . 166.72 . 175.74 4.11 4.94 .
14  RyanP   21  S   3   5   10817.32073 69  220.0   .   .   .   .   .
84  74  .   .   .   . 166.72 . 175.74 4.32 4.94 .
14  RyanP   21  S   3   6   10598.76647 69  220.0   .   .   .   .   .
84  74  .   .   .   . . 172.19 172.19 . . .
14  RyanP   21  S   3   7   10817.32073 69  220.0   .   .   .   .   .
84  74  .   .   .   . . 172.19 175.74 4.25 . 4.25
14  RyanP   21  S   3   8   10708.60118 69  220.0   .   .   .   .   .
84  74  .   .   .   . . 172.19 173.97 4.94 . 4.25
14  RyanP   21  S   3   9   10708.60118 69  220.0   .   .   .   .   .
84  74  .   .   .   . . 172.19 173.97 4.17 . 4.25
14  RyanP   21  S   3   10  10708.60118 69  220.0   .   .   .   .   .
84  74  173.23 173.97 175.74 175.74 . 172.19 173.97 3.85 . 4.25
14  RyanP   21  P   4   1   10598.76647 69  220.0   .   .   .   .   .
89  89  .   .   .   . 172.19 . 172.19 . . .
14  RyanP   21  P   4   2   10817.32073 69  220.0   .   .   .   .   .
89  89  .   .   .   . 172.19 . 175.74 4.69 4.69 .
14  RyanP   21  P   4   3   10817.32073 69  220.0   .   .   .   .   .
89  89  .   .   .   . 172.19 . 175.74 4.12 4.69 .
14  RyanP   21  P   4   4   10708.60118 69  220.0   .   .   .   .   .
89  89  .   .   .   . 172.19 . 173.97 4.02 4.69 .
14  RyanP   21  P   4   5   10817.32073 69  220.0   .   .   .   .   .
89  89  .   .   .   . 172.19 . 175.74 4.01 4.69 .
14  RyanP   21  P   4   6   10598.76647 69  220.0   .   .   .   .   .
89  89  .   .   .   . . 172.19 172.19 . . .
14  RyanP   21  P   4   7   10817.32073 69  220.0   .   .   .   .   .
89  89  .   .   .   . . 172.19 175.74 4.01 . 4.01
14  RyanP   21  P   4   8   10708.60118 69  220.0   .   .   .   .   .
89  89  .   .   .   . . 172.19 173.97 3.94 . 4.01
14  RyanP   21  P   4   9   10817.32073 69  220.0   .   .   .   .   .
89  89  .   .   .   . . 172.19 175.74 4.07 . 4.01
14  RyanP   21  P   4   10  10708.60118 69  220.0   .   .   .   .   .
89  89  174.68 174.32 175.74 175.74 . 172.19 173.97 3.90 . 4.01
14  RyanP   21  .   5   1   .   69  224.0   13.12614216 19.76333333
35.2    4084    56.555  .   .   .   .   .   . . . . . . .
15  ColtonS 19  .   1   1   .   74  253.0   18.8278827  19.59   41.1
6300    55.43   .   .   .   .   .   . . . . . . .
15  ColtonS 19  G   2   1   10555.62117 74  253.0   .   .   .   .   .
80  91  .   .   .   . 171.49 . 171.49 . . .
15  ColtonS 19  G   2   2   10844.86982 74  253.0   .   .   .   .   .
80  91  .   .   .   . 171.49 . 176.19 5.18 5.18 .
15  ColtonS 19  G   2   3   10844.86982 74  253.0   .   .   .   .   .
80  91  .   .   .   . 171.49 . 176.19 5.13 5.18 .
15  ColtonS 19  G   2   4   10555.62117 74  253.0   .   .   .   .   .
80  91  .   .   .   . 171.49 . 171.49 5.02 5.18 .
15  ColtonS 19  G   2   5   10555.62117 74  253.0   .   .   .   .   .
80  91  .   .   .   . 171.49 . 171.49 5.11 5.18 .
15  ColtonS 19  G   2   6   10258.21987 74  253.0   .   .   .   .   .
80  91  .   .   .   . . 166.66 166.66 . . .
