THE BEST YOU CAN LEGALLY FEEL

CHOOSE HAPPY

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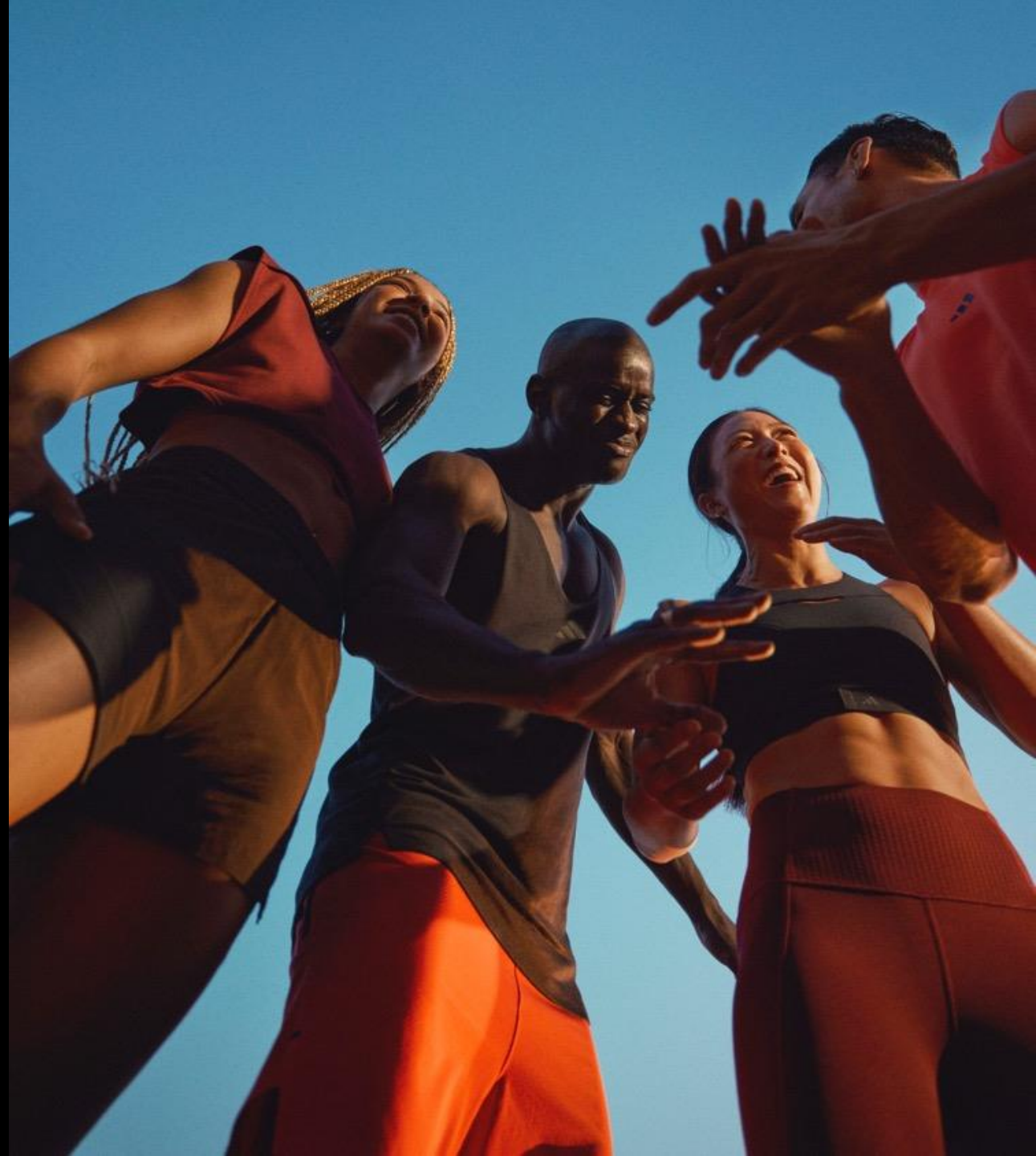
CONTINUOUS GLUCOSE MONITORING: LEARNINGS FROM ACTIVE ADULTS

Medical Fitness Association
2024 Webinar Series

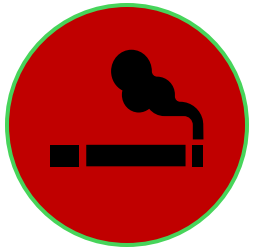
Bryce Hastings & Jinger Gottschall



According to the Centers for Disease Control and Prevention, nearly **1 out of every 2 Americans suffers from a chronic disease**, defined as a noncommunicable disease (NCD) prolonged in duration, including cancer, heart disease, and diabetes. Chronic diseases are the number one cause of death in the United States.

The most common behaviors that lead to chronic disease are:



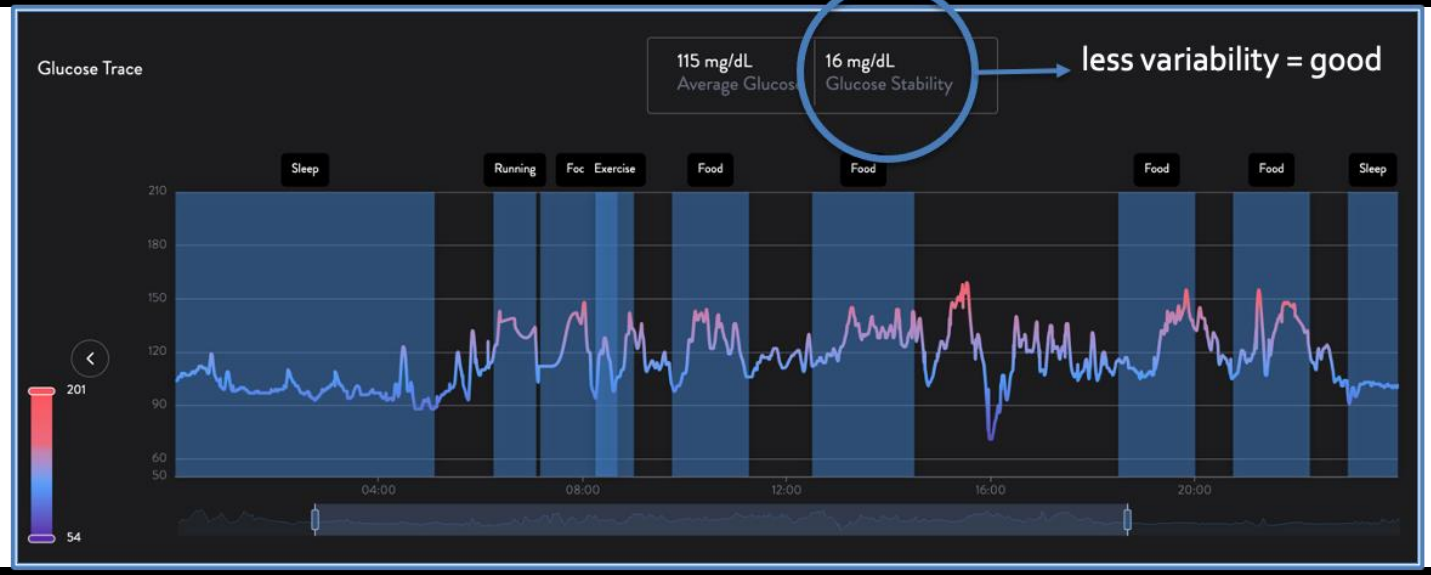



High glucose variability (fluctuations) and high peak glucose levels are independently associated with earlier onset of disease in healthy adults without diabetes.[1,2] More specifically, prospective studies demonstrate that higher glucose variability is associated with an increased risk of chronic diseases.[3,4]

SINGLE PARTICIPANT DAILY GLUCOSE TRACES: glucose variability* **A** > **B** with similar average glucose

A

B



*Supersapiens uses the term Glucose Stability as the metric for fluctuations in glucose.

