

Does Miami University Believe a Hot Dog Is a Sandwich?

Noah Dunn
dunnnm2@miamiOH.edu
Miami University
Oxford, Ohio

John Hata
hatajm@miamiOH.edu
Miami University
Oxford, Ohio

John Meyer
meyerjm@miamiOH.edu
Miami University
Oxford, Ohio

Nick Hagerty
hagertnl@miamiOH.edu
Miami University
Oxford, Ohio

Steven Yu
yuh21@miamiOH.edu
Miami University
Oxford, Ohio

Lynn Stahr
stahrcl@miamiOH.edu
Miami University
Oxford, Ohio



Figure 1: It's not your average dog

ABSTRACT

This paper examines the question, “Is the hot dog a sandwich?”. There is little literature and even less empirical evidence to support any one classification. Anecdotal responses lean towards a specific definition but the available material is inconclusive. The authors developed and conducted a research experiment to determine the validity of the published classification models. This paper begins with a literature review, then provides the research methodology, data analysis and conclusions. While purists define a hot dog as a sandwich, these results support the general consensus that a hot dog is not a sandwich. The disparity and potential faults in the taxonomy are reviewed.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from permissions.acm.org.

Conference'17, July 2017, Washington, DC, USA

© 2020 Association for Computing Machinery.

ACM ISBN 978-x-xxxx-xxxx-x/YY/MM...\$15.00

<https://doi.org/10.1145/nnnnnnnn.nnnnnnnn>

KEYWORDS

Hot Dog, Sandwich, Pop Culture, Miami University

ACM Reference Format:

Noah Dunn, John Meyer, Steven Yu, John Hata, Nick Hagerty, and Lynn Stahr. 2020. Does Miami University Believe a Hot Dog Is a Sandwich?. In *Proceedings of ACM Conference (Conference'17)*. ACM, New York, NY, USA, 10 pages. <https://doi.org/10.1145/nnnnnnnn.nnnnnnnn>

1 INTRODUCTION

Is the hot dog a sandwich? The question may seem trivial but the answers can prove illuminating and expose misunderstanding. Much of the literature defines a sandwich with more or less consistency, but there is little empirical evidence to suggest the general populace agrees. A disconnect between standards and practical application can shed light on regional food preferences.

Some foods and cuisine can be evocative of seasons and experiences. With respect to the hot dog, most Americans would first think of picnics and baseball games. Furthermore, one is unlikely to consider getting a sandwich off the barbeque or having a sandwich at the seventh inning stretch, at least in Americana. Still, much of the literature would suggest a hot dog would be defined as a sandwich.

Considering this dichotomy, the researchers set out to collect empirical evidence regarding classification of the hot dog. This article is organized into two parts. First, a literature review is presented and an analysis provided. While there is a dearth of literature on this particular topic, a previously developed taxonomy provides the foundation for any current and future research. The latter part of the article consists of the research study, including the methodology, data analysis and conclusions with final thoughts for further research.

2 LITERATURE REVIEW

With respect to professional research, the question of whether or not a hot dog is a sandwich has been largely untapped by academics and researchers across the world. Although there is a distinct lack of formal resources on the topic, peer-reviewed or otherwise, this research seeks to address all that there is to offer on the literature of the topic.

Of the available literature, Quantum Physicist and Professional Researcher Dr. Orad Reshef of the University of Ottawa produced an article/letter with sources to expand on the discussion of whether or not a hot dog is a sandwich [12]. In his article, he proposes what he describes as the scientific classification of “GUTS” or the Grand Unified Theory of Sandwich. For something to be deemed a sandwich under the GUTS classification, it must meet the following six criteria [12]:

- (1) All elements in a sandwich must be edible.
- (2) Every sandwich must consist of at least one of each of the following elements: a *bread* and a *filling*, where the primary role of the bread in the sandwich is to protect the eater’s hands from its filling.
- (3) The bread must be pre-prepared, and not baked or cooked simultaneously with its filling.
- (4) Individual bread elements must possess flat or positive curvature with respect to their filling.
- (5) A singular filling cannot be formed of loose particulate matter.
- (6) A singular filling in a liquid phase must be viscous enough such that the bread may continue to protect the hands during consumption.

Reshef provides detailed justifications for these particular “axioms” as he calls them. The definitions not only limit the taxonomy but maximizes their application. The axioms are clear and cover a spectrum of food items such that classification is simple but comprehensive. For example, items like pizza are not included despite being made of items sitting on bread (i.e. crust). Likewise, croutons are excluded despite being part of a food item that, reconstituted, could be easily defined as a sandwich. The author also notes that none of his axioms say anything to the number of pieces of bread, and as such, the classification opens up to items like open-faced sandwiches, burritos, and hot dogs.

Beyond Reshef’s seminal work, the literature either speaks to the hot dog sandwich classification either peripherally or directly. In Philosophy, for example, Karen Bennett of Cornell University brings the question up in her discussion on Conceptual Analysis, or how humans choose to classify and group things [1]. In particular, she addresses one of the concerns that a large number of people

run into when attempting the taxonomy of classifying sandwiches. She poses that if you ask a person to define a sandwich, and then address something that is or is not matching their initial definition, they are inclined to change their definition, thus enabling further refinement. This focus on narrowing classification in determining whether or not a hot dog is a sandwich is exactly the kind of method that individuals like Dr. Reshef attempt, in his case with the GUTS model. Bennett does take a stance, noting that “My own gut reaction is no, it’s not a sandwich” [1]. So, while the literature does not focus on the hot dog classification, the literature does render an opinion.