15  ColtonS 19  G   2   7   10701.22282 74  253.0   .   .   .   .   .
80  91  .   .   .   . . 166.66 173.85 5.49 . 5.49
15  ColtonS 19  G   2   8   10701.22282 74  253.0   .   .   .   .   .
80  91  .   .   .   . . 166.66 173.85 5.63 . 5.49
15  ColtonS 19  G   2   9   10844.86982 74  253.0   .   .   .   .   .
80  91  .   .   .   . . 166.66 176.19 5.64 . 5.49
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15  ColtonS 19  G   2   10  10701.22282 74  253.0   .   .   .   .   .
80  91  173.37 172.88 176.19 176.19 . 166.66 173.85 5.35 . 5.49
15  ColtonS 19  P   3   1   10844.86982 74  253.0   .   .   .   .   .
81  100 .   .   .   . 176.19 . 176.19 . . .
15  ColtonS 19  P   3   2   10986.63884 74  253.0   .   .   .   .   .
81  100 .   .   .   . 176.19 . 178.49 4.96 4.96 .
15  ColtonS 19  P   3   3   10701.22282 74  253.0   .   .   .   .   .
81  100 .   .   .   . 176.19 . 173.85 5.08 4.96 .
15  ColtonS 19  P   3   4   10844.86982 74  253.0   .   .   .   .   .
81  100 .   .   .   . 176.19 . 176.19 5.26 4.96 .
15  ColtonS 19  P   3   5   10701.22282 74  253.0   .   .   .   .   .
81  100 .   .   .   . 176.19 . 173.85 4.44 4.96 .
15  ColtonS 19  P   3   6   10986.63884 74  253.0   .   .   .   .   .
81  100 .   .   .   . . 178.49 178.49 . . .
15  ColtonS 19  P   3   7   10986.63884 74  253.0   .   .   .   .   .
81  100 .   .   .   . . 178.49 178.49 3.75 . 3.75
15  ColtonS 19  P   3   8   10986.63884 74  253.0   .   .   .   .   .
81  100 .   .   .   . . 178.49 178.49 4.23 . 3.75
15  ColtonS 19  P   3   9   11264.82562 74  253.0   .   .   .   .   .
81  100 .   .   .   . . 178.49 183.01 4.15 . 3.75
15  ColtonS 19  P   3   10  11126.60167 74  253.0   .   .   .   .   .
81  100 175.71 179.85 178.49 183.01 . 178.49 180.76 4.11 . 3.75
15  ColtonS 19  S   4   1   11116.91519 74  256.0   .   .   .   .   .
78  100 .   .   .   . 180.61 . 180.61 . . .
15  ColtonS 19  S   4   2   10973.46512 74  256.0   .   .   .   .   .
78  100 .   .   .   . 180.61 . 178.28 4.65 4.65 .
15  ColtonS 19  S   4   3   10828.11479 74  256.0   .   .   .   .   .
78  100 .   .   .   . 180.61 . 175.91 4.85 4.65 .
15  ColtonS 19  S   4   4   10973.46512 74  256.0   .   .   .   .   .
78  100 .   .   .   . 180.61 . 178.28 4.98 4.65 .
15  ColtonS 19  S   4   5   11116.91519 74  256.0   .   .   .   .   .
78  100 .   .   .   . 180.61 . 180.61 4.80 4.65 .
15  ColtonS 19  S   4   6   10680.78664 74  256.0   .   .   .   .   .
78  100 .   .   .   . . 173.52 173.52 . . .
15  ColtonS 19  S   4   7   10828.11479 74  256.0   .   .   .   .   .
78  100 .   .   .   . . 173.52 175.91 4.99 . 4.99
15  ColtonS 19  S   4   8   11116.91519 74  256.0   .   .   .   .   .
78  100 .   .   .   . . 173.52 180.61 5.05 . 4.99
15  ColtonS 19  S   4   9   11116.91519 74  256.0   .   .   .   .   .
78  100 .   .   .   . . 173.52 180.61 4.81 . 4.99
15  ColtonS 19  S   4   10  10973.46512 74  256.0   .   .   .   .   .
78  100 178.74 177.78 180.61 180.61 . 173.52 178.28 4.55 . 4.99
15  ColtonS 19  .   5   1   .   74  245.0   15.00127946 16.35666667 43
6453    54.345  .   .   .   .   .   . . . . . . . .
