

Obesity and Residence Hall Satisfaction Among Differing BMI Levels

by

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## TABLE OF CONTENTS

<b>ABSTRACT</b>	<b>v</b>
<b>LIST OF TABLES</b>	<b>vii</b>
<b>LIST OF FIGURES</b>	<b>ix</b>
<b>1. INTRODUCTION</b>	<b>1</b>
Purpose of the Study	2
Research Questions	3
Theoretical/Conceptual Framework	4
Transactional Theory	4
Behavior Setting Theory	4
Assumptions	5
Definition of Terms	6
Delimitations	10
Significance of the Study	11
<b>2. REVIEW OF LITERATURE</b>	<b>13</b>
Basic Background Facts	12
Obesity Facts	14

Obesity & Genetics	16
Satisfaction	22
Eating Choices	23
Living On Versus Off Campus	28
Costs Related to Obesity	32
Human Factors and Ergonomics	34
Housing on Texas Tech University Campus	35
Summary	39
<b>3. METHODOLOGY</b>	<b>41</b>
Research Questions	41
Research Rationale	42
Quantitative Research	42
Strategy/Context of the Study	43
Survey Questionnaire	43
Data Collection Methods	43
Survey Construction	44
Data Sources	45
Selection of Participants	45
Data Analysis	48
Data Management Plan	49
Survey Procedure	49

Recruitment	50
In Class Announcement of Survey	50
TechAnnounce Survey	52
Data Analysis Method	52
Basic Statistical Analysis	52
Reliability and Validity	59
Factor Analysis/Reliability	59
Regression	59
Main Question	59
Subquestions	59
<b>4. RESULTS</b>	<b>61</b>
Factor Analysis and Reliability Results	63
Regression Analysis Results	64
Regression Analysis Main Question	64
Regression Analysis-Subquestion 1	68
Regression Analysis-Subquestion 2	70
<b>5. DISCUSSION OF FINDINGS</b>	<b>72</b>
Regression Analysis	73
Main Question	73
Sub-Question 1	74
Sub-Question 2	74
Limitations	75
Future Research	77

Interpretation	78
<b>REFERENCES</b>	<b>80</b>
<b>APPENDICES</b>	<b>90</b>
A. Survey Monkey Survey Questions	90
B. Baylor University Double Room* Accommodations	94
C. Supplemental Tables	101

## **ABSTRACT**

Research has shown numerous areas of design can influence the physical activity and dietary choices of individuals (Trowbridge, et al., 2013). Obesity and its relationship to design is a relatively new topic; although, with the increasing obesity rates within the United States, a change needs to be made. Although this obesity problem is relatively new, it is more of a concern among American children, whose obesity rates having tripled since 1980 (Vitelli, 2013). This age group is particularly prone to weight gain, which is vital since the choices made now will affect the rest of their lives, for example, a lower quality of life and being overweight as an adult (Harvey-Berino, Pope, & Gold, 2012).

The home environments, in which individuals eat, sleep and live, can have a significant impact on their body type including their weight. Living on campus provides students with housing close to classes, countless nearby food options, various on campus exercise opportunities, and many more benefits. Multiple aspects can play a role in the amount of weight gained or lost by an individual, but this study specifically focuses on the relationship between BMI and satisfaction. The food and exercise choices individuals make as well as the built environments they use can facilitate or hinder physical activity and healthy eating (Booth, Pinkston and Poston, 2005).

Through the review of literature it was apparent that there was a need for spaces to be designed with obesity and satisfaction in mind. According to the Herman Miller, 2007, the residence hall plays a significant role in a student's decision to go to that particular school. The purpose of this research study is to determine the relationship between satisfaction levels of residence halls on the campus of Texas Tech University and the four differing weight groups of individuals. It is important to determine how the

existing as well as new on campus residence halls should be designed and changed in order to help improve the resident's satisfaction.

Through statistical analysis it was proven that BMI did significantly predict an individual's opinion on room layout when choosing a traditional room style residence hall on the campus of Texas Tech University. While the relationship between overall satisfaction and an individual's decision to stay residing in the residence halls on the campus of Texas Tech University could not be determined, there was not a statistically significant relationship found between these two variables and body mass index.

This area of research is important to both design and the campus of Texas Tech University because it is important to design to satisfy the needs of the individuals residing within your space. It is important to the University because it allows them the opportunity to see relationships between design and their dwellers and could possibly change the way their residence halls are designed in the future. Future research could go further in depth in this area of study by looking closer at reasons behind BMI influencing an individual's opinion on room layout.

## LIST OF TABLES

2.1	Prevalence of obesity among children and adolescents aged 2-19, by sex and age: United States, 2009-2010	17
2.2	Daily Recommendation of Fruit Intake	26
2.3	Recommended Daily Dairy Intake	27
2.4	Texas Tech University on Campus Living Options	36
3.1	Room Furnishings and Dimensions- Shared Rooms with Build-In Furniture	47
3.2	Survey Participation Information	52
3.3	Tests of Normality	55
3.3	Mahalanobis Distance Coefficients Table	56
3.5	Skewness	57
3.6	Kurtosis	58
4.1	Factor Analysis Table	65
4.2	Model Summary Output Table, Main Question	67
4.3	Model Summary Output Table, Sub-Question One	69
4.4	Model Summary SPSS Output Table, Sub-Question Two	73

## LIST OF FIGURES

2.1	2010 Obesity percentages in U.S. Adults	19
2.2	2012 Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory	20
2.3	2017 Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS	21
2.4	MyPlate	24
2.5	Inadequate Facility at Rejected Institution (%)	31
2.6	Baylor University Penland Hall	37
3.1	Room Layout	48
4.1	Roommate Breakdown	62

## CHAPTER I

### INTRODUCTION

Research regarding the relationship between obesity among differing age groups and the built environment is strong. Research has shown that numerous areas of design can influence the physical activity and dietary choices of individuals (Trowbridge, et al., 2013). Obesity and its relationship to design is a relatively new topic; although, with the increasing obesity rates within the United States, a change needs to be made. According to Booth, Pinkston and Poston (2005) researchers studying the built environment and obesity are primarily concerned with one question “whether community design factors might prevent individuals from engaging in physical activity while encouraging them to select and eat more energy-dense and low-nutrient-value foods” (Booth, Pinkston and Poston, 2005, pg. S111).

Community perceptions of seriousness of health problems rank overweight and obesity as the second highest concern, after cancer (81%). With women (81%) being twelve percent more likely than men (69%) to say that obesity is a concern (NORC T. A., 2013). More specific to this research study, obesity among the college-aged individuals of the United States begins with an average weight gain of 1.6 pounds within the first 5 months of their freshman year to an average of 8.8 pounds over the course of the entire year (Harvey-Berino, Pope, & Gold, 2012). In addition, the weight gain rate within the first five years of college aged individuals is 6.7 times greater than what is expected of an American adult (Harvey, Berino, Pope & Gold, 2012). Although this obesity problem is relatively new, it is more of a concern among American children, whose obesity rates

having tripled since 1980 (Vitelli, 2013). This age group is particularly prone to weight gain, which is vital since the choices made now will affect the rest of their lives, for example, a lower quality of life and being overweight as an adult (Harvey-Berino, Pope, & Gold, 2012).

Harvey-Berino, Pope and Gold (2012) expressed that new interventions for college aged students need to be developed to assist with the obesity epidemic. Finkelstein, et al. (2012) stated that by the year 2030 as much as 51% of the United States population will be obese if today's rates are consistent. If obesity levels are kept at 2010 rates, it will save \$550 billion in health care related costs. Little research has been conducted strictly regarding individuals within this age group. Based on the findings of Gokee-LaRose, Gorin, Raynor, Laska, Jeffery, Levy and Wing (2009), there is an extreme need for research regarding the recruitment and retention techniques for this age group.

### **Purpose of the Study**

The relationship among satisfaction, obesity and design is the main topic of research within this study. The design of spaces used on a daily basis are affected by an individual's satisfaction as well as the size of an individual. The design of community spaces are being affected by the obesity epidemic which can be seen within the design of hospitals, ambulances, as well as residential environments. The purpose of this research study is to determine the relationship between satisfaction levels of residence halls on the campus of Texas Tech University and the four differing weight groups of individuals. It

is important to determine how the existing as well as new on campus residence halls should be designed and changed in order to help improve the resident's satisfaction.

### **Research Questions**

Due to the lack of knowledge and research on this topic, for this particular age group, it is necessary to fill the research gap by answering the questions society does not currently know about this age group. The objective of this study is to determine three main research questions regarding satisfaction of residence hall living environments on university campuses. The hypothesis for this study is that there is a negative correlational relationship between BMI and satisfaction levels of individuals.

The main question addressed within the research study is, is there a relationship between satisfaction levels of individuals and BMI of varying levels within current traditional room style residence halls on the campus of Texas Tech University? To address the part you highlighted, should it read, is there a difference between satisfaction levels of individuals with a higher BMI rather than a lower BMI within current traditional room style residence halls? The following sub-questions will also be discussed:

**Question 1:** Is there a relationship between BMI and an individual's opinion on room layout when choosing a residence hall on the campus of Texas Tech University?

**Question 2:** Is there a relationship between an individual's decision to continue to live in the residence halls on the Texas Tech University campus and body mass index?

## **Theoretical/Conceptual Framework**

**Transactional Theory.** Transactional theory “is a method of inquiry that concentrates on patterns of relationships and states that the human-environment relationship is mutually supportive” (Kopec, 2006). In simpler terms, design affects individuals just as much as individuals affect design. This can be seen with the design of environments such as the Cornell kitchen triangle. The kitchen triangle was designed to save time for the user. There are three zones of the kitchen which were put within reach of each other to save time for the user. Within this setting, the design of the space is determining the way the user performs. Individuals affecting design can be seen in the design of new environments or furniture. When designers design new buildings or furniture they have to take into consideration the sizes of these individuals. An example of this would be chair selection in a healthcare environment. If a new space was being designed for a doctor specializing in bariatrics, for example, the individual would influence the furniture selection. Furniture chosen within this area will typically require stronger chairs made for bariatric patients.

**Behavior Setting Theory.** Behavior-setting theory was conceived by Roger Barker, who defined this theory as “public places or occasions that evoke particular patterns of behaviors” this theory also suggests that behaviors must be studied in their natural contexts (Kopec, 2006). The design of built environments directly affect the way individuals function in their everyday lives, hence fitting with the behavior setting theory. Individuals act specific ways depending on the type of environment they are in. For example, if an individual is in an area where physical activity is seen as positive and is

highly encouraged, then the individuals living in that area or using that area will have a higher probability of getting more physical activity. According to the Committee on Environmental Health, the physical layout of a community can both promote and prevent physical activity within the area, if communities are supporting an active lifestyle, then the design of neighborhoods can promote physical activity patterns (Committee on Environmental Health, 2009). An example of this taking place is within the NeighborWalk program created by the Boston Public Health Commission. This program was developed of 56 walking groups in seven racially diverse neighborhoods. These neighborhoods were known for having a high prevalence of priority diseases and risk factors, this program allows residents to walk together as little as once a week for thirty minutes to one hour (Centers for Disease Control and Prevention, 2011). Developing a behavior setting according to Barker is done in public environments that contain the following three things 1) physical properties 2) social components, and 3) the environmental setting (Kopec, 2006).

### **Assumptions**

Assumptions that can be made for this study vary among all areas. The first assumption is that all students who are freshman generally live on campus. This is not always true as there are exceptions. Students who are from Lubbock or own a home in Lubbock can forgo this option. Though undergraduate students who do not fit the criteria to live off campus, must live on campus until they have 30 hours of college credit (not including high school-college credit). One more assumption is that individuals who are

larger may not be as satisfied with their living situations because they have less room for everyday tasks.

### **Definitions of Terms**

*Behavior-setting*: Physical or psychological environment (i.e., place or occasion) that elicits or supports certain patterns of behavior that are based on the environmental design and learned as a result of operant conditioning (Kopec, 2006).

*BMI- Body Mass Index*: “BMI is calculated by taking your weight in kilograms and dividing it by your height in meters squared (Nelson & Zeratsky, 2010); an index for assessing overweight and underweight, obtained by dividing body weight in kilograms by height in meters squares: a measure of 25 or more is considered overweight (Dictionary.com, BMI, 2015).

*Built environment*: “The built environment includes all of the physical parts of where we live and work (e.g., homes, buildings, streets, open spaces, and infrastructure) (CDC, Impact of the Built Environment on Health, 2011)

*Closed-ended question*: A question on a questionnaire or interview for which a limited number of possible responses are specified in advance (Slavin, 2007)

*Comfort*: (Merriam-Webster, Comfort, 2015)

- a. To cause (someone) to feel less worried, upset, frightened, etc.: to give comfort to (someone)

- b. To give strength and hope to
- c. To ease the grief or trouble of

*Correlational Study:* A non-experimental research design in which the researcher collects data on two or more variables to determine if they are related (that is, is they consistently vary in the same or opposite directions) (Slavin, 2007)

*Effect Size:* The measure of difference or relatability between factors (Sawilowsky S., Sawilowsky J., Grissom R.J., 2011)

*Ergonomics:* (Merriam-Webster, Ergonomics, 2015)

- a. A science that deals with designing and arranging things so that people can use them easily and safely
- b. The parts or qualities of something's design that make it easy to use  
An applies science concerned with designing and arranging things people use so that the people and things interact most effectively and safely-  
called also biotechnology, human engineering, human factors

*Greenspace:* "land that is partly or completely covered with grass, trees, shrubs, or other vegetation. Greenspace includes parks, community gardens, and cemeteries" (EPA, 2014).

