The Behavioral Effect of Nutritional Awareness for College Students in the Dining Hall: Label Reading and Food Choice at the Dessert Station

Abstract

University dining programs are poised to educate college students on the benefits of health food choices by introducing programming in the dining halls that goes beyond the food program and includes more than just nutrition labeling. This pilot study looks at college students’ food choice under simulated conditions at a dessert station of an all-you-care-to-eat dining hall facility. Two different treatments are tested to see whether awareness of individual health goals influences food choice. Though food choice is mostly motivated by taste and convenience [4], does the presence of questions about health goals alter those choices of desserts? In addition, does the awareness of health lead to usage of food nutrition labels? I hypothesize that students who reflect upon their health goals at the point of food selection at a dessert station will choose a dessert that is healthier in nature. Also, it is my hypothesis that there will be an increase in instances of label reading once participants are asked to reflect on their health goals.

Introduction

University communities have opportunities and responsibilities across campus to educate students, and not just in classrooms. The education that staff members and administrators can present in college and university environments can happen in every interaction a student has with the institution during their time at the university. One such place to educate students is in the dining halls on campus through food labeling and raising awareness about health goals as they relate to food. Campus food program administrators and the staff at the university that work with the staff in the cafeteria must include an educational layer to the day-to-day happenings in the dining hall. There are many aspects of a food program to balance- meals, variety, friendly service, inventory, budgets- but educating the students in
the dining environment is vital to the health and well-being of students while on campus, and
the knowledge and practice of health behaviors affect students for their adult lives.

This study aims to expand on the existing published information about food labeling and
its impact on food choice. During the formative, developmental years of college where students
are making independent choices, it would seem that self-reflection upon health goals related to
food choice at the point of service would affect that food choice. So while access to information
is one way we can prepare students for decision making, this study looks at food choice and
label use as it relates to students’ stated health goals.

Literature Review

Food Labels and the Impact on Food Choice

The Nutrition Labeling and Education Act, NLEA, was passed in the United States in
1990. The legislation required labeling for packaged foods and recommended labeling in other
situations. In 1997, Congress tightened the requirements and in 2000, they were expanded
again with dietary guidelines emphasizing that physical activity is important as well as
monitoring food intake [25]. Today’s college students have had nutritional labeling on foods for
almost their whole lives. Today’s traditionally aged college student, born between 1988 and
1992, has only known food packaging with nutritional labels.

Along with nutrition labels on packaged foods, the ongoing communication around
preventing or decreasing obesity has been a consistent message to students for as long as they
have been alive. Students are aware of health and nutrition issues, but the labeling
requirement still do not extend to restaurants and other food establishments such as dining hall
facilities. The lack of labeling encourages the idea that the dining halls are responsible for the
typical weight gain of first year students, of the “freshman 15” as it has been coined. “College
students enrolled in university dining plans are exposed daily to a food environment
characterized by foods high in energy, fats, added sugars, and low in nutrient density” [12 p.
1409]. Because of such negative stereotypes about college foods, many colleges and
universities elect to post nutritional information both at the point of selection and on websites.
This allows students to have access to nutritional information so that they can make decisions that meet their health goals.

This access to information, nutritional labeling, does help people understand their food intake, though researchers have come to mixed conclusions whether labeling impacts actual food choice. Several studies conclude that it does impact food choice [2], [4], [8], and [9]. Because of the 20 years of focus on the rise of obesity and nutrition labeling, “…consumer interests in health and diet issues have increased and consequently nutrition labeling has received considerable attention” [1 p. 2]. People are aware of the benefits and they have a greater understanding of how the knowledge impacts their food choices. Whether or not labeling information helps in actual food choice and consumption leaves more room to question if labeling has an impact on health. Several other studies conclude that it does not influence food choice [1], [11], and [12]. “Despite the fact that food labels may influence the perceived healthiness of foods by the consumers, this is unlikely to have a major impact on food choice and consumption. Thus, there is little reason to assume that signpost [red, yellow, and green traffic light-like labels] food labels will be an effective instrument in the prevention of overweight and diet related diseases” [4 p. 10].

