

# The Effect of a Traffic Light Labeling Intervention on Amount of Food Served in a College Dining Hall

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## Abstract

College students may not use the nutrition facts label suggesting changes to the label, such as the Traffic Light Label, are needed to increase user friendliness. This study utilized a repeated measures observational design with a control and an intervention period each lasting 28 days at a Midwestern midsize, private university. Following the control period (nutrition facts panels), each food was labeled with a single color (red, yellow, or green) based upon its nutritional quality. Number of servings per day by color (dependent variable) was combined for both lunch and dinner during the control and intervention period. To compare the amount served per day of each color during control and intervention, a one-way analysis of variance (ANOVA) was used. Bonferroni post hoc tests were utilized for multiple comparisons. The one-way ANOVA for color and time point was significant ( $F(5, 150) = 4.75, p < 0.001$ ). Yellow-labeled foods during the intervention ( $M = 341.89, SD = 275.86$ ) was significantly lower than red-labeled foods during control ( $M = 654.56, SD = 286.40, p < 0.0001$ ) and intervention ( $M = 604.91, SD = 295.84, p = .008$ ). However, there were no other significant differences between colors and time points. These results suggest that traffic light labels may not be more effective than nutrition facts panels in college dining halls to improve food choices. Specifically, there was no significant difference in number of servings per day in red- and/or green-labeled foods between control and intervention. Furthermore, servings per day of red-labeled foods continued to be significantly greater than yellow-labeled foods during the intervention. Because students may not use nutrition labels to make food choices, college dining halls should consider reformulating recipes to improve the healthfulness of options.

SNEB Nutrition Educator Competencies: 1.4, 7.1, 8.10

## Introduction & Objective

Dietary quality may decrease between adolescence and adulthood when young adults move away to college (Forshee & Storey, 2006). Buffet-style dining halls may lead students to overeat and plate themselves large serving sizes, making it difficult to make healthful decisions in a dining hall environment (Peterson et al., 2010; Rolls, 1986; Rolls et al., 2002). Although the use of nutrition labels promotes healthier diet choices, many college students do not take the time to examine these labels (Campos et al., 2011; Graham & Laska, 2012). A color-coding system is one promising alteration to increase user friendliness, and therefore, label use. The labeling system used to inspire the present study was created by the Food Standards Agency (Food Standards Agency, 2007). This system assigns traffic light colors to food items based on their nutritional contents.

The objective of this study was to examine the effect of traffic light labels on the amount of food served in a university dining hall in comparison to the control nutrition facts panels.

## Methods

This study was approved by the Bradley University Committee on the Use of Human Subjects in Research.

### Design

- Repeated measures observational design with a control (nutrition facts panel) and an intervention period (traffic light labels) each lasting 28 days at a Midwestern midsize, private university dining hall.
- Each item served on the main food line in the dining hall was assigned either a red, yellow, or green color depending on its nutritional value (Table 1).

### Data Collection

- Main variable of interest was servings taken for each red, yellow, and green item in the main line (collected by dining services at the university).
- To summarize characteristics of dining hall patrons, participants ages 18 and older were recruited to take a survey at 2 time points during control and intervention.

### Data Analysis

- Number of servings of all green, yellow, and red food items served between lunch and dinner were totaled for each day.
- One-way ANOVA (SPSS 21.0) was used to compare the amount served of each color during control and intervention.
- Bonferroni post hoc tests were utilized for multiple comparisons (Table 2).
- To compare participant characteristics and demographics between control and intervention, chi-square test and t-test were performed (Table 3).