*IRB- Institutional Review Board:*

- a. "IRBs must approve proposed non-exempt research before involvement of human subjects may begin" (U.S.DepartmentofHealth&HumanServices, n/a) "The IRB's mission to protect the rights and welfare of human

subjects participating in research” (TTU, HUMAN RESEARCH PROTECTION PROGRAM (HRPP), 2015)

*Open-ended questions:* (Merriam-Webster, Open-ended, 2015)

- a. Able-to change: not ending in a certain way or on a certain date
- b. Allowing people to talk in a way that is not planned or controlled
- c. Not rigorously fixes: as
  - i. Adaptable to the developing needs of a situation
  - ii. Permitting or designed to permit spontaneous and unguided responses

*Monogenic:* “of or relating to, or controlled by a single gene and especially by either of an allelic pair” (Merriam-Webster, Monogenic, 2015)

*Multiple Regression:* Explains the relationship between a dependent variable (criterion variable) and at least two (or more) independent variables (predictors) (Slavin, 2007)

*Noise:* (Merriam-Webster, Noise, 2015)

- a. A loud or unpleasant sound
- b. A sound that someone or something makes
- c. Unwanted electronic signals that harm the quality of something (such as a radio or television broadcast or digital photograph)

*Non-experimental quantitative design:* A research study where the researcher strictly measures or observes study subjects for the purpose of observing/measuring and does not attempt a treatment (Slavin, 2007)

*NORC:* “NORC at the University of Chicago serves the public interest and improves lives through objective social science research that supports informed decision making” (NORC, n.d.).

*Quantitative Research:* Gathering and analyzing data that is able to be measured and expressed in numerical form (Law, 2011).

*Satisfaction:* According to Merriam-Webster, satisfaction is “a happy or pleased feeling because of something that you did or something that happened to you: the act of providing what is needed or desired, the act of satisfying a need or desire: a result that that deals with a problem or complaint in an acceptable way (Merriam-Webster, Satisfaction, 2015). Satisfaction has many meanings, in terms of this particular research study; satisfaction is based on the resident’s opinions of everyday activities and features that they use frequently. For this particular study, satisfaction “refers to individuals’ appraisal of the conditions of their residential environment, in relation to their needs, expectations and achievements” (Amerigo & Aragonés, 1997). Other definitions of satisfaction are “A measure of the gap between consumers’ actual and aspired needs” (Galster, 1987). It is considered a very useful criterion in the evaluation of housing because it indicated the general levels of success, measures the users’ affective and cognitive responses, points out the irksome aspects of dwelling environments

and predicts user responses to future environments. It also helps to identify the contribution of various factors to satisfaction, the differences between different types of factors and the relationships between various dimensions of the residential environment” (Amole, 2009, p. 76)

*Statistical Significance:* A determination using statistics that a given relationship between variables is unlikely to have happened by chance (Cohen, 1994).

*USDA- United States Department of Agriculture:*

- b. Mission Statement: “We provide leadership on food, agriculture, natural resources, rural development, nutrition, and related issues based on sound public policy, the best available science, and efficient management” (USDA, Mission Statement, 2014)
- c. Vision Statement: “To expand economic opportunity through innovation, helping rural America to thrive; to promote agriculture production sustainability that better nourishes Americans while also helping feed others throughout the world; and to preserve and conserve our Nation’s natural resources through restores forests, improved watersheds, and healthy private working lands” (USDA, Mission Statement, 2014).

## **Delimitations**

Delimitations within this study would be traditional style residence halls on the campus of Texas Tech University. Traditional style residence halls were chosen because it gives the opportunity to gather more participants from areas that are created exactly the

same. The more information the study gathers, the more beneficial it will be. It will not be necessary for information to be gathered regarding other residence halls, they will not be used in the comparison. For future studies, it may be interesting to gather data regarding the same type research for non-traditional residence halls and compare to traditional style residence halls.

Any level students who are currently living in the residence halls will be the study participants. It is important for individuals of all class ranks to express their satisfaction about the residence halls. It is important to acquire individuals who live there currently, therefore, the information for the questions is fresh and they are not remembering their feelings from previous years. If surveying an individual who does not currently live in the residence halls, they may not recall exactly how they felt when they lived in the residence halls in previously.

### **Significance of the Study**

The home environments, in which individuals eat, sleep and live, can have a significant impact on their body type including their weight. Living on campus provides students with housing close to classes, countless nearby food options, various on campus exercise opportunities, and many more benefits. Students are moving away from their home environments where they are transitioning from routines which have been set forth by their guardians, to college environments where they have new daily routines (Small, Bailey-Davis, Morgan, Maggs, 2012). Multiple aspects can play a role in the amount of weight gained or lost by an individual, but this study specifically focuses on the relationship between BMI and satisfaction. The food and exercise choices individuals

make as well as the built environments they use can facilitate or hinder physical activity and healthy eating (Booth, Pinkston and Poston, 2005).

## **CHAPTER II**

### **REVIEW OF LITERATURE**

To fully understand the relationship between satisfaction, obesity and design, background knowledge is necessary on all three areas. Throughout this review of literature, topics related to obesity and satisfaction, will be discussed thoroughly to allow for background knowledge on the areas of focus. Information for this literature review was gathered through online sources such as Google Scholar, books, websites and journal articles.

#### **Basic Background Facts**

Although the relationship between obesity, satisfaction and design does not necessarily seem to be strong, living environments of individuals do impact lifestyle factors like food choices (Brunt and Rhee, 2008). When college students transition into this new phase of life, they are beginning a stage where the choices they make will impact their future. The transition into young adulthood is a critical stage in a student's life for developing obesity, this period has also shown a decline in healthy eating and physical activity (Nelson, Kocos, Lytle and Perry, 2009). According to Small, Bailey-Davis, Morgan and Maggs (2013) a college student's daily behaviors and routines will potentially affect their health status during their college career and into adulthood. This period of life is a dangerous time for excess weight gain. A limited number of these students have strategies for coping with the change they are about to experience (Nelson, Kocos, Lytle and Perry, 2009).

From a student's perspective, the living choices one makes when entering college may not seem important. Living choices can have an impact on an individual's body type by influencing one's eating and physical activity behaviors (Small, Bailey-Davis, Morgan, Maggs, 2012). While students' progress through college it is common for their living situations to change, workloads and extracurricular activities increase, leaving less time for sedentary activities (Small, Bailey-Davis, Morgan, Maggs, 2012). Less time spent performing sedentary behaviors is a benefit since individuals will be increasing their physical activity.

According to Najib, Yusof and Sani (2012), the ideal housing will "give" the student a silent place to study, provide security and privacy, promote friendships among residents, and help to achieve future housing needs and desires to better the environments for future students (Najib & Sani, 2012). The satisfaction levels of students are of particular importance. If their needs are met they will be satisfied and potentially choose to live longer on campus. According to Kaya and Erkip (2001), due to the public nature of residence halls the satisfaction of students is a harder goal to achieve. The activity levels and quality of eating choices can improve with the help and support from the university as long as these behaviors are established during the early stages of living (Small, Bailey-Davis, Morgan, Maggs, 2012). Designers can play a role in the design of environments to try and promote these areas for future living options.

### **Obesity Facts**

Approximately fifty-seven percent of individuals between the ages of twenty to thirty-nine years of age are overweight or obese (Nelson and Story, 2009), which is why

this college age group was chosen for this particular study. These individuals have increased health problems and have been shown to have a lower quality of life. This population has more functional limitations as well as has a lower life expectancy (Lehnert, Sonntag, Konnopka, Riedel-Heller and Konig, 2013). According to Small et. al., (2013) college students within today's society are currently gaining weight at almost six times the general population. Through the incorporation of features geared towards a healthier lifestyle, these outcomes could be changed.

The World Health Organization (WHO) has estimated that as of the year 2006 there were at least 400,000,000 adults throughout the world that were obese. The number of obese individuals in the world is projected to double by the year 2015 (Withrow and Alter, 2011). The college-aged population within the United States makes up 21% of the obese population (Hlang, W., Nath, S. D., & Huffman, F. G., 2007). These individuals having weight issues now can lead to health problems in the future such as cardiovascular disease (CVD). Research has shown that this age group has the highest increase in obesity between the years of 1991-1997 (Hlang et. al., 2007). As the population of the United States continues to rise, it is only expected that this age group will continue to rise as well.

The obese population continues to increase and this is a major concern for our society. Obesity is a problem throughout the rest of the world as well, with one-third of the adult population being obese as of 2008 (Lehnert, Sonntag, Konnopka, Riedel-Heller and Konig, 2013). Evidence has shown that obesity does negatively impact individuals, healthcare, employers and the economy in general (Lehnert, Sonntag, Konnopka, Riedel-

Heller and Konig, 2013). This negative impact is due to these obese individuals using considerably more services in terms of healthcare. With all the technological, economic, and social changes happening within today's society, environments conducive to weight gain have been created.

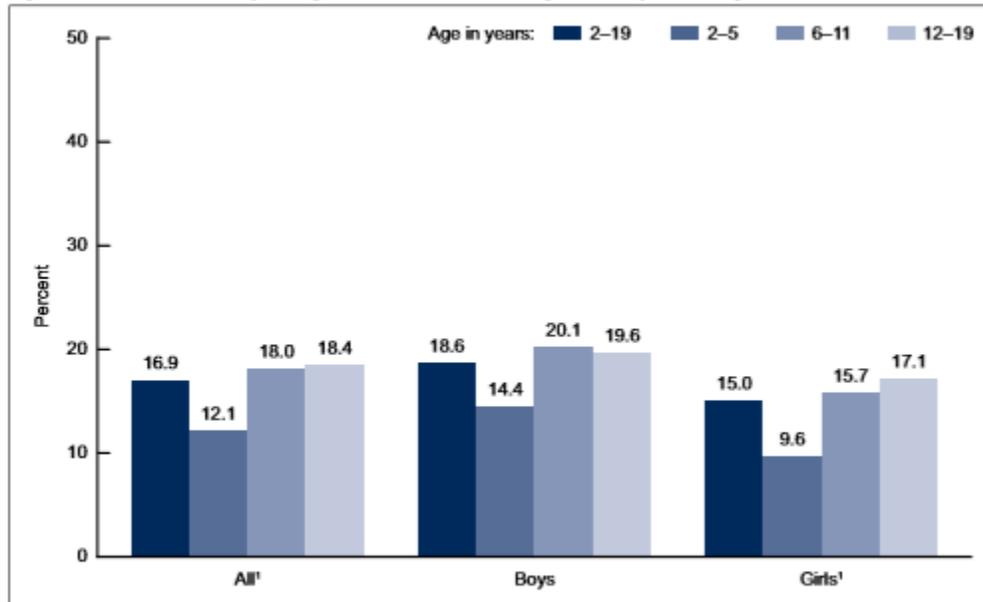
### **Obesity and Genetics**

Although obesity can be related to genetics there have not been any dominant genes discovered whose presence is essential or sufficient in causing obesity (Booth, Pinkston and Poston, 2005). Therefore the chance of genetics being the reason behind an individual becoming obese is low. Although an individual's genes can technically influence obesity, genetic changes in humans occur too slowly to be responsible for this obesity epidemic (CDC, 2013).

There are two different types of obesity related genetics; monogenic (a specific variant of a single gene) which is rare. The second type of obesity related genetics is multifactorial (complex interactions of multiple genes and environmental factors) obesity, which is the case in most situations (CDC, 2013). The CDC states that obesity is the effect of an energy imbalance occurring when a person's body burns less calories than they consume. There are associations with obesity and diabetes, heart disease, strokes and forms of cancer (CDC, 2013), making obesity an important topic. The breakdown of obesity among age groups from ages two to nineteen can be seen in Table 2.1. This figure shows the age group of twelve to nineteen having the highest prevalence of obesity overall among boys and girls.

Table 2.1.

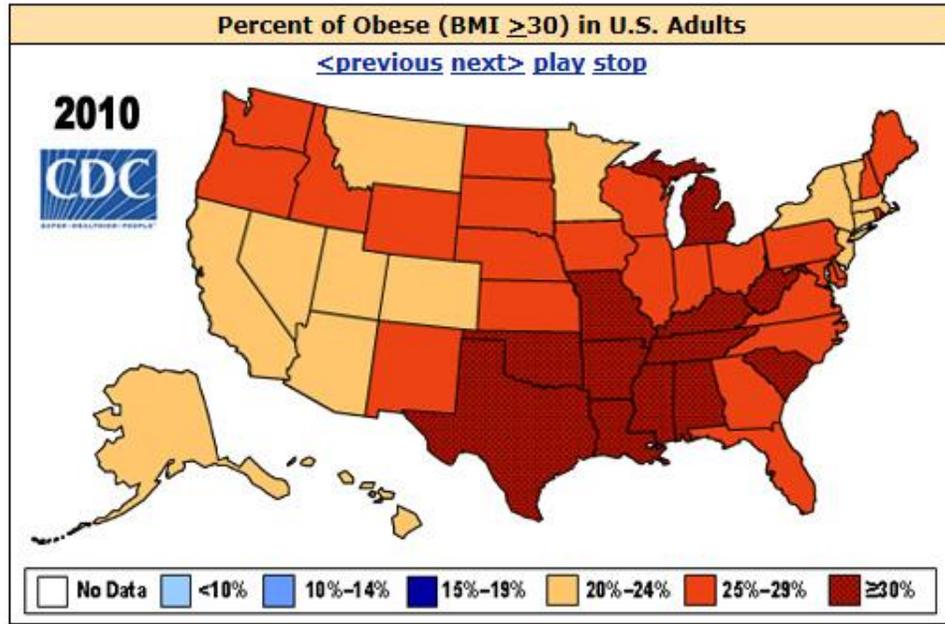
*Prevalence of obesity among children and adolescents aged 2-19, by sex and age:  
United States, 2009-2010*



<sup>1</sup>Significant increasing linear trend by age ( $p < 0.005$ ).  
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey, 2009-2010.