The studies above have mixed reactions as to whether food labeling on packaged foods translates into consumer action. As the research builds and expands into other areas of food labeling, colleges and universities are already taking the lead in labeling foods in food courts and dining halls. In one study at Oregon State University, Frasieur …“explore[s] the various impacts of posting point of sale nutrition information (calories and fat grams) on venue and item sales as well as how food choice motives (FCM), nutrition awareness and purchase choice motives influence choice among subjects in a college dormitory food court” [9 p. 2]. While OSU’s food court is more like a fast food restaurant and has significant differences from a dining commons, Frasieur connects labeling to food choice in her study. Building off her research, I move my experiment into the dining commons and add a health related component to the conditions. Overall, the literature states that there are results for and against nutritional labeling having an impact on food choice in the general population and among college-aged students.
Food Labeling Document Type, Placement, and Wording

What is said, where it is said, and how it is said are important considerations in labeling food. In addition to the impact that labeling has on food choice, it is important for the documentation to be easily understood. The Food and Drug Administration has set forth guidelines on their website for formatting the layout. The site shows the standard vertical format, tabular display, simplified tabular format, linear display, shortened linear display, and aggregate display labels [26]. Shown in Image 1 is an example of the standard vertical format:

![Nutrition Facts table](http://www.bestapples.com/healthy/images/nutritionfacts.jpg)

What the label looks like and where it is placed matters. Though the FDA has guidelines for food packaging, labeling in other areas still varies. Because the labels on food packages have become conventional, this standard method of labeling, both in information presented and in design, should accompany any other type of labeling, such as other types tested in the literature- traffic light types of indicators, healthy check marks, and graphic indicators such as a heart or a thumbs-up.
Nutritional labels come in different formats. The format that consistently produces the most positive dietary benefits is the percentage declaration of the various nutrient amounts based on the daily values for each nutrient. Consumers tend to perform poorly with manipulation of quantitative nutrient information. Furthermore, the use of bold text, colored nutrition panels, and whole numbers instead of decimals and calories instead of joules… are preferred by the majority of [British] consumers [7 p. 12].

In addition to the design, the placement emphasizes the rhetorical effect or lessens it.

Borgmeier and Westenhoefer say that front of package labeling gives the message more rhetorical prominence whereas the back gives it less importance, though there is limited research analyzing label placements and formats. “However, the effectiveness of such labeling depends on the organization and presentation of the information, implying the importance of regulatory issues [1 p. 2]. Slater, Buller, Waters, Archibeque, and LeBlanc agree that nutrition information is too seldom evaluated [23]. For maximum rhetorical impact in my study, I’d like to use the standard packaging label because it is recognizable with its design and its format. With the image and the text working in concert, both the design and format contribute to instant recognition. With the two elements working together, this supports the dual-coding theory developed by Pavio [21]; however, the labeling that is in the dining commons differs from the standard format seen in Image 1. To mimic the dining commons as closely as possible, I will use the format already currently in use.

**College Students and Food**

The literature shows that obesity is up 200% for 19-24 year olds in the twenty years from 1980-2000 [3 p. 91]. Misra adds that although there are several studies on children and adults, few are focused on adolescents and young adults and that often their nutrition knowledge is limited [17]. Away from their home environments, college students are making independent eating decisions. Conklin writes that this independent decision-making around
food is a time for college students to figure things out for themselves and may not take kindly to overt instruction about how to eat [4]. College-aged students are a difficult population to educate because young adults do not want to be told anything, least of all that something is good for them. Students need to develop their decision-making skills through developmental stages that college students experience as they gain independence. Additionally, college students are an important risk group to target for education because the decisions they make, as they gain their independence, set their habits for years to come [3], [12]. These poor habits have dire consequences and staff members at colleges and universities who interact daily with students in the dining halls should take steps to educate students. “Health-risk behaviors such as eating poorly, being physically inactive, and smoking contribute to the leading causes of morbidity and mortality in the United States and are often established during adolescence and young adulthood...The transition from adolescence to adulthood may be an opportune time for intervening to prevent future chronic disease” [13]. While the labeling of foods at points of sale or service have be tested on college campuses, the studies have not delved much into student food choice once labels are on foods. Maybe point of selection or sale nutritional information labeling is not enough for students to make better decisions as compared to a more personal approach of asking students to evaluate their health goals just before the selection of a dessert.

