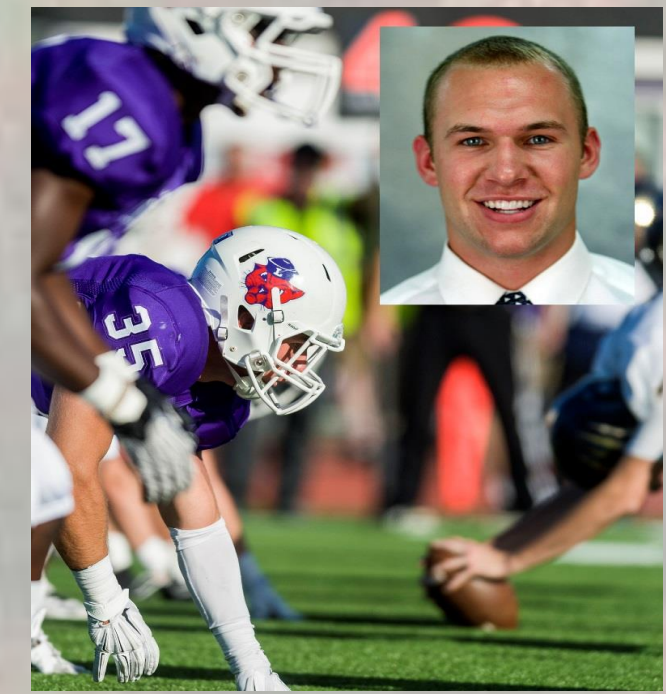


# Energy and Macronutrient Intake of First Year Football Players: A Pilot Study

M. Kume, M. Aldrich & J.T. Peterson, FACSM

Department of Health, Human Performance and Athletics, Linfield College, McMinnville, OR.



Linfield Strong #35



## Abstract

**PURPOSE:** The purpose of this study was to examine the energy intake and macronutrient breakdown of first year football players at a Division III school. A secondary purpose was to examine the relationship of dietary intake to clinical measures. **METHODS:** Seventeen first-year football players completed a 24-Hour Diet Recall interview. Players had their height, weight, body composition, fasting blood glucose and cholesterol measured. Researchers provided measuring devices to help participants recall their food and liquid intake for the previous 24 hours. Independent T-tests were performed to examine the differences between skilled and lineman football players. **RESULTS:** The athletes consumed an average of 4,103 kcals (range 1,283.4 kcals – 8,347.3 kcals) with the following macronutrient breakdown: 48% Carbohydrate, 35% Fat and 17% protein. Linemen were heavier, had higher Body Mass Index (BMI), larger waist circumferences (WC), higher percent body fat (BF), and higher fasting blood glucoses ( $p > 0.05$ ) than the skilled players. There were no differences in total kcals consumed, macronutrient composition or water intake between the two groups. **CONCLUSION:** Skilled and linemen football players had similar energy intakes; linemen had higher BMIs, WC, and BF. This would suggest that linemen expend lower amounts of energy than skilled players. This information combined with the higher blood glucose levels can be an indicator for a football player's future health.

## Introduction

It is generally believed that athletes require higher energy intake than suggested by the recommended daily allowances. This is largely due to the increased energy expenditure through practice, training and competition. Football players are advised to eat higher overall calories and to increase their caloric intake from protein. For example, one study suggested football players consume anywhere from 5,000 – 6,000 kcals per day with more than double the current protein intake (Short & Short, 1983). Excessive calorie consumption at any activity level will lead to potentially harmful excessive weight gain.

A study completed by National Institute of Occupational Health and Safety (NIOHS) found certain retired National Football League (NFL) players, specifically linemen (offensive and defensive), had a higher risk of death from CVD. In an effort to make recommendations towards resolving this increased health risk, these authors made the statement “we are not going to fix the condition by waiting until the players retire. The best place to address it is in pre-professional training programs, including college athletics” (Miller et al., 2008). Therefore, we would like to examine the nutrient intake of Division III first year football players as a way of identifying areas for increased education.