## Results

**Table 1.** Traffic Light Label Nutritional Criteria

Positive Criteria	Negative Criteria
Source of fruit or fruit juice (greater than 80% juice)	Saturated fat content greater than 5g
Source of vegetables	Added sugar: has a total sugar content of more than 8g, contains added sugar
Source of whole grains with a carbohydrate-fiber ratio less than 10	High sugar: has a sugar content greater than 20g
Lean protein source: must have less than 5g saturated fat and 12g or more of protein	High sodium: has a sodium content greater than 600mg
Low-fat dairy source: at least 200mg calcium and less than 2g saturated fat	Source of red meat
	Source of refined starch with a carbohydrate-fiber ratio greater than 10
Net Positive Score = Green label, Neutral Score = Yellow label, Net Negative Score = Red label	

**Table 2.** Mean Differences of Number of Servings between Control and Intervention by Color with Post Hoc Comparisons using Bonferroni

	M	SD	1	2	3	4	5
1. Control Red	654.56	286.40	--	49.65	194.60	312.68*	182.52
2. Intervention Red	604.91	295.84	-49.65	--	144.95	263.03*	132.88
3. Control Yellow	459.96	295.34	-194.60	-144.95	--	118.08	-12.07
4. Intervention Yellow	341.89	274.86	-312.68*	-263.03*	-118.08	--	-130.15
5. Control Green	472.04	195.54	-182.52	-132.88	12.07	130.15	--
6. Intervention Green	463.35	192.38	-191.21	-141.57	3.38	121.46	-8.69

**Table 3.** Summary & Comparison of Characteristics of Dining Hall Patrons During Control & Intervention

Characteristic	Control		Intervention		p-value
	M	SD	M	SD	
Age	19.32	1.26	19.27	1.10	0.74
	N(%)				
	Control	Intervention	Total		
Year in School					.40
Freshman	71(50)	63(53)	134(51)		
Sophomore	40(28)	41(34)	81(31)		
Junior	18(13)	12(10)	30(12)		
Senior	9(6)	3(3)	12(5)		
Graduate Student	3(2)	1(1)	4(2)		
Gender					.40
Male	83(59)	64(53)	147(56)		
Female	58(41)	55(46)	113(43)		
Other	0(0)	1(1)	1(0.4)		
Race					.16
Asian or Asian American	7(5)	10(8)	17(7)		
Black or African American	13(9)	16(13)	29(11)		
Hispanic or Latino/a/x	16(11)	10(8)	26(10)		
White or Caucasian	96(68)	72(60)	168(64)		
Multiracial	9(6)	12(10)	21(8)		
Diet Status					.53
Dieter	59(42)	47(39)	106(41)		
Non-Dieter	81(58)	72(61)	153(59)		
College Nutrition Course					.16
Yes	8(6)	11(9)	19(7)		
No	133(94)	107(89)	240(92)		
I don't know	0(0)	2(2)	2(1)		
Dining Hall Use					.30
1-2 times per week	17(13)	18(16)	35(14)		
3-4 times per week	29(21)	30(26)	59(23)		
5-6 times per week	30(22)	31(27)	61(24)		
7-8 times per week	20(15)	18(16)	38(15)		
9-10 times per week	18(13)	9(8)	27(11)		
More than 10 times per week	22(16)	10(9)	32(13)		
Nutrition Panel Use					.83
Never	46(34)	33(28)	79(31)		
Rarely	34(25)	36(31)	70(28)		
Sometimes	35(26)	30(26)	65(26)		
Often	12(9)	9(8)	21(8)		
Always	9(7)	8(7)	17(7)		
Website Use					.03
Never	57(42)	42(36)	99(39)		
Rarely	19(14)	31(27)	50(20)		
Sometimes	23(17)	17(15)	40(16)		
Often	26(19)	11(9)	37(15)		
Always	12(9)	15(13)	27(11)		

M, mean

SD, Standard Deviation

\*Not all frequencies add up to 261 due to skipped questions

## Discussion & Conclusions

The results of this study suggest that the traffic light labels were not effective for this population. Because the intervention period of this study overlapped with the university's midterm exams, students' food choices may have been driven by stress. College students report struggling to maintain a healthy diet more during exam periods than at other points in the school year (Michels et al., 2020). Furthermore, traffic light labels may also be less effective for the college age population. Instead, taste has been identified as the main factor that influences young adult food purchases (Roy & Allassadi, 2020; Hebden et al., 2015). If the food selection of young adults is mostly guided by taste instead of nutrition, they may not have noticed or utilized the traffic light labels at all. University dining services should consider reformulating the recipes of red labeled items by reducing their contents of sodium and saturated fat for example. This would increase the number of yellow and green labeled items available in university dining halls.

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Please contact the author for reference list.