Classification of the “hot dog” also appears in more literature about food history and choices but only alludes to a classification. In the book, “Hot Dog: A Global History”, author Bruce Kraig remarks “...in cities such as Rome, sell ‘hot-dogs’, along with menu items including pizza slices and sandwiches...” [5]. Kraig denotes a distinction between hot dogs and sandwiches in his book, clearly showing a distinction in the two. In a different historical account regarding the Po’Boy sandwich, Hennig Cohen notes that “In New Orleans today, the poor boy surpasses the hot dog and hamburger in popularity at dozens of **sandwich** shops” [2]. Unlike Kraig, Cohen does not deliberately distinguish between the hot dog under the moniker of the sandwich shop. He maintains the association. Neither of these historians directly writes “A hot dog is/is not a sandwich”; however, that does not remove the implication that these authors are inclined to the stance they imply by their word choice.

Yet other literature and resources address the hot dog classification directly. The internet provides a sizeable platform for purists. The medium provides many examples of the debate, with both sides of the argument passionate in their truth and superiority. Merriam Webster posted an article stating that a hot dog was, by their definition, a sandwich [13]. Hot-Dog.org, sponsored by the National Hot Dog and Sausage Council with support from the North American Meat Institute, provides a list of a dozen reasons why a hot dog cannot be classified as a sandwich [8]. A similar site for Feltman’s of Coney Island, the self-described originator of the frankfurter on a bun, comes to the same conclusion [11] based on feedback from actors and other public figures. The Washington Examiner takes on the problem from a legal classification stance. According to this news site, until the late 1800s, the hot dog was commonly referred to as a “Coney Island Sandwich”, or a “Frankfurter sandwich”, and it wasn’t until the mid-1900s that anyone began to reconsider the classification [10]. This time period saw the development of states purposefully classifying hot dogs as non-sandwiches for tax purposes. As such, the Examiner declares that historically a hot dog has been and will always be a sandwich. In a similar light, a USDA representative consulted the USDA’s *Food Standards and Labeling Policy Book* which disqualifies a hot dog as a sandwich based on several criteria [4]. In any case, the literature reveals that there is no consensus on whether or not a hot dog is a sandwich and the definition is negotiable for tax purposes.

3 RESEARCH METHODOLOGY

In order to study the question of whether or not a hot dog is a sandwich, the team elected a mixed research methodology with both

quantitative and qualitative data collection. Specifically, this experiment used the sequential explanatory strategy. In this strategy, the qualitative results will be used to help understand or explain the qualitative data[3]. Given the lack of empirical data and limited literature, this approach would provide insight into the quantitative findings and suggest future research.

For the quantitative data collection, the team developed an electronic survey (Appendix A and distributed it to the population at Miami University (<https://www.miamioh.edu/>), a public, residential, liberal arts institution. The research area of interest was the main campus in Oxford, OH, USA. The campus can be described as a mid-sized American university located in a rural setting. The population frame consists of undergraduate and graduate students, a total of approximately 20,000, 46.8% male, 53.2% female and 16.6% domestic students of color. Most (65%) of the population at the Oxford campus are in-state residents and 13% are international[9]. Invitations to participate may also include faculty which number 983 as of 2019¹ [7].

The survey was administered through Google Forms which began on March 9th, 2020 and closed on April 1st, 2020 at 11:59PM with the goal of collecting 2,000 responses. To achieve a collection of 2,000 responses, the team distributed as many invitations as possible with a minimal goal of 10,000. A 20% response rate is considered typical. The sampling design is a simple random sample without replacement. Use of a non-probability sampling technique to get a true cross section of the population is prohibitive in this case [6]. The research team believes this is acceptable as the research question pertains to the student body and community as a whole. Finally, invitations to participate were distributed at random. Participation via email limits any selection bias that may be inherent in distributing the paper invitations.

Following the survey, a sample of participants were interviewed by a single interviewer. The interviews were open-ended with a focus on understanding why the respondent made his/her choices.

3.1 SURVEY QUESTIONS AND GOALS

The electronic survey was composed of two sections in addition to opening language regarding the research purpose, rights of the participant and consent². The first section collected participant characteristics. The second section used closed-ended and short answer questions to collect participant feedback regarding the research topic, including classification of specific, well-known food items, the defining characteristic of a sandwich, the respondent's personal definition of a sandwich, and finally whether the respondent believed a hot dog is a sandwich.

3.1.1 Demographic Information. Demographics were collected for each respondent: gender, role, major (if applicable), and state or country of residence. These characteristics were used to find correlations between survey responses and groups.

3.1.2 Specific Food-Item Classification. A list of well-known food items was listed and had to be classified as a sandwich or not by the participant. The responses provide a baseline or litmus of sorts.

¹Participation by any non-student person is considered trivial as all invitations to participate will be sent to students.

²IRB approval received on March 9, 2020

In general, the responses indicate preconceived sandwich classification prior to reading the remaining questions that could influence responses. The foods provided were: a McDonald's McMuffin, a gyro, a sub, an ice cream sandwich, a hamburger, a PB & J, and a grilled cheese.