16  BlakeS  20  .   1   1   .   76  234.0   14.75570856 13.19   41.1
5680    50.62   .   .   .   .   .   . . . . . . . .
16  BlakeS  20  P   2   1   11957.06971 76  234.0   .   .   .   .   .
83  85  .   .   .   . 194.26 . 194.26 . . .
16  BlakeS  20  P   2   2   9059.593847 76  234.0   .   .   .   .   .
83  85  .   .   .   . 194.26 . 188.78 4.73 4.73 .
16  BlakeS  20  P   2   3   12067.27544 76  234.0   .   .   .   .   .
83  85  .   .   .   . 194.26 . 196.05 4.65 4.73 .
16  BlakeS  20  P   2   4   11845.83873 76  234.0   .   .   .   .   .
83  85  .   .   .   . 194.26 . 192.45 4.36 4.73 .
16  BlakeS  20  P   2   5   11390.05762 76  234.0   .   .   .   .   .
83  85  .   .   .   . 194.26 . 185.04 4.14 4.73 .
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16  BlakeS  20  P   2   6   11505.69569 76  234.0   .   .   .   .   .
83  85  .   .   .   . . 186.92 186.92 . . .
16  BlakeS  20  P   2   7   11620.18304 76  234.0   .   .   .   .   .
83  85  .   .   .   . . 186.92 188.78 4.44 . 4.44
16  BlakeS  20  P   2   8   11733.55337 76  234.0   .   .   .   .   .
83  85  .   .   .   . . 186.92 190.62 4.43 . 4.44
16  BlakeS  20  P   2   9   11035.87562 76  234.0   .   .   .   .   .
83  85  .   .   .   . . 186.92 179.29 4.58 . 4.44
16  BlakeS  20  P   2   10  11845.83873 76  234.0   .   .   .   .   .
83  85  191.31 187.61 196.05 192.45 . 186.92 192.45 3.70 . 4.44
16  BlakeS  20  G   3   1   11957.06971 76  234.0   .   .   .   .   .
79  100 .   .   .   . 194.26 . 194.26 . . .
16  BlakeS  20  G   3   2   12284.72132 76  234.0   .   .   .   .   .
79  100 .   .   .   . 194.26 . 199.58 3.61 3.61 .
16  BlakeS  20  G   3   3   12067.27544 76  234.0   .   .   .   .   .
79  100 .   .   .   . 194.26 . 196.05 3.65 3.61 .
16  BlakeS  20  G   3   4   11957.06971 76  234.0   .   .   .   .   .
79  100 .   .   .   . 194.26 . 194.26 3.63 3.61 .
16  BlakeS  20  G   3   5   11845.83873 76  234.0   .   .   .   .   .
79  100 .   .   .   . 194.26 . 192.45 3.74 3.61 .
16  BlakeS  20  G   3   6   11957.06971 76  234.0   .   .   .   .   .
79  100 .   .   .   . . 194.26 194.26 . . .
16  BlakeS  20  G   3   7   11845.83873 76  234.0   .   .   .   .   .
79  100 .   .   .   . . 194.26 192.45 3.68 . 3.68
16  BlakeS  20  G   3   8   11957.06971 76  234.0   .   .   .   .   .
79  100 .   .   .   . . 194.26 194.26 3.85 . 3.68
16  BlakeS  20  G   3   9   12067.27544 76  234.0   .   .   .   .   .
79  100 .   .   .   . . 194.26 196.05 3.77 . 3.68
16  BlakeS  20  G   3   10  11845.83873 76  234.0   .   .   .   .   .
79  100 195.32 193.89 199.58 196.05 . 194.26 192.45 3.98 . 3.68
16  BlakeS  20  S   4   1   12197.29829 76  234.4   .   .   .   .   .
89  72  .   .   .   . 198.16 . 198.16 . . .
16  BlakeS  20  S   4   2   12305.72085 76  234.4   .   .   .   .   .
89  72  .   .   .   . 198.16 . 199.92 4.10 4.10 .
16  BlakeS  20  S   4   3   12305.72085 76  234.4   .   .   .   .   .
89  72  .   .   .   . 198.16 . 199.92 4.19 4.10 .