*Note:* Reprinted from “Prevalence of Obesity in the United States, 2009–2010”, by Ogden, Carroll, Kit & Flegal., (2012). Retrieved from website: <http://www.cdc.gov/nchs/data/databriefs/db82.pdf>

As previously stated, obesity is a rising problem and has substantially increased in recent decades, now it is one of the major health problems globally (Lehnert, Sonntag, Konnopka, Riedel-Heller and Konig, 2013). The changes over nine years in terms of obesity in the United States can be seen in figures 2.1 – 2.3, these figures show how the obesity levels have increased throughout the nation.



*Figure 2.1.* 2010 Obesity Percentages in U.S. Adults

*Note:* Reprinted from “Adult Obesity Facts”, by Centers for Disease Control and Prevention. 2013, August 16. Retrieved from <http://www.cdc.gov/obesity/data/adult.html>



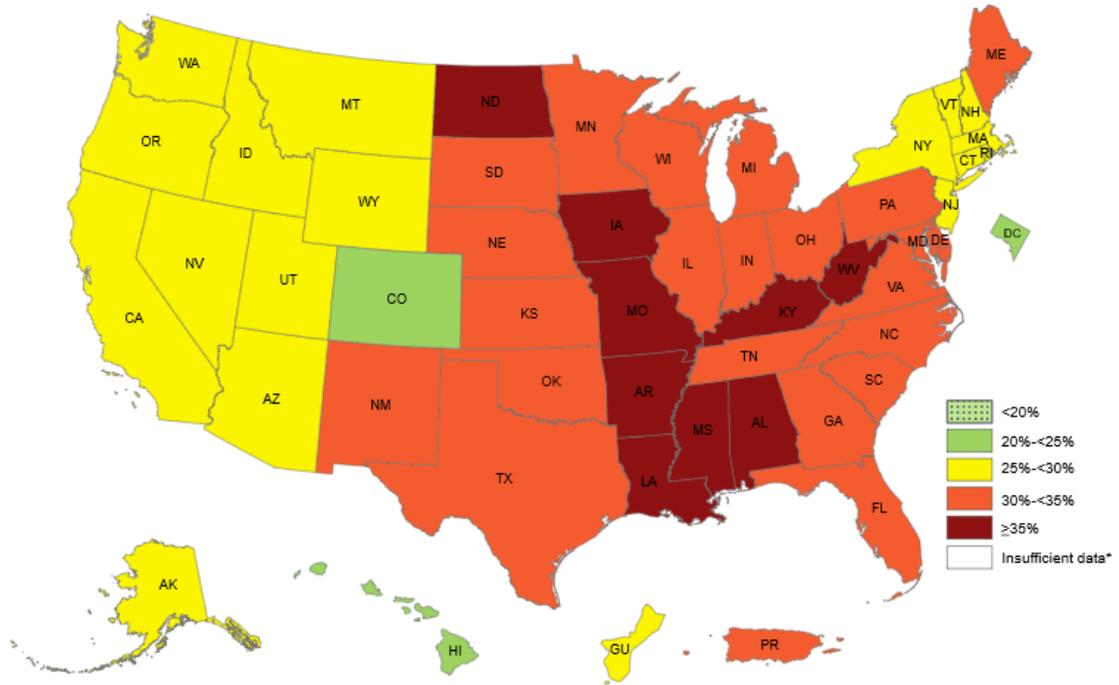


Figure 2.3. 2017 Prevalence of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2018

Note: Reprinted from “Adult Obesity Prevalence Maps”, by Centers for Disease Control and Prevention. 2019, September 12. Retrieved from <https://www.cdc.gov/obesity/data/prevalence-maps.html>

## **Satisfaction**

Satisfaction can be measured in multiple ways, in terms of this research study satisfaction will be measured on a Likert scale with one counting as strongly disagree and six counting as strongly agree. According to Merriam-Webster, satisfaction is

“a happy or pleased feeling because of something that you did or something that happened to you: the act of providing what is needed or desired, the act of satisfying a need or desire: a result that that deals with a problem or complaint in an acceptable way” (Merriam-Webster, Satisfaction, 2015).

Satisfaction for this research study; is based on the resident’s opinions of everyday activities and features that they frequently use. Also for this research study satisfaction “refer(s) to (an) individuals’ appraisal of the conditions of their residential environment, in relation to their needs, expectations and achievements” (Amerigo & Aragonés, 1997).

Whether an individual is or is not satisfied with their residence hall environment, the dissatisfaction they feel can play a part in whether the student returns to campus for housing in the future. According to Najib, Yousof and Osmans (2011) there have been few studies conducted on the satisfaction among university level individuals. The lack of research on this age group allows for an opportunity for new research regarding differing weight classes. The relationship between obesity levels and residence hall satisfaction may be significant and lead to the creation of new residence halls or the update of existing residence halls. According to a 2004 study regarding life satisfaction and body weight, there was a relationship between BMI and satisfaction levels with a greater BMI being associated with a lower satisfaction level (Ball, Crawford, & Kenardy, 2004).

## **Eating Choices**

Through the incorporation of locally grown food the community of Texas Tech University has access to a varied diet depending on the season, which includes plentiful fruit and vegetables meaning fewer intake of high sugar, fat and salt foods (Lake, Townshend, & Alvanides, 2010). The costs of healthy foods, have been shown to have an effect on what individuals eat or buy, more than half of the women within the NORC study believed that the costs of the foods are a major point that increases obesity (Kerr & Adiesta, 2013). Women are also more likely to blame easy and cheap fast food options while at the same time believing that the food industry should take a lot of the responsibility for finding the solutions (Kerr & Adiesta, 2013).

According to Harvey-Berino, Pope, Gold, Leonard and Belliveau (2009) college aged students show bias about their health behaviors. Bias could decrease this age groups motivation to change their current habits, because they do not feel they have a problem when comparing themselves to others around them (Harvey-Berino, Pope, & Gold, 2012). When an individual shows bias, getting them to realize something is wrong or that they have a problem could be a challenge, they might ask themselves “Why would I fix or change how I live and eat if nothing is wrong with me now?”

Multiple changes can be made throughout the world, as well as on the Texas Tech University campus. By creating partnerships between the university and the community, the food environments of these students can improve. The college years for these students are an ideal time to gain structured support to practice good health behaviors in the future (Small, Bailey-Davis, Morgan and Maggs, 2012). Though citizens do see the

need to do something about the obesity epidemic, six out of ten people surveyed within the NORC study oppose taxes, which target unhealthy foods, these taxes are known as soda or fat taxes (Kerr & Adiesta, 2013). One other key food “law” that individuals do not agree with is being restricted on what they can buy, 75% of individuals disagreed with this incorporation (Kerr & Adiesta, 2013) Although incorporating a “fat tax” on items may seem a little extreme, it may in-fact one step in the right direction, a change needs to be made towards this direction but perhaps not this excessive.

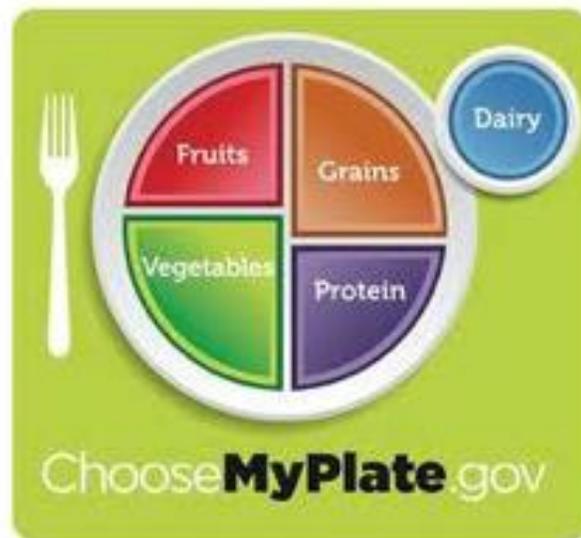


Figure 2.4. MyPlate

*Note:* Reprinted from “Adult Obesity Prevalence Maps”, by Centers for Disease Control and Prevention. 2019, September 12. Retrieved from <https://www.choosemyplate.gov/>

The new MyPlate (see Figure 2.5) was released on June 2, 2011, and is used in place of the older food pyramid. MyPlate shows individuals to focus on fruits, vary the vegetables, have at least half of your grains come from whole grains, go lean when choosing proteins and lastly, calcium-rich foods are important (USDA,

ChooseMyPlate.gov, n/a). The website, [www.choosemyplate.gov](http://www.choosemyplate.gov), can help all individuals with information regarding but not limited to, eating choices, physical activity and healthy recipes. The website has a BMI calculator, a SuperTracker program which has a weight manager, lets you set your personal goals, save your favorite recipes, track your physical activities and food and lastly, look up nutrition information for over 8,000 foods while also comparing these foods side-by-side (USDA, ChooseMyPlate.gov, n/a). The website provides charts for the five different categories broken down into what an individual needs on a daily basis. Table 2.2 shows the daily fruit recommendations and Table 2.3 shows dairy recommendations for different individuals.

Table 2.2		
<i>Daily Recommendation of Fruit Intake</i>		
Daily recommendation*		
Children	2-3 years old	1 cup**
	4-8 years old	1 to 1 ½ cups**
Girls	9-13 years old	1 ½ cups**
	14-18 years old	1 ½ cups**
Boys	9-13 years old	1 ½ cups**
	14-18 years old	2 cups**
Women	19-30 years old	2 cups**
	31-50 years old	1 ½ cups**
	51+ years old	1 ½ cups**
Men	19-30 years old	2 cups**
	31-50 years old	2 cups**
	51+ years old	2 cups**
<p>*These amounts are appropriate for individuals who get less than 30 minutes per day of moderate physical activity, beyond normal daily activities. Those who are more physically active may be able to consume more while staying within calorie needs.</p> <p>Note: (also depends on age, race and gender)</p> <p><i>Note:</i> Reprinted from “About Us - My Plate”, by U.S. Department of Agriculture. 2011. Retrieved from <a href="http://www.choosemyplate.gov/about.html">http://www.choosemyplate.gov/about.html</a>.</p>		

Table 2.3					
<i>Recommended Daily Dairy Intake</i>					
Daily Recommendation					
Children	2-3 years old	2 cups	Women	19-30 years old	3 cups
	4-8 years old	2 ½ cups		31-50 years old	3 cups
Girls	9-13 years old	3 cups		51+ years old	3 cups
	14-18 years old	3 cups	Men	19-30 years old	3 cups
Boys	9-13 years old	3 cups		31-50 years old	3 cups
	14-18 years old	3 cups		51+ years old	3 cups
<i>Note:</i> Reprinted from “About Us - My Plate”, by U.S. Department of Agriculture. 2011. Retrieved from <a href="http://www.choosemyplate.gov/about.html">http://www.choosemyplate.gov/about.html</a> .					

There have been significant studies regarding the food choices that college aged individuals make as well as the amount of exercise they participate in. In a study by Small, Bailey-Davis, Morgan and Maggs (2012) regarding food choices and college aged students over seven semesters; it was proven that the fruit and vegetable consumption on a daily basis significantly declined from the first to the seventh semesters. This study showed that these habits were even worse when students lived off of campus. The eating habits of new college students consisted of low fruit, vegetable, and dietary fiber intake and were typically high in fast food and alcohol (Small, Bailey-Davis, Morgan, Maggs, 2012). A lot of students typically rely on sugar-sweetened beverages as well as alcohol consumption. Research has shown that there are few adults in the United States who meet the dietary recommendations for optimal nutrition (Nelson and Story, 2009). At the same time the amount of fruit and vegetable consumption across semesters declined significantly and are deteriorating over time (Small, Bailey-Davis, Morgan and Maggs, 2012).

### **Living On Versus Off Campus**

Living on versus off campus can also play a significant role in the food and physical activity choices that students make. In a study by Small, Bailey-Davis, Morgan and Maggs (2012) it was found that students who lived off campus were less likely to consume a variety of fruits and vegetables, while the students who lived on campus consumed more. Texas Tech University has an opportunity with their incoming freshman who live in residence halls, to enable them to have a beneficial and exciting experience. A positive experience will make them want to stay for more than one year, they need to be drawn back to stay longer than what is required by the university. The

housing on campus has a chance to contribute to as well as support the educational experiences of the students living on campus (Muslim, Karim and Abdullah, 2012).

According to Muslim et. al. in 2012, the student housing departments play an important role in terms of enrolling students, because the correct facilities can influence students to stay on campus longer than planned.