American Heart Association®
Healthy for Good™

UNDERSTAND BLOOD GLUCOSE

The first step to managing your blood sugar is to understand what makes blood sugar levels rise

GLUCOSE

The carbohydrates and sugars in what you eat and drink turns into glucose (sugar) in the stomach and digestive system. Glucose can then enter the bloodstream.

INSULIN

Insulin is a hormone made in the pancreas that helps the body's cells take up glucose from blood and lower blood sugar levels.

PANCREAS

2.

the body glucose monitor- detects sugar

FOOD

1.

blood glucose (sugar) increases after eating

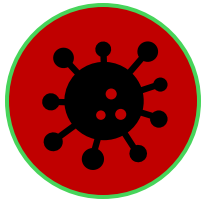
INSULIN

3.

released by the pancreas, this unlocks the cell- letting glucose in

BODY CELL

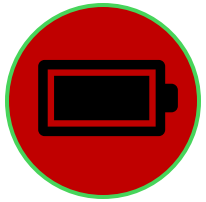
4.



turns glucose into energy the body can store or use

ENERGY

5.



fuels body and blood sugar decreases- ready for food again!

later

muscles, fat, and/or liver

OR

now

TRACK LEVELS

Continuous Glucose Monitors (CGM) provide real time blood sugar levels- providing an honesty check on how your daily lifestyle habits influence typical glucose fluctuations.

Fasting Blood Glucose	Diagnosis	What It Means
Lower than 100 mg/dl	Normal	Healthy range
100 to 125 mg/dl	Prediabetes (impaired fasting glucose)	At increased risk of developing diabetes.
126 mg/dl or higher	Diabetes Mellitus (Type 2 diabetes)	At increased risk of heart disease or stroke.

TIPS FOR SUCCESS

EAT SMART

Eat a healthy diet of vegetables, fruits, whole grains, beans, legumes, nuts, plant-based proteins, lean animal proteins like fish and seafood.

Limit sugary foods and drinks, red or processed meats, salty foods, refined carbohydrates and highly processed foods.

MANAGE WEIGHT

Stay at a healthy weight to help prevent, delay or manage diabetes

MOVE MORE

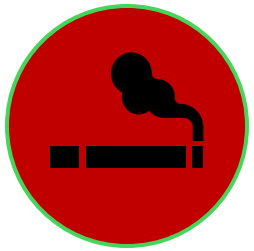
Being physically active can lower your risk of developing diabetes and help you manage the disease if you already have it.

NO NICOTINE

Smoking, vaping, exposure to secondhand smoke or using tobacco can increase your risk of heart disease, stroke, many cancers and other chronic diseases. It may also make prediabetes and diabetes harder to manage.

The most common behaviors that lead to chronic disease are:



Unfortunately, there are limited data on continuous glucose concentrations in individuals **without diabetes**. Most studies of glucose profiles in healthy adults had small sample sizes or used less accurate early-generation monitoring devices.

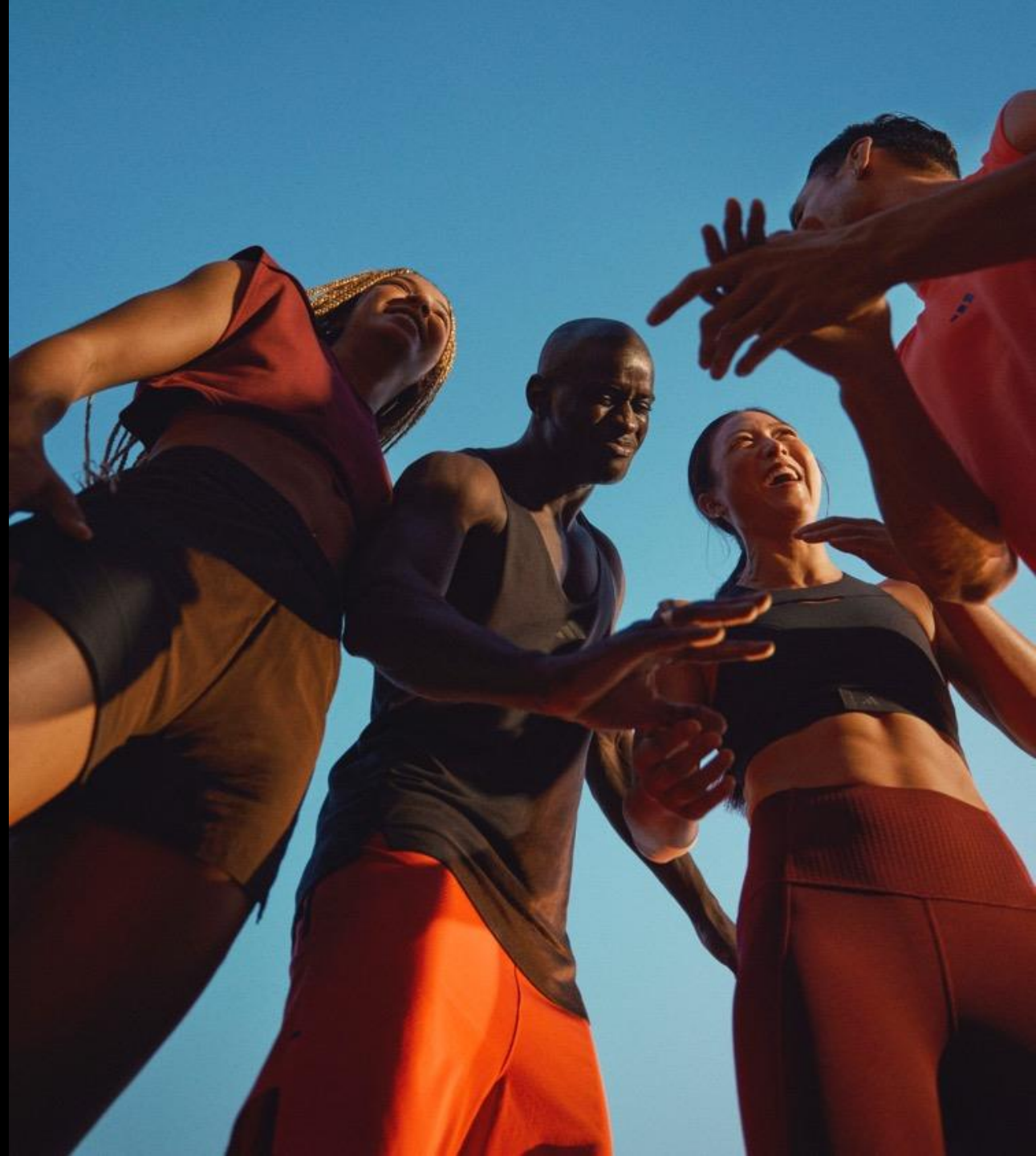
Multiple past studies report that moderate, vigorous, and high intensity cardiovascular exercise, as well as resistance training, improve both high glucose variability and high peak glucose levels.[6,7] We had a unique opportunity to evaluate the effect of these various training sessions (total time, intensity zones, perceived exertion) as well as daily meals (time of day, macronutrient grams), sleep (total time, subjective quality), and emotions (stress, motivation, fatigue).

