

# The Hunger Pains: Ghrelin, Weight Loss, and Maintenance

by

**Lynn M. Diener**  
Sciences Department  
Mount Mary College, Milwaukee, WI



## Part I – You Look Fantastic!



**Mallory Messner** Hey Sara, it was great to see you during break! It's been way too long. And by the way, congratulations on the weight loss, you look fantastic. Do you mind if I ask how you did it?

April 5 at 1:32pm [Like](#)



**Sara Finnegan** Mal, it was great to see you too! Thanks for noticing the weight loss, it required a lot of hard work. I started exercising 5 days a week and restricting calories (eating smaller portions mainly).

April 5 at 1:45pm [Like](#)



**Mallory Messner** You'd think I would already have realized that there is no trick when it comes to weight loss, being a biology major and all—sigh—I just hoped maybe you had found some magic solution. Haha.

April 5 at 1:50pm [Like](#)



**Sara Finnegan** I gotta tell you though, I'm having a heck of a time keeping the weight off. It seems like I'm always hungry! You know, they always say that only 5% of people who lose weight ever keep it off long term. I'm hoping to remain in the 5% but right now I'm not so sure. =(

Have you heard about some hormone called ghrelin in any of your biology classes? I've been reading about it in the news lately, I wonder if it has anything to do with my struggles...

April 5 at 1:55pm [Like](#)



**Mallory Messner** Actually I do recall learning something about ghrelin in class. Let me take a look and get back to you. I'll send you an email!

April 5 at 1:57pm [Like](#)

## Questions

1. Craft an email from Mallory to Sara explaining some of the basics of ghrelin. Your email should explain what a hormone is and what kind of hormone ghrelin is. It should also explore ghrelin's effect on growth hormone and metabolism. Feel free to use your textbook and reliable internet sources.
2. What is the effect of growth hormone on metabolism? Pay special attention to its effect on protein, bone, fatty tissue, and carbohydrates.
3. What does anabolic mean? What about catabolic? How would you classify growth hormone?

## Part II – Sleep Is Important



**Mallory Messner** So ghrelin seems like an intriguing possibility, huh? Did you know that it's generally elevated in people after they lose weight? Even a whole year after they lost the weight!

April 5 at 6:03pm [Like](#)



**Sara Finnegan** Yeah, thanks for the email. I can't believe that a chemical like ghrelin can help to increase your appetite. And the fact that it's elevated in people after they lose weight, ugh!

April 5 at 6:09pm [Like](#)



**Mallory Messner** I found some other really interesting studies about ghrelin. How are you sleeping lately?

April 5 at 6:12pm [Like](#)



**Sara Finnegan** I'm a college sophomore, just like you, how do you think I'm sleeping?

April 5 at 6:14pm [Like](#)



