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# DOES BEER CAN SHAPE AND SIZE INFLUENCE HEALTH PERCEPTION OF CONTENTS?

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## *ABSTRACT*

*The research we conducted was to determine if the size and shape of beer cans is perceived to reflect the health content of the beer, plus the preferred shape and size of cans by regular beer drinkers. With the increased use of slimmer beer cans in those "light" products, like Michelob Ultra, Corona Premier and Light, and Heineken Light, there has been very little research as to whether or not the consumer is making the connection between the thinner cans and the lesser calories and carbohydrates. Our original belief was consumers would associate taller and skinnier cans with being less dense in calories and therefore would be more likely to purchase beer in those cans, if they were seeking fewer calories in their beers. The results we obtained through our research differ from our original hypothesis. The research showed a majority of all of our surveyed age groups chose a regular beer bottle as their preferred choice of beer container. All age groups were mostly unconcerned with how many calories they were consuming when drinking beer. As far as gender, over 60 % of male participants were not concerned with caloric intake while drinking, with slightly under 50% of female participants being unconcerned. Due to the lack of concern from our survey participants in caloric intake, there was little correlation between the size and shape of a bottle or can and whether or not consumers were more or less likely to purchase each particular shape, and perceiving one size to be less dense in calories or "healthier" than another. These results lead us to believe that most beer consumers aren't as concerned with caloric intake when drinking as we previously had thought, and the preferred packaging choice for the majority of consumers would be the classic long neck glass bottle.*

***KEYWORDS:*** *Michelob Ultra, Heineken Light, Calories and Carbohydrates*

## INTRODUCTION

As more beer brands are turning to slimmer cans for their lighter offerings, defined as less than 100 calories and less than 4 crabs per serving, our research team was interested in the dichotomy between drinking beer and also being health conscious. If the can is slimmer, does the consumer perceive that can to contain product that is "lighter" (and therefore healthier); and, if so, has that size and shape become the preferred size and shape in which to purchase and consumer beer? Since beer is naturally high in calories, especially India Pale Ales and Stouts, did people care at all about all of the empty calories consumed when drinking beer, or were they solely purchasing and consuming beer for taste and/or intoxication? Our research goal was to survey a minimum of 230 individuals aged 21 and older, in order to determine whether or not they viewed beer as being lower in calories if it were to be placed in a tall, skinny can as opposed to the standard 12 ounce can and bottle shapes currently used.

## LITERATURE REVIEW

When doing the research, we wanted to check the different trends that beverages companies are already experiencing. There is a common trend in all of them that the number of calorie intake in the beverages has been decreasing during the last 10 + years. During the early 2000's, the number of average beverage calories ingested per day in the US was 263, and during 2017 it was 198 (Beverage Marketing Corporation, 2018). Making us see already the trend happening around consumers drinking less calories. Moreover, going more specifically into the alcohol industry consumption. During 2007-2010 the percentage of people consuming an alcoholic beverage with no calories was 67.3 % men and 82.1 % of women. While 5.8 % of men and 5.7 % of women consume 150 calories or less on a given day in alcohol, and 19 % men and 6 % women consume 300 calories or more in an alcoholic beverage (CDC and NCHS, 2012). This statistic validates our research by seeing the regular trend in consumers being healthier when choosing what alcoholic beverage to consume.

When doing the research, we must take into consideration the different motives consumers have when choosing their beverage. Income level can be one of the influencers. In the period of 2007-2010 we can observe this influence mainly in women and their calorie intake when consuming alcoholic beverages. Women that are under the 130% of poverty level consume 91 calories per day in alcoholic beverages, and women that are over 350% of poverty level consume 75 calories (Ibid). Furthermore, we can observe that women between the ages of 20-39 consume more beer and liquor than wine. While, women 60 years and older consume more wine than any other alcoholic beverage (Ibid.). Now, if we are focusing on beer there are many brands that now carry "Light' versions of their original beer. The purpose of the "Light" versions is to have fewer calories and appear a healthier choice. For example, Bud Light has 110 calories, Coors Light 104, Miller Lite 96, Michelob Ultra 95, etc. (Advertising Age, 2010).