16  BlakeS  20  S   4   4   11977.50914 76  234.4   .   .   .   .   .
89  72  .   .   .   . 198.16 . 194.59 3.89 4.10 .

16  BlakeS  20  S   4   5   12305.72085 76  234.4   .   .   .   .   .
89  72  .   .   .   . 198.16 . 199.92 3.99 4.10 .
16  BlakeS  20  S   4   6   11866.08803 76  234.4   .   .   .   .   .
89  72  .   .   .   . . 192.78 192.78 . . .
16  BlakeS  20  S   4   7   11866.08803 76  234.4   .   .   .   .   .
89  72  .   .   .   . . 192.78 192.78 4.59 . 4.59
16  BlakeS  20  S   4   8   11866.08803 76  234.4   .   .   .   .   .
89  72  .   .   .   . . 192.78 192.78 4.08 . 4.59
16  BlakeS  20  S   4   9   11866.08803 76  234.4   .   .   .   .   .
89  72  .   .   .   . . 192.78 192.78 4.25 . 4.59
16  BlakeS  20  S   4   10  11753.61073 76  234.4   .   .   .   .   .
89  72  198.50 192.41 199.92 192.78 . 192.78 190.95 5.07 . 4.59
16  BlakeS  20  .   5   1   .   76  237.0   14.03476305 11.81333333
38.1    5388    51.875  .   .   .   .   .   . . . . . . .
17  BrandonT    20  .   1   1   .   69  218.3   17.22728592 22.69
47.3    5662    54.5    .   .   .   .   .   . . . . . . .
17  BrandonT    20  S   2   1   9477.604457 69
218.3   .   .   .   .   .   80  91  .   .   .   . 153.97 . 153.97 . . .
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17  BrandonT    20  S   2   2   9477.604457 69
218.3   .   .   .   .   .   80  91  .   .   .   . 153.97 . 153.97 6.61
6.61 .
17  BrandonT    20  S   2   3   9717.581787 69
218.3   .   .   .   .   .   80  91  .   .   .   . 153.97 . 157.87 6.60
6.61 .
17  BrandonT    20  S   2   4   9231.390832 69
218.3   .   .   .   .   .   80  91  .   .   .   . 153.97 . 149.97 7.89
6.61 .
17  BrandonT    20  S   2   5   9355.307663 69
218.3   .   .   .   .   .   80  91  .   .   .   . 153.97 . 151.99 5.78
6.61 .
17  BrandonT    20  S   2   6   9231.390832 69
218.3   .   .   .   .   .   80  91  .   .   .   . . 149.97 149.97 . . .
17  BrandonT    20  S   2   7   9355.307663 69
218.3   .   .   .   .   .   80  91  .   .   .   . . 149.97 151.99 6.74 .
6.74
17  BrandonT    20  S   2   8   9105.787825 69
218.3   .   .   .   .   .   80  91  .   .   .   . . 149.97 147.93 7.55 .
6.74
17  BrandonT    20  S   2   9   9231.390832 69
218.3   .   .   .   .   .   80  91  .   .   .   . . 149.97 149.97 6.37 .
6.74
17  BrandonT    20  S   2   10  9355.307663 69
218.3   .   .   .   .   .   80  91  153.56 150.37 157.87 151.99 .
149.97 151.99 6.96 . 6.74
17  BrandonT    20  G   3   1   9162.769945 69
211.0   .   .   .   .   .   81  100 .   .   .   . 148.86 . 148.86 . . .
17  BrandonT    20  G   3   2   9162.769945 69
211.0   .   .   .   .   .   81  100 .   .   .   . 148.86 . 148.86 4.95
4.95 .
17  BrandonT    20  G   3   3   9162.769945 69
211.0   .   .   .   .   .   81  100 .   .   .   . 148.86 . 148.86 4.77
4.95 .
17  BrandonT    20  G   3   4   9162.769945 69
211.0   .   .   .   .   .   81  100 .   .   .   . 148.86 . 148.86 5.32
4.95 .
17  BrandonT    20  G   3   5   9044.535702 69
211.0   .   .   .   .   .   81  100 .   .   .   . 148.86 . 146.94 4.65
4.95 .