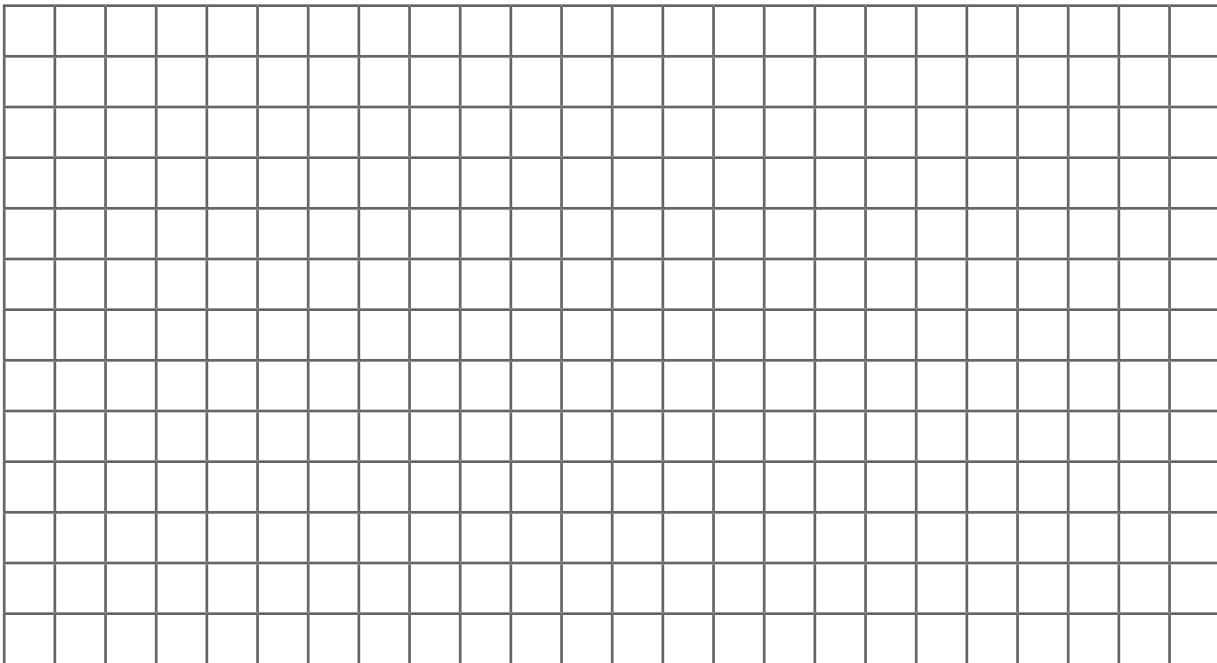
**Mallory Messner** Haha, point taken. Well one study found some correlations with sleep and ghrelin levels. More sleep, less ghrelin! I found their data on the correlation between hours of sleep and BMI interesting as well.

Hours of sleep	Average BMI	Standard error
6.10	32.15	0.70
6.55	31.4	0.25
7.40	31.05	0.25
8.25	31.4	0.30
9.10	31.6	0.50

April 5 at 6:23pm [Like](#)

### Questions

1. Make a line graph of this data using the space below. Don't forget to include error bars using the standard error. Identify and label the dependent and independent variables; this will dictate their placement on your graph.



2. Explain the trend you see in the data you graphed.
3. Using a ruler, show which error bars overlap and don't overlap on the graph above.
4. Without knowing the results of any statistics done on the data, which data point(s) may be significantly different from each other based on the data provided? Which data did you rely on to come to your conclusion?
5. Knowing that less sleep means more ghrelin, what suggestions might you make to Sara if you were Mallory? What is a take-away message for this study?

## Part III – Dessert for Breakfast



**Sara Finnegan** Maybe I need to start prioritizing my sleep just a little bit...

April 5 at 7:01pm [Like](#)



**Mallory Messner** Seriously! Me too... =) Another really fascinating recent study looked at the timing and composition of calories ingested, focusing specifically on breakfast. Are you familiar with those high protein diets?

April 5 at 7:04pm [Like](#)



**Sara Finnegan** Oh yeah, my roommate is trying to lose weight that way.

April 5 at 7:06pm [Like](#)



**Mallory Messner** Well researchers had one group of obese individuals eat a small (calorie-wise), protein enriched breakfast in the morning. The other group ate many more calories high in carbohydrates and enriched in protein. Both ingested the same number of calories over the course of the whole day, the differences were in the timing and quantity of fats, carbs and protein. The amusing part is that the second group of dieters also had dessert with every breakfast. =D

April 5 at 7:10pm [Like](#)



**Sara Finnegan** Seriously??? I'd love to start every morning with dessert. I bet I know who lost weight and who didn't.

April 5 at 7:13pm [Like](#)