During 2017, the top 3 leading domestic beer brands in the US were all "Light" versions. But Light with 18.4 % of market share, Coors Light with 9.6 %, Miller Lite with 8.1 % (Grocery Headquarters, 2017). This shows how much the consumers are choosing the "healthier" versions over original ones. In 2018, the trend continues to be proven by the consumers. The "Light" beer had 42.6 % of consumption share in the US. Super Premium and Premium with 13 %, and Craft with 11.7 %. (CDC and NCHS, 2012). With this data, we can see why more brands are trying to come up with "Light" and "healthier" versions of their alcoholic beverages, since it has a consumption share of 42.6 %. Another alcoholic beverage that is growing is the seltzers. In 2018, the top 3 flavored malt beverages were White Claw, Truly, and Twisted Tea. The change in volume sales for them in 2018 was 251.5 % for White Claw, 199.8% for Truly, and 19.8 % for Twisted Tea (Beverage Industry Magazine, 2018).

### Definition of the Problem

The problem we sought to define was regarding beer container shapes and sizes and whether or not consumers viewed certain can or bottle sizes as having more calories than others. Does the shape of the container in which the beer is in affect the consumers purchasing decision in any way? If there were multiple can and bottle options in front of a consumer, would they choose the container in which they thought was the least caloric dense, or go with the most familiar option to them such as a standard can or bottle? Do consumers even care about how many calories they will consume when purchasing and eventually drinking their beer? Ultimately, the answer to all of these questions will help us to determine whether or not there is an optimal shape and size of container for beer companies to package their beer in in order to maximize their sales.

**Sample Plan**

We wanted to survey a representative sample of ages and gender, in order to get the best results. Using convenience sampling, we knew the majority of our respondents would be college students, as they were the most accessible. Given the information we knew that around 53.6% of college students were actively drinking alcohol compared to 49.9 % of the same age group not attending college (Alcohol Statistics 2019), this gave us assurance we would be able to reach an actively beer consuming population.

**Sample Size**

The original goal when first beginning the collection process was to obtain 250 responses. However, with the rule of having to be 21 to take the survey, we began to hit a roadblock as the survey progressed. Our ending sample size came out to be 129 respondents. The majority of our responses came from the college student ages, however, we also a decent response from an older audience. This was convenience and snowball sampling, and the resulting gender ratio was fairly even as 52 % of respondents were female while 47 % of the respondents were males. Less than 1% did not want to specify their gender.

**Development of the Questionnaire**

While developing the questionnaire, we knew we wanted determine what kind of packaging people associate with being healthy, specifically for alcoholic beverages. Knowing this we limited our survey to those that are above the age of 21. We also wanted to understand whether they even took into account the calories when they drink alcohol, so we added questions trying to gauge whether people even care whether they are taking in more calories. Next we placed four pictures of different types of packaging with skinny; normal, bigger IPA typed cans and tallboy cans, and asked our respondents which of these cans they associated with higher and lower calorie counts. We then asked them which they would pick, assuming all shapes and sizes contained the same product inside (to determine a preferred package). Finally we wanted to know exactly why they would choose that type of packaging, which allowed people to voice their opinion if health was a decision factor. The use of this final question was to be broad and invite a spectrum of answers (Paradis 2016).

**Data Collection Method**

For the data collection method we had to use a few strategies to try and attain representativeness. The first of which was to send the survey to all personal friends and ask them to spread the survey to their friends (snowball). This would primarily involve the demographics of college students, since we were conducting this research as a project on campus. We also sent the survey to families and contacts off campus, which would cover a variety of ages from 21–70 years old. Other than reaching out to the people we knew, we let the survey snowball as people spread word and sent it to their friends- especially through the use of Snapchat, Instagram, and Facebook.

**Response Rate**

Due to the access limitations of our survey, we were only able to bring together 129 total responses, from the original goal of 250. In addition, out of those 129, only 110 we could consider useable. We some difficulty due to the requirements of having responses be at least 21 years of age.

**Profile of the Sample**

In a 2012 study by the NCHS Data Brief, they found that 32.7 % of men and 18 % of women admit to consuming alcoholic calories every day (Nielsen, 2012). Figure 1 shows the findings regarding the amount of alcohol related calories consumed daily by each age group and gender. We mostly focus on the top bar, which is beer.

Figure 1 shows every age group and gender has some share of daily calories from beer. However, it is clear males and 29-39 drink the most calories from beer daily. We were not trying to go after a certain gender or age group when we surveyed, since such a broad demographic is involved. Although looking at our respondents, we obviously only allowed people over the age of 21 to answer any questions regarding alcohol consumption. Figure 2 shows the varying ages of respondents and the number of them in each age group.