According to the University of Wisconsin-Madison, research has proven to demonstrate that students who live on campus during their first year of college, do better academically as well as having had higher level of individuals who receive a degree (University of Wisconsin-Madison, University Housing- Construction Projects, 2015). As previously stated, this is a major time for this age group to make many new changes in their lives. According to the University of Wisconsin-Madison,

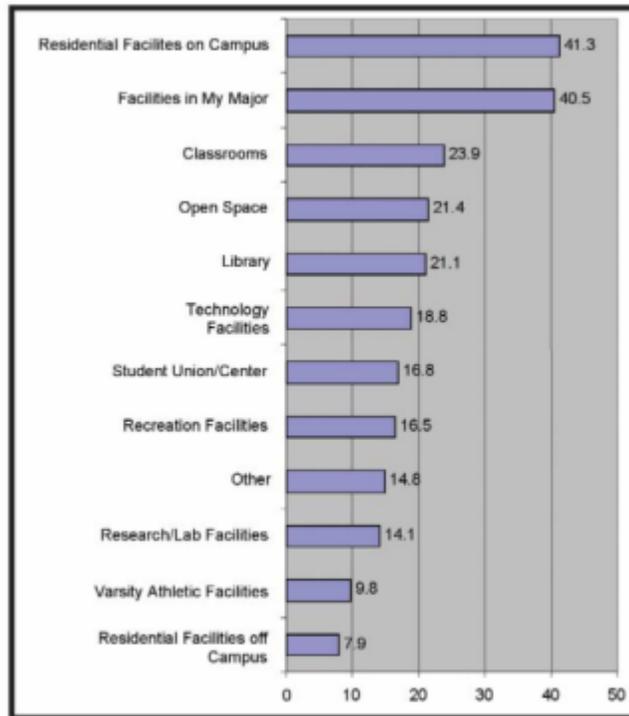
“In the area of personal growth and development, students living in traditional residence halls tend to make significantly greater positive gains in a number of areas of psychological development than their counterparts who reside off-campus” (University of Wisconsin-Madison, 2004-20 Division of University Housing Construction & Renovation Master Plan, 2014)

On the campus of Texas Tech University, there are currently fourteen residence halls, three suite-style halls, and one apartment complex, these residences house about 7,000 students (Texas Tech University, 2011). According to Texas Tech University policy as of 2011, students who do not have at least 30 college hours (not including dual credit or credit by exam) must live in the residence halls on campus (unless exempted by University student Housing). For the 2013-2014 school year the University has sixteen

learning community housing options, for example, Wall/Gates is the fine arts learning community. These specific communities help students succeed by placing students with similar academic goals living together (Texas Tech University, 2013).

Students moving into residence halls are concerned with amenities. According to the Herman Miller, 2007, the residence hall play a significant role in a student's decision to go to that particular school. Figure 2.5 titled Inadequate Facility at Rejected Institution (%) shows the factors which influence an incoming freshman's decision to attend a particular school. The residential facilities that a campus has are shown to be the number one influence at 41.3% for incoming freshman. At the same time, this particular study involving 16,153 respondents from 46 institutions across the U.S. and Canada, reported that the facilities were even more important in terms of students saying no to a particular university. Therefore, it is even more important for these institutions to be up-to-date and have pleasant and inviting residence halls (Cain & Reynolds, 2006).

*Inadequate Facility at Rejected Institution (%)*



David Cain & Gary Reynolds. March/April *Facilities Manager* 2006. Used with permission from APPA.

*Figure 2.5. Inadequate Facility at Rejected Institution (%)*

*Note:* Reprinted from “The Impact of Facilities on Recruitment and Retention of Students”, by Cain, D., & Reynolds, G., 2006, March/April, *Facilities Manager Magazine*, 22(2), 54–60. Retrieved from [http://www.appa.org/files/FMArticles/fm030406\\_f7\\_impact.pdf](http://www.appa.org/files/FMArticles/fm030406_f7_impact.pdf)

DePaul University in Chicago as of 2006 had re-designed some of their student apartments, and referring to these spaces as Loft-Right. Loft-Right offers amenities such as city views, granite countertops, modern furniture as well as kitchens and bathrooms, and is said to look like a hip hotel. The students can hire a cleaning service, grocery delivery and laundry service, to come to their residence hall. Though these amenities do sound amazing and a lot of people would enjoy them, they do come with a hefty price

tag, typically around \$1,000 for a single unit in a two- to four-bedroom unit with a bathroom per two students (Irvine, 2006).

Other college campuses across the United States have implemented amenities within their residence halls that students have found to be particularly interesting. High Point University in High Point, North Carolina has an on-campus steak house, a dry cleaning service, common lounges which feature pool tables, air hockey tables, first-run movie theater with free snacks, an arcade, putting green and a free ice cream truck, one residence hall on campus is even pet friendly (Hoyt, 2014). Saint Leo University in Saint Leo, Florida requires all fulltime students to live on campus (with some exceptions) though they offer features such as a 2,100-gallon aquarium, as well as a relaxation rooms with “nap pods” that play soothing music (Hoyt, 2014). Lastly, Washington University in St. Louis, Missouri feature TempurPedic mattresses, and a student run laundry service which picks up and delivers your laundry to and from your door (Stone, 2013).

### **Costs Related to Obesity**

The costs related to obesity can be tied to many varying health problems such as cancers, diabetes and heart disease, with a link to more than 60 chronic diseases (CampaignToEndObesity, 2014). The American Cancer Society states that “572,000 Americans die of cancer each year, about one-third of these cancer deaths are linked to excess body weight, poor nutrition and/or physical inactivity” (CampaignToEndObesity, 2014). Another health problems related to obesity are hypertension, with more than 75% of cases directly linked to obesity (TrustforAmerica'sHealthandRobertWoodJohnsonFoundation, 2015).

The obese population requires the use of excess services, which increases healthcare costs, these costs are approximately 30% higher than those of an individual of normal weight (Lehnert, Sonntag, Konnopka, Riedel-Heller and Konig, 2013). The costs related to obesity not only affect the obese population; they can affect the non-obese population as well. These costs also directly affect the productivity of the workforce, according to Lehnert, Sonntag, Konnopka, Riedel-Heller and Konig (2013), the increase in obese individual's results in the increase of the total annual national healthcare expenditure being spent on these individuals. According to Thorpe, Florence, Howard and Joski (2004) the costs and rising prevalence of obesity was the reason for the 27 percent increase in medical spending between the years of 1987 and 2001.

There are both direct and indirect healthcare costs related to obesity. According to Lehnert et. al., direct costs are the resources consumed while providing healthcare services. Indirect costs are the amount of loss of economic production caused by illness, indirect costs of obesity are not as easily seen as the direct costs (Lehnert 2013). A reduction in the job performance of an individual is an indirect cost of obesity and can be related to changes in work though physical strain and stress level just to name a few.

Within today's society there is considerable emphasis placed on the disadvantages of smoking and related problems, though not much attention is paid to obesity. The medical costs attributable to obesity are equal to or exceed the medical costs of smoking in the United States (Withrow and Alter, 2011). An immense amount of money is spent yearly on these associated health problems. If obesity numbers decline there should be a decline in the healthcare related costs as well.

## **Human Factors and Ergonomics**

Human Factors and Ergonomics are significant in all aspects of design including residence hall living environments. Research has proven when an individual lives in a shorter corridor versus a longer corridor, it gives individuals a greater sense of privacy as well as less crowding (Sanders, 1993). Human factors are based on human beings and “their interaction with products, equipment, facilities, procedures, and environments used in work and everyday living” (Sanders, 1993). Currently the residence halls being researched within this study have a long corridor-type layout. When designing spaces that are best for the human body, human factors are a key item to keep in mind.

When an individual is sitting at the improper type of desk it can cause backaches, neck aches, and shoulder problems. When work surfaces are not at the proper height, the user may be bent over too far therefore causing back problems (Sanders, 1993). One idea for desks within residence halls could be a slanted surface. When a slanted (15°) surface is used it will result in less neck bending; a more upright trunk as well as less trunk flexion (Sanders, 1993). Currently the residence halls of Texas Tech University have flat horizontal desks without the ability to slant them. Ergonomically, individuals have a normal and maximum working area, the normal reach for individuals is 47” W x 15.5” D, the maximum working area for an individual is 59” W x 20” D. The desks within the chosen residence halls are currently at 41” W x 35” D therefore not even equaling the normal working area for a desk, the desks are almost double in depth, though not large enough in width.

## **Housing on Texas Tech University Campus**

As of 2019, Texas Tech University has nine residence hall options with shared rooms and moveable furniture, which allow more flexibility while arranging furniture; these rooms also have individual temperature controls. There are five complexes on campus with shared rooms and built-in furniture; some rooms offer individual temperature controls. Lastly, students have the option of choosing an apartment or suite style hall, which offer single occupancy bedrooms as well as a semi-private bathroom (Texas Tech University, 2019). A list of residence halls and amenities can be seen in Table 2.4, the residence halls chosen for this study are highlighted.

Table 2.4.

*Texas Tech University on Campus Living Options*

<i>Residence Hall</i>	Cost/Academic Year	Accommodations	Furniture Mobility
<i>Bledsoe</i>	\$4,675	Shared room	Moveable
	\$3,675/triple occupancy	Triple Occupancy Shared wing/floor bathroom	
<i>Sneed</i>	\$4,675	Shared room	Moveable
	\$3,675/triple occupancy	Shared wing/floor bathroom	
<i>Horn/Knapp</i>	\$4,675	Shared room	Moveable
	\$3,675/triple occupancy	Shared wing/floor bathroom	
<i>Stangel/Murdough</i>	\$4,675	Shared room	Built-In
		Shared wing/floor bathroom	
<i>Chitwood/Weymouth</i>	\$4,675	Shared room	Built-In
		Quad Occupancy	
		Community Bathroom	
<i>Coleman</i>	\$4,675	Shared room	Built-In
		Quad Occupancy	
		Community Bathroom	
<i>Hulen/Clement</i>	\$4,675	Shared room	Built-In
		Community Bathroom	
<i>Wall/Gates</i>	\$4,675	Shared room	Built-In
		Community Bathroom	
<i>Gordon</i>	\$5,425	Shared room/Semi-private bathroom	Moveable
<i>Carpenter/Wells</i>	\$6,600-7,250	Individual room/Semi-private bathroom	Moveable

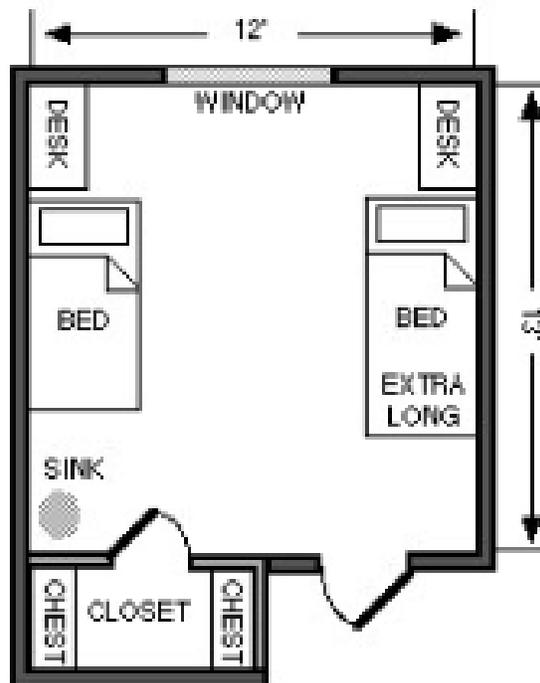
		1-4 bedroom options	
<i>Murray</i>	\$6,600-6,800	Individual room/Semi-private bathroom	Moveable
		3-4 bedroom options	
<i>West Village</i>	\$7,450-8,500	Individual rooms & individual and Semi-private bathroom	Moveable
		A- 4-bedroom apartments B- 1 & 2 bedroom apartments Fully furnished kitchens	
<i>Talkington</i>	\$6,600-7,000	Individual room/Semi-private bathroom	Moveable
		2 and 4 bedroom options	
<i>Honors</i>	\$5,950	Shared Rooms Cluster or PODS Community Bathrooms	Moveable

Note: These fees are not for single rooms, single rooms (if available) are priced differently.

Note: "2019-2020 Rates," by Texas Tech University Student Housing, 2019, September 3 (<http://www.depts.ttu.edu/housing/financial>).

There are nine other schools within our athletic conference (Big 12), which include Baylor University, Iowa State University, University of Kansas, Kansas State University, University of Oklahoma, Oklahoma State University, University of Texas at Austin, Texas Christian University and West Virginia University. Upon checking the floorplans and websites of all of these universities, it appears that not many of these colleges still use a traditional style dorm like the ones within this study. Baylor University had one dorm with non-moveable furniture, the dressers are located within the one shared closet, and there is one standard twin bed and one extra-long twin bed. The desks within these dorms measure approximately 23.5” deep by 36” wide. A floor plan of the rooms can be seen in Figure 2.6.

### A 2-person room in Penland Hall



*Figure 2.6.* Baylor University Penland Hall

*Note:* Reprinted from “*Penland Hall Information*”. by Baylor-Campus Living and Learning, N/A. Retrieved from <http://www.baylor.edu/cll/index.php?id=72358>

The only other universities within the Big 12 that have built in furniture, based on each university website, is at the University of Kansas, Oliver Residence Hall, which has a built in dresser with mirror, as well as in Corbin hall where there are built in cabinets and storage. Kinsolving Hall, at the University of Texas has built in furniture, which is very similar to the layout of the traditional style dorms at Texas Tech University, though they have a built in Debathroom. For complete information on the amenities of other schools see Tables 3.4-3.12 in Appendix C. This comparison is beneficial because if the research shows that individuals living in traditional style residence halls have a higher BMI or are less satisfied, then Texas Tech University may benefit from changing these residence halls to have more residence halls with moveable furniture like other universities in our Big 12 Conference.

### **Summary**

From existing literature, it is known that obesity is a significant problem and a problem that needs to be addressed with individuals in all fields, including the fields of design. The high healthcare costs attributed to it are known, as well as the increase in obesity levels as the years go by, it is now important to determine a plan of action and help to fight the obesity problem. The built environments in which individuals live are always contributing to the shape of the user. There are approximately 300,000 deaths per year that can be attributed to obesity, while this problem continues, the need for more research will continue as well (CDC, 2011).