PURPOSE

To correlate lifestyle variables-

- exercise
- nutrition
- sleep
- emotions

- with glucose variability.

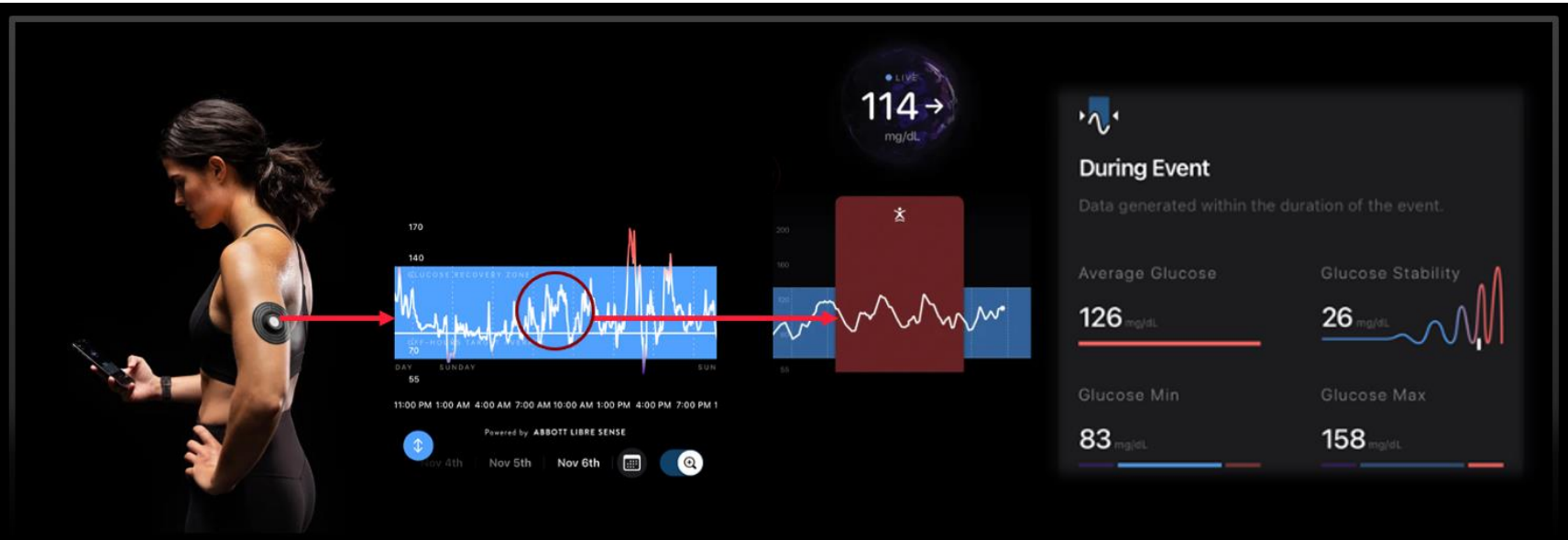


METHODS

participants: Thirty-five healthy, active adults (8 women, age = 47 ± 8 years, mass = 74 ± 12 kilograms, height = 175 ± 9 centimeters, basal metabolic rate = 2574 ± 428 kilocalories; mean ± standard deviation)

protocol: Participants wore an Abbott Libre Sense Glucose Sport Biosensor continuous glucose monitor (CGM) connected to the Supersapiens application for two weeks, maintained their typical routines, and recorded the data. They also completed each planned exercise session with a heart rate chest transmitter. The study participants logged these training sessions (total time, intensity zones, perceived exertion) as well as their personal, unprescribed daily meals (time of day, macronutrient grams), sleep (total time, subjective quality), and emotions (stress, motivation, fatigue).

analysis: We correlated these lifestyle variables with daily glucose variability.



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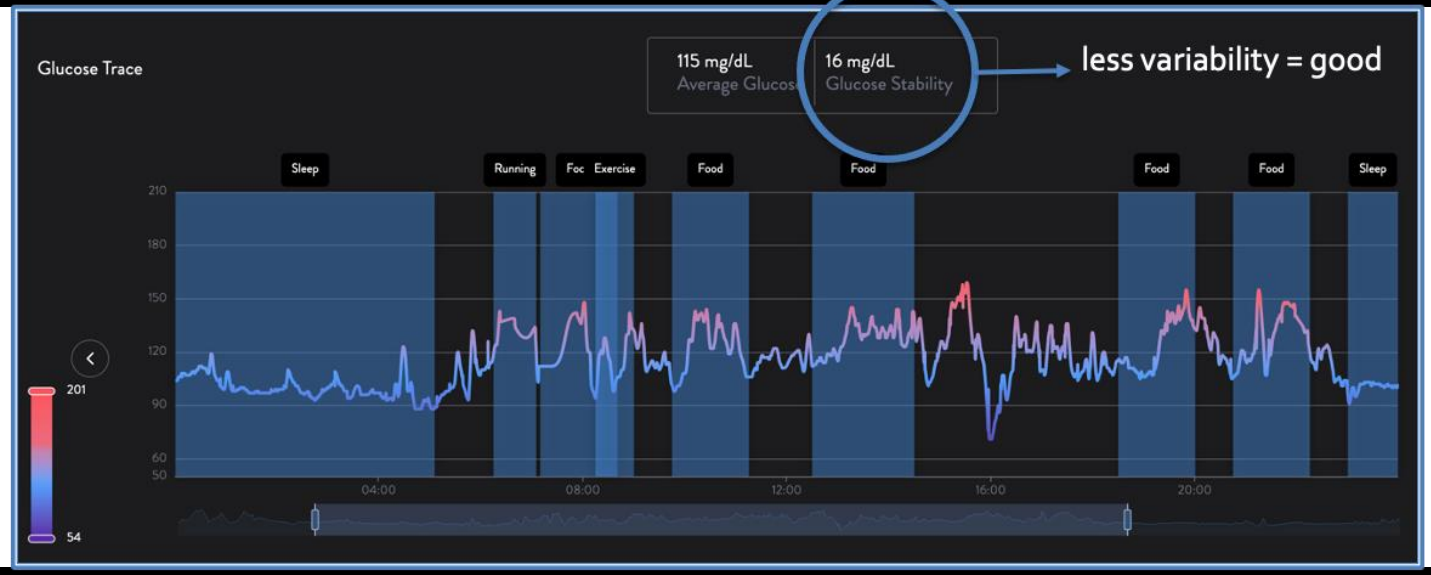