17  BrandonT    20  G   3   6   9044.535702 69
211.0   .   .   .   .   .   81  100 .   .   .   . . 146.94 146.94 . . .
17  BrandonT    20  G   3   7   9044.535702 69
211.0   .   .   .   .   .   81  100 .   .   .   . . 146.94 146.94 3.79 .
3.79
17  BrandonT    20  G   3   8   9162.769945 69
211.0   .   .   .   .   .   81  100 .   .   .   . . 146.94 148.86 4.09 .
3.79
17  BrandonT    20  G   3   9   9044.535702 69
211.0   .   .   .   .   .   81  100 .   .   .   . . 146.94 146.94 3.97 .
3.79
17  BrandonT    20  G   3   10  9279.497835 69
211.0   .   .   .   .   .   81  100 148.47 148.09 148.86 150.76 .
146.94 150.76 3.91 . 3.79
17  BrandonT    20  P   4   1   9508.655744 69
211.0   .   .   .   .   .   89  72  .   .   .   . 154.48 . 154.48 . . .
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17  BrandonT    20  P   4   2   9394.77552  69
211.0   .   .   .   .   .   89  72  .   .   .   . 154.48 . 152.63 5.21
5.21 .
17  BrandonT    20  P   4   3   9508.655744 69
211.0   .   .   .   .   .   89  72  .   .   .   . 154.48 . 154.48 5.96
5.21 .
17  BrandonT    20  P   4   4   .   69  211.0   .   .   .   .   .   89
72  .   .   .   . 154.48 . . 6.21 5.21 .
17  BrandonT    20  P   4   5   .   69  211.0   .   .   .   .   .   89
72  .   .   .   . 154.48 . . . . .
17  BrandonT    20  P   4   6   9279.497835 69
211.0   .   .   .   .   .   89  72  .   .   .   . . 150.76 150.76 . . .
17  BrandonT    20  P   4   7   9394.77552  69
211.0   .   .   .   .   .   89  72  .   .   .   . . 150.76 152.63 4.57 .
4.57
17  BrandonT    20  P   4   8   9394.77552  69
211.0   .   .   .   .   .   89  72  .   .   .   . . 150.76 152.63 3.58 .
4.57
17  BrandonT    20  P   4   9   9394.77552  69
211.0   .   .   .   .   .   89  72  .   .   .   . . 150.76 152.63 3.81 .
4.57
17  BrandonT    20  P   4   10  9394.77552  69
211.0   .   .   .   .   .   89  72  153.86 152.25 154.48 152.63 .
150.76 152.63 4.02 . 4.57
17  BrandonT    20  .   5
1   .   .   .   .   .   .   .   .   .   .   .   .   .   . . . . . . .
18  DannyT  19  .   1   1   .   72  179.0   9.237925742 9.306666667
53.8    5278    54.055  .   .   .   .   .   . . . . . . .
18  DannyT  19  S   2   1   8533.240457 72  179.0   .   .   .   .   .
84  89  .   .   .   . 138.63 . 138.63 . . .
18  DannyT  19  S   2   2   8066.584731 72  179.0   .   .   .   .   .
84  89  .   .   .   . 138.63 . 131.05 11.12 11.12 .
18  DannyT  19  S   2   3   8441.973229 72  179.0   .   .   .   .   .
84  89  .   .   .   . 138.63 . 137.15 7.30 11.12 .

18  DannyT  19  S   2   4   8623.541813 72  179.0   .   .   .   .   .
84  89  .   .   .   . 138.63 . 140.10 4.66 11.12 .
18  DannyT  19  S   2   5   8623.541813 72  179.0   .   .   .   .   .
84  89  .   .   .   . 138.63 . 140.10 4.00 11.12 .
18  DannyT  19  S   2   6   8256.412696 72  179.0   .   .   .   .   .
84  89  .   .   .   . . 134.13 134.13 . . .