Though Conklin, Lambert, and Cranage suggest that “Supplying nutrient information... at POS [Point of Sale] in a college dining commons might be a way to facilitate student’s choice of food for weight maintenance and health” [4 p. 91], there needs to be more than just access to information. It may not be enough to present the nutrition information to students in the hopes that they will read the information, understand the information, and act with the knowledge that the information presents them. Slater, Buller, Waters, Archibeque and LeBlanc ran an experiment in 2003 that looked at the delivery of nutrition education information by comparing various written approaches to presenting the information: testimonial, conversational, and didactic. They found that information written in a conversational form has more of an impact on behavioral change than traditional didactic and narrative approaches [23]. Would participants be more likely to change their behavior by taking this idea of a conversational approach and asking the participants to, in a sense, have that conversation with themselves
rather than attempting to identify with other people? The self-examination of health goals at the point of selection may show that when participants express attitudes and motivations in the form of health goals, they may make different food choices. In Borgmeier & Westenhoefer’s article, they recommend the further study of the intersection of food labeling, food choice, and attitudinal/motivational factors:

“We also did not include motivational or attitudinal variables in our study. Future studies should examine whether subjects with different attitudes and/or motivations differ in their understanding of and profit from the use of different food labels. In addition, systematically examining, how other factors, particularly attitudinal and motivational variables that influence food choice, may be changed in order to achieve healthier food choices in different target population groups, may yield valuable information” [1, p. 10].

In my experiment, I look at the attitudes surrounding college students’ health goals because while students are able to articulate their goals, they do not necessarily know how to reach them. Lowry reports from a 1995 study, called the National College Health Risk Behavior Survey, that 35% of students are overweight or obese and 465 of the students surveyed were trying to lose weight [14]. We need to connect health goals with nutritional information at the point of selection so students can evaluate their choices. Even with adults information alone is not enough. People need to know how to read the information and make sense of it when they are making decisions about food choice, food purchases, and food consumption [2]. Conklin says that food and nutrition professionals have the opportunity to influence college students’ decisions [4]. So do the staff members who act as contract administrators for out-sourced food programs. Contract managers can set goals with food professionals and intentionally educate students on food choice as it relates to their health goals.

**Food Choice Motivation**

Balancing the food needs of many diverse people with different tastes and nutritional motivations is not easy, especially when “…college students are motivated by taste and convenience” [5 p. 91]. When negotiating a vending contract or planning menus for campus, providers want to make the foods enjoyable, convenient, and cost-efficient. If food professionals can understand the motivation for food choices and balance that with the
responsibility to educate students about nutrition behavior, then food professionals can provide delicious food choices that span the range of healthiness [18]. To maintain a focus on education as well as all of the other components of a food program is difficult as few studies have examined the use of food choice motives among college students and if those motives are modified by the presence of nutrition information (menu labeling). [9 p. 21]. College students are in a vulnerable place as they assert their independence in college. Age and levels of education that students may or may not have received at home or high school environments limit their experiences with food choice. “Each time they choose a food, people bring their past food choices, events, and experiences to the table” [6 p. 121]. This sum of experiences is more than social cognitive theory; it is more than environmental interactions. It is both, plus a view of choices over time. The current theoretical body of literature around food motivation and food choice looks at these elements in specific situations and not over the course of a lifetime [6]. Those that have studied food choice and motivation do so for specific instances in time. “Food choice motives have been explored and show motives including: sensory appeal or taste, health, convenience or time, cost or price, mood or [social] context (Steptoe, Pollard & Wardle, 1995; Glanz, Basil, Maibach, Goldberg, & Snyder, 1998; Pliner, Bell, Hirsch & Kinchla, 2006)” [9 p. 21]. As noted above, taste most consistently ranks as the highest motive for food choice. Foods at a the simulated dessert station in my study have the emotional pull of comfort foods on one end with sweet, high calorie foods alongside the choices of significantly lower calorie items such as apples or jello. In my study, students are asked to choose from these significantly different options and though taste should be the biggest factor, I hypothesize that given the opportunity to reflect on health goals, students will choose a lower-calorie option, though their motives at the time of the selection of the dessert may conflict. Trying to impact food choice at a dessert station is made even harder by the habits that adolescents have formed: “…30% of the daily calories that American adolescents consume come from foods of modest nutritional value, with sweeteners and desserts accounting for nearly 25% of this amount.) [4 p. 91]. Also, research has show that habitual behaviors motivate choice: “…it has been shown that habit is more important than attitude in influencing behavioral intention” 31 [22] and that “many people frequently find themselves acting impulsively and in ways that do not necessarily
correspond to their declared evaluations and goals” [10 p. 398]. However, college students are at the point in their lives where these habits can be manipulated as they are developing their independence. By raising their awareness level about their health goals, a new motive for food choice is introduced at the point of food selection. Chunhong sums up the difficulty is assessing motivation and food choice: “Food consumption patterns of human beings reflect complex interrelations and interactions among the individual, the culture and the society in which people live” [3 p. 748].