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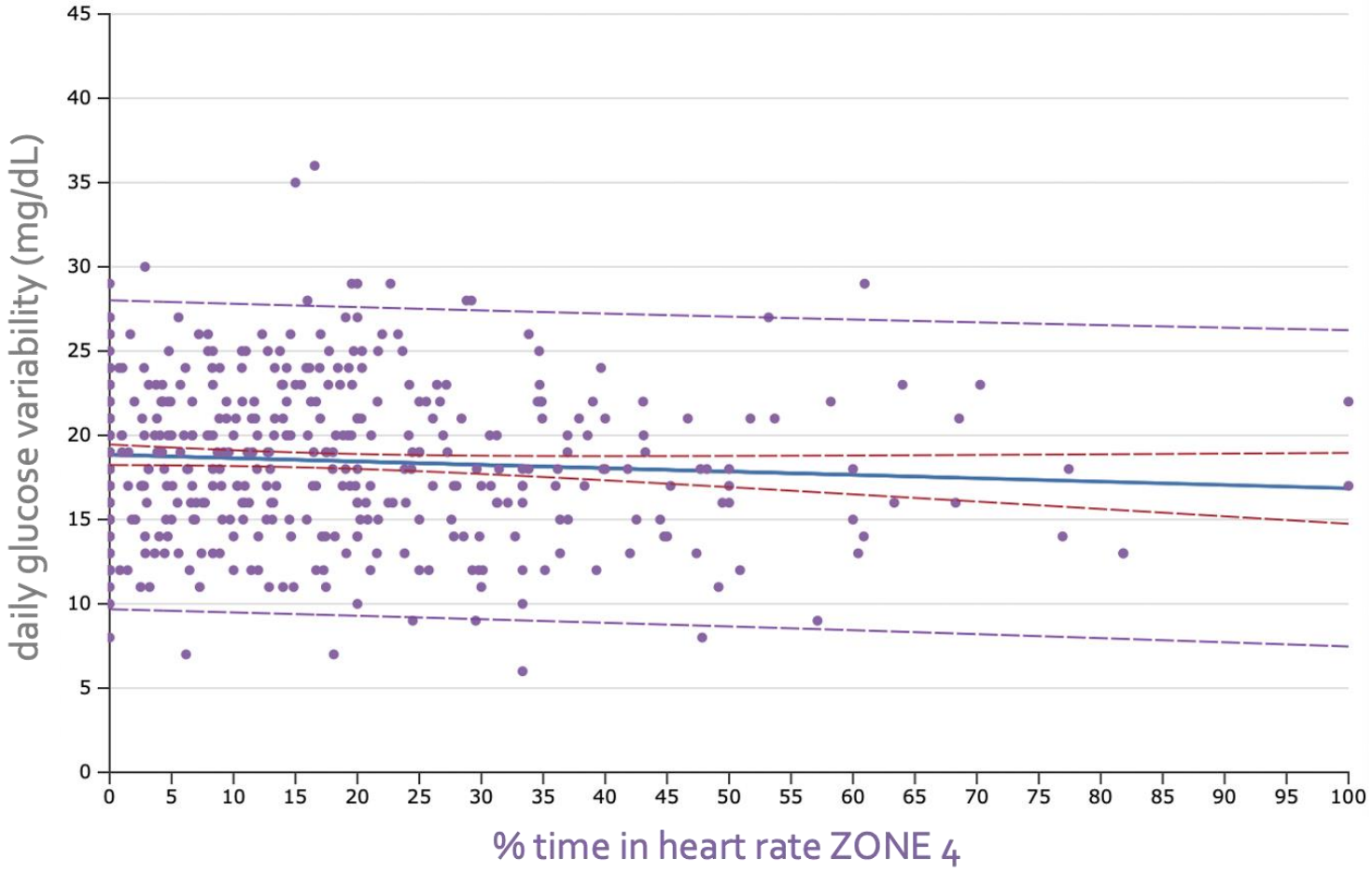
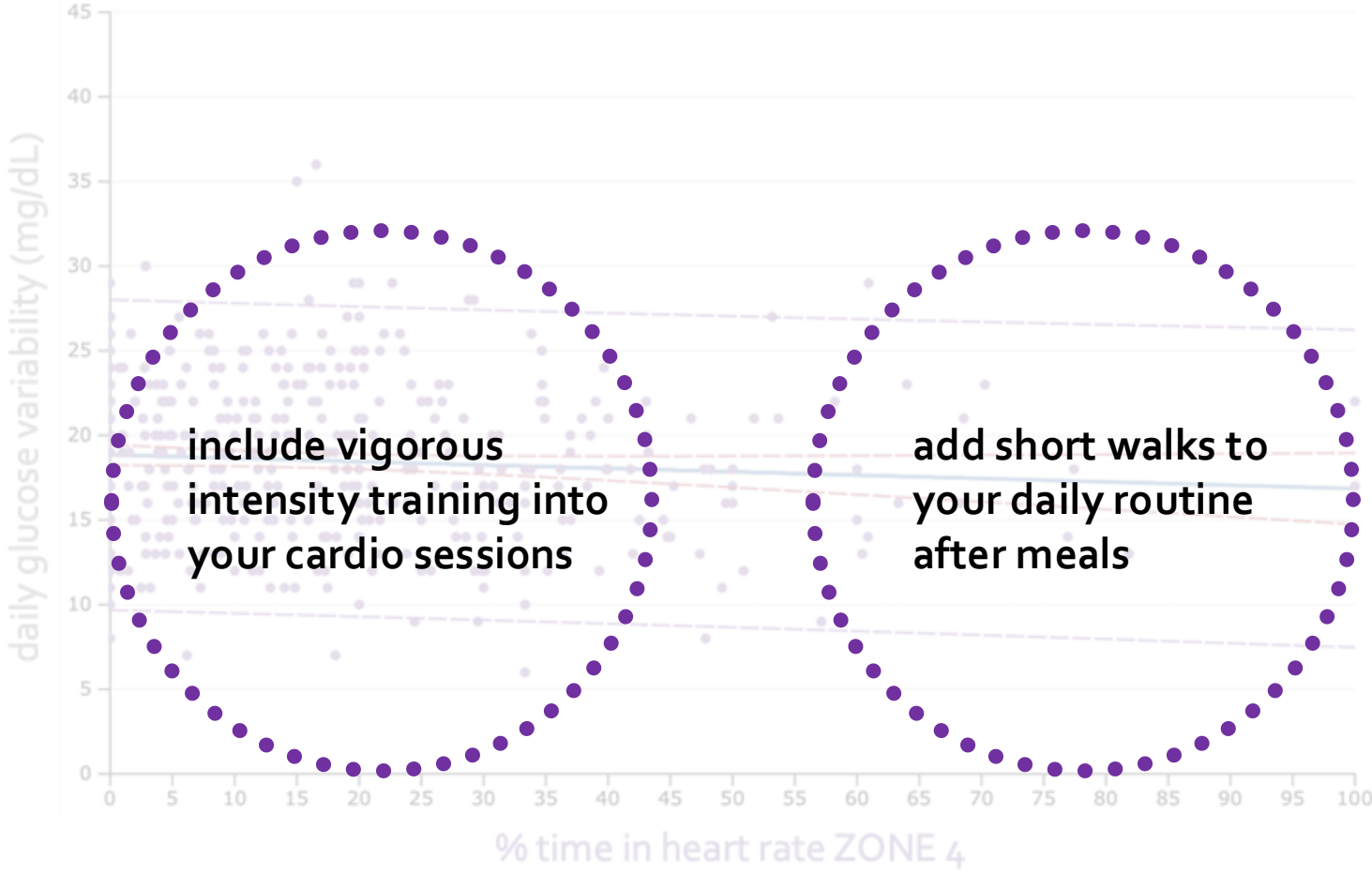
RESULTS _ EXERCISE