18  DannyT  19  S   2   7   8256.412696 72  179.0   .   .   .   .   .
84  89  .   .   .   . . 134.13 134.13 4.78 . 4.78
18  DannyT  19  S   2   8   8441.973229 72  179.0   .   .   .   .   .
84  89  .   .   .   . . 134.13 137.15 4.62 . 4.78
18  DannyT  19  S   2   9   8441.973229 72  179.0   .   .   .   .   .
84  89  .   .   .   . . 134.13 137.15 4.66 . 4.78
18  DannyT  19  S   2   10  8441.973229 72  179.0   .   .   .   .   .
84  89  137.41 136.53 140.10 140.10 . 134.13 140.10 3.99 . 4.78
18  DannyT  19  G   3   1   8533.240457 72  179.0   .   .   .   .   .
79  100 .   .   .   . 138.63 . 138.63 . . .
18  DannyT  19  G   3   2   8801.365507 72  179.0   .   .   .   .   .
79  100 .   .   .   . 138.63 . 142.99 4.39 4.39 .
18  DannyT  19  G   3   3   8712.907327 72  179.0   .   .   .   .   .
79  100 .   .   .   . 138.63 . 141.55 4.29 4.39 .
18  DannyT  19  G   3   4   8975.666893 72  179.0   .   .   .   .   .
79  100 .   .   .   . 138.63 . 145.82 4.42 4.39 .
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18  DannyT  19  G   3   5   8712.907327 72  179.0   .   .   .   .   .
79  100 .   .   .   . 138.63 . 141.55 4.70 4.39 .
18  DannyT  19  G   3   6   8441.973229 72  179.0   .   .   .   .   .
79  100 .   .   .   . . 137.15 137.15 . . .
18  DannyT  19  G   3   7   8712.907327 72  179.0   .   .   .   .   .
79  100 .   .   .   . . 137.15 141.55 4.78 . 4.78
18  DannyT  19  G   3   8   8712.907327 72  179.0   .   .   .   .   .
79  100 .   .   .   . . 137.15 141.55 4.96 . 4.78
18  DannyT  19  G   3   9   8712.907327 72  179.0   .   .   .   .   .
79  100 .   .   .   . . 137.15 141.55 4.79 . 4.78
18  DannyT  19  G   3   10  8712.907327 72  179.0   .   .   .   .   .
79  100 142.11 140.67 145.82 141.55 . 137.15 141.55 4.84 . 4.78
18  DannyT  19  P   4   1   8888.94344  72  179.0   .   .   .   .   .
89  89  .   .   .   . 144.41 . 144.41 . . .
18  DannyT  19  P   4   2   8888.94344  72  179.0   .   .   .   .   .
89  89  .   .   .   . 144.41 . 144.41 4.41 4.41 .
18  DannyT  19  P   4   3   8888.94344  72  179.0   .   .   .   .   .
89  89  .   .   .   . 144.41 . 144.41 4.29 4.41 .
18  DannyT  19  P   4   4   8975.666893 72  179.0   .   .   .   .   .
89  89  .   .   .   . 144.41 . 145.82 4.54 4.41 .
18  DannyT  19  P   4   5   8975.666893 72  179.0   .   .   .   .   .
89  89  .   .   .   . 144.41 . 145.82 4.73 4.41 .
18  DannyT  19  P   4   6   8801.365507 72  179.0   .   .   .   .   .
89  89  .   .   .   . . 142.99 142.99 . . .
18  DannyT  19  P   4   7   8801.365507 72  179.0   .   .   .   .   .
89  89  .   .   .   . . 142.99 142.99 4.54 . 4.54
18  DannyT  19  P   4   8   8801.365507 72  179.0   .   .   .   .   .
89  89  .   .   .   . . 142.99 142.99 4.34 . 4.54
18  DannyT  19  P   4   9   8712.907327 72  179.0   .   .   .   .   .
89  89  .   .   .   . . 142.99 141.55 4.64 . 4.54
18  DannyT  19  P   4   10  8712.907327 72  179.0   .   .   .   .   .
89  89  144.97 142.41 145.82 142.99 . 142.99 141.55 4.38 . 4.54
18  DannyT  19  .   5   1   .   72  178.0   12.68306827 8.55    46
5018    53.135  .   .   .   .   .   . . . . . . .