These items were determined to target specific traits and included in order to draw correlations between an absolute definition and classification in general. The McDonald's McMuffin was chosen to test if whether the food was a breakfast food affected how they defined a sandwich. The gyro was chosen to test if respondents would consider a food that wraps a filling with bread to be a form of sandwich. The sub was chosen to test if the respondent's definition of a sandwich was affected by the bread itself, with a hot dog and a sub sharing similar buns that wrap around the filling but are open on one side. The ice cream sandwich option was chosen to test if respondents considered a food item with "sandwich" in the name, as well as a food that is considered a dessert, to be a sandwich. The PB & J was chosen to test if the filling between two slices of bread played an important role in whether the respondent considers a food a sandwich. Finally, the grilled cheese was chosen to find out if respondents considered whether or not the bread was cooked to be a determining factor.

3.1.3 Determining Factors of Sandwiches. Participants were asked to select from four options which was the most important factors in defining a sandwich. The options included: shape, structure, temperature, and type of content. Similar to the previous question, this selection would reinforce how a respondent defines their sandwich.

3.1.4 Respondents Definition of a Sandwich. Respondents are asked to provide their unique definition of a sandwich. This information was parsed for similarities in participant responses. The goal of this question was to allow the user to provide information on what they determine to be integral to a sandwich. The analyzed results shed light on how the participants feels about a hot dog versus a specific definition.

3.1.5 Is a Hot Dog a Sandwich? This question simply collects the respondent's answer to the question of interest. The information from the previous question is to be used to find any correlations in how each respondent arrives at their conclusion.

4 ANALYSIS AND FINDINGS

4.1 Demographic Information

This section contains aggregated summaries of demographic information collected from participants, including gender, role in the university, major (for students), and place of permanent residence. These results indicate, despite the small sample size, the demographic distribution was remarkably similar to the University population.

Gender:

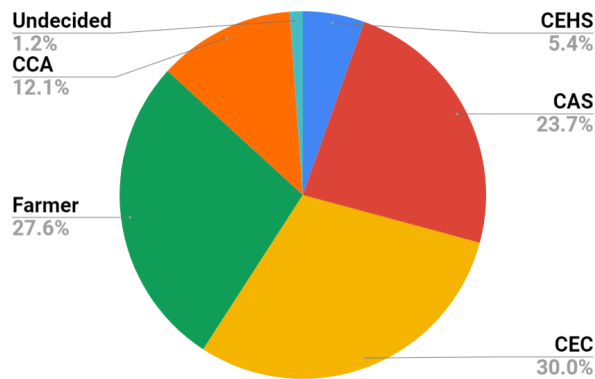
Male	49.5%
Female	49.8%
Other	< 1%

Role:

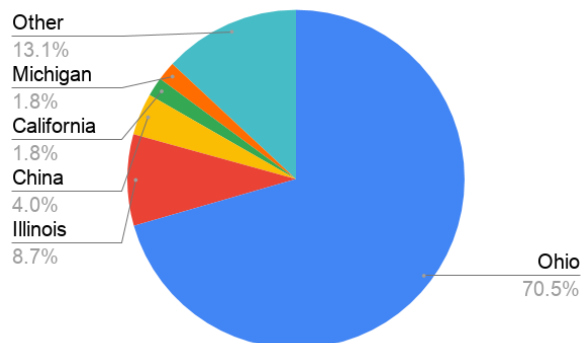
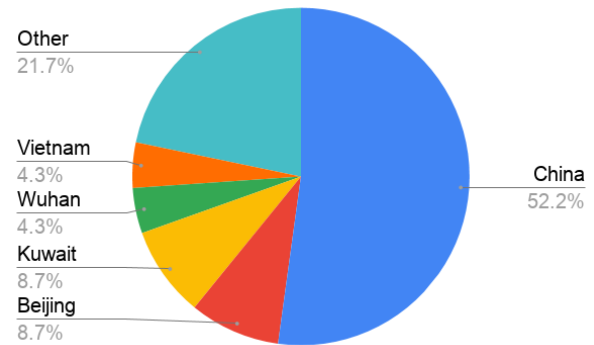
Student	97.8%
Faculty	< 1%
Other	1.5%

Major:

- 30.0% of respondents are from the College of Engineering and Computing (CEC)
- Figure 2 shows a complete breakdown of survey respondents by major

**Figure 2: Participant Representation by College****Location:**

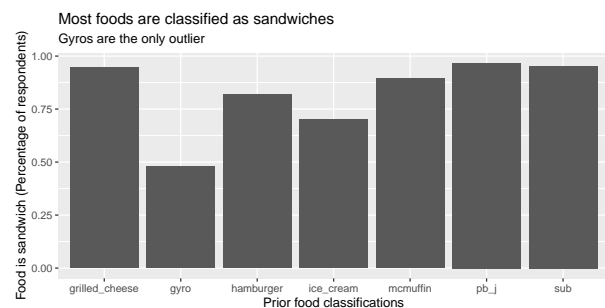
- Respondents from 24 different U.S. states, 5 different countries
- Figure 3 shows a complete breakdown of respondents by location, domestic and international
- Figure 4 shows a breakdown of international respondents

**Figure 3: Participant Representation by Place of Residence****Figure 4: International Participant Representation by Country****4.2 Survey Results**

4.2.1 Sandwich Litmus Test. Survey recipients were presented with a series of food items and asked to indicate if they considered it a sandwich or not. The binary question applied to these common food items: McDonald's McMuffin, Gyro, Sub, Ice Cream Sandwich, Hamburger, PB & J, and Grilled Cheese.