## Purpose

The purpose of this study was to examine the energy intake and macronutrient breakdown of first year football players at a Division III school. A secondary purpose was to examine the relationship of dietary intake to clinical measure.

## Methods

1. Height was taken from the Athletics Website
2. Blood pressure, weight, body fat (bioelectrical impedance analysis and ultra sound), waist circumference (supra iliac and abdominal), fasting cholesterol and blood glucose were measured as part of the ongoing Metabolic Syndrome study, which occurred on the same day.
3. Diets were recorded via a standard 24-hour diet recall interview protocol with recall tools such as, bowls, plates, measuring cups and spoons.
4. This study was approved by the Linfield College Institutional Review Board.

## Results

Table 1: Demographics and Clinical Results

	All	Linemen	Skilled	p-value
Number of Players	17	8	9	
Age (years)	18.8 ± 0.5	18.9 ± 0.6	18.8 ± 0.5	0.599
Height (m)	1.8 ± 0.1	1.9 ± 0.1	1.8 ± 0.1	0.014
Weight (kg)	97 ± 16.1	107.7 ± 15.2	85.1 ± 4.6	0.001
BMI (kg/m <sup>2</sup> )	29.6 ± 3.8	31.5 ± 4.0	27.5 ± 2.3	0.024
Systolic BP (mmHg)	130.5 ± 11.6	130.6 ± 11.0	130.5 ± 13.0	0.987
Diastolic BP (mmHg)	81.9 ± 11.2	78.3 ± 12.4	86.0 ± 8.7	0.168
Total Cholesterol (mg/dL)	169.5 ± 34.4	161.4 ± 30.1	177.6 ± 38.7	0.401
Triglycerides (mg/dL)	111.8 ± 51.8	128.1 ± 65.8	95.4 ± 29.5	0.253
LDL Cholesterol (mg/dL)	107 ± 37.2	100.1 ± 24.3	113.9 ± 47.9	0.512
HDL Cholesterol (mg/dL)	40.3 ± 10.6	35.7 ± 4.3	44.9 ± 13.3	0.109
Fasting Glucose (mg/dL)	92.2 ± 7.2	96.4 ± 6.1	88.0 ± 5.8	0.021