The field of design needs to place more attention on the study of obesity than what it currently does. Students living in a college residence hall need to be provided

with the amenities to help curb the obesity epidemic. This is true in terms of the ergonomic design of spaces, as well as the implementation of campus amenities (eating and exercise choices). Satisfaction levels of residence hall dwellers need to be met to keep residence halls full and keep college campuses growing, this can be done by increasing resident satisfaction within the residence halls to help retain students and increase residence hall numbers. As designers, the opportunity is there to help lessen the obesity epidemic as well as increase satisfaction based on the design of environments.

## **CHAPTER III**

### **METHODOLOGY**

As stated in the literature review, obesity is a significant problem that needs to be addressed, as 300,000 deaths per year can be attributed to obesity (Centers for Disease Control and Prevention, 2011). Living environments of individuals, such as food choices, do affect lifestyle factors (Brunt & Rhee, 2008).

For this study, I randomly recruited individuals at the college level, both male and female, who were currently living in or had lived the traditional room style residence halls on the campus of Texas Tech University within the previous two semesters. This age group was understudied in relation to obesity; therefore, new research needed to be conducted. The intention of this research was to determine the relationship between lifestyle satisfaction levels and body mass index of students on campus. This was a Likert-type scale study that focused on the relationship between weight and lifestyle satisfaction. Lifestyle satisfaction, for this study, refers to how an individual feels, performs in, and experiences these particular environments.

#### **Research Questions**

The main question addressed within the research study is: Is there a relationship between satisfaction levels of individuals and BMI of varying levels within current traditional room style residence halls on the campus of Texas Tech University? The following subquestions will also be discussed:

**Question 1:** Is there a relationship between BMI and an individual's opinion on room layout when choosing a residence hall on the campus of Texas Tech University?

**Question 2:** Is there a relationship between an individual's decision to continue to live in the residence halls on the Texas Tech University campus and body mass index?

### **Rationale**

The study is cross-sectional in nature with only one online Survey Monkey survey taken by each individual at one point in time (Trochim, Time in Research, 2006). A cross-sectional study can compare different groups, such as different obesity levels, for a single time (InstituteForWork&Health, 2015). One disadvantage to using cross-sectional data is that it does not provide definitive answers regarding cause-effect relationships because the researcher is not conducting a longitudinal research study and surveying participants multiple times over time (InstituteForWork&Health, 2015). In this case it is not necessary to compare data overtime, though it may be beneficial for future research.

### **Quantitative Research**

Quantitative research is chosen when the researcher wishes to gather and analyze data that are able to be measured and expressed in numerical form (Law, 2011). More specifically, this research is non-experimental quantitative research because it involved observing relationships between multiple variables and how they exist without trying to make a change to them (Slavin, 2007). Furthermore, this research is a correlational study

because the research involved collecting data on multiple variables to identify relationships between them (Slavin, 2007).

For this study, I used the Likert-type scale method of quantitative research for the survey because it allowed me to measure numbers on a continuum (*Strongly Agree* to *Strongly Disagree*; McLeod, 2008). It was necessary to gather quantitative data for this particular portion of the study because the data for each variable needed to be analyzed for significant differences or correlations among variables.

### **Strategy/Context of the Study:**

**Survey Questionnaire.** Surveys are used to obtain the opinions, behaviors, or characteristics of the population being researched and are often used to find differences between various groups within the study (Slavin, 2007). The survey strategy chosen for this research study was a questionnaire for two reasons: it can be administered to a large number of individuals, and the responder is able to answer the questionnaire when it is convenient for them (Trochim, Types of Surveys, 2006). Online questionnaires are beneficial because they have a higher response rate, within the first few days, than do mailed questionnaires or in-person interviews (Nolinske, 2019).

### **Data Collection Methods**

The ideal data collection method for current Texas Tech University students is a direct survey because it can be easily administered and other ways of surveying students are not permitted. Other methods were not chosen for the study because of the high likelihood of skipped responses when asking a participant's weight in a phone interview,

some may report their weight as higher or lower than their accurate weight for a variety of reasons. Alternatively, when administering a survey by mail, participants may not give accurate information, and some individuals may not return the survey. Furthermore, students' addresses were not accessible to me, and I was not permitted to put mail in their mailboxes.

### **Survey Construction**

Survey items were constructed based on previous research regarding satisfaction, residence hall living on other campuses across the nation, focusing on areas that were lacking and needed research among this age group. The survey consists of 16 closed-form items of a Likert-type scale format. Closed-form was chosen to limit the number of possible responses. The questions were derived based on various needs within the residence hall as well as the needs within the individual student rooms. The Likert-type scale assigns each item response a numerical value; this numerical value is then used to measure attitudes or opinions of participants (McLeod, 2008). The survey can be found in Appendix A.

Data were analyzed through the use of Cronbach's alpha which measures internal consistency and determines how closely related items being studied actually are (UCLA Institute for Digital Research & Education, accessed October 17, 2019). A factor analysis is done to determine the underlying structure of the questions and determine if there are factors which relate the questions (Tabachnick & Fidell, 2018). Factor analysis was conducted to reduce the data down to fewer factors and to be sure that the questions were answering what was intended.

## Data Sources

### Selection of Participants

The rise in childhood obesity levels and diabetes has resulted in an increased number of students who arrive to college already unhealthy, according to the Director of Student Health Services at Fordham University, Kathleen Malara (Epstein, 2007). This is a widespread problem that has been the focus of many research studies, including a study at the University of New Hampshire during the 2005–2006 year school. More than 800 undergraduate students participated in the study, and findings showed that high blood pressure, high cholesterol, and obesity were among the health problems of these college-aged individuals (Epstein, 2007).

Past research has focused mainly on the effects of eating and physical activity on young adult women (Walsh, 2009). In this particular study, I surveyed both males and females to ascertain the opinions of both genders, as these spaces were to be designed for both.

According to the World Health Organization, body mass index (BMI) is calculated by dividing an individual's weight in kilograms by the individual's height in meters squared ( $\text{kg}/\text{m}^2$ ). Weights of all of the participants in the study were recorded, and the participants were classified into one of four different categories: underweight (BMI < 18.50), normal (BMI 18.5–24.99), overweight (BMI  $\geq$  25.00–24.99) and obese (BMI  $\geq$  30). Two of these categories, underweight and obese, are further subdivided. The underweight category is

comprised of three classifications: severe thinness (BMI < 16.00), moderate thinness (BMI 16.00–16.99), and mild thinness (BMI 17.00–18.49). The obese category is comprised of three classifications: obese class I (BMI 30.00–34.99), obese class II (BMI 35.00–39.99), and obese class III (BMI ≥ 40.00; WHO, 2015). Recording the body weights of the participants allowed me to determine the participants' BMI and use it to compare against satisfaction levels, for example.

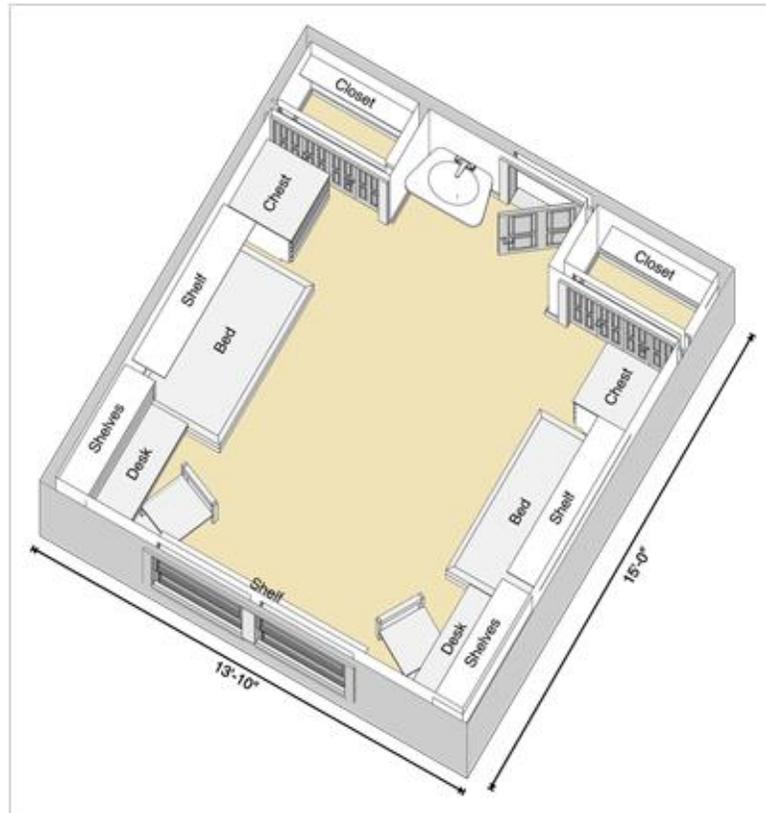
The participants of this study were required to be living in the residence halls at Texas Tech University in a room with a traditional layout, which included built-in furniture. The rooms in the residence halls chosen for this particular study are similar in arrangement, in that they all included built-in furniture. The one exception is that the beds in Hulen/Clement and Wall/Gates are 4" shorter in length than the beds in the other residence halls included in the study. The residence halls chosen are (a) Chitwood/Weymouth, (b) Coleman, (c) Hulen/Clement, (d) Stangel/Murdough, and (d) Wall/Gates. The specific details of the room furnishings and measurements can be seen in Table 3.1. Each of the rooms in these residence halls each measures 15' x 13'10" in space and each includes pull-out beds, desks and chairs, chests of drawers, a sink with medicine cabinet and mirror, closets with overhead storage, and bookshelves. A typical floor plan of the rooms used for the study can be seen in Figure 3.1.

Table 3.1

*Room Furnishings and Dimensions of Shared Rooms With Build-In Furniture*

		Stangel/Murdough	Chitwood/Weymouth/ Coleman	Hulen/Clement Wall/Gates
<ul style="list-style-type: none"> <li>• Twin Pull-Out Beds (extra-long except Hulen/Clement and Wall/Gates)</li> <li>• Chests of Drawers</li> <li>• Desks and Chairs</li> <li>• Sink</li> <li>• Medicine Cabinet with Mirror</li> <li>• Closets with Overhead Storage</li> <li>• Bookshelves</li> <li>• Window Blinds</li> <li>• Cable TV</li> <li>• Ethernet connections</li> </ul>	Bed	36" W x 80" L	39" W x 80" L	39" W x 76" L
	Chest of Drawers	Built-in (drawers vary in size)	Built-in (drawers vary in size)	Built-in (drawers vary in size)
	Under Bed Storage	12" H (drawers)	12" H (drawers)	12" H (drawers)
	Bed Bolster	77" W x 4" H (2 drawers)	77" W x 13" H (2)	77" W x 12" H (2)
	Bed Shelf	77" W x 6" D	77" W x 6" D	77" W x 6" D
	Bookcase	Built-in above desk (3 shelves)	Built-in above desk (3 shelves)	Built-in above desk (3 shelves)
	Desk	41" W x 35" D	41" W x 35" D	41" W x 35" D
	Closet	43" W x 31" D	43" W x 31" D	43" W x 31" D
	Bulletin Board	81" W x 41" H	81" W x 41" H	81" W x 41" H
	Ceiling Height	8'	8'	8'
	Window	72 ¼" L x 55 1/8" W x 29 ¾" H	119" L x 53" H	72 ¼" L x 55 1/8" H
	Ledge Under Window	11" D x 78" W x 29 ¾" H	11" D x 78" W x 29 ¾" H	11" D x 78" W x 29 ¾" H
	Floor Space	14' x 10'	14' x 10'	14' x 10'
Area Rug	10' x 6'	10' x 4'	10' x 6'	

*Note:* Adapted from "Room Furnishings and Dimensions," by Texas Tech University Student Housing, 2015 (<http://www.depts.ttu.edu/housing/halls/>).



*Figure 3.1.* Room layout. From “University Student Housing,” by Texas Tech University Student Housing, 2014 (<http://URL>). Copyright 2014 by Texas Tech University.

### **Data Analysis**

Following data collection, Statistical Package for Social Sciences (IBM SPSS Statistics 24, Version XX) was used to run statistical tests, which helped determine the relationships between satisfaction and other areas within the study. A factor analysis was completed to categorize the data into smaller groups which was then followed by testing the reliability of the survey through the use of Cronbach’s alpha to measure the closeness of the relationships between the variables. Multiple-regression analysis- “evaluates the effects of one or more independent variables on a dependent (outcome) variable, controlling for one or more covariates or control variables” (Slavin, 2007, p. 97).

## **Data Management Plan**

Data was collected through in person surveys done by visiting classes within the Human Sciences Department at Texas Tech University. This method was resulting in few participants therefore it was determined that gaining participant through the use of TechAnnounce would be the most logical method left. Data analysis was next, with the use of SPSS data was able to be entered into the program for each individual that it was collected for, which was beneficial because it was not necessary for all of the participants to complete the survey before transferring information into the program. Surveys were taken through Survey Monkey and stored online through their website. The surveys were collected anonymously with no characterizing descriptions for the participants.

## **Survey Procedure**

This was a cross sectional study with survey responses gathered in one administration. The participants were asked to complete the 16-item survey, as well as the 10 demographic items, which were placed at the beginning of the survey. Because this was a cross-sectional study, it was not necessary to determine if there had been weight gains over the course of time. Included in the data collected were the name and type of location (i.e., rural or urban) of the participant's high school. This information would provide some indication of socioeconomic status and allow me to determine if this played a role in the participant's satisfaction with living in the residence halls. Furthermore, this information is beneficial because certain residence halls are closer to certain amenities on the campus of Texas Tech University. For example, Stangel and Murdough Halls have The Market eating establishment on their first floor, Chitwood,

Weymouth, and Coleman Halls are all located near the student recreation center while Wall and Gates Halls are farthest away. Individuals in these residence halls could possibly have a higher or lower satisfaction rate because of their socioeconomic status.