Method

Selection of Subjects

This pilot study both includes and moves beyond the nutritional labeling of food by exploring the impact of asking college students, in a simulated dining commons, questions about their health goals at the point of selection at a dessert station. The primary objective of this pilot study is to determine if reflection about or definition of health goals changes behavior in one of two ways: do the participants make a different food choice after they expressed their health goals before selecting a dessert? Secondly, is there an observed difference in how the participants use the nutritional information posted point of selection at the dessert station when asked about their health goals versus not? The hypothesis is that students who reflect upon their health goals at the point of food selection at a dessert station will choose a dessert that is healthier in nature. Also, it is my hypothesis that there will be an increase in label reading once students are asked to reflect on their health goals.

This experiment is a within-subjects design with a simulated dining commons environment on the campus of a small, private, technical university in an urban location in the Midwest. Students selected are volunteers from the 14-meal meal plan. This is the most popular meal plan on campus and allows students to eat 14 meals in the dining hall per week. Participants are screened for the study by asking if they eat desserts. Those that sometimes, often, or always eat desserts are eligible to participate. Those that answer rarely or never are not asked to participate. The second criterion for participation is that the student must be on a
meal plan in the dining hall, as mentioned. Lastly, students need to be available on the same day and time two times within a month to visit the replicated dessert station twice.

The student sample used would consist of traditionally aged undergraduate students, 18-22 years of age. The population in the study would likely be more heavily male as the ratio of men to women is 7:1 on campus. Students would need to be on a meal plan in the dining commons and should identify themselves as dessert eaters sometimes, often, or always. Those that rarely or never eat desserts would be excluded from the study as would those not on a meal plan.

**Procedure**

The experimental conditions are set up to mimic the dining hall so that conditions can be as controlled as possible. All elements are kept constant with the exception of the independent variable, the health goals questionnaire. The dependent variables being measured are food choice, use of the nutritional labeling, and the time it took to make decisions. For the experiment, the conditions are outlined as in Table 1.

**Table 1: Experimental Conditions Overview**

<table>
<thead>
<tr>
<th>Condition One: No health goals questionnaire</th>
<th>Condition Two: Health goals questionnaire</th>
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<tbody>
<tr>
<td>1. Simulate the dessert setup in the dining commons</td>
<td>1. Simulate the dessert setup in the dining commons</td>
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<tr>
<td>2. Introduce the team and the experiment</td>
<td>2. Introduce the team and the experiment</td>
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<td>3. Give the participant instructions</td>
<td>3. Give the participant instructions</td>
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<tr>
<td>4. Present participants with a scenario that frames their state of mind</td>
<td>4. Request that the participant fill out a short questionnaire about their health goals</td>
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<tr>
<td>5. Ask the participant to choose a dessert</td>
<td>5. Present participants with scenario that frames their state of mind</td>
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<tr>
<td>6. Time and observe the selection process</td>
<td>6. Ask the participant to choose a dessert</td>
</tr>
<tr>
<td></td>
<td>7. Time and observe the selection process</td>
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</table>

Once eligibility is determined, participants are invited to the lab setting where the mock-up of the dessert station is and they are introduced to the team facilitating the experiment. There are three team members to the research team: a leader, a timekeeper, and an observer for the experiment. The leader reads the instructions for the participant and answers any
questions during the experiment. The timekeeper times the participant from the beginning to
the end of the experiment for condition one and when the participant returns for condition
two. The observer watches in both conditions to see how the participant makes their decision
by noting body movements, recording any utterances, and seeing if the nutritional label was
used in the decision-making process. The participant is video-recorded to provide data for
further examination. After introductions, the participant reads instructions, told disclaimers
about the experiment, and signs the appropriate statement of understanding about the
experiment. The student would be informed that the study is IRB approved. In condition one,
the student reads a prepared scenario that looks to set the student’s frame of mind.