Figure 1: Body Fat Percentage by Skilled Players and Linemen

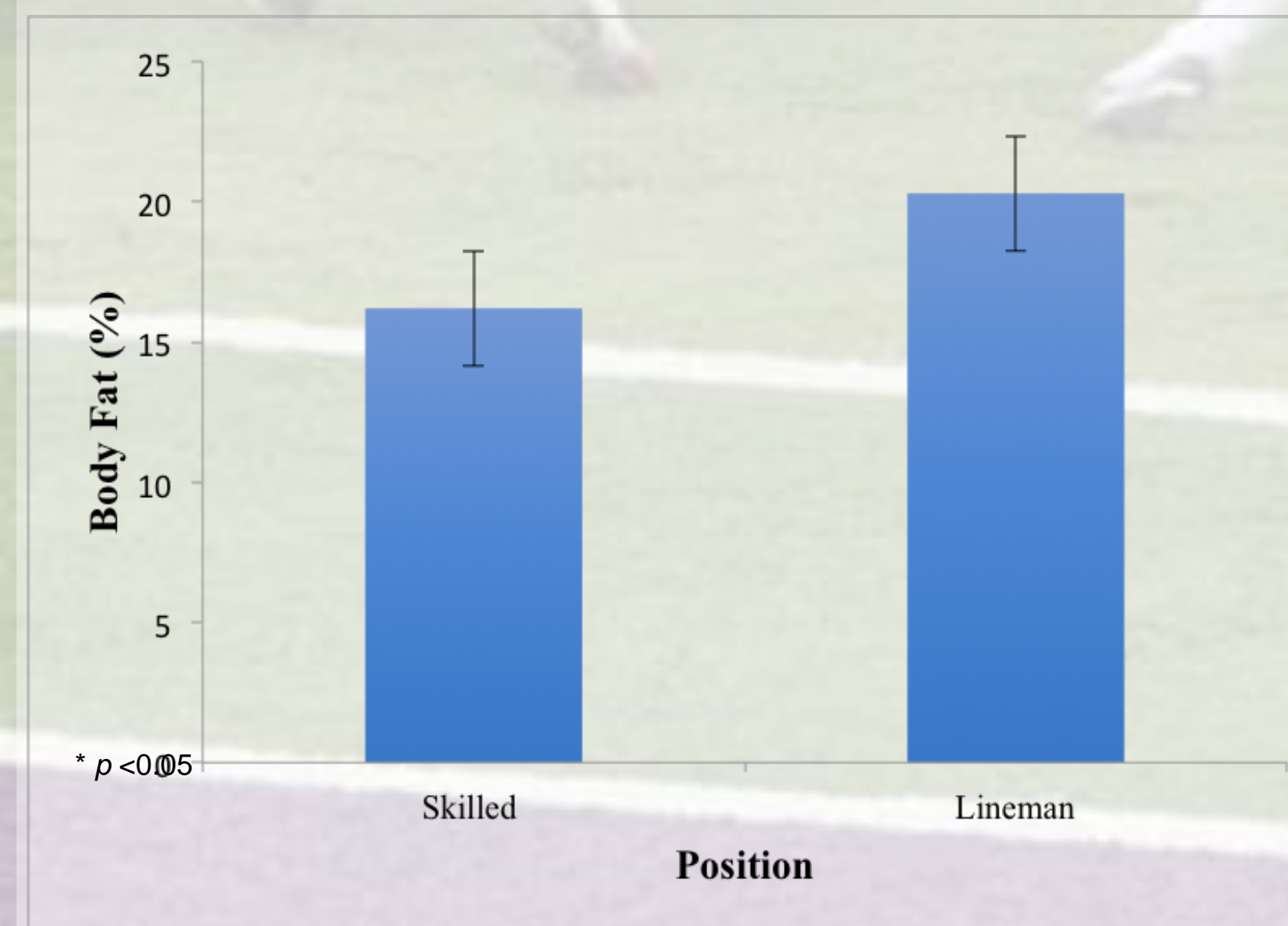