The personal information, such as name, R number or other identifying characteristics of the participants was not reported... At the end of the survey, participants were provided the email address of the research team members and directed to email one of them to be entered in a drawing, as 10 gift cards were awarded to participants whose names were drawn at random. This approach allowed me to offer participants incentives without linking participants to their survey responses.

## **Recruitment**

### **In-Class Announcement of Survey**

In the beginning of the research process, the intent was to conduct a pre-survey followed by a final survey. The purpose of the pre-survey was to determine the items that would be included in the final survey. Students enrolled in freshman courses in the College of Human Sciences were recruited for the pre-survey participation because freshman are the students most likely to live in a residence hall. The pre-survey was announced within the designated class periods. Students were given a handout with information regarding the study, including the information about the incentive for participation and the online link to complete the survey. The link directed them to Survey Monkey, and they were able to complete the survey on their own time. Students were given the opportunity to participate if they choose to do so; they were not coerced.

After recruiting in a few classes, the participation was minimal. That is when the research process was reworked; it was decided that trying to recruit participants by visiting classes was not going to yield the desired number of participants. Therefore, the research design was changed from two surveys to one, which would serve as a “pilot study,” allowing for a smaller number of participants. The method of recruiting participants was also changed. It was decided that participants would be recruited by sending an announcement by way of the university’s electronic announcement email system, TechAnnounce. This decision was made after face-to-face recruiting in the classroom failed, and no other way was permitted by the university. Neither recruiting participants through regular mail nor setting up a location in residence halls to ask individuals to participate were permitted. The survey participation information can be seen in Table 3.2.

Table 3.2

*Survey Participation Information*

Administered through	Visiting undergraduate classes & Survey Monkey
Time	Participants Convenience
Location	Participants Convenience
Question Type	Demographic Likert-type Scale

**Tech Announce**

Participants were recruited through the use of TechAnnounce, an email of announcements sent to students, staff, and faculty on a daily basis or as defined by their categories (Texas Tech University, 2008). Through the use of TechAnnounce, I knew the information about the survey and its link were being delivered to the students the days that I arranged for the announcement to be posted. Using TechAnnounce assured me that the study information and survey link would be delivered only to students of Texas Tech University.

**Data Analysis Method****Basic Statistical Analysis**

To ensure consistency and eliminate errors, it was necessary to clean the data by running a normality test. A Shapiro-Wilk test was conducted on the responses to the Likert-type items (see Table 3.3) A Mahalanobis distance test was used to calculate multivariate normality (see Table 3.4). It was also necessary to analyze the patterns of skewness and kurtosis and identify outliers. Skewness or kurtosis scores of +/- 3 were in question (see Tables 3.5 and 3.6)

Numbers highlighted in yellow were in question. All supplemental tables can be found in Appendix C.

I performed data transformations by determining the correct SPSS formula based on the histograms for each survey item with a Z-score of +/- 2.96. The variables' skewness and kurtosis values were analyzed, and the variables were separated into two groups based on these values. The variables needing to be transformed are as follows:

- Moderate negative skewness (Questions 12, 15, 16, 18, 21, 24 and 26)
  - 12. I feel that I am able to study comfortable in my residence hall.
  - 15. I feel that I am satisfied with the non-moveable furniture that came with my room.
  - 16. There are reasonable features that could be added to my residence hall to increase my satisfaction.
  - 18. I feel as if I have enough privacy in my room.
  - 21. I feel as if the eating choices on campus are satisfactory.
  - 24. I would recommend living on campus to another individual.
  - 26. I feel that I spend the majority of my free time in my residence hall or room.
- Substantial negative skewness (Questions 11, 17, 22, 25).
  - 11. Overall, I feel comfortable living in my room.
  - 17. I feel safe (not likely to be hurt, harmed or in danger) in my residence hall.
  - 22. I feel satisfied with the walking distance from my residence hall or room to eating locations,

25. My experience on campus thus far has been a positive one.

Table 3.3

*Tests of Normality*

	<u>Kolmogorov-Smimov<sup>a</sup></u>			<u>Shapiro-Wilk</u>		
	Statistic	<i>df</i>	<i>p</i>	Statistic	<i>df</i>	Sig.
Q11	.285	152	.000	.798	152	.000
Q12	.234	152	.000	.888	152	.000
Q13	.195	152	.000	.918	152	.000
Q14	.180	152	.000	.915	152	.000
Q15	.236	152	.000	.875	152	.000
Q16	.286	152	.000	.822	152	.000
Q17	.264	152	.000	.775	152	.000
Q18	.243	152	.000	.889	152	.000
Q19	.214	152	.000	.911	152	.000
Q20	.199	152	.000	.910	152	.000
Q21	.213	152	.000	.888	152	.000
Q22	.262	152	.000	.853	152	.000
Q23	.282	152	.000	.759	152	.000
Q24	.293	152	.000	.842	152	.000
Q25	.275	152	.000	.825	152	.000
Q26	.218	152	.000	.876	152	.000

a. Lilliefors Significance Correction

Table 3.4

*Mahalanobis Distance Coefficients<sup>a</sup> Table for Model 1*

	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	Sig.
(Constant)	14.899	49.682		.300	.765
Q11	5.298	5.690	.114	.931	.354
Q12	-.252	4.080	-.007	-.062	.951
Q13	-2.134	3.178	-.064	-.671	.503
Q14	4.619	2.716	.154	1.701	.091
Q15	-.459	3.439	-.014	-.133	.894
Q16	2.702	4.315	.054	.626	.532
Q17	3.323	4.810	.065	.691	.491
Q18	-4.147	3.333	-.129	-1.244	.216
Q19	2.381	3.164	.072	.753	.453
Q20	-1.092	3.073	-.035	-.355	.723
Q21	-2.697	3.392	-.079	-.795	.428
Q22	-2.601	3.554	-.070	-.732	.466
Q23	.166	6.270	.002	.026	.979
Q24	9.256	3.755	.279	2.465	.015
Q25	-3.868	5.114	-.089	-.756	.451
Q26	2.658	3.043	.086	.874	.384

Table 3.5

*Skewness*

	Statistic	SE	Z
Q11	-1.446	0.197	-7.3401
Q12	-0.786	0.197	-3.98985
Q13	-0.454	0.197	-2.30457
Q14	-0.286	0.197	-1.45178
Q15	-0.809	0.197	-4.1066
Q16	-1.028	0.197	-5.21827
Q17	-1.507	0.197	-7.64975
Q18	-0.6181	0.197	-3.13756
Q19	-0.4321	0.197	-2.1934
Q20	0.344	0.197	1.745193
Q21	-0.757	0.197	-3.84264
Q22	-1.03	0.197	-5.22843
Q23	-0.443	0.197	-2.24873
Q24	-1.039	0.197	-5.27411
Q25	-1.256	0.197	-6.37563
Q26	-0.798	0.197	-4.05076

Table 3.6

*Kurtosis*

	Statistic	SE	Z
Q11	3.449	0.391	8.820972
Q12	0.236	0.391	0.603581
Q13	-0.521	0.391	-1.33248
Q14	-0.996	0.391	-2.54731
Q15	-0.129	0.391	-0.32992
Q16	1.302	0.391	3.329923
Q17	3.993	0.391	10.21228
Q18	-0.582	0.391	-1.48849
Q19	-0.727	0.391	-1.85934
Q20	-0.93	0.391	-2.37852
Q21	-0.039	0.391	-0.09974
Q22	0.774	0.391	1.97954
Q23	-0.66	0.391	-1.68798
Q24	0.372	0.391	0.951407
Q25	2.142	0.391	5.478261
Q26	-0.194	0.391	-0.49616

## **Reliability and Validity**

### **Factor Analysis/ Reliability**

After completing these statistical analysis, factor analysis was carried out to categorize the data into smaller groups. This was followed by testing the reliability of the survey through the use of Cronbach's alpha to measure how closely the variables are related. Bivariate Correlations were calculated to see how each of the five factors relate to BMI.

### **Regression**

#### ***Main Question:***

To begin, a new variable (scale score) was created with the mean of the scores from all question responses within the Survey Monkey survey. A multiple linear regression was then completed with part and partial correlations. BMI, age, number of roommates and gender were all used as predictors, and the new variable (scale score of all survey question responses) was used as the criterion variable (dependent variable). It is important to note that gender was coded as either male (1) or females (0).

#### ***Sub-questions:***

Scale scores were created for both subquestions, using multiple questions from the survey for each subquestion. The questions used for Subquestion one scale score calculations, related to comfort/satisfaction, questions relating to an individual's desire to continue to live on campus/satisfaction were selected for Subquestion two. After creating the

scale scores, a linear regression was conducted with BMI as the predictor and Question 1 or Question 2 as the criterion variable.

A new variable was created (scale score) for subquestion 1 with the averages from Questions 11, 12, 13, 15, 19 of the Survey Monkey survey taken by the participants.

11. Overall, I feel comfortable living in my room.

12. I feel that I am able to study comfortable in my residence hall.

13. I do feel like my bed is large enough for me to be comfortable in.

15. I feel that I am satisfied with the non-moveable furniture that came with my room.

19. I feel like I have enough desk space for doing homework, in my room.

For Subquestion 2, the responses to Questions 20, 24, 25, 26 of the Survey Monkey survey were used to create a new variable (scale score).

20. If I were to live in the residence halls again, I would choose to live in a traditional room without moveable furniture.

24. I would recommend living on campus to another individual.

25. My experience on campus thus far has been a positive one.

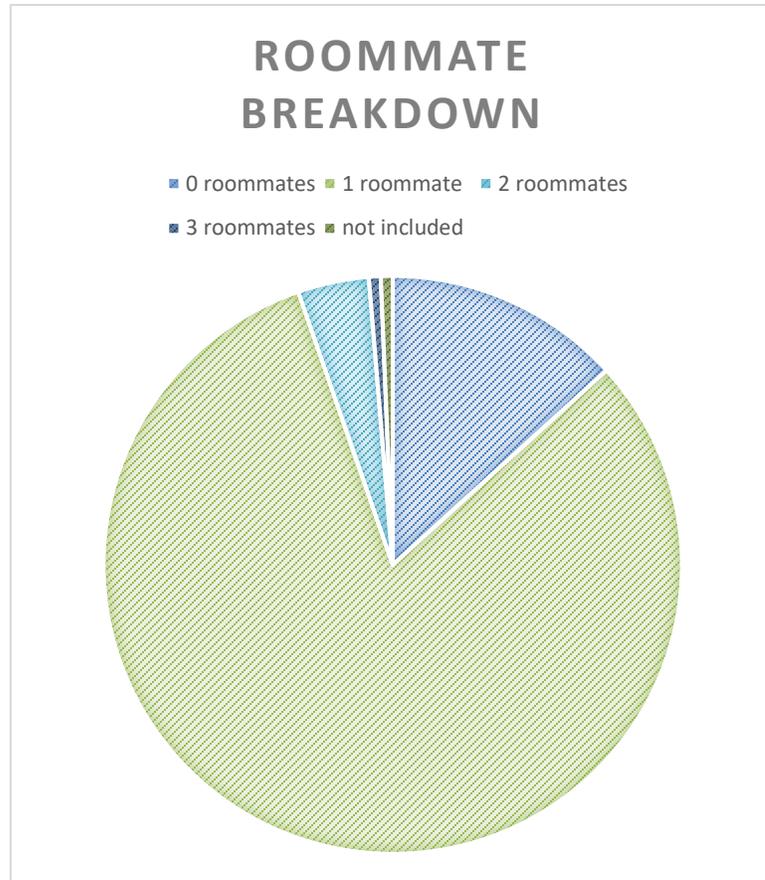
26. I feel that I spend the majority of my free time in my residence hall or room.

## **CHAPTER IV**

### **RESULTS**

Information about an invitation to participate in the study were posted in TechAnnounce 37 times, yielding a total of 194 participants. Of these 194 collected surveys, 152 participants met the inclusion criteria. The breakdown of participants can be seen below.

- Participants surveyed overall numbered 194; 152 participants met the inclusion criteria, as surveys of individuals who did not reside in the selected residence halls and incomplete surveys were excluded from analysis.
- The number of female who completed the survey was 130; the number of males who completed the survey was 39.
- Twenty participants had no roommates; 123 participants reported having one roommate; six participants had two roommates; one participant had three roommates; and one participant had four roommates. One survey respondent was not included in the study because they answered both zero and one roommate (see Figure 4.1).



*Figure 4.1.* Roommate breakdown.

For individuals to participate, the criteria below needed to be met.

- Students who currently live in or lived in one of the following Texas Tech University residence halls within the previous two semesters: Hulen/Clement, Stengel/Murdough, Coleman, Wall/Gates and Chitwood/Weymouth.

Three analyses were conducted with the collected data. The results will be presented as they answer the main research question, Subquestion 1, and Subquestion 2.

## **Factor Analysis and Reliability Results**

After running the factor analysis (see Table 4.1), two factors loaded heavily: overall satisfaction with living on campus and satisfaction with the food choices on campus. The variables which loaded on multiple factors, variables which were cross loaded, as well as variables greater than, or equal to .4 were excluded.

A reliability test was conducted to measure the extent to which the survey measures what it was designed to measure. The Cronbach's alpha was .798. This alpha value was considered appropriate to proceed with the regression analysis. The survey items loaded onto two factors as follows:

### Factor 1- General room/residence hall overall satisfaction

Q11- Overall, I feel comfortable living in my room.