Figure 2 shows Most of our respondents were younger, in the 21–25 years old group at 48.2 %. Also, we had a solid representation of the upper middle aged, 41–55 year olds at 32.7 %. We saw a small number from the remaining groups, most likely because they were harder to reach compared to college students and parents or guardians. As for gender we saw slightly more female respondents at 52 %, than males at 47.2 %. Although, that is relatively balanced and very close to 50 / 50. Figure 3 shows how often our respondents actually drink beer.

Figure 3 shows the majority of our respondents enjoy beer weekly, at just over 60 % of respondents either drinking beer every week or a few times a week. This result strengthens our respondents' answers because of their more constant and prevalent experience with beer. Therefore most of them will have an understanding of what they are being asked. Although Figure 4 shows whether respondents are actually concerned with the number of calories they consume when drinking beer.

Figure 4 shows Most of our respondents were not concerned about their calorie intake when they drink, at 54.5 %. This means most of our respondents are not necessarily paying attention to calories so they probably haven't thought of an association between the shape of beer cans and the amount of calories in them. However, a study in 2018 (IWSR, 2018), found most consumed type of beer in the US is light beer at 42.6 %. The next highest was much less, with premium at 13 %( Conway, 2019). This shows the obvious emphasis on lighter, less calorie heavy beer in America. This may not directly correlate with Americans being calorie conscious when they drink beer, but it does show the dominant success of lighter beers.