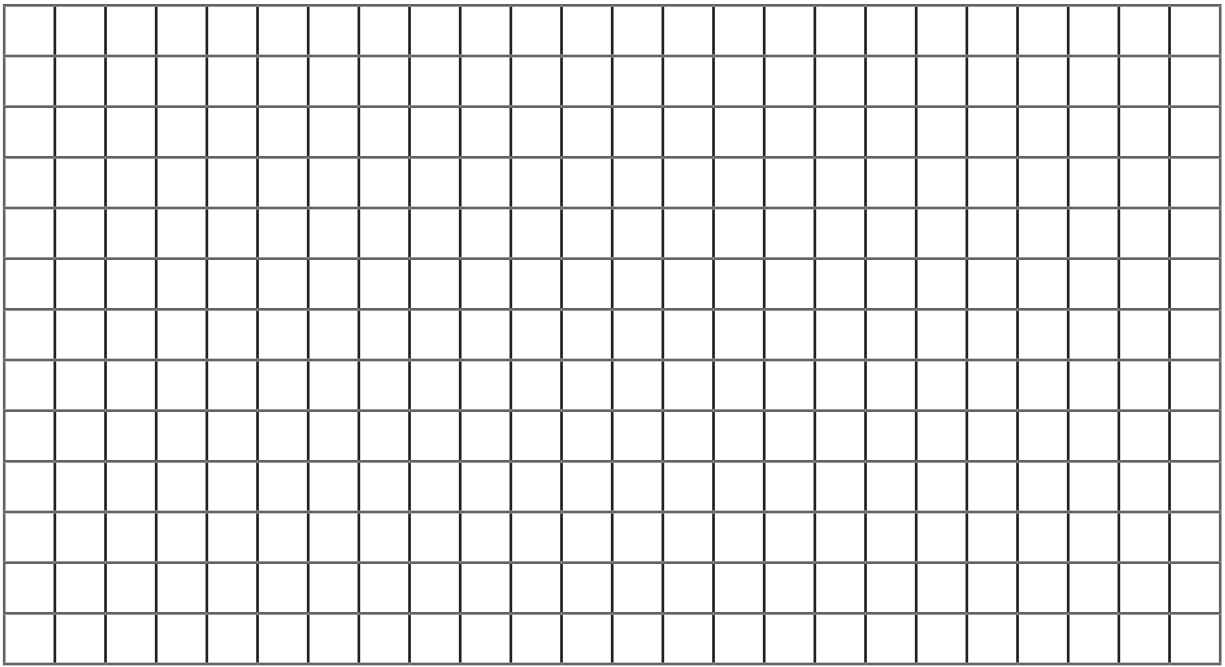
**Mallory Messner** Seriously! And we're talking doughnuts, cake, chocolate bars. You might find the results surprising though. Here, take a look at the weight loss data. They were "dieting" from weeks 0 till 16. Week 16–32 was follow up, when they were trying to maintain their weight loss.

Time (weeks)	Low calorie breakfast average weight (kg)	Dessert for breakfast average weight (kg)
0	89	91
4	85	87
8	82	85
12	77	82
16	75	78
20	78	76
24	81	74
28	84	72
32	87	71

April 5 at 7:21pm [Like](#)

*Questions*

1. Make a line graph of the data above in the space provided below.



- 2. What is the trend the researchers saw? You should focus on which group lost more weight and had more successful weight loss maintenance.
- 3. Do you think Sara is surprised by the results?
- 4. Does ghrelin make you hungry or leave you feeling satisfied?
- 5. Knowing what you do about ghrelin, in which case do you think the researchers saw a greater decrease in ghrelin after eating?

## Part IV – Easier Weight Loss?



**Sara Finnegan** Mal, that's a seriously cool study.  
30 minutes ago [Like](#)



**Mallory Messner** I know! And they saw all sorts of other things change in the dessert group. Levels of ghrelin decreased after meals, feelings of satiety (satisfaction) increased, and cravings decreased.  
28 minutes ago [Like](#)



**Sara Finnegan** Haha, maybe I'll try the dessert for breakfast diet to combat my difficulty in maintaining.  
25 minutes ago [Like](#)



**Mallory Messner** Well, it's only one study. I'm not sure I'd change your whole diet outlook based on one study, but the results are definitely compelling. There really is a lot left to learn about ghrelin and weight loss in general.  
20 minutes ago [Like](#)

### Questions

1. Speculate about why the dessert for breakfast group saw decreases in cravings and increases in satiety.
2. Would you change your diet based on the study? What kind of evidence is necessary to make you “believe” a research study?
3. If you were doing research in this area, what would be your next step?



*Credit:* Licensed image in title block © Konstantin Andy #1627988 | Fotolia. Case copyright held by the [National Center for Case Study Teaching in Science](#), University at Buffalo, State University of New York. Originally published September 17, 2012. Please see our [usage guidelines](#), which outline our policy concerning permissible reproduction of this work.