Q14- I am satisfied with sharing the bathroom facilities within my residence hall.

Q15- I feel that I am satisfied with the non-moveable furniture that came with my room.

Q18- I feel as if I have enough privacy in my room.

Q19- I feel like I have enough desk space for doing homework, in my room.

Q24- I would recommend living on campus to another individual.

Q25- My experience on campus thus far has been a positive one.

Q26- I feel that I spend the majority of my free time in my residence hall or room.

### Factor 2- Satisfaction in terms of eating.

Q21- I feel as if the eating choices on campus are satisfactory.

Q22- I feel satisfied with the walking distance from my residence hall or room to eating locations.

Table 4.1

*Factor Analysis Table*

	1	2	3	4	5
Q11	.771				
Q12	-.646			-.455	
Q13	-.544				-.453
Q14	.443				
Q15	.663				
Q16			-.523		-.672
Q17	-.489		-.516		
Q18	.639				
Q19	.501				
Q20	-.545			-.616	
Q21		.638			
Q22		.736			
Q23			-.498	-.410	
Q24	.665				
Q25	.684				
Q26	.537				

## **Regression Analysis Results**

### **Regression Analysis Main Question**

The main research question for this research study was: Is there a relationship between satisfaction levels of individuals and BMI within current traditional room style residence halls on the campus of Texas Tech University? I hypothesized that as BMI increases, an individual's satisfaction with living in the residence halls decreases. The predictors in this study were number of roommates, gender, BMI, and age. The criterion variable was the mean of the survey responses or satisfaction levels based on Likert type scale for all survey question answers. See Appendix A for all survey questions.

Multiple linear regression was conducted to determine to what extent each of the predictor variables (i.e., number of roommates, gender, BMI, age) predicts the criterion variable—satisfaction with living in a traditional residence hall at Texas Tech University. It was found that BMI did not predict the satisfaction of living in the current traditional room style residence halls on the campus of Texas Tech University.

As shown in Table 4.2, none of the independent variables were significant predictors of satisfaction. The regression model does not confidently reflect the extent to which the independent variables influence the dependent variable. All supplemental tables can be found in Appendix C.

Table 4.2:

*Model Summary Output Table, Main Question*

Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.238 <sup>a</sup>	.057	.031	.606

### **Regression Analysis—Subquestion One**

Subquestion one was: Is there a relationship between BMI and an individual's opinion on room layout when choosing a residence hall on the campus of Texas Tech University? I hypothesized that there was a negative correlation between BMI and an individual's opinion on room layout when choosing a residence hall on the campus of Texas Tech University.

A linear regression analysis was used to determine if there is a relationship between BMI and an individual's opinion on room layout when choosing a traditional room style residence hall on the campus of Texas Tech University. The results of the regression indicated the predictor variable explained 24.1% of the variance ( $R^2 = .058$ ,  $F(1,150) = 9.256$ ,  $p < .003$ ). It was found that BMI significantly predicted an individual's opinion on room layout when choosing a traditional room style residence hall on the campus of Texas Tech University.

$R$  (.241) quantifies the simple correlation between the two variables, while  $R^2$  quantifies the amount of the total variation in the dependent variable (satisfaction) can be explained by the independent variable (BMI). Table 4.3 reports the statistical significance of the regression model is .003 (no need to state "which is less than .05 – that is implied when you state it was significant), which indicates the regression model significantly predicts the outcome variable. All supplemental tables can be found in Appendix C.

Table 4.3

*Model Summary Output Table, Sub-Question One*

Model Summary				
Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.241 <sup>a</sup>	.058	.052	.846
a. Predictors: (Constant), BMI				

### **Regression Analysis—Subquestion Two**

The second subquestion for the research study was: Is there a relationship between an individual's decision to continue to live in the residence halls on the Texas Tech University campus and body mass index? Individuals with a higher BMI will be less satisfied with the current traditional room style residence halls on campus; therefore, it is believed that there will be a negative correlation between BMI and the decision to continue to live within the traditional room style residence halls on the campus of Texas Tech University.

A linear regression analysis was used to test the relationship between an individual's decision to continue to live in the residence halls on the Texas Tech University campus and BMI. As can be seen within table 4.4, it was found that there was no relationship between BMI and an individual's decision to continue to live in the residence halls on the Texas Tech University campus.

Table 4.4

*Model Summary SPSS Output Table, Sub-Question Two*

Model Summary				
Model	R	R <sup>2</sup>	Adjusted R Square	Std. Error of the Estimate
1	.065 <sup>a</sup>	.004	-.002	.922
a. Predictors: (Constant), BMI				

## **CHAPTER V**

### **DISCUSSION OF FINDINGS**

The purpose of this cross-sectional research study is to determine the relationship between satisfaction levels of traditional room style residence halls on the campus of Texas Tech University and BMI. This study used random college aged individuals of both male and female gender who had lived in (within the previous two semesters) or were currently living in the traditional room style residence halls on the campus of Texas Tech University. This age group is understudied in relation to obesity so conducting research to discover new information is both necessary and beneficial to the field of design.

Through the review of literature it was apparent that there was a need for spaces to be designed with obesity and satisfaction in mind. According to the Herman Miller, 2007, the residence hall plays a significant role in a student's decision to go to that particular school. Therefore in order to retain students living in the residence halls on the campus of Texas Tech University it is best to determine what amenities they need to lengthen their stay. Resident's satisfaction should be a priority for Texas Tech University to help increase enrollment as well as grow the university. For this research study, satisfaction is based on the resident's opinions of everyday activities and features that they frequently use. Particularly, satisfaction "refer(s) to (an) individuals' appraisal of the conditions of their residential environment, in relation to their needs, expectations and achievements" (Amerigo & Aragonés, 1997).

A twenty-six (ten demographic and sixteen Likert-type scale) question Survey Monkey survey was used to collect data for this research study, this took thirty seven attempts through the use of TechAnnounce as well as multiple in person attempts by attending undergraduate classes in the College of Human Sciences.

### **Factor Analysis**

Two factors emerged from the data: overall satisfaction and satisfaction with the choice of food on campus. It is not uncommon for a pilot study to yield only two factors. However, it would be ideal for a future study to generate three or more factors.

One limitation of this study was the small sample size, which resulted from the difficulty encountered with recruitment. The small sample size also tempers the conclusions that can be drawn from the factor analysis. It is also important to note that for a larger application it is necessary to test with a completely new sample or participants to confirm factor structure and validity.

### **Regression Analysis**

#### **Main Question**

The main question for this research study is, is there a relationship between satisfaction levels of individuals and BMI of varying levels within current traditional room style residence halls on the campus of Texas Tech University?

After conducting regression analysis with part and partial correlations, it was determined that the Anova was not significant, the model did not predict the

outcome. Therefore, the research conducted is unable to determine whether there is a relationship between the variables (BMI and the mean of all sixteen satisfaction related questions). This may be explained in part due to the limitations of the study, such as the trouble with getting participants to participate, limitations will be discussed further.

### **Sub-Question 1**

The first sub-question for the statistical analysis is, is there a relationship between BMI and an individual's opinion on room layout when choosing a residence hall on the campus of Texas Tech University?

After conducting a linear regression analysis, it was determined that there was a relationship between BMI and an individual's opinion on room layout when choosing a residence hall. BMI was found to be a significant predictor of satisfaction of room layout with the significance of the study being .003.

### **Sub-Question 2**

The second sub-question for the research study is, is there a relationship between an individual's decision to continue to live in the residence halls on the Texas Tech University campus and body mass index?

Through the analysis of data for sub-question two, it was found that there is no relationship between an individual's decision to continue to live in the residence halls on the Texas Tech University campus and BMI. BMI was not a

significant predictor of the participant's decision to continue to live in the residence halls on the Texas Tech University Campus any longer.

### **Limitations**

Although the data were tested for reliability and validity, there are inherent issues with self-reported data. It was necessary to gather self-reported data to answer the research questions. On the other hand, self-reported data has its issues. Some of the main issues with self-reported data are honesty, introspective ability, and understanding, rating scales, response bias and control of sample. Participants' interpretation of the Likert-type scale could vary among participants. Response bias also has an influence because an individual may have a tendency to respond a certain way, regardless of how they actually feel. Furthermore, Introspective ability could vary among participants.

Within this research study the ratio of male to female participants could be a limitation, with men accounting for only 25.66% of the participants that participated in the study. Out of all of the participants there were only thirty-nine males of the 152 total participants. This is a limitation because it is possible that women and men have differing opinions on the survey questions, having too many of one gender could throw the data off.

One of the survey questions will be asking the participating individuals body weight; will the individual actually be accurate with what they were to record? One limitation relevant to this research study is an individual's survey responses not being accurate, such as their weight. Will the participant make a more socially acceptable answer instead of being truthful in their reporting (Salters-Pedneault, 2019)? Due to the

fact that individuals may or may not give accurate information regarding their weight, it will be necessary to meet participants in person and weigh them as well as recording the participant's heights.

The time of the survey may have an influence on the study, it could possibly be important to study individuals at the end of their dorm living or in the middle and not at the beginning. This is due to the individual not being in their new routine or having created their new habits when they just move in. If a student were to be interviewed or given a questionnaire at the end of their dorm living, they may have all negative things to say about the dorm because they are excited to move on to their next living environment, perhaps not in the dorm. Although, for a future study, it could also be interesting to interview individuals both at the beginning and end of their dorm living, therefore allowing future studies with the comparison of results of over time.

Attaining the proper number of participants is a concern for the fact that students can be busy, especially when starting college or moving into a residence hall. Will students really be willing to participate in this research study and if so, will there really be enough participants? This is also where the incentives are beneficial, because individuals may be more willing to participate if they are being rewarded in some form.

One additional limitation for this particular study is the fact that some of the traditional style residence halls on campus have been changed to house four individuals. Though these rooms are only for a handful of rooms, it is still important to note this. The students living in these rooms may have differing answers compared to their fellow participants because of the fact that they do live with more individuals. Their rooms are

larger, though they live with one or two more individuals. This is also the same for individuals who are living alone in their dorm room. Their answers may be different because they have space for two individuals and it's all to themselves.

Lastly, in regards to participants, one issue with sending out emails through TechAnnounce is that not all individuals may check their email. Although this will only be a problem with the initial recruitment of individuals, the results of the study will not be affected by individuals deleting their TechAnnounce emails. It is not possible to send this announcement on TechAnnounce daily, therefore the announcement will be sent out weekly, unless a revision to the original announcement is needed (TTU, TechAnnounce Posting Policy, 2008).

### **Future Research**

For future studies, it could be beneficial to gather the same information for non-traditional as well as traditional style residence halls and compare the two against each other. Doing this could show differences in satisfaction therefore the university know which style of living is best for future building projects. Through this research study it could help the housing department determine which type of residence halls to build in the future.

In regards to keeping the same study, it would be interesting to see if there are other relationships among the other variables collected. An example of this would be, is there a difference in satisfaction levels depending on what floor participants live on. Other demographic information collected are items such as the residence hall the participants lived in, the floor the participant lives on, race and if the participant was

raised in an urban or rural environment. Comparing this data with satisfaction could potential show some correlations, both positive and negative and would be interesting for further research.

Interviewing individuals both at the beginning and end of their residence hall living could be beneficial for future research. This would allow the researcher to compare the participant's results over time from beginning to end of educational career at Texas Tech University or even for the participant over a shorter period of time such as beginning to the end of the semester.

With a larger sample size it would be a possibility to include a pilot study and main study with finalized questionnaire on two different groups for each study. With one of the main limitations of this study being the ability to get participants it was not a possibility to conduct a pilot and final study, though that was the intention at the beginning of the research process. With more participants the researcher could potentially draw more conclusions with the research on other relationships such as demographic information, satisfaction and BMI.

Confirmatory factor analysis with new sample could be an idea for the future, with a much larger sample. With this the research team would already have their factor assumptions and would determine if the new sample would with these factors.

Significance of the study, layout.

### **Interpretation**

This area of research is very important to the design community because as designers it is important to design for the needs of a buildings inhabitants. Designers

want the buildings users to be satisfied with the spaces they design therefore the spaces will be used more frequently. This is particularly important on the campus of Texas Tech University because the university wants to retain students, the department of University Student Housing wants to keep their building full and continually build new residence halls as well as update existing residence halls with features that the students feel are important and features students find necessary to continue to live on campus.

In the future it would be wise for this information to be taken into consideration when building new residence halls on the campus of Texas Tech University as well as other campus across within the Big 12 and across the nation as well. This topic can be further researched and the body of knowledge on this particular subject will only continue to grow as the needs and desires of students change over the coming years. There are many other aspects of the relationship between obesity, design and satisfaction that can be studied such as the relationship between an individual's proximity to and design of a workout facility, BMI and satisfaction. There are many features that could possibly be added to residence halls over the coming years to increase satisfaction and potentially contribute positively to the obesity epidemic as well.