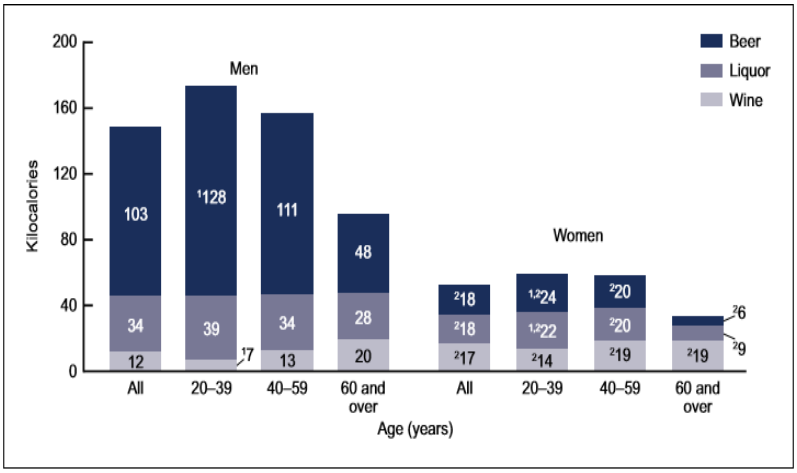


**Figure 1: Average Daily Consumption of Beer, Wine, and Liquor.**

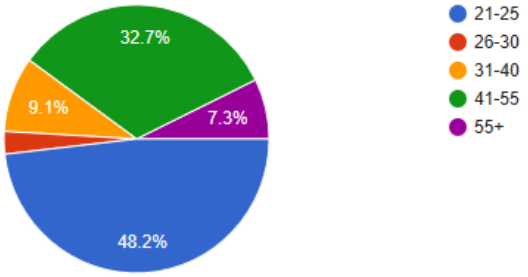


**Figure 2: Respondent Age.**

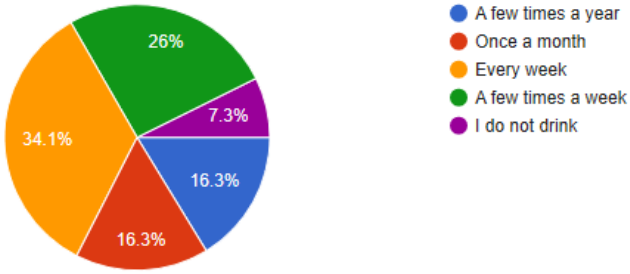


**Figure 3: Respondent Consumption Rate.**

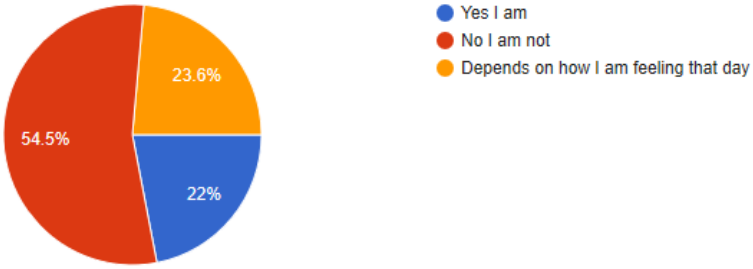


**Figure 4: Are You Concerned with Calories in Beer?.**

## RESULTS

Our overall results consisted of some surprising findings, which conflicted with our initial hypothesis that most people would likely perceive slimmer and taller beer cans to have few calories as opposed to shorter, bulkier containers. Our first finding, which was not that surprising, was that most respondents associated a bigger and fatter beer container with being more calorically dense than the other options (a regular can, a slim/tall can, and a regular beer bottle). These results are summarized in Figure 5.

Figure 5 shows most respondents (about 50 %) felt the bigger and fatter beer container was associated with having the highest caloric density. Surprisingly, though, the tall and slim can was in fact associated with having the highest amount of calories by about 25 % of all respondents; which is completely contrary to what our initial assumption.

Another surprising finding from our survey comes from Figure 6 depicting the containers associated with having the lowest caloric density. Figure 6 is below.

Figure 6 shows what was not as surprising about Figure 6 was the majority of respondents (about 40–45 %) felt the taller and slimmer can was associated with having the lowest caloric density. However, our initial assumption was a far greater number of respondents would have chosen the taller and slimmer can as having a lower caloric density. Additionally, the fact nearly 25 % of respondents thought a regular bottle was associated with lower calories was not necessarily surprising to us, since a regular bottle is also fairly tall and slim. It may be safe to assume had the beer bottle option not been a choice, the majority of those who picked the regular beer bottle as the least calorically dense looking container would probably had picked the tall and slim can instead, however this is just an assumption, and would require further investigation. Also, we did not anticipate over 25 % of respondents would think a regular beer can would look the least calorically dense. Reasons for these variations in expectations could have something to do with the fact the choices for the containers were presented as pictures in the online survey, which may have made the sizes look more similar than they would in real life. For this reason, the results may have changed if the survey was conducted in person with real containers of varying sizes. This point is discussed further in the limitations section.

Our group also analyzed what beer container participants would prefer if they had a choice, regardless of which one looked more or less calorically dense. These findings are depicted in Figure 7.

Figure 7 shows the vast majority of participants would choose a standard beer bottle over any of the other choices. This is likely due for a variety of reasons not necessarily related to the perception of caloric density. In other words, variables such as taste should be included in future replications.