These seven food items were deliberately selected in order to target specific traits of sandwiches that respondents consider. For example, grilled cheese was chosen to test if respondents think that cooking the bread or frying it influences whether the food is a sandwich or not. The different options also represented breakfast, lunch and dinner items; hot or cold items; open-face presentation; and deserts or snacks in order to distinguish a meal or main course from lighter fare.

The results of this litmus test are visualized in Figure 5. The majority of these test foods were considered to be sandwiches by respondents, with the exception of the gyro. The next food item least commonly identified as a sandwich was the ice cream sandwich, as only 75% of respondents considered the ice cream sandwich to be a sandwich. Of the remaining items, the hamburger, McMuffin, sub, PB & J and grilled cheese were most often identified as a sandwich.

**Figure 5: Sandwich Classification Litmus Test**

4.2.2 Sandwich Defining Quality Test. The survey recipients were asked to select the characteristic that is most important in defining, exemplifying or illustrating a sandwich. The options were:

- (1) SHAPE
Ex: Rectangular/Square/Circular
- (2) STRUCTURE
Ex: Open/Closed, Between two or more pieces of bread/Folded
- (3) TEMPERATURE
Ex: Hot/Cold, Toasted or Untoasted
- (4) CONTENT TYPE
Ex: Meat/Vegetables/Spread

As Figure 6 shows, the vast majority found structure to be the predominant characteristic of a sandwich. The second most significant characteristic was the content of the sandwich. Only about 4% of respondents considered shape as the most defining characteristic. Almost no one, 0.36%, considered temperature the most important characteristic.

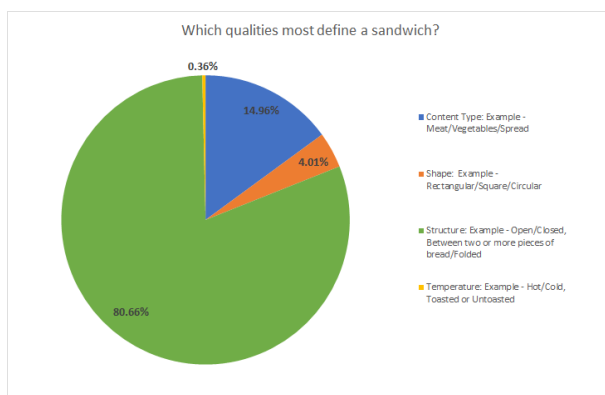


Figure 6: Quality that most defines a sandwich

4.2.3 Interview through Definition. As a proto-interview technique, survey recipients were asked how they defined a sandwich. To determine words considered by participants to be integral to the definition of a sandwich, a word-cloud (Figure 7) was generated to visualize important words. Some of the most frequent words were:

- “Bread”, in 68.9% of all responses
- “Between” and “Pieces”, in 38.7% of responses containing the word “Bread”
- “Food”, in 32.8% of all responses
- “Meat”, used in 18.1% of all responses
- “Slices”, used in 11.2% of all responses



Figure 7: Word Map of Sandwich Definitions

As visualized, the word “bread” is the most associated word with a sandwich by respondents. “Between” and “pieces” were also commonly used in descriptions with “bread”. “Pieces” and “between” potentially imply that multiple pieces of bread are being used, so this association led to an investigation of whether responses that used “pieces” and “between” in the definition disproportionately chose that a gyro or a sub is not a sandwich.

In further investigating, it was discovered that 4.1% of these responses believe that a sub is not a sandwich (compared to an overall average of 4.7%), while 58.9% of these responses believe that a gyro is not a sandwich (compared to an overall average of 52.4%). So, these responses slightly favor defining a sub as a sandwich, while favoring defining a gyro as not a sandwich despite the structural similarities.

4.3 Hypothesis Testing

Prior to this study, several hypotheses were constructed. The researchers developed these hypotheses based on the literature review, prior experience and knowledge of the population and American culture. These hypotheses were constructed to target three specific questions in addition to the primary research question.

Hypothesis 1: Greater than or equal to 60% of the respondents will believe that a hot dog is **not** a sandwich

Hypothesis 2: The majority (greater than 50%) of individuals who believe **content** is the most important quality of a sandwich will believe that a hot dog is a sandwich.

Hypothesis 3: The majority of individuals (greater than 50%) who believe that a gyro, a sub, or both are sandwiches **will believe** that a hot dog is a sandwich.

Hypothesis 4: The majority of individuals (greater than 50%) who are from Ohio will believe that a hot dog is **not** a sandwich.

In the next sections, each hypothesis is evaluated against the gathered data.

4.3.1 Hypothesis 1. Hypothesis 1 states that greater than or equal to 60% of respondents believe that a hot dog is not a sandwich. The results of the survey find that 64% of the sample believes a hot dog is not a sandwich, as shown in Figure 8.

Is a Hotdog a Sandwich?

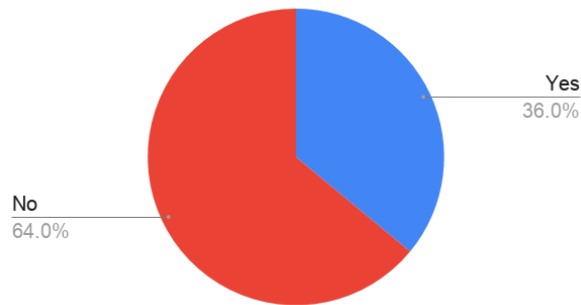


Figure 8: Pie chart of 'Is a Hot Dog a sandwich?'