Daily glucose variability (n = 532) was significantly correlated with %time in heart rate ZONE 4 ($\rho = -0.32$, $p < 0.0001$) as well as number of cardio sessions per day ($\rho = -0.19$, $p < 0.0001$).

RESULTS _ EXERCISE



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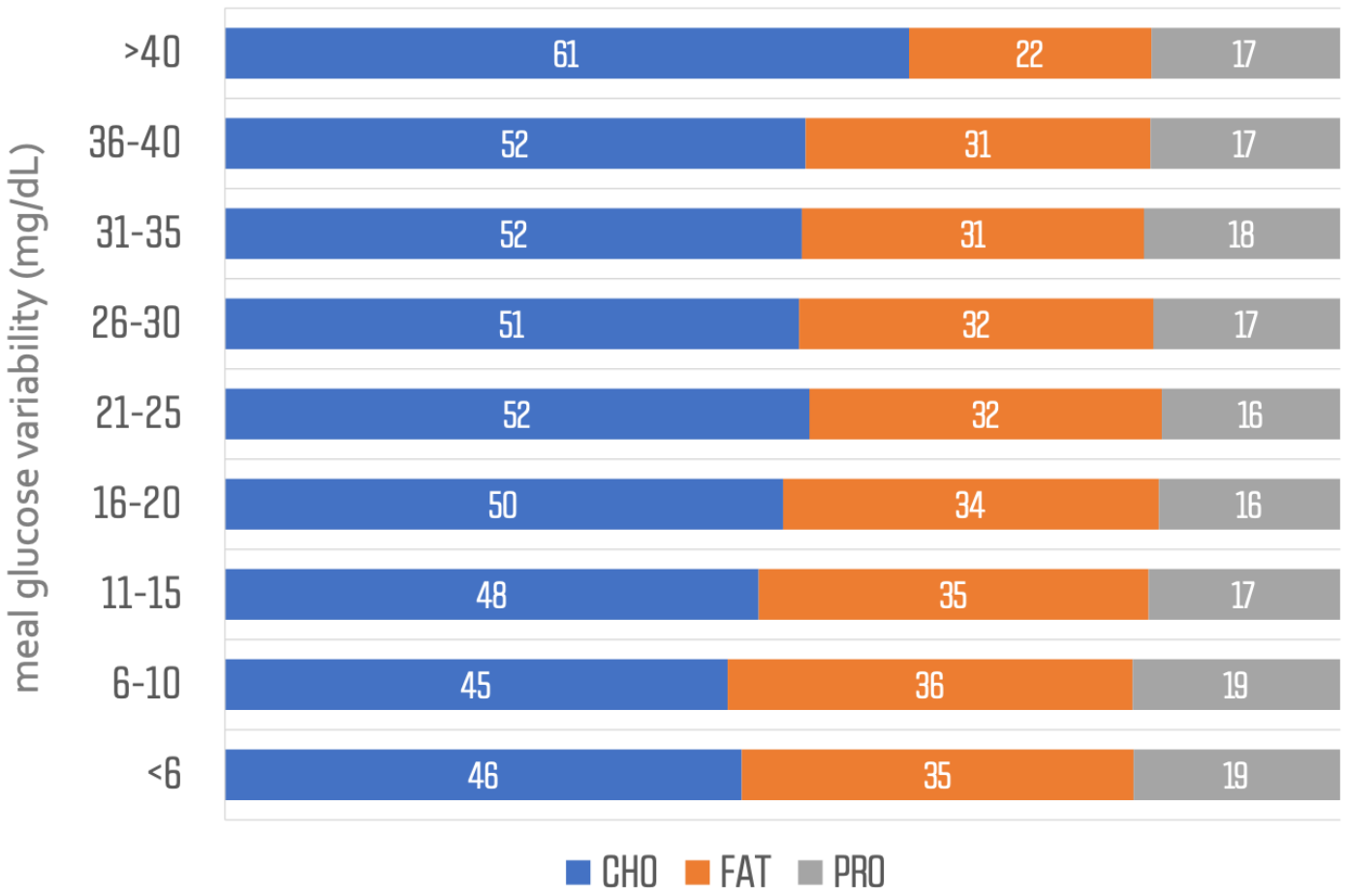
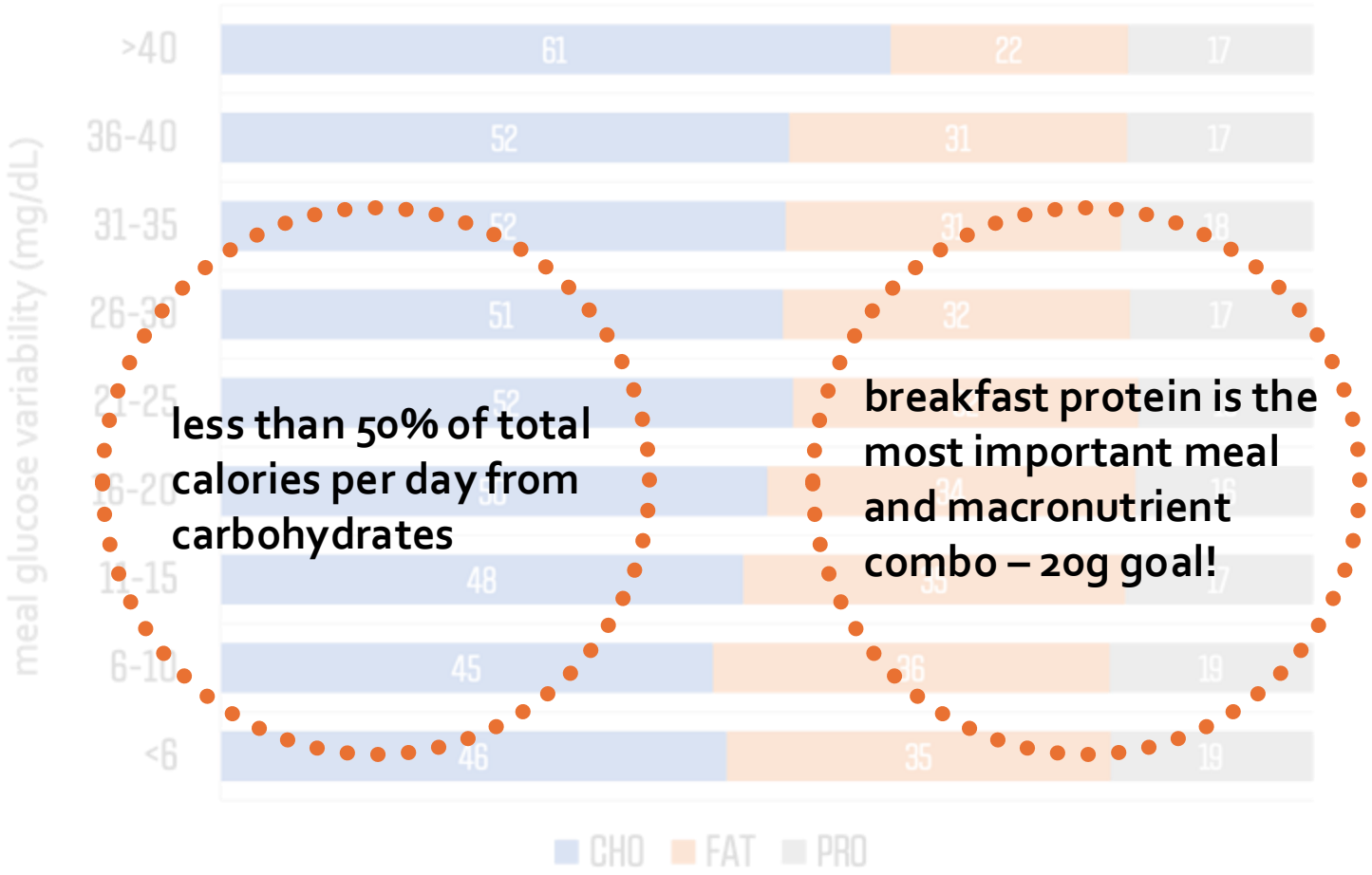
RESULTS _ NUTRITION