**Figure 5: Calorie Perception and Can / Bottle Size**

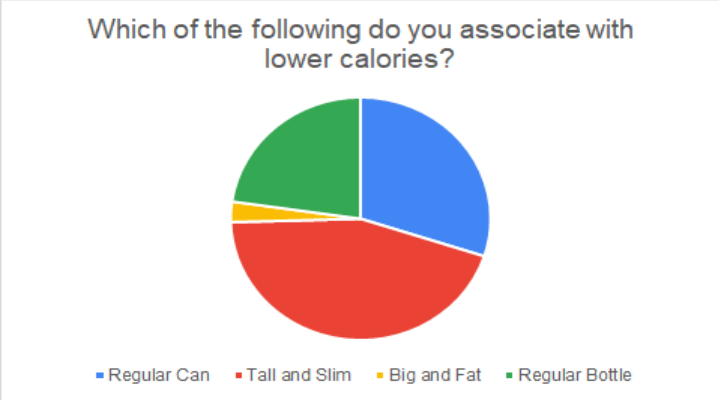


**Figure 6: Can or Bottle Size Associated with Lower Calories**

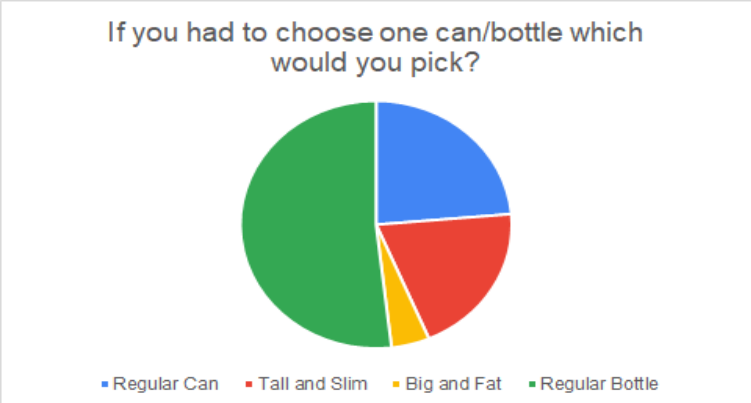


**Figure 7: Preferred Size of Beer Container**

## CONCLUSIONS AND RECOMMENDATIONS

In the analysis of our data, in addition to examining the amount of responses for one particular question, we also examined how different groups of respondents answered particular questions. The groups we examined were based upon gender (Male and Female respondents) and age brackets (21–25, 26–30, 31–40, 41–55 and 55 + years of age). Because of the fact there were major differences in the total number of respondents from one group to the next (for instance there were 60 female respondents, and 49 male respondents) instead of examining these numbers in absolute terms, we charted these responses as a percentage of the total number of responses for that group. As an example, in Figure 8 below, we examine the relationship between gender and the concern of calorie intake while consuming beer. In this chart, there were 15 females that responded they were concerned about calories in their beer, but since there were a larger number of total female respondents than male respondents, we graphed the number of females concerned about calories as 15 / 60 (or 25 %). This method was used for the rest of the charts seen below in this section.

Figure 8 shows as mentioned previously, the above chart depicts the percentage of female and male respondents who are concerned, not concerned, or sometimes concerned about the amount of calories in their beer. Based upon this chart, it can be inferred that generally, males are likely to be less concerned about the calories in their beer, while females are likely to be more concerned.

Figure 9 below examines the relationship between gender and which container from our survey was viewed as being associated with the lowest caloric density.

Below the Figure 9, it can be seen the tall and slim can was viewed by both genders as generally being associated with the lowest caloric density. However, females associated standard beer bottles as being much less calorically dense than males did, while males associated standard beer cans as being much less calorically dense than females did.

Additionally, Figure 10 examines the relationship between gender and the preferred container for beer to come, or be served, in.

Figure 10 shows males and females prefer the same types of beer containers, with most participants choosing a standard beer bottle as their preferred container. Females we slightly more likely to prefer tall and slim cans than males, while males were slightly more likely to prefer standard beer cans, as well as big and fat containers.

We also examined the relationships between the same association and preference questions as displayed in the figures above, only this time those results were paired with the age range of the respondents. Figure 11 examines the relationship between concern for calories in beer, and the age range of respondents.

Figure 11 shows it can be seen that among every age group, the majority of respondents were not concerned with their calorie intake while drinking beer, which is consistent with our findings when comparing the same question to the gender of the respondents. It can also be seen that 55 + year olds are slightly more likely than the other age ranges to be concerned with their calorie intake from beer, followed by 21–25 year olds. Again, these results were not what we were expecting before conducting this research, and are contradictory to our initial assumptions that, generally, people like to try and reduce their calorie consumption and are concerned with their 'healthiness'.

A potential reason for this discrepancy is that most people who drink beer already know it is generally not very healthy for them, and have essentially accepted the fact that no matter what kind of beer they consume, it is going to be unhealthy. Additionally, according to a study examining consumer preferences and opinions on 'healthy' beer, which was identified by the study as being light beer: most consumers perceived light beer as being healthier, and consumers also reported that, generally, healthier beer was viewed as being less tasty than regular beer (Chrysochou, 2014). Because of this, participants in this study that drink beer may feel less inclined to try and make 'healthier' choices when drinking because they dislike the taste of light, and lower calorie, beers, even though consumers do generally identify lighter beers as being easier to consume (Jaeger, et al. 2017), not necessarily more enjoyable.

Figure 12 examines the relationship between age and which container was associated with the lowest caloric density.

Figure 12 shows the tall and slim can was most often associated with the lowest caloric density, followed by the standard beer bottle, then the regular beer can. However, it is worth mentioning that the standard beer bottle was actually associated with the lowest calorie density for 31–40 year olds, and the tall and slim cans tied with the standard beer bottle among 55+ year olds, as well as the standard beer bottle and beer can among 26–30 year olds. There was a surprising amount of mixed results when examining this question based on the age range of participants, and would probably require further investigation in order to draw any basic conclusions from them.