This hypothesis was confirmed by this sample, as 64% is higher than the required 60%.

4.3.2 Hypothesis 2. Hypothesis 2 states that at least 50% of respondents who believe **CONTENT** is the most important quality of a sandwich will believe that a hot dog is a sandwich. As can be seen in Figure 9, this hypothesis is rejected.

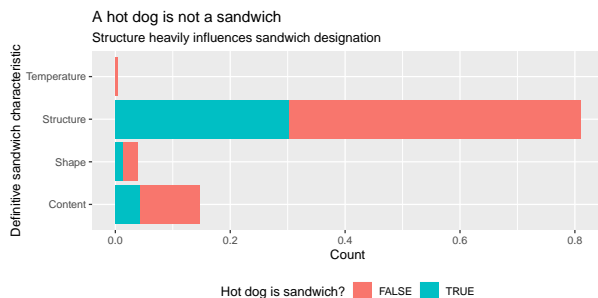


Figure 9: Stacked bar chart of sandwich characteristics

Out of the 41 responses considering content the most important quality of a sandwich, only 12 respondents believed that a hot dog is a sandwich. At just 29% of respondents who believe that content is the most important quality of a sandwich considering a hot dog to be a sandwich, this hypothesis is rejected.

4.3.3 Hypothesis 3. Hypothesis 3 states that the majority of individuals believing a gyro, a sub, or both are sandwiches believe that a hot dog is a sandwich. As shown in Figure 10, this hypothesis is also rejected, with only approximately 35% of respondents who believe either a gyro or sub or both to be a sandwich considering a hot dog to be a sandwich.

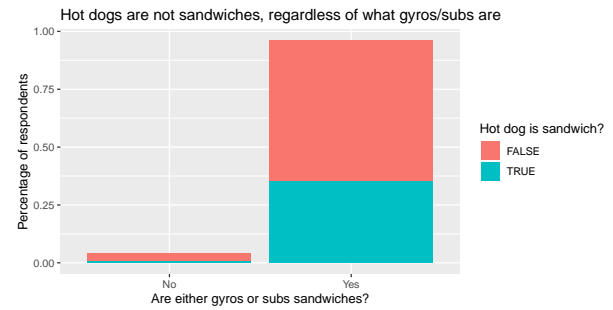


Figure 10: Stacked bar chart of gyro/sub vs hot dog

4.3.4 Hypothesis 4. Hypothesis 4 states that greater than 50% of individuals who consider Ohio to be their permanent residence believe that a hot dog is **not** a sandwich. Figure 11 displays the breakdown of sandwich believers by Ohio residents vs out-of-state residents.

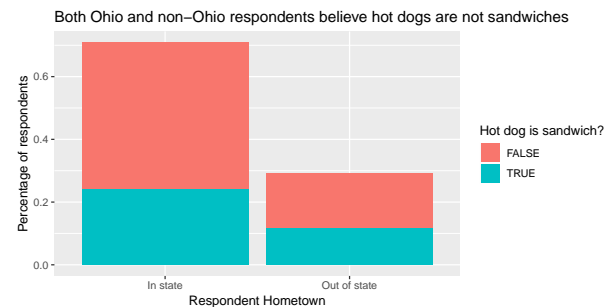


Figure 11: Stacked bar chart of Ohio residents vs non-Ohio residents

As can be seen in Figure 11, greater than 50% of respondents from Ohio believe that a hot dog is **not** a sandwich, confirming this hypothesis. For comparison, the same breakdown is shown for out-of-state residents. While a narrower margin, the majority of out-of-state residents also consider a hot dog to not be a sandwich. This demonstrates that Ohioans are slightly more biased against the idea of a hot dog being a sandwich than out-of-state residents.

4.4 Interviews with Survey Respondents

After the survey was concluded, several participants were offered the opportunity to interview and elaborate on their stance to the status of a hot dog as a sandwich or not. Interviews were intended to be brief in order to encourage participation and discourage bias with extraneous banter. With the use of Discord, freeware VoIP technology, and standard SMS text messaging, the interviewer posed a single question to the participant: "Why do you believe a Hot Dog is a sandwich?" / "Why do you believe a Hot Dog is not a sandwich?". This is the central goal of this research study. Gaining a firm understanding of individual participant's justification offers some insight into what leads a person to one conclusion or the other.

One participant stressed the necessity to appeal to the dictionary to begin his explanation. He pointed out that his dictionary's definition of a sandwich requires four distinct categories.

- It is made of two components, an external and internal where the internal item is often eaten on its own
- The external component must be made of mostly carbohydrates
- The external component must have been baked in an oven at some point
- The external component must contain enough flour to rise during the baking processing

The participant began with this description and uttered a follow up that there must be enough of the internal component to cover at least two sides of the external component, but not more than three sides. This participant was focused on the importance of abiding by the definition in the dictionary for their justification. A hot dog, the internal component or frankfurter, can be said to be often eaten on its own. The bun also meets all requirements of the external component that the participant listed. As such, the participant justified the existence of a hot dog as a sandwich based on these criteria.