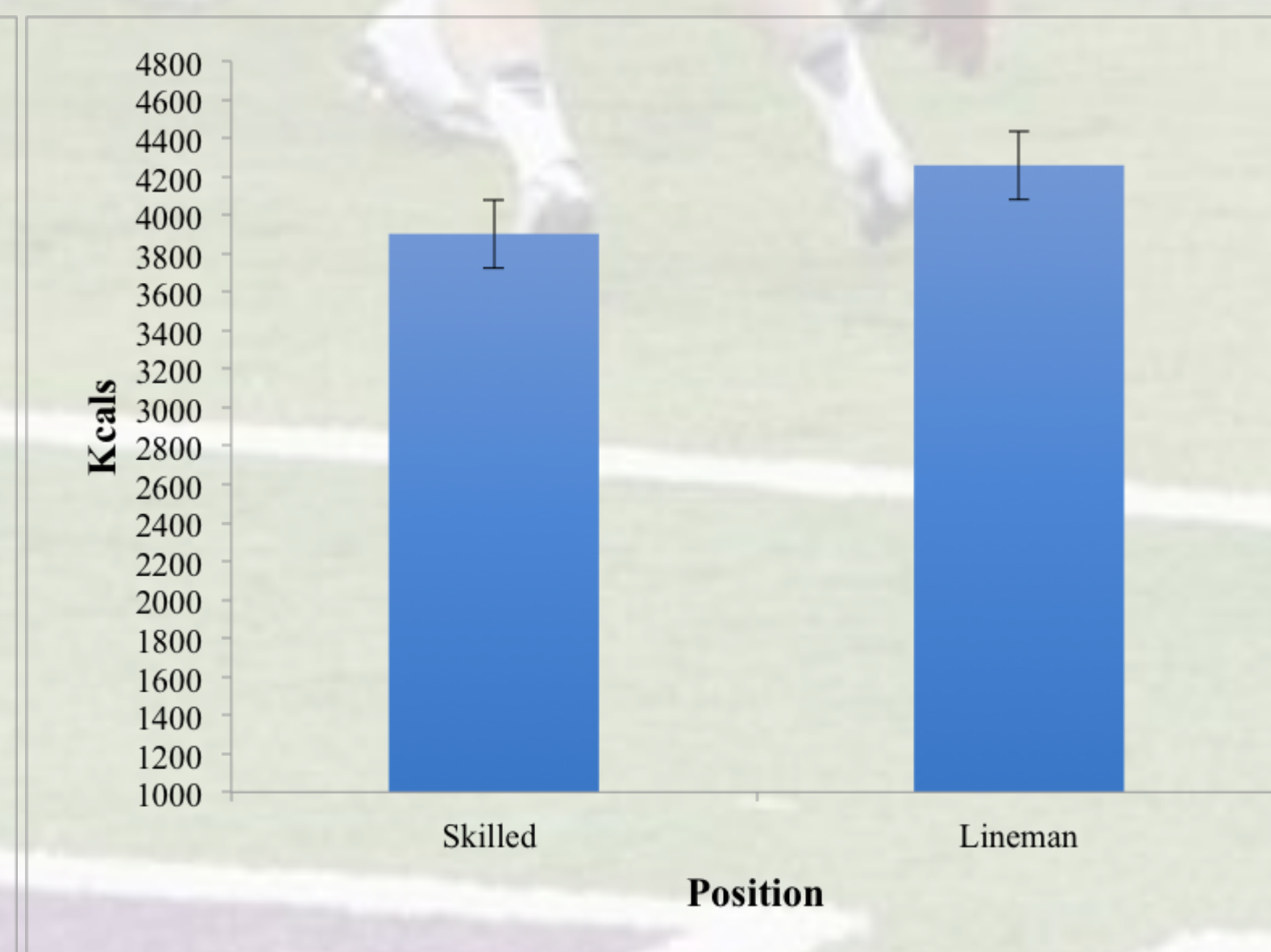
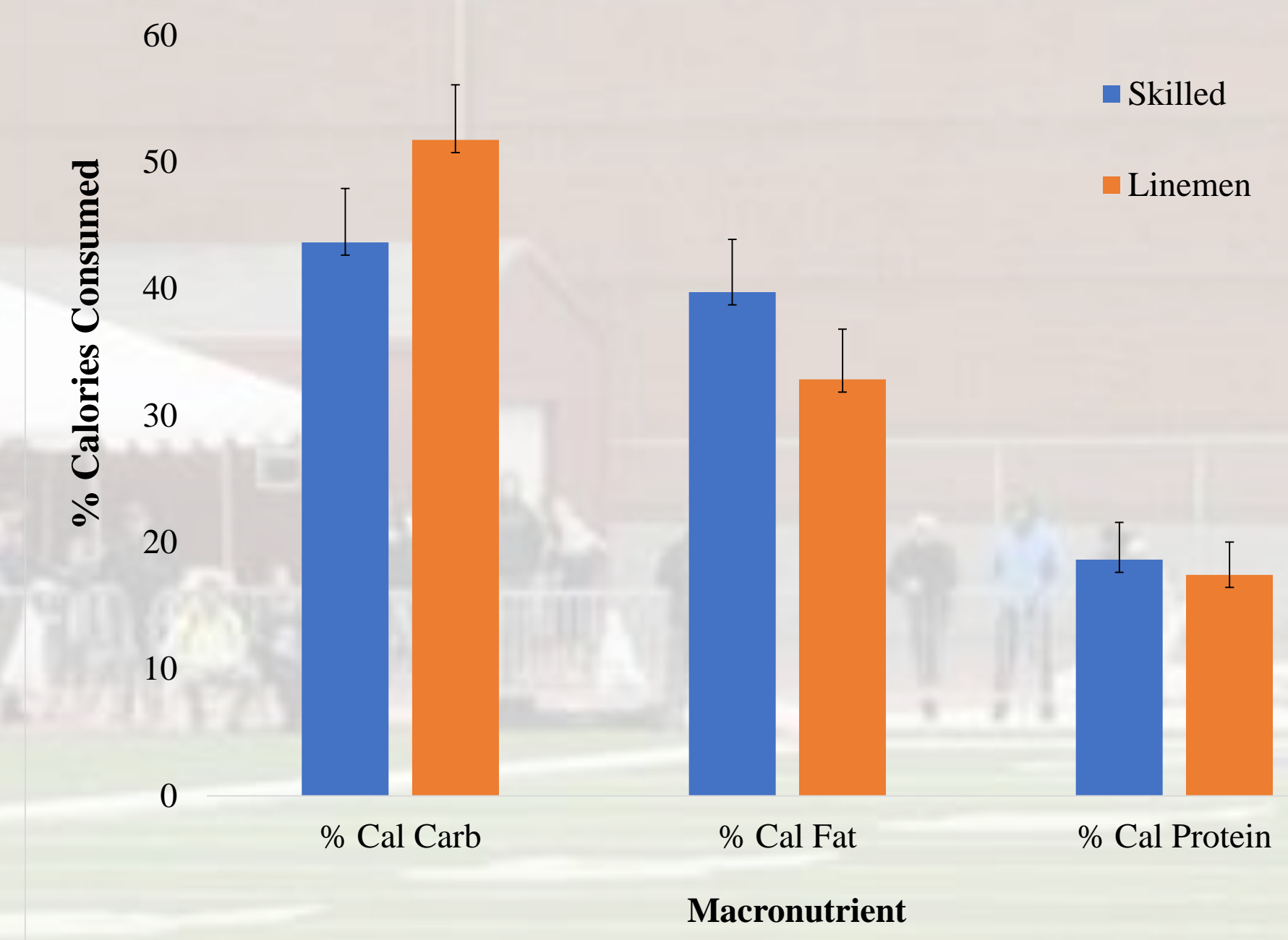