Lastly, we examined the relationship between age range the preferred beer container. Figure 13 displays our findings.

Figure 13 shows the standard beer bottle is the preferred beer container among all age groups, followed by the standard beer can. The tall and slim can is only preferred by a relatively small number of respondents from the two oldest, as well as the youngest age ranges. The reasons for these preferences are likely due to the fact that standard beer bottles and beer cans have been around for so long that most people have grown accustomed to these standard sizes. Additionally, most beer can / bottle 'tools and accessories', such as "koozies", cup holders and other related products are designed for these types of containers; and an overly large, or undersized can/bottle would not work as well with those products. According to four separate multi-method studies, it has been observed the more elongated a container, the lower its purchase quantity by consumers (Yang & Raghubir, 2005); but it can be reasonably assumed that most people prefer standard size cans and bottles for these reasons.

This study has examined various shapes and sizes of beer containers, and their perceived caloric densities by different groups of respondents within our sample. However, it must also be noted many other factors contribute to how a product is perceived. A number of seemingly more important factors than a product's shape and size are its colour, label design, and what was identified as the most important method of communication between a product and a customer, the text displayed on the actual product (Zekrir & Hasani, 2015). Nonetheless, it can be seen from the results collected in this study, the shape and size of a beer container does in fact have an effect on the way consumers perceive the product, and what they associate it with. Although, our results did not invariably support our original hypothesis that taller and slimmer cans will make consumers perceive it has having fewer calories, we cannot conclusively disprove the null hypothesis that consumers do not perceive taller and slimmer cans as having fewer calories. This is because, even though the majority of overall respondents did indicate they associated the tall and slim can option with having few calories, too many variations and discrepancies exist within the data, to reject the null hypothesis conclusively. Further research must be undertaken with fewer limitations on the research methods, and an improved method of sampling participants, which would preferably consist of an in-person survey.