Of the remaining 7 interviews conducted, three (3) believed a hot dog was a sandwich, and four (4) believed a hot dog was not a sandwich. This was not intentional, but did provide some insight on both sides of the argument. Of those that supported a hot dog as a sandwich, 2 of the 3 used a transitive definition approach to justify their choice of a hot dog as a sandwich. In two of the interviews, the participant's main points were that they believed a hot dog was a sub, and that a sub was a sandwich. By transitive relationship, therefore, they believed a hot dog was a sandwich. The remaining individual took more of a social commonality approach with their justification. This participant's claim is that an individual, when asked what they were having for lunch, would reply they had a sandwich, instead of saying that they had a hot dog. As such, these two terms could be used interchangeably.

The four interviewees who said that a hot dog was not a sandwich offered three unique perspectives, with only two cases of overlap between their individual ideas. Additionally, these individuals chose to provide short justifications, as opposed to the lengthier descriptions of their counterparts. One individual claimed a hot dog was not a sandwich because they believed the term "Hot Dog" referred to the meat, not the bun. They argued that since a sandwich could not exist without bread, the term "Hot Dog" could not be used to refer to a sandwich. Another interviewee said that their prime justification for a Hot Dog not being a sandwich was due to the fact that one does not say "I'm going to eat a hot dog sandwich", therefore disqualifying it from this classification.

The two remaining interviewees posed the necessity of the separation of bread as the key factor in deeming a hot dog to be a sandwich. Both of these people argued that due to the nature of a sandwich requiring two separate pieces of bread, a hot dog bun, which exists as a single piece of bread built as a hinge, does not count as a sandwich. This is a contrast to some of the "Hot Dog is a Sandwich" affirming crowd, as one of those interviews in particular focused on individual points of contact as opposed to separate pieces of bread.

5 DISCUSSION

The goal of this paper is to determine if Miami University students consider the hot dog as a sandwich or not. Use of a basic questionnaire and random interviews of those who responded to the questionnaire why or why not they consider hot dog as a sandwich.

According to the survey results, the conclusion is that Miami University's population considers a hot dog **NOT** to be a sandwich. Among the responses, 64.0% consider the hot dog not a sandwich. In addition, the survey included questions on how they would classify McDonald's McMuffin, Gyro, Sub, Ice Cream Sandwich, Hamburger, PB & J, and Grilled Cheese, and except for Gyro, each of them is classified as a sandwich by nearly 75% of respondents. Based on the sandwich defining quality test, structure is the major factor for people to determine whether some food, in this case a hot dog, should be classified as a sandwich.

Three approaches for the support side and two approaches for the opposition side were identified to justify their opinions during interviews. The table 1 shows these different approaches.

The social commonality approach appeared in arguments of both sides and but are applied differently. For those who consider a hot dog a sandwich, their argument is that they would not distinguish between a hot dog or sandwich when telling people what they eat. For the opponents, they focus on how people would formulate a phrase with sandwich, and they argue that hot dog is rarely used as an adjective of sandwich, which makes it something other than sandwich.

5.1 GUTS Criteria

GUTS, or the Grand Unified Theory of Sandwich, as presented in the brief Literature Review above, deems six criteria for a sandwich[12]. The criteria are presented again below:

- (1) All elements in a sandwich must be edible.
- (2) Every sandwich must consist of at least one of each of the following elements: a *bread* and a *filling*, where the primary role of the bread in the sandwich is to protect the eater's hands from its filling.
- (3) The bread must be pre-prepared, and not baked or cooked simultaneously with its filling.
- (4) Individual bread elements must possess flat or positive curvature with respect to their filling.
- (5) A singular filling cannot be formed of loose particulate matter.
- (6) A singular filling in a liquid phase must be viscous enough such that the bread may continue to protect the hands during consumption.

These criteria can be applied to the situations analyzed by the four primary hypotheses.

Hypothesis 1 states that more than 60% of respondents will believe that a hot dog is not a sandwich. The GUTS criteria can be used to provide a well-founded prediction on the outcome of this hypothesis. According to the six criteria of GUTS, all elements of a hot dog are edible (1), a hot dog has both a bread and a filling (2), the bread is pre-prepared (3), and the sides of the buns possess a positive curvature around the hot dog (4). The meat inside the bun is a solid entity (5), and (6) is irrelevant due to the nature of the

Table 1: Survey Respondent Interview Results

Argument	Decision Basis	Logic	Respondent
Hot dog is a sandwich	Dictionary Definition	Based on four (4) distinct categories defined by the dictionary	1
	Transitive Definition	A hot dog is a sub, and a sub is a sandwich	2,3
	Social Commonality	When answering others about what they eat, they would normally reply a sandwich instead of a hot dog	4
Hot dog is NOT a sandwich	Composition Approach	“Hot Dog” is referring to the meat, not the whole A sandwich requires two separate breads but a “hot dog” bun is a single piece	5 6,7
	Social Commonality	People rarely say “I’m going to eat a hot dog sandwich”	8

filling being a solid. So, both the GUTS criteria and this survey’s results support a hot dog as being classified as **not** a sandwich.

Hypothesis 2 states that the majority of respondents who believe content is the most important quality of a sandwich will believe that a hot dog is a sandwich. Content primarily addresses items 2, 5, and 6 of the GUTS criteria. As discussed above, a hot dog does match criterion 5 of the GUTS criteria, which happens to be one of the criteria tested by content. So, a hot dog does pass the GUTS criteria as a result of one of the content-based criteria. Contrary to the GUTS criteria, respondents who believe that content is the most important quality of a sandwich will believe that a hot dog is a sandwich, in direction counter to the results of Hypothesis 2.

