THE EFFECTS OF DIFFERENT END ANCHORS ON SATIETY SCALES

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ABSTRACT

The purpose of the test was to determine what satiety scale, the Satiety Labeled Intensity Magnitude (SLIM) scale or the General Labeled Magnitude Scale (GLMS), was more capable of discriminating among hunger and fullness. Also to observe the effect of varying endpoints on the way panelists rate their hunger/fullness. Forty volunteers came in three times and ate one snack of differing caloric value each time. Each volunteer rated their hunger and fullness before and after each snack. Twenty volunteers used the SLIM scale and the other twenty used the GLMS scale. Neither scale was found to be superior. The GLMS yielded much more condensed data due to its broad end anchor. An additional observation was an indirect relationship between hunger and fullness. After a panelist consumed a product, their fullness changed significantly while their hunger was relatively unaffected.

SCALES
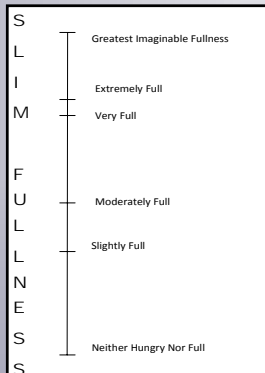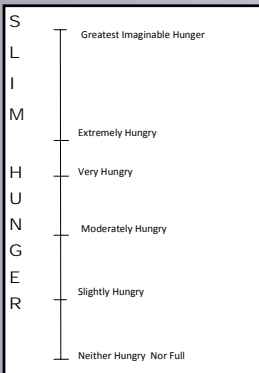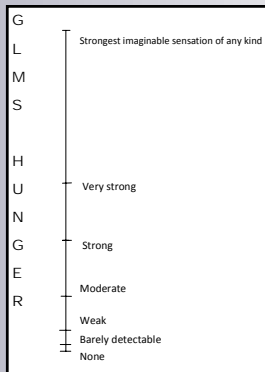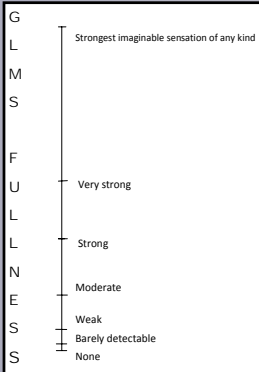
OBJECTIVES

We examined two commonly used scales, the SLIM scale and the GLMS, and had two major goals:

1.) Determining which scale was most capable of discriminating amongst hunger and satiety levels.
2.) Determining how the different end anchors affect people's use of the scale.

MATERIALS AND METHODS

100 Calorie Snack Pack   *3 chocolate chip cookies*   *homemade chocolate chip cookie bar*
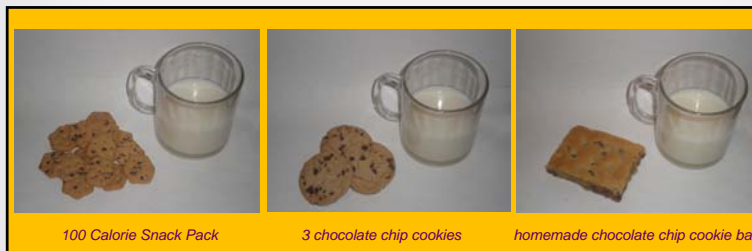
Subjects:
Forty volunteers were recruited though the University of Minnesota Sensory Center email list. Most participants were graduate or undergraduate students. Panelists were asked to come in on three separate occasions to consume three different products, one product each session. After successful completion of the study panelists were compensated five dollars for their participation.

Products:
Each session the panelists consumed a different snack. The three products provided were a variety of chocolate chip snacks ranging in caloric content from 100 calories to 570 calories.

- 1 packet of Chips Ahoy™ 100 Calorie Snack Pack (100 calories)
- 3 Keebler™ chocolate chip cookies (255 calories)
- 1 3in. x 2in. homemade chocolate chip cookie bar (570 calories)

Experimental Procedure:
Twenty panelists rated their hunger and fullness on the SLIM scale while the other twenty rated their hunger and fullness on the GLMS. During each session, panelists received one of the three products in randomized order along with a set of four scales. They were given a set of directions instructing them to:

- Rate your **HUNGER** on the first scales labeled Hunger Before Consumption.
- Rate your **FULLNESS** on the scale labeled Fullness Before Consumption.
- CONSUME the sample.
- Rate your **FULLNESS** on the scale labeled Fullness After Consumption.
- Rate your **HUNGER** on the scale labeled Hunger After Consumption.

Data Analysis:
The hunger/fullness indicated by the panelists for each trial was quantified numerically by measuring the distance from the bottom of the scale to the panelist's mark and then normalized using a maximum value of 100. The normalized data were submitted to computational analysis. Excel was used to organize data by product, scale and panelist number while Statistix® was used to give an analysis of variance. Analyses of variance were conducted separately for each of the 4 scales. The rating was the dependent variable; calorie level and subject were predictors.

RESULTS

1.) What satiety scale was most capable of discriminating amongst hunger and fullness?
To determine which scale was most effective, F-values determined from the analysis of variance were examined. The F-values represent the scales' ability to discriminate among the different calorie levels. In order to declare one scale more effective than the other, it is necessary for all the F-values to be statistically significant, and approximately four times greater than those of the opposing scale. As shown in Table 1, these criteria are not fulfilled. Based on the standards for this study neither scale was found to be statistically superior.

Table 1. F-values calculated for the comparison of the 3 calorie levels for each scale

scale	*Hunger Difference	*Fullness Difference	Hunger After	Fullness After
GLMS	0.5	3.6	2.5	3.5
SLIM	0.2	3.1	2.7	2

*Difference was determined by subtracting the initial value of hunger/fullness from the final value.

2.) How did different end anchors affect each scale?
The GLMS ha very broad end anchors defined as "Greatest Imaginable Feeling of Any Kind". Data replicated previously published observations showing that broad end anchors result in compressed data. Table 2 shows that the hunger/fullness ratings of the twenty panelists were consistently smaller for the GLMS. This indicates when a scale has a more extreme end anchor, panelists are less likely to place a rating near the end of that scale.

Table 2. Mean rating of twenty panelists after consuming each product, values based on a 100 unit scale

Scale	Product	Hunger Before	Fullness Before	Fullness After	Hunger After
GLMS	100 cal. Pack	20	16	24	12
SLIM Scale	100 cal. Pack	25	33	47	11
GLMS	3 cookies	20	14	26	10
SLIM Scale	3 cookies	33	24	43	18
GLMS	Homemade bar	18	16	33	7
SLIM Scale	Homemade bar	30	29	53	14

3.) The terms "hunger" and "fullness" are generally accepted to be inversely related to one another. As fullness increases the level of hunger is thought to decrease a comparable amount. However, our data show otherwise. Consuming the snacks produced larger changes in fullness ratings than in hunger ratings (Table 3). This indicates the two terms are somewhat independent of one another.

Table 3. F-values illustrating how both hunger and fullness were affected

	GLMS	SLIM
Hunger Difference	0.5	0.2
Fullness Difference	3.6	3.0