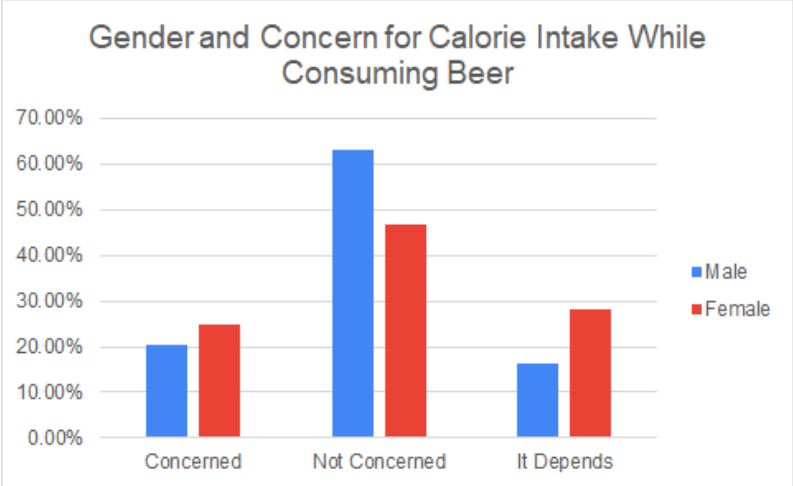


**Figure 8: Gender and Caloric Concern**

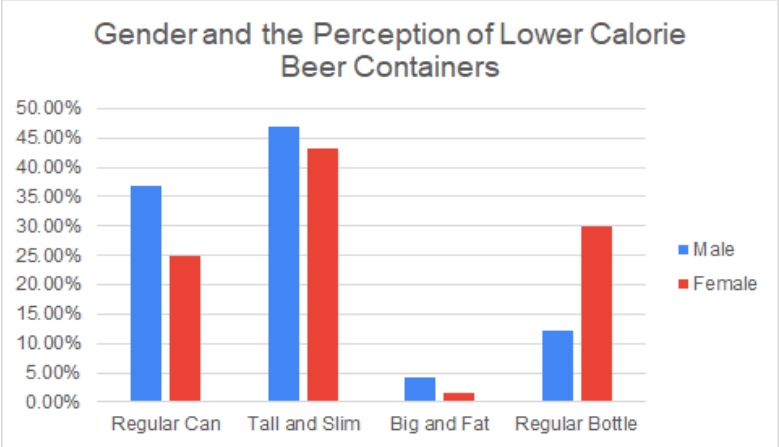


**Figure 9: Gender and Container Perception**

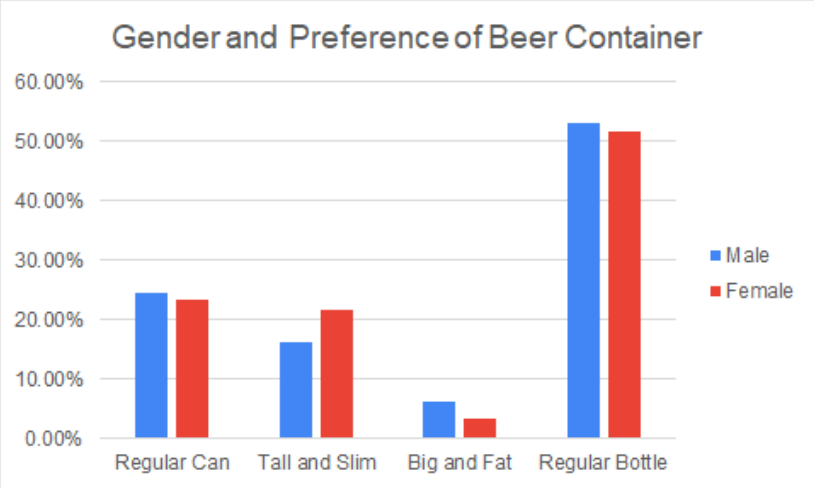


**Figure 10: Gender and Preferred Container**

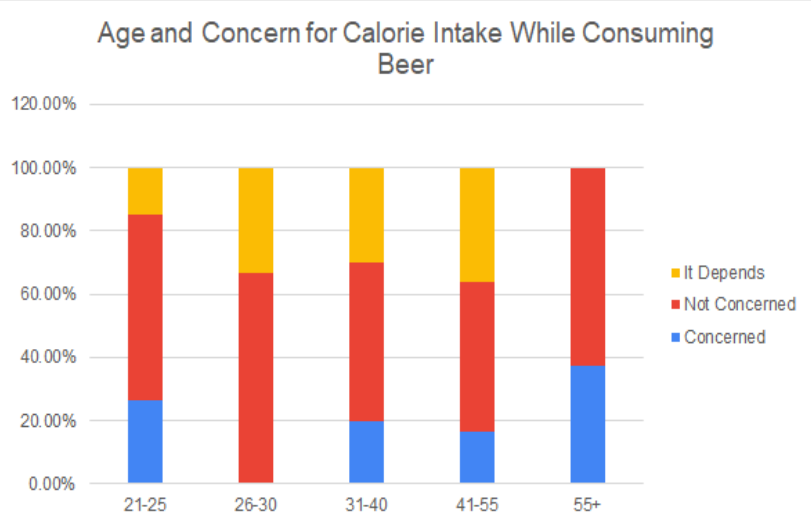


**Figure 11: Age and Concern for Calories**

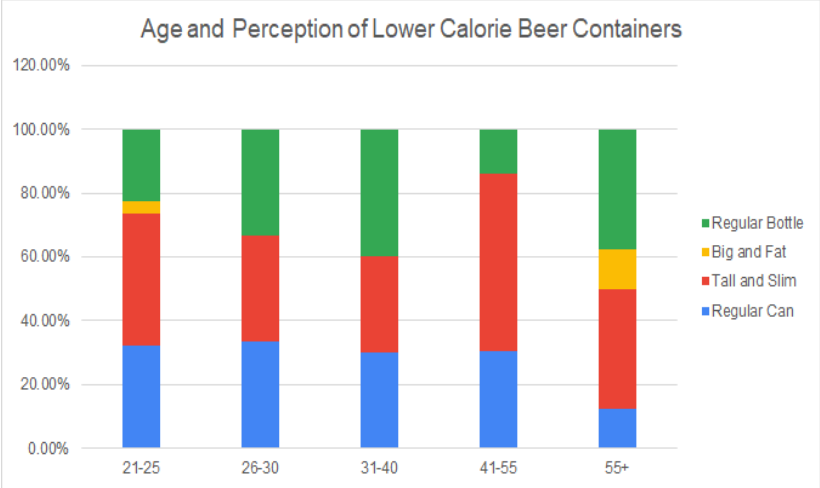


**Figure 12: Age and Container Perception**

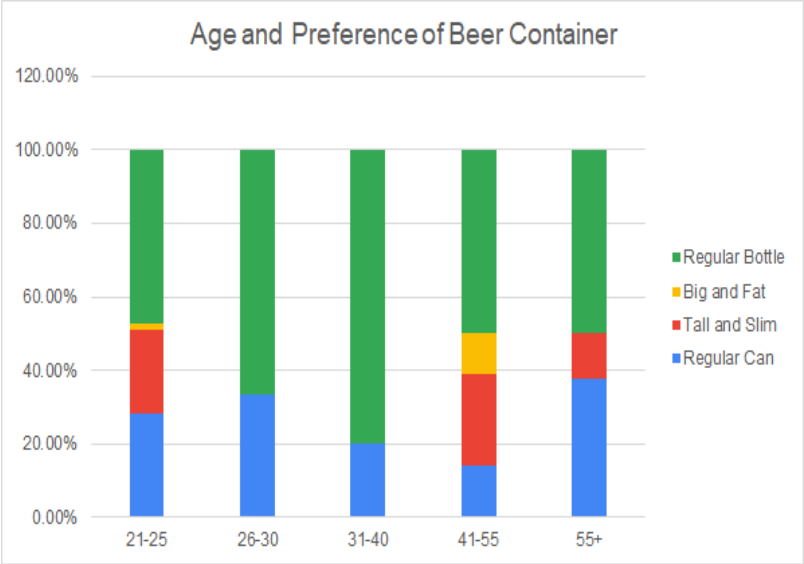


**Figure 13: Age and Preferred Container**

If any Conclusions or Recommendations were to be taken from this Study, it would likely be that:

- The shape and size of a beer container does have an effect on the way consumers perceive its caloric density.
- Generally, females are more likely to be concerned with their caloric intake while consuming beer, but the majority of both males and females are not concerned while doing so.
- There is some variation in opinions among age groups regarding the concern of caloric intake while consuming beer, as well as the perception of which container is associated with the lowest caloric density, and what the preferred beer container is.
- The most preferred beer container among all age groups and genders is the standard beer bottle, which was also generally associated with having the second lowest caloric density. Because of this, based off of our findings we might recommend to beer companies and manufacturers that if they wish for their customers to view their beer as having a lower caloric density than other beers, while at the same time putting their beer

in a container that appeals to the most amount of consumers, they should choose to put their beer in a standard long neck glass beer bottle.

## LIMITATIONS

There are multiple limitations to this study that could have had an impact on the quality and reliability of our results. Budget was also a major limitation on this study. No money was spent by any of the researchers or team members during the course of this study, and all the resources that were used in the development, collection, and analysis of results were obtained from free and open sources. Had our team had access to a reasonable budget, we would have been able to improve the quality of our results by obtaining additional resources during the course of our research, such as access to a focus group and a wider range of potential respondents.