Hypothesis 3 states that the majority of respondents who believe that either a gyro, a sub, or both are sandwiches believe that a hot dog is a sandwich. By the GUTS criteria, a gyro is a sandwich, matching the GUTS criteria in a manner similar to a hot dog. The same argument is also applicable for a sub. Similar to the argument for hypothesis 2, a gyro and sub are sandwiches by content-based criteria. This provides insight into the association among gyros, subs, and hot dogs as sandwiches.

Hypothesis 4 states that the majority of respondents who are from Ohio believe that a hot dog is not a sandwich. This brings in a geological bias into the survey results. Do sandwiches common to the Midwest typically contain a certain classification of filling? For example, if pulled pork sandwiches are common cuisine in the region, that could inflict bias among respondents towards disregarding the wholeness of filling as a criterion for classification as a sandwich.

5.2 Limitations

Due to the COVID-19 pandemic, researchers were experiencing difficulties in reaching out to a sufficient number of respondents to get enough responses. In the experiment design, the research team originally targeted 2,000 responses; however, only 278 responses were collected. Meanwhile, there are over-representation and under-representation issues that appear in the questionnaire responses. The biggest over-represented group is students from College of Engineering and Computing (CEC) and has consisted 30% of all responses while in reality, CEC students represent 12% of overall Miami University students.

Furthermore, the interviews were conducted online and communications were through standard SMS text messaging instead of face-to-face interviews, which made it possible for interviewees to be affected by internet resources and their surroundings that potentially alternate their responses. In addition, this occasion made it impossible for researchers to observe the tone, facial expressions, and body language of the interviewees.

5.3 Future Work

With regard to the limitations presented in the research, future research can improve by collecting more data from the targeted population and trying best to cover all classes, majors, colleges, etc. and to collect samples that better represent the actual population. A better sample would decrease bias and increase reliability of the research. Furthermore, whenever face-to-face interview is possible, researchers should seek this form as it can provide more accurate information than standard SMS text messaging. Since the research target is Miami University’s entire population (not just those present in April 2020), long track information may be collected in future work. In a longitudinal study, a pilot to test the questionnaire for clarity and reliability would also be important.

As scientists, the GUTS decision model appears useful, accurate and comprehensive. Applying the GUTS axioms, the hot dog would be classified as a sandwich. Similar to the literature, though, the results collected indicate that the participants consider the hot dog is not a sandwich. Future research could explore the GUTS model and identify its deficiency.

6 CONCLUSION

This research investigates the opinion of Miami University’s population on whether a hot dog is considered a sandwich. In order to find out the answer as well as why, an electronic survey was created and distributed. Two-hundred-and-seventy-eight responses were collected while the survey was open from March 9th, 2020 to April 1st, 2020, with the survey capturing respondent demographics, whether a respondent would classify specific foods as sandwiches, what factors a respondent would define as the determining factors in a sandwich, how a respondent defined a sandwich, and finally whether a respondent would classify a hot dog as a sandwich. Four

hypotheses were constructed in addition to answering the main question: whether “greater than or equal to 60% of the respondents would believe that a hot dog is not a sandwich”, whether “the majority (greater than 50%) of individuals who believe content is the most important quality of a sandwich will believe that a hot dog is a sandwich”, whether “the majority of individuals who believe that a gyro, a sub, or both are sandwiches will believe that a hot dog is a sandwich”, and finally whether “the majority of individuals who are from Ohio will believe that a hot dog is not a sandwich”. Out of the four hypotheses, the first and fourth hypotheses were accepted while the second and third hypotheses were rejected.

Based on the 278 responses collected, the research team finds that Miami University’s population does not consider a hot dog a sandwich. In addition, interviews reflect that survey respondents have applied different approaches to justify their arguments on whether a hot dog is a sandwich: dictionary definition, transitive definition, social commonality, and a composition of different approaches. While the dictionary definition approach applied a taxonomy similar to GUTS, the decision criteria was different. The remaining methods relied on the similarity of the hot dog or its components with other food items to arrive at a conclusion.

The participant views in this study are consistent with the literature but inconsistent with GUTS taxonomy. Further research could clarify the disparity.