In condition one, before the participant chooses dessert, he or she reads a scenario that
frames their state of mind. The scenario is constructed so that each participant acts with the
same set of circumstances in mind. The scenario could read like this:

(Warning- please “think out loud” as you process your decision-making.)
You have just finished a meal in the all-you-can-eat dining commons and you are planning to eat
dessert. After clearing your dishes, you walk over to the dessert station in the cafeteria. Choose
the dessert or desserts you want to eat.

When the participant finishes reading the scenario, the timekeeper starts the clock to measure
the time it takes for the participant to make the food choice. Another observers records the
actions of the participant, records any comments by the participant and if the participant reads
the nutritional information or not, and what dessert was chosen. The desserts are the typical
offerings students would see in the menu cycle in the dining hall. The dessert menu for the
experiment consists of the following foods:

- Chocolate chip cookies
- Seven layer cookie bars
- Vanilla puddings
- Cups of strawberry Jello
- Apples

On display with the dessert items is a nutritional fact sheet that the dining staff prints out each
day to accompany the dessert items. For the second condition, participants are asked to come
back within the next three following weeks on the same day of the week at the same time and
are given the same scenario to read. The same menu is presented with the same nutritional
information in the same room.
The variation in condition two is that before reading the scenario, the participant would answer a short questionnaire about their health goals. The questions could look like this survey modified from Lauver et al [9 p. 147]:

**Table 2: Questions to Assess Health Goals**

A) Please think of health broadly, such as your overall well-being in body, mind, heart, or soul. Think about one broad, health-related goal that you would like to reach in the next several months. Do you have such a goal? If ‘yes’, what would that be?

___________________________________________________________________________

B) Could you be any more specific about your goal? If you are able to be more specific about what your health goal is, then please write it here:

___________________________________________________________________________

C) Please think about how you could move toward your goal by taking some steps over the next several days. My first steps that I could take toward my goal in the next several days would be:

___________________________________________________________________________

Table 2: Questions to ask of participants about their health goals before making a dessert selection.

After the participants fill out the health goals questionnaire and read the scenario, observers again record time spent, food chosen, comments, and use of the nutritional information. At the conclusion of the two treatments, participants are asked to fill out a post-study survey with questions that ask participants about their experiences in each condition. Possible survey questions could include:

**First Visit**

1. Did you use the nutrition labels on the foods to make your decision the first time you chose a dessert? Yes/no Why or why not?

2. If yes, did you use nutrition labels during the first visit, please circle on the label what information you used. (Participants would have reprints of labels to mark-up.)

3. If you did use the label, what additional information, if any, would you have liked on the label?

**Second Visit**

4. During your second visit, did the questions about health goals alter your food choice decision? Yes/no Why or why not?

5. Did you use the labels on the foods to make your decision the second time you were here? Yes/no Why or why not?

6. If yes, you did use nutrition labels during the first visit, please circle on the label what information you used. (Participants would have reprints of labels to mark-up.)

7. If you did use the label, what additional information, if any, would you have liked on the label?
Analysis of Results

Because this is a proposal for a potential experiment, there are no actual results yet. If there were data to interpret, I would portray the data in three bar graphs. Graph 1 shows the average number of calories eaten in condition one versus condition two. The hypothesis that the questionnaire about health goals would influence food choice would result in a decreased number of calories eaten after the participants reflect on their health goals. In Graph 2, hypothesizing that questioning students about their health goals does make a difference, would theoretically lead participants to make more careful choices about their dietary intake at the dessert table. This deliberation over choices with their health goals freshly in their minds should extend the time it takes to consider the choices and possibly read the labels. Graph 3 would compile self-reported data by the participants in their survey with observed data to determine if participants used nutrition labeling in their decision-making at the dessert station. Thinking that this focus on health goals once again does make a difference, the incidents of label usage should increase in frequency from condition one to condition two. The three sample graphs with idealized data are below:

Graph 1: Simulated Data Comparing Treatment Conditions for Calorie Intake

Graph 1: Shows the average number of calories eaten in the first treatment and in the second treatment.
**Graph 2: Simulated Data Comparing Treatment Conditions for the Time it takes to Choose Dessert**

**Timed Dessert Choices**

![Bar chart showing time taken to choose dessert](chart1.png)

- **Graph 2:** Shows the average number of seconds it takes participants to make a dessert decision.

**Graph 3: Simulated Data Comparing Treatment Conditions for the Use of Nutrition Labels**

**Use of Nutritional Labels**

![Bar chart showing use of nutritional labels](chart2.png)

- **Graph 3:** Shows whether the participants used the nutrition labeling.
Discussion

If this experiment were to be conducted, findings would hopefully suggest that nutrition labeling alone is not enough to educate or motivate students about their food choices. Asking students to reflect upon their health goals by posing a few questions connects their health goals to their behavior at the point of selection at a dessert station. This proximity of self-reflection and behavior links the two ideas of health goals and food choice in real time. Because today’s students live their lives with instant access to people and information, matching health goals to food selection at the same time helps students to make that connection. Hopefully, this data would show that students would make a different decision about their food choice, they would use the label more often, and that they would deliberate more about their choice after answering questions about their health goals. The information collected would be driven largely by a male population and that would have implications on this study. Since the sample population has more men to women by a ratio of 7:1, it likely that the subjects of the study would more heavily populate by men. While this may be a limitation to the study, it does offer up another angle for investigation. With much written about how women use food labels to make food purchases and choices, this study may have value for drawing conclusions about men’s eating habits. The literature is short on this research [8], [7], [11], though there are some studies to review [20], [19].

A limitation of this study is how the foods are visually arranged— is food choice influenced by placement? In the dining commons, and in the simulation, pieces of whole fruit sit to the far right of the dessert display. This may speak to the lack of importance of choosing a healthier option— it is off to the side and does not have the visual rhetorical importance of a front-and-center display. How would food choice change if apples were placed prominently like the seven layer cookie bars? Food choice is complex and factors unrelated to the reflection upon health goals could limit the effectiveness of the study. For example, variations in participants’ stress levels may affect food choice. In this study, the participants were asked to schedule their time in the lab on the same day of the week and at the same time to help control for variations in scheduling and stress levels at those times. Another limitation may be that students who are on different meal plans have differing eating habits. Students on different meal plans may respond differently and this is an area for further research.
In addition to how students on different sizes of meal plans may respond, there are several areas ripe for research as it relates to food labeling. As mentioned above, gender differences have been studies but most of the writing is about women. There is room to research the impact of nutrition labeling with men. Portion sizes and nutrition labeling- do people know what a 110 calorie 6-ounce ladle of soup looks like? Portion sizes have grown, influenced by the restaurant industry and that people eat one-third of their meals outside of the home [24]. How can college students be expected to understand what a portion size looks like in an all-you-care-to-eat dining facility? The serving stations should have spoons, labels, and other serving utensils labeled so that the serving size can be determined at the point of food selection as they read the nutrition labels. Another educational piece for students is the Dietary Guidelines: “For fruit, dairy, protein, and whole grains, increased knowledge of dietary guidance is related to meeting the Dietary Guidelines for Americans 2005, and with regard to individual choices...the relationship between knowledge and improved dietary behavior is even stronger”[12 p. 1412]. Educators in dining halls and in universities have opportunities to program around these issues and much more.

References


[3] Chunhong Liu, Bin Xie, Chih-Ping Chou, Carol Koprowski, Dunjin Zhou, Paula Palmer, Ping Sun, Qian Guo, Lei Duan, Xiufa Sun, and Anderson Johnson. 2007. Perceived stress, depression and food consumption frequency in the college students of China seven cities. Physiology & Behavior 92: 748–754.


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