DATA POWER;
SET GATOR;
IF TMPOINT = 1 AND TRIALNUM = 1 THEN DELETE;
IF TMPOINT = 5 AND TRIALNUM = 1 THEN DELETE;
IF BEVERAGE = ' ' THEN DELETE;
IF TRIALNUM = 1 THEN DELETE;
IF TRIALNUM = 2 THEN HALF = '1STHALF';
IF TRIALNUM = 3 THEN HALF = '1STHALF';
IF TRIALNUM = 4 THEN HALF = '1STHALF';
IF TRIALNUM = 5 THEN HALF = '1STHALF';
IF TRIALNUM = 6 THEN DELETE;
IF TRIALNUM = 7 THEN HALF = '2NDHALF';
IF TRIALNUM = 8 THEN HALF = '2NDHALF';
IF TRIALNUM = 9 THEN HALF = '2NDHALF';
IF TRIALNUM = 10 THEN HALF = '2NDHALF';
IF ID = 'WillA' THEN DELETE;
IF ID = 'KirkE' THEN DELETE;
IF ID = 'BrandonT' THEN DELETE;
IF ID = 'JayD' THEN DELETE;
PKGMMIN = PKGMSEC * 60;
WATTS = PKGMMIN / 6.12;
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FHAWATTS = (FSTHAV*60) / 6.12;
SHAWATTS = (SNDHAV*60) / 6.12;
FHPWATTS = (FSTHPEAK*60) / 6.12;
SHPWATTS = (SNDHPEAK*60) / 6.12;




******CONSTRUCTS DATA SET FOR 1ST HALF SLED PUSHES**SUBJECTS RECEIVED
NO BEBERAGES IN 1ST HALF****;
************COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR
EACH "HALF" RESPECTIVELY*******;
DATA FIRSTH;
SET POWER;
IF HALF = '2NDHALF' THEN DELETE;
PROC GLM;
TITLE1 'ANALYSIS OF COVARIANCE FOR TRIALS 1-5 (FIRST HALF) WHERE
SUBJECTS RECEIVED NOTHING';
TITLE2 'COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR EACH
"HALF" RESPECTIVELY';
TITLE3 'THIS MODEL ASSUMES NO SUBJECT BY TREATMENT INTERACTION EXISTS';
TITLE4 'OUTLIERS DELETED';
CLASS  TRIALNUM;
MODEL SPTIME  = SUBJNUM TRIALNUM SPCOV1;
LSMEANS TRIALNUM  / PDIFF ;
*PROC SORT;
*BY TRIALNUM BEVERAGE;
*PROC MEANS MAXDEC=2 MEAN N STD NMISS;
*BY TRIALNUM BEVERAGE;
*VAR AGE HEIGHT WEIGHT SKFAT HYDFAT VO2M WATTS SHUTTLE FHAWATTS
SHAWATTS FHPWATTS SHPWATTS;



*************CONSTRUCTS DATA SET FOR 2ND HALF SLED PUSHES****;
************COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR
EACH "HALF" RESPECTIVELY*******;
DATA SECHALF;
SET POWER;
IF HALF = '1STHALF' THEN DELETE;
PROC GLM;
TITLE1 'ANALYSIS FOR TRIALS 6-10 (SECOND HALF) WHERE SUBJECTS RECEIVED
DIFFERENT BEVERAGES';
TITLE2 'COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR EACH
"HALF" RESPECTIVELY';
TITLE3 'THIS MODEL ASSUMES NO SUBJECT BY TREATMENT INTERACTION EXISTS';
TITLE4 'OUTLIERS DELETED';
CLASS SUBJNUM TRIALNUM BEVERAGE;
MODEL SPTIME = SUBJNUM TRIALNUM BEVERAGE TRIALNUM*BEVERAGE SPCOV2;
LSMEANS TRIALNUM BEVERAGE  TRIALNUM*BEVERAGE/ PDIFF ;
*PROC SORT;
*BY TRIALNUM BEVERAGE;
*PROC MEANS MAXDEC=2 MEAN N STD NMISS;
*BY TRIALNUM BEVERAGE;
*VAR AGE HEIGHT WEIGHT SKFAT HYDFAT VO2M WATTS SHUTTLE FHAWATTS
SHAWATTS FHPWATTS SHPWATTS;
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******SAME ANALYSIS AS ABOVE FOR "2ND HALF" BUT WITH OUTLIERS