REFERENCES

- [1] Karen Bennett. 2017. Conceptual Analysis and its Limits. *Philosophic Exchange* 46, 1 (Oct 2017). https://digitalcommons.brockport.edu/phil_ex/vol46/iss1/1/
- [2] Hennig Cohen. 1950. The History of ‘Poor Boy’, the New Orleans Bargain Sandwich. *American Speech* 25, 1 (1950), 67–69. <http://www.jstor.org/stable/454218>
- [3] John W Creswell. 2003. *Research design : qualitative, quantitative, and mixed methods approaches* (2nd ed ed.). Sage Publications.
- [4] Elise Hu. 2014. What Burritos And Sandwiches Can Teach Us About Innovation. <https://www.npr.org/sections/alltechconsidered/2014/06/26/325803580/what-burritos-and-sandwiches-can-teach-us-about-innovation>, Last accessed 2020-04-28.
- [5] Bruce Kraig. 2009. *Hot dog: a global history*. Reaktion Books.
- [6] Paul J. Lavrakas. 2008. *Encyclopedia of Survey Research Methods*. SAGE Publications. <http://ebooks.ohiolink.edu/xtf-ebc/view?docId=tei/sage/9781412918084/9781412918084.xml&query=&brand=default> accessed from ohiolink.edu.
- [7] Miami University. [n.d.]. Faculty Diversity & Inclusion. Published online. <https://miamioh.edu/diversity-inclusion/data-reports/faculty/> Retrieved March 4, 2020.
- [8] Eric Mittenenthal. 2016. Is A Hot Dog A Sandwich? NHDSC. <https://www.hot-dog.org/culture/hot-dog-sandwich>, Last accessed 2020-04-28.
- [9] Miami University Office of Admission. 2020. Fall 2019 Admitted Student Statistics. Published online. <https://miamioh.edu/admission/high-school/admitted-student-stats/index.html> Retrieved March 4, 2020.
- [10] Kathryn Paravano. 2019. End of debate: A hot dog is a sandwich. *Washington Examiner* (Aug 2019). <https://www.washingtonexaminer.com/opinion/end-of-debate-a-hot-dog-is-a-sandwich>
- [11] Michael Quinn. 2018. Is a Hot Dog a Sandwich? <https://www.feltmansofconeyisland.com/blogs/news/is-a-hot-dog-a-sandwich> Last accessed 2020-05-01.
- [12] Orad Reshef. 2019. Is a Hot Dog a Sandwich? <https://www.thexylom.com/post/is-a-hot-dog-a-sandwich>
- [13] Merriam Webster. 2020. To Chew On: 10 Kinds of Sandwiches. <https://www.merriam-webster.com/words-at-play/to-chew-on-10-kinds-of-sandwiches>.

A SURVEY QUESTIONNAIRE

The survey can be found at: <https://drive.google.com/drive/u/0/folders/0AODA6roT3SjyUk9PVA>

Research Consent Information: How does the Miami University Community classify certain food items?

The purpose of this research is to examine how the University community classifies certain food items.

This study is being conducted by researchers from the Computer Science and Software Engineering Department at Miami University, CSE601 Research Methods class. Invitations to complete this survey will be posted on social networking sites such as Facebook and Twitter, published in random classroom settings, emailed directly to peer groups and distributed on paper.

The Details:

- Participation in this research is restricted to persons 18 years of age or older.
- Completing the survey should take about 3 minutes.
- Your participation is voluntary. You may skip questions you do not want to answer, and you may stop at any time.
- The survey does not request information that would explicitly identify you. If you inadvertently include identifying information, such information will be removed from stored data. Only the researchers will have access to individual responses. Results of the survey will only be presented publicly as aggregate summaries.

Have Questions?

- If you have any questions about this research or you feel you need more information to complete this survey, you can contact the lead researcher Dr. Eric Rapos at rapos@miamioh.edu.
- If you have questions or concerns about the rights of research subjects, you may contact our reviewing body: the Research Ethics and Integrity Office at Miami University at (513) 529-3600 or humansubjects@miamioh.edu.

— Thank you for your participation, the Research Team

Continue to the survey? *

☐ Yes

☐ No

Figure 12: The first page of the questionnaire

Some information

Please provide a few details about yourself. We do not collect any personally identifying information but need this to help with our analysis.

Select Your Gender *

☐ M

☐ F

☐ Other

Role at Miami University *

☐ Student

☐ Faculty

☐ Staff

☐ Other

Major (If Applicable)

Your answer _____

Where have you lived most of your life? *

Choose _____

If you answered "Somewhere Else Outside the US" to the previous question, where are you from?

Your answer _____

Figure 13: The second page of the questionnaire

The Questions

Please answer the following to the best of your abilities. Individual questions are 'required' but you do have the option to exit the survey and no information will be collected. Thank you for your participation.

Do you consider these items to be a sandwich? *

	Yes	No
McDonald's McMuffin	<input type="radio"/>	<input type="radio"/>
Gyro	<input type="radio"/>	<input type="radio"/>
Sub	<input type="radio"/>	<input type="radio"/>
Ice Cream Sandwich	<input type="radio"/>	<input type="radio"/>
Hamburger	<input type="radio"/>	<input type="radio"/>
PB & J	<input type="radio"/>	<input type="radio"/>
Grilled Cheese	<input type="radio"/>	<input type="radio"/>

Which of the following qualities is MOST IMPORTANT to you in your definition of a sandwich? *

☐ Shape: Example - Rectangular/Square/Circular

☐ Structure: Example - Open/Closed, Between two or more pieces of bread/Folded

☐ Temperature: Example - Hot/Cold, Toasted or Untoasted

☐ Content Type: Example - Meat/Vegetables/Spread

Define a Sandwich *

Your answer

Is a Hot-Dog a sandwich? *

☐ Yes

☐ No

Figure 14: The third page of the questionnaire

Thank you for your time.

Thank you for your participation in this research about How the Miami University community classifies certain food items. Your help is greatly appreciated.

If you have any questions about this research or you feel you need more information, you can contact the research team via Dr. Eric Rapos at rapos@miamioh.edu. If you have questions or concerns about the rights of research subjects, you may contact our reviewing body: Research Ethics and Integrity Office at Miami University at (513) 529-3600 or humansubjects@miamioh.edu.

Figure 15: The fourth page of the questionnaire