Figure 2: Total Calories Consumed by Skilled Players and Linemen



Overall the athletes consumed an average of 4,103 kcals (1,283.4 – 8,347.3 kcals) with the following macronutrient breakdown: 48% Carbohydrate, 35% Fat and 17% protein. Linemen were heavier, had higher Body Mass Index (BMI), larger waist circumferences (WC), higher percent body fat (BF), and higher fasting blood glucoses ( $p < 0.05$ ) than the skilled players There were no significant differences between skilled players and linemen in a breakdown of macronutrients such as fats, carbohydrates, and protein between the two groups.

Figure 3. Percent Calories Consumed in Each Macronutrient by Skilled Players and Linemen



## Discussion

Although linemen and skilled players consumed similar amount of calories, lineman had higher body fat percentages. These results suggest that linemen were not expending as much energy as the skilled players because their energy intakes were relatively similar. Linemen are expected to be bigger and strong because of the requirements of their positions; however, the relatively high body fat percentages suggested they gained more fat than muscle. It is suggested that football players, in particular linemen, work with a registered dietitian to develop an eating plan to maximize lean body mass.

## Conclusion

Skilled and linemen football players had similar energy intakes; linemen had higher BMI, WC, and BF percentage. These data suggest that linemen expend lower amounts of energy than skilled players. This information combined with the relatively higher blood glucose levels may be an indicator for future health outcomes. Further research is suggested to identify athletes with high risk of developing chronic health conditions and to implement education programs to help athletes with a sound dietary plan.

## Study Limitations

Players struggled to accurately remember all the foods and beverages they consumed the previous 24 hours. Some players weren't able to provide sufficient detail about what they consumed. Players may have also been hesitant to share everything in fear of judgment. In addition, the sample size was fairly small and only conducted within a Division III program. Results may have differed with a larger sample size or in a Division I or II school.

## Acknowledgements

We would like to thank the Linfield College first year football players and coaches. In addition, we acknowledge and thank the Exercise Science and Athletic Training students whom helped with data collection. And finally, a special thanks to Shannon Mayer and Sara Saloka for their assistance with the 24 hour diet recall data.