Additionally, another major limitation of this study was geography (i.e. the location in which we conducted the study). There is a heavy bias in this study towards college-aged students. Nearly half of our total usable respondents were 21–25 years of age. Additionally, there is an even greater probability that not only does this study consist of mainly college students, but also those respondents are mostly from the northeast United States, and primarily New York; so this study is likely not using a representative sample of the total beer drinking population.

To go along with the above mentioned limitations, it must also be mentioned that because the study's sample size was so small, consisting of only 110 usable respondents, our failure to meet our intended goal of 250 usable respondents is also a noteworthy limitation for this study. Had we been able to gather a larger sample of respondents, the quality of our results and possible recommendations and conclusions drawn from them would have greatly improved.

Lastly, the inability for our team to put together an in-person survey or focus group using real life cans and bottles, which for this type of research would have been preferable to having respondents view pictures of containers on a computer screen, is also a notable limitation of this study. This is because the size differences in cans and bottles are much more pronounced when viewed in person than when viewed on an electronic device. In fact, it was noted in a recent study examining the impact of product presentation over the internet that “consumers, in general, perceive elongated packages to be larger [than they actually were]” (Al-Samarraie, 2019). This means that, more than likely, a number of our respondents may have perceived the long and slim can as being larger than the other containers, when in fact if viewed in person, it would be seen as being smaller. This means the number of respondents that felt the long and slim can was associated with few calories may be lower than it otherwise would be.

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