Meal glucose variability (n = 2157) was lowest when carbohydrate (CHO) percentage was less than 50% and fat and protein (PRO) were at least 34% and 16%, respectively. Our statistical analysis predicted that the optimal ratio is 46% CHO, 35% FAT, and 19% PRO.

RESULTS _ NUTRITION



less than 50% of total calories per day from carbohydrates

breakfast protein is the most important meal and macronutrient combo – 20g goal!

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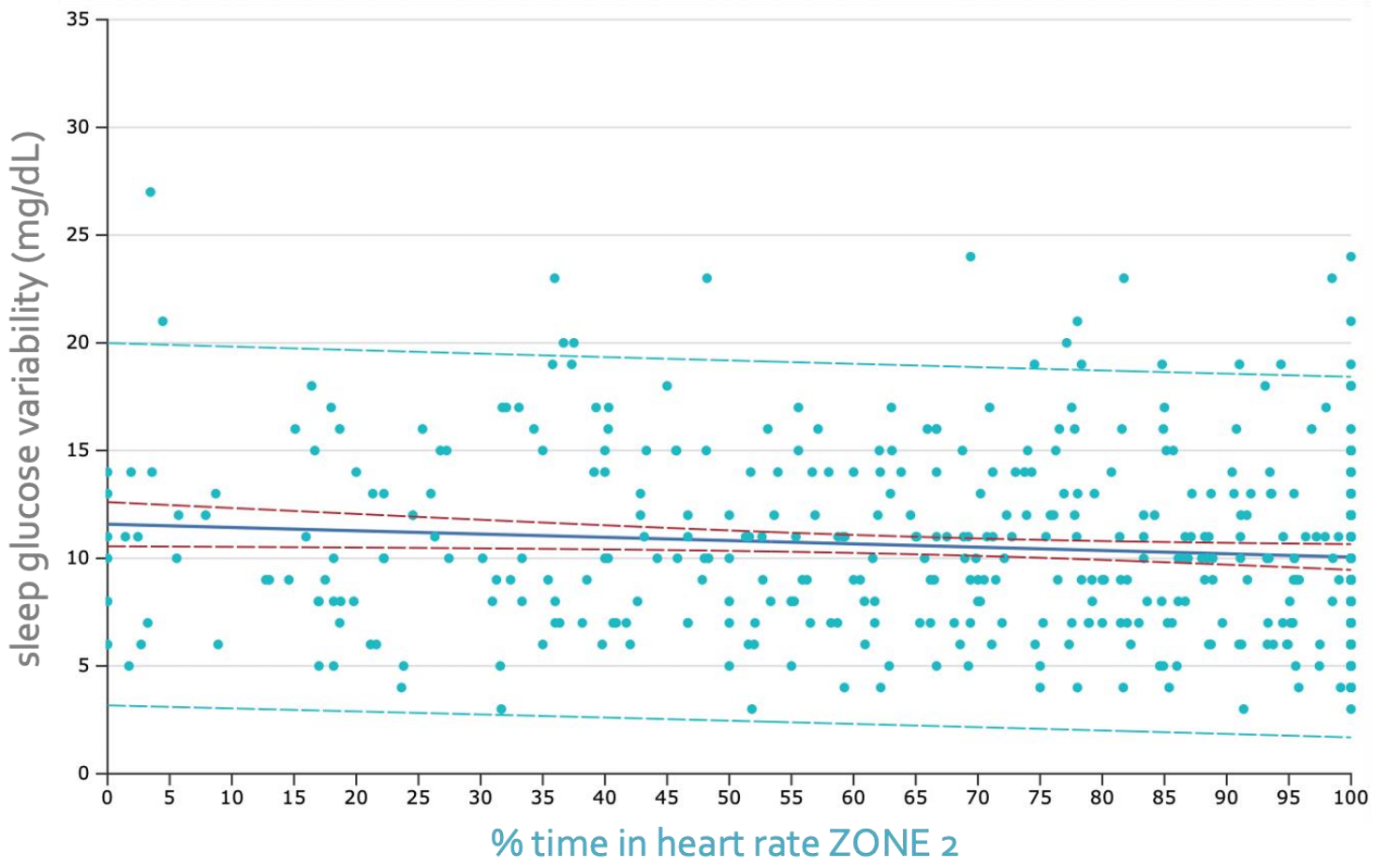
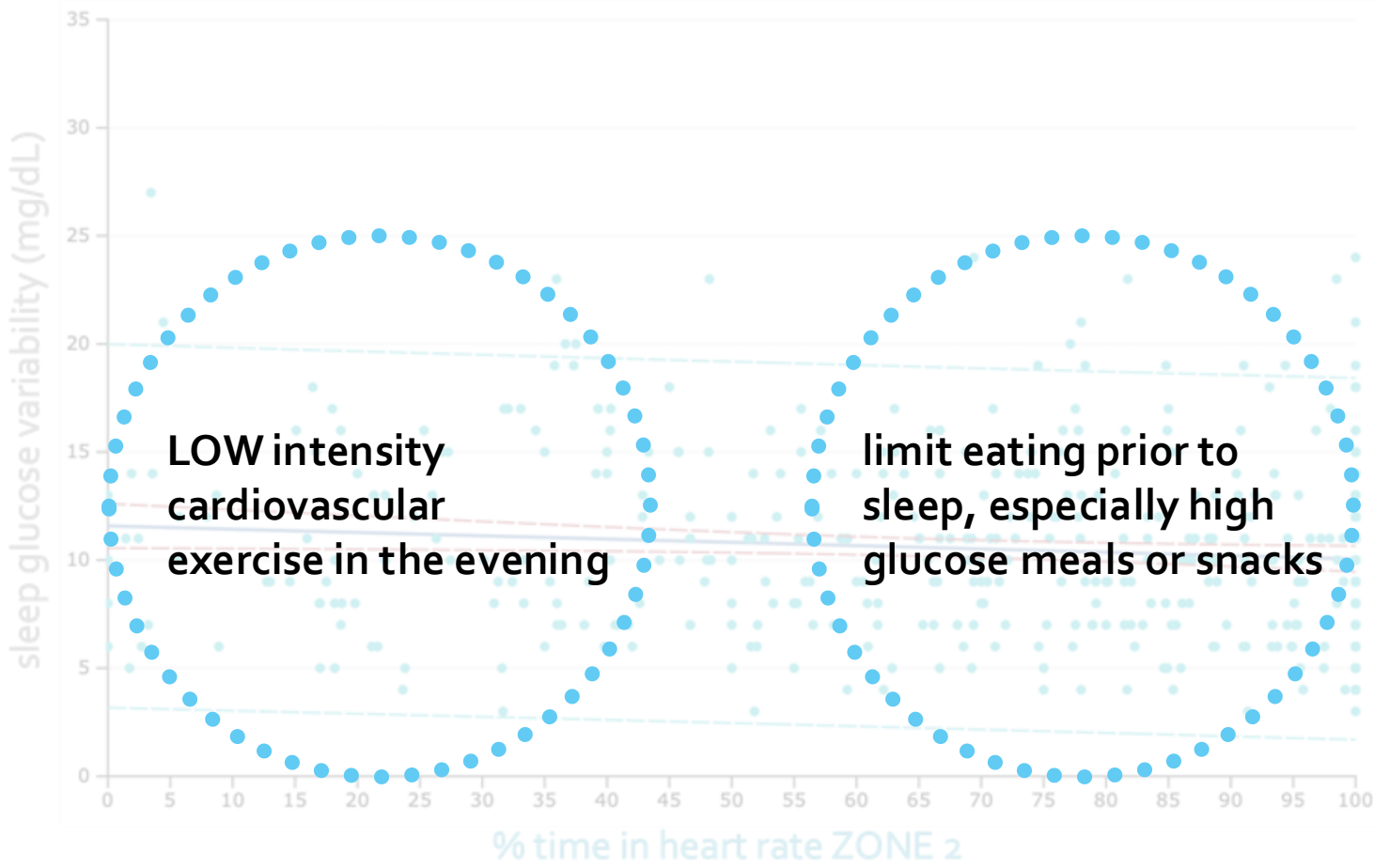
RESULTS _ SLEEP



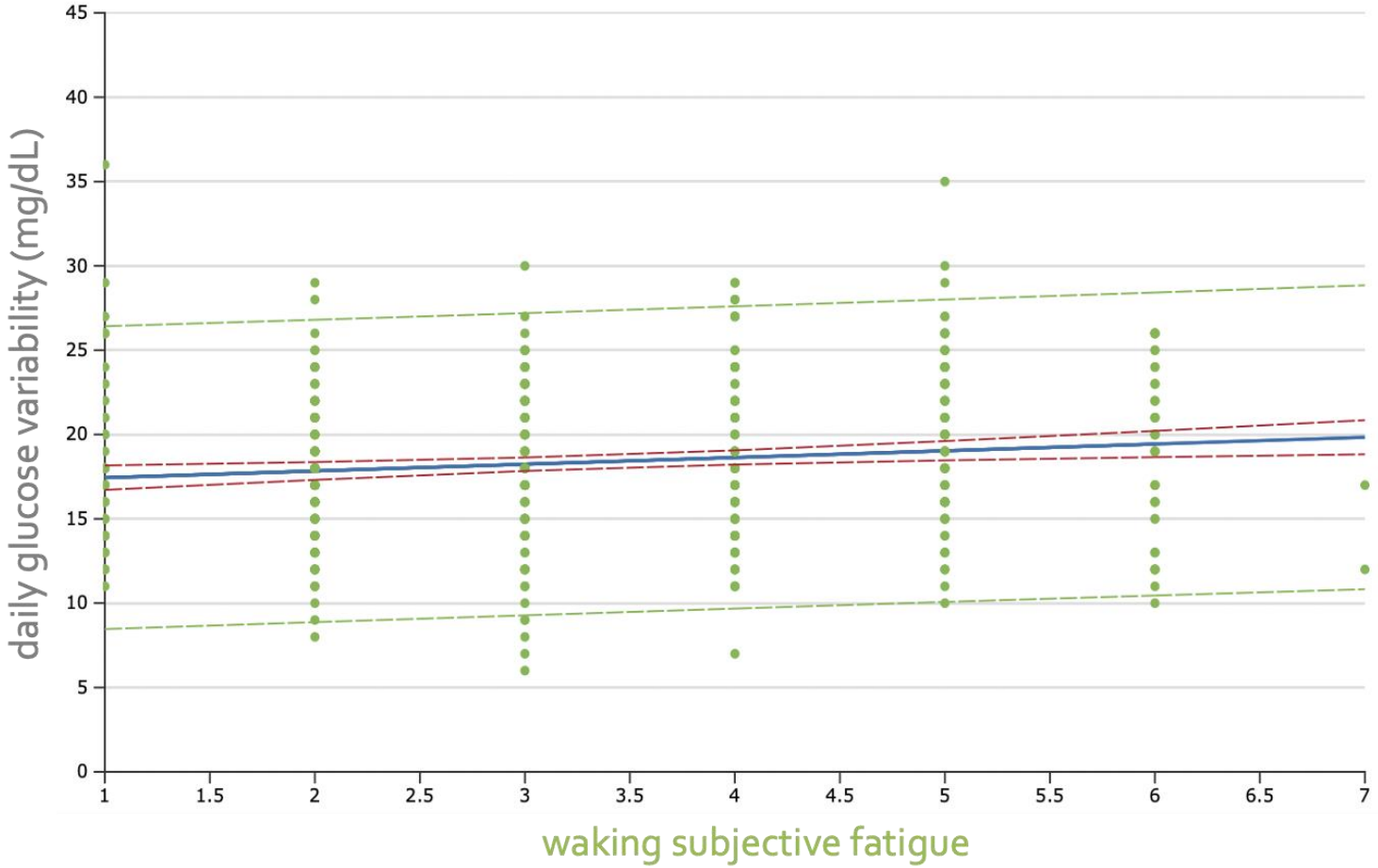
Sleep glucose variability was significantly correlated with %time in heart rate ZONE 2 ($\rho = -0.23$, $p < 0.0001$) as well as the previous day average daily glucose variability ($\rho = -0.17$, $p < 0.0001$).