INCLUDED*****;

DATA POWER;
SET GATOR;
IF TMPOINT = 1 AND TRIALNUM = 1 THEN DELETE;
IF TMPOINT = 5 AND TRIALNUM = 1 THEN DELETE;
IF BEVERAGE = ' ' THEN DELETE;
IF TRIALNUM = 1 THEN HALF = '1STHALF';
IF TRIALNUM = 2 THEN HALF = '1STHALF';
IF TRIALNUM = 3 THEN HALF = '1STHALF';
IF TRIALNUM = 4 THEN HALF = '1STHALF';
IF TRIALNUM = 5 THEN HALF = '1STHALF';
IF TRIALNUM = 6 THEN HALF = '2NDHALF';
IF TRIALNUM = 7 THEN HALF = '2NDHALF';
IF TRIALNUM = 8 THEN HALF = '2NDHALF';
IF TRIALNUM = 9 THEN HALF = '2NDHALF';
IF TRIALNUM = 10 THEN HALF = '2NDHALF';
PKGMMIN = PKGMSEC * 60;
WATTS = PKGMMIN / 6.12;
FHAWATTS = (FSTHAV*60) / 6.12;
SHAWATTS = (SNDHAV*60) / 6.12;
FHPWATTS = (FSTHPEAK*60) / 6.12;
SHPWATTS = (SNDHPEAK*60) / 6.12;



******CONSTRUCTS DATA SET FOR 1ST HALF SLED PUSHES**SUBJECTS RECEIVED
NO BEBERAGES IN 1ST HALF****;
************COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR
EACH "HALF" RESPECTIVELY*******;
DATA FIRSTH;
SET POWER;
IF HALF = '2NDHALF' THEN DELETE;
PROC GLM;
TITLE1 'ANALYSIS OF COVARIANCE FOR TRIALS 1-5 (FIRST HALF) WHERE
SUBJECTS RECEIVED NOTHING';
TITLE2 'COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR EACH
"HALF" RESPECTIVELY';
TITLE3 'THIS MODEL ASSUMES NO SUBJECT BY TREATMENT INTERACTION EXISTS';
TITLE4 'OUTLIERS INCLUDED';
CLASS  TRIALNUM;
MODEL SPTIME  = SUBJNUM TRIALNUM SPCOV1;
LSMEANS TRIALNUM  / PDIFF;
*PROC SORT;
*BY TRIALNUM BEVERAGE;
*PROC MEANS MAXDEC=2 MEAN N STD NMISS;
*BY TRIALNUM BEVERAGE;
*VAR AGE HEIGHT WEIGHT SKFAT HYDFAT VO2M WATTS SHUTTLE FHAWATTS
SHAWATTS FHPWATTS SHPWATTS;



*************CONSTRUCTS DATA SET FOR 2ND HALF SLED PUSHES****;
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************COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR
EACH "HALF" RESPECTIVELY*******;
DATA SECHALF;
SET POWER;
IF HALF = '1STHALF' THEN DELETE;
PROC GLM;
TITLE1 'ANALYSIS FOR TRIALS 6-10 (SECOND HALF) WHERE SUBJECTS RECEIVED
DIFFERENT BEVERAGES';
TITLE2 'COVARIATES SPCOV1 SPCOV2 ARE INITIAL SLED PUSH TIMES FOR EACH
"HALF" RESPECTIVELY';
TITLE3 'THIS MODEL ASSUMES NO SUBJECT BY TREATMENT INTERACTION EXISTS';
TITLE4 'OUTLIERS INCLUDED';
CLASS SUBJNUM TRIALNUM BEVERAGE;
MODEL SPTIME = SUBJNUM TRIALNUM BEVERAGE TRIALNUM*BEVERAGE SPCOV2;
LSMEANS TRIALNUM BEVERAGE TRIALNUM*BEVERAGE / PDIFF ;
*PROC SORT;
*BY TRIALNUM BEVERAGE;
*PROC MEANS MAXDEC=2 MEAN N STD NMISS;
*BY TRIALNUM BEVERAGE;
*VAR AGE HEIGHT WEIGHT SKFAT HYDFAT VO2M WATTS SHUTTLE FHAWATTS
SHAWATTS FHPWATTS SHPWATTS;

RUN; QUIT;
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VITA

GLENDA ELANE CRAWFORD

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