RESULTS _ SLEEP



Sleep glucose variability was significantly correlated with %time in heart rate ZONE 2 ($\rho = -0.23$, $p < 0.0001$) as well as the previous day average daily glucose variability ($\rho = -0.17$, $p < 0.0001$).

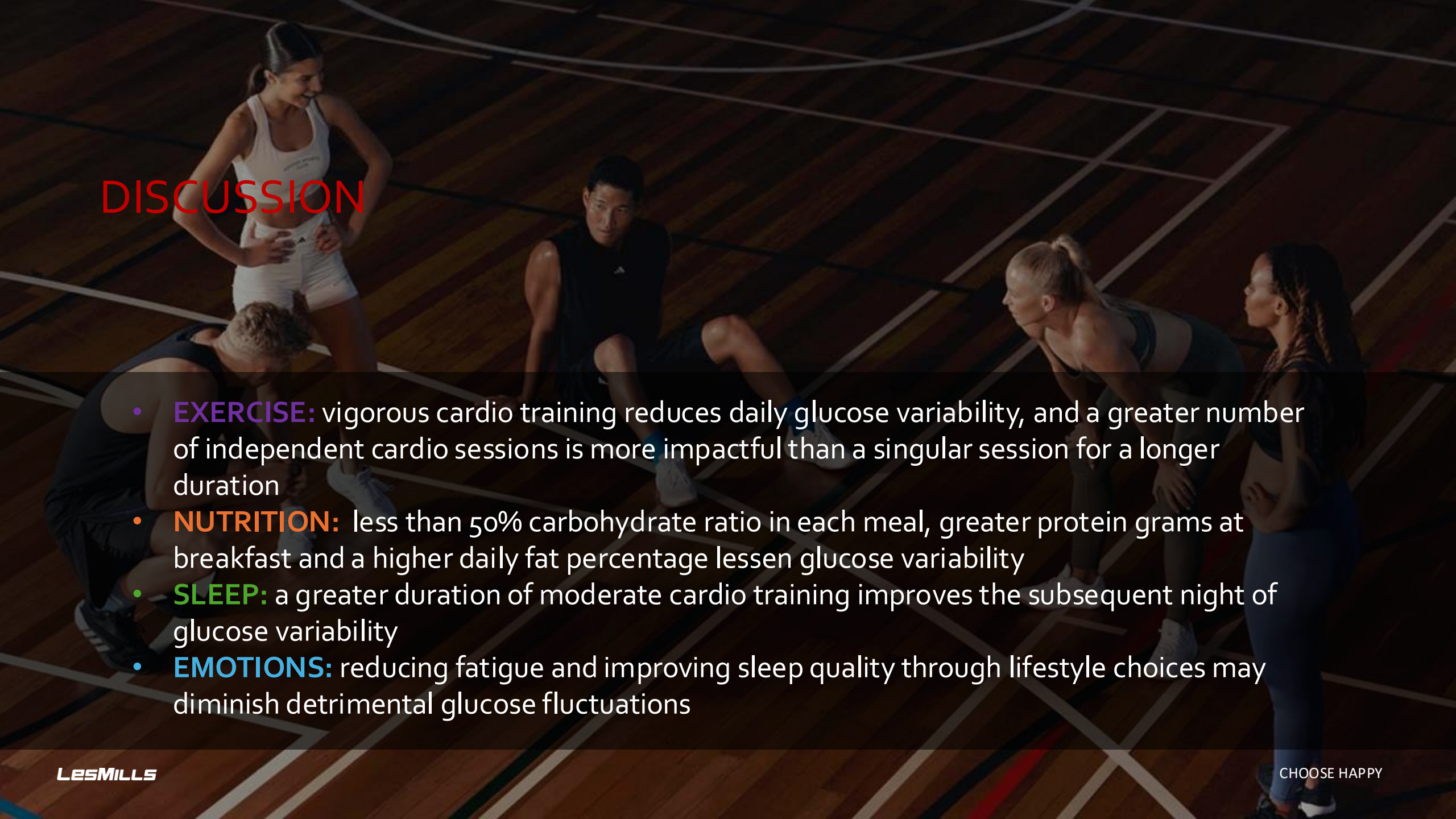
RESULTS _ EMOTIONS



Daily glucose variability (n = 532) was significantly correlated with waking subjective fatigue ($\rho = 0.14$, $p < 0.0001$) as well as waking subjective sleep quality ($\rho = -0.44$, $p < 0.0001$).

RESULTS _ EMOTIONS

Daily glucose variability (n = 532) was significantly correlated with waking subjective fatigue ($\rho = 0.14$, $p < 0.0001$) as well as waking subjective sleep quality ($\rho = -0.44$, $p < 0.0001$).



DISCUSSION

- **EXERCISE:** vigorous cardio training reduces daily glucose variability, and a greater number of independent cardio sessions is more impactful than a singular session for a longer duration
- **NUTRITION:** less than 50% carbohydrate ratio in each meal, greater protein grams at breakfast and a higher daily fat percentage lessen glucose variability
- **SLEEP:** a greater duration of moderate cardio training improves the subsequent night of glucose variability
- **EMOTIONS:** reducing fatigue and improving sleep quality through lifestyle choices may diminish detrimental glucose fluctuations

SUMMARY

Vigorous cardio training (ZONE 4), carbohydrate percentage less than 50%, and reducing fatigue can minimize glucose variability, thereby potentially lowering future disease risk.

JOIN Bryce Hastings and Dr Gillian Hatfield

2024 Medical Fitness Association
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Delivering Clinical Outcomes Via Evidence-Based Group Exercise Programming

Wednesday, November 20th 5:00 - 5:50 pm

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