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## Appendices

### Appendix A

#### Survey Monkey Survey Questions

- Height: \_\_\_\_\_
- Weight: \_\_\_\_\_
- Age: \_\_\_\_\_
- Gender: \_\_\_\_\_
- High School Attended: \_\_\_\_\_
- Residence Hall Name: \_\_\_\_\_
- Floor/Room Number: \_\_\_\_\_
- Number of Roommates: \_\_\_\_\_
- Race: \_\_\_\_\_
- Were you raised in an urban or rural environment: \_\_\_\_\_

#### Comfort

1. Overall, I feel comfortable living in my room.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree
  
2. I feel that I am able to study comfortably in my residence hall.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree
  
3. I do feel like my bed is large enough for me to be comfortable in.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree

- 5) Disagree
- 6) Strongly Disagree

**Satisfaction**

- 4. I am satisfied with sharing the bathroom facilities within my residence hall.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree
  
- 5. I feel that I am satisfied with the non-moveable furniture that came with my room.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree
  
- 6. There are reasonable features that could be added to my residence hall to increase my satisfaction.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree

**Privacy/Safety**

- 7. I feel safe (not likely to be hurt, harmed or in danger) in my residence hall.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree
  
- 8. I feel as if I have enough privacy in my dorm room.
  - 1) Strongly Disagree

- 2) Agree
- 3) Slightly Agree
- 4) Slightly Disagree
- 5) Disagree
- 6) Strongly Disagree

### **Design**

9. I feel like I have enough desk space for doing homework, in my room.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree
  
10. If I were to live in the residence halls again, I would choose to live in a traditional room without moveable furniture.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree

### **Facilities/Features**

11. I feel as if the eating choices on campus are satisfactory.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree
  - 4) Slightly Disagree
  - 5) Disagree
  - 6) Strongly Disagree
  
12. I feel satisfied with the walking distance from my residence hall or room to eating locations.
  - 1) Strongly Agree
  - 2) Agree
  - 3) Slightly Agree

- 4) Slightly Disagree
- 5) Disagree
- 6) Strongly Disagree

13. I am satisfied with the exercise facilities on campus.

- 1) Strongly Agree
- 2) Agree
- 3) Slightly Agree
- 4) Slightly Disagree
- 5) Disagree
- 6) Strongly Disagree

**General**

14. I would recommend living on campus to another individual.

- 1. Strongly Agree
- 2. Agree
- 3. Slightly Agree
- 4. Slightly Disagree
- 5. Disagree
- 6. Strongly Disagree

15. My experience on campus thus far has been a positive one.

- 1) Strongly Agree
- 2) Agree
- 3) Slightly Agree
- 4) Slightly Disagree
- 5) Disagree
- 6) Strongly Disagree

16. I feel that I spend the majority of my free time in my residence hall or dorm room.

- 1) Strongly Agree
- 2) Agree
- 3) Slightly Agree
- 4) Slightly Disagree
- 5) Disagree
- 6) Strongly Disagree

**Appendix B**

**Baylor University Double Room\* Accommodations**

<b>Residence Hall</b>	<b>Cost Per Academic Year</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
<b>Collins</b>	\$6,160	Shared Room	Moveable	13'X12'
<b>Kokernot</b>	\$6,160	Shared Room	Moveable	12'x12'
<b>Martin</b>	\$6,160	Shared Room	Moveable (except bunk beds in 3 person room)	12'x13'
<b>North Russell</b>	\$6,160	Shared Room	N/A	N/A
<b>South Russell</b>	\$6,160	Shared Room	Moveable	9'6"x12'

\*Some double rooms at Baylor University have shared bathrooms with four other rooms (eight residents) which consist of three sinks, two toilets and two showers. These were not included within this chart.

University of Texas Accommodations

<b>Residence Hall</b>	<b>Cost Per Academic Year</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
<b>Andrews</b>	\$9,757	Shared Room/Community Bath	Bunkable Bed Moveable Desk and Dresser	12'9"-16'2"
<b>Blanton</b>	\$9,757	Shared Room/Community Bath	Adjustable Beds Moveable Desk and Dresser	12'6"x15'9"
<b>Carothers</b>	\$9,757	Shared Room/Community Bath	Bunkable Beds Moveable Desk & Dresser	11'5X17'9"
<b>Kinsolving</b>	\$9,757	Shared Rooms/Community bath on South, Connecting bath on North	Built-in	12'10"x15'*

<b>Littlefield</b>	\$9,757	Shared Room/Community Bath	Bunkable Bed Moveable Desk Built-in Dresser	11'5"x17'9"
	\$9,757	Shared Room/Community Bath	Bunkable Beds Moveable Desk and Dresser	Buildings A, B, C: 12'6 x 15'9" Buildings D, E, F: 13'7"x14'10"
	\$9,757	Shared Room/Community Bath	Bunkable Beds Moveable Desk Built-in Dresser & Shelves	12'4"x15'7"
	\$9,757	Shared Rooms/Community Bath	Bunkable Beds Built-in Desks & Shelves Built-In Dresser	12'6"x15'6"
	\$9,757	Shared Rooms/Community Bath	Bunkable Beds Built-in Desks & Shelves	12'4"x16'
	\$9,757	Shared Rooms/Community Bath	Bunkable Beds Moveable Desk Built-in Dresser and Shelves	12'4"x16'
	\$9,757	Shared Rooms/Community Bath	Bunkable Beds Moveable Desk Built-in Dresser and Shelves	N/A
	\$9,757	Shared Rooms/Community Bath	Bunkable Beds Moveable Desk Built-in Dresser and Shelves	N/A

<b>Jester West</b>	\$9,757	Connecting and Community Bathrooms	Built-in	12'10"x15'10"*
<b>Jester East</b>	\$10,057	Connecting and Community Bathrooms	Built-in	12'10"x15'10"*

\*Dimensions given are for room with community bathroom

The University of Oklahoma Accommodations

<b>Residence Hall</b>	<b>Cost Per Academic Year</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
<b>Adams</b>	\$9,742	Suite Style with Semi-Private Bathroom	Moveable	11'x16'
<b>Couch</b>	\$9,742	Suite Style with Semi-Private Bathroom	Moveable	11'x16'
<b>Walker</b>	\$9,742	Suite Style with Semi-Private Bathroom	Moveable	11'x16'
<b>Cate Center</b>	\$8,716	Shared Rooms/Community Bath	Built-in Bookshelf	11'x13'
<b>David L. Boren</b>	\$8,716	Shared Rooms/Community Bath	Build-in Dressers	8'x16'
<b>Headington</b>	2 Bed/2 Bath/2 Person: \$10,670 2 Bed/1 Bath/2 Person: \$8,590	Own bathroom or shared with one person	N/A	N/A

Oklahoma State University Community Style Accommodations

<b>Residence Hall</b>	<b>Cost Per Academic Year</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
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<b>Kerr-Drummond</b>	\$3,850	Shared Rooms/Community Bathroom	Roughly 10'6"x11' (depending on location of room)
<b>Parker</b>	\$3,850	Shared Rooms/Community Bathroom	Roughly 10'6"x11' (depending on location of room)
<b>Wentz</b>	\$3,850	Shared Rooms/Community Bathroom	Roughly 10'6"x11' (depending on location of room)
<b>Stout</b>	\$4,090	Shared Rooms/Community Bathroom	Roughly 10'6"x11' (depending on location of room)
<b>Iba</b>	\$3,850	Shared Rooms/Community Bathroom	Roughly 10'6"x11' (depending on location of room)

(OklahomaStateUniversity, 2014)

West Virginia University Accommodations

<b>Residence Hall</b>	<b>Cost Per Academic Year</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
<b>University Park-Oakland Hall (Opening Fall 2015)</b>	\$7,572	single occupancy restrooms within a community style area	include built-in closets, single beds, desks, underbed dressers	11' x 22'
<b>Arnold</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A
<b>Bennett Tower</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A
<b>Boreman</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A

<b>Braxton Tower</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A
<b>Brooke Tower</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A
<b>Dadisman</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A
<b>International House</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A
<b>Lyon Tower</b>	\$6,216	Shared rooms/Community Bathrooms*	Moveable, includes bunkable bed, desk and dresser	N/A

\*Information for double occupancy rooms only

(WestVirginiaUniversity, 2015)

Texas Christian University Accommodations

<b>Residence Hall</b>	<b>Cost Per Academic Year</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
<b>Clark</b>	\$6,900	Shared Room/Community Bathroom	Bunkable Beds & Moveable	11'x15'
<b>Colby</b>	Closed for Renovation	Shared Room/Community Bathroom	Built-in Closets, Bunkable/Moveable	11'x16'
<b>Foster</b>	\$6,900	Shared Rooms/Semi-Private and Community Bathrooms	Built-in closets	12'x18'

<b>Milton Daniel</b>	\$6,900	Shared Room/Community Bathroom	Built-in Closets and storage Bunkable Beds	11'x15'
<b>Moncrief</b>	\$6,900	Shared Rooms/Semi-Private and Community	Built-in Closets and storage Bunkable Beds	11'x15'
<b>Waits</b>	\$6,900	Shared Rooms/Semi-Private and Community Bathrooms	Moveable & Bunkable Beds	11'x18'
<b>Sherley</b>	\$6,900	Shared Rooms/Community Bathrooms	Bunkable Beds/Moveable Furniture	11'x15'

Iowa State University Double Occupancy Accommodations

<b>Residence Hall</b>	<b>Cost Per Academic Year*</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
<b>Barton (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted Bed	N/A
<b>Birch (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted (appears moveable in photos)	N/A
<b>Elm (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted Bed	N/A
<b>Freeman (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted Bed	N/A
<b>Friley (1/2 AC)</b>	AC: \$4,334 No ACL \$4,279	Shared Rooms/Community Bathrooms	Unlofted, metal frame	N/A
<b>Helser (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Unlofted, metal frame	Brown House (1 of 13): Approx. 10'x14'6"
<b>Larch</b>	\$4,334	Shared Rooms/Community Bathrooms	Lofted, wood frame	9'9.6"x14'6"

<b>Linden (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted	N/A
<b>Lyon (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted	N/A
<b>Oak (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted	N/A
<b>Roberts (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted (appears moveable in photos)	N/A
<b>Wallace</b>	\$4,093	Lofted (appears moveable in photos)	Lofted (appears moveable in photos)	Room ending in 03, 04, 55, 56(13' 9" x 12') 07 to 52(13' 9" x 12") 59-60 (14'6" x 9' 2")
<b>Welch (no AC)</b>	\$4,279	Shared Rooms/Community Bathrooms	Lofted (appears moveable in photos)	N/A
<b>Willow</b>	\$4,334	Shared Rooms/Community Bathrooms	Lofted (appears moveable in photos)	14' 6" x 9' 9 1/2"
<b>Wilson</b>	\$4,093	Lofted (appears moveable in photos)	Lofted (appears moveable in photos)	Room ending in 03, 04, 55, 56(13' 9" x 12') 07 to 52(13' 9" x 12") 59-60 (14'6" x 9' 2")

\*Prices given for double occupancy only

The University of Kansas Double Occupancy Accommodations (Information on new residence call, Oswald, Self Halls, not included due to lack of information. Also information on McCollum hall not included due to building closing.)

<b>Residence Hall</b>	<b>Cost Per Academic Year</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions*</b>
<b>Corbin</b>	\$4,372	Shared Rooms/Community Bathrooms*	Lofted beds/Built-in cabinets/storage	9'-13'x12'- 14'*

<b>Ellsworth</b>			Moveable Desk & Dresser	
	\$5,590	Shared Rooms/Community Bathrooms*	Lofted beds, Built-in closets, Moveable Desk & Dresser	10'x15'*
	\$5,590	Three levels of privacy for bath: two private ensuites; each wing also contains single bath and two community baths	Lofted beds, Built-in closets, Moveable Desk & Dresser	8'11"x13'
	\$5,590	Shared Rooms/Community Bathrooms*	Lofted beds, Built-in closets, Moveable Desk & Dresser	13'-13'7"x14'
<b>Oliver</b>	\$4,372	Shared Rooms/Community Bathrooms	Lofted bed, Moveable desk, Built-in dresser, mirror and closet	12'4x12'6

\*Information for double rooms

Kansas State University

<b>Residence Hall</b>	<b>Cost Per Academic Year**</b>	<b>Accommodations</b>	<b>Furniture Mobility</b>	<b>Room Dimensions</b>
<b>Ford</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A
<b>Haymaker</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A
<b>Moore</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A

<b>West</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A
<b>Goodnow</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A
<b>Marlatt</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A
<b>Boyd</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A
<b>Putnam</b>	\$8,430	Shared Rooms/Community Bath*	Dresser, Desk and lofted bed, built in closets	N/A

\*Information given for Standard Double Community Bath

\*\*Price includes 20 meals (students who sign a residence hall contract must purchase meal plan)

**Appendix C****Supplemental Tables***Z-Scores Skewness*

	<u>Before Transformation</u>			<u>After Transformation</u>		
	Statistic	SE	Z	Statistic	SE	Z
Q11	-1.446	0.197	-7.3401	.037	0.197	.18782
Q12	-.0786	0.197	-3.98985	.269	0.197	1.36548
Q13	-.454	0.197	-2.30457	-.454	0.197	-2.30457
Q14	-.286	0.197	-1.45178	-.286	0.197	-1.45178
Q15	-.809	0.197	-4.1066	.358	0.197	1.81726
Q16	-1.028	0.197	-5.21827	.451	0.197	2.28934
Q17	-1.507	0.197	-7.64975	.219	0.197	1.11168
Q18	-.6181	0.197	-3.13756	.221	0.197	1.12183
Q19	-.4321	0.197	-2.1934	-.4321	0.197	-2.1934
Q20	.344	0.197	1.746193	.344	0.197	1.74619
Q21	-.757	0.197	-3.84264	.277	0.197	1.40609
Q22	-1.03	0.197	-5.22843	-.037	0.197	-0.18782
Q23	-.443	0.197	-2.24873	-.443	0.197	-2.24873
Q24	-1.039	0.197	-5.27411	.562	0.197	2.85279
Q25	-1.256	0.197	-6.37563	.066	0.197	0.33503
Q26	-.798	0.197	-4.05076	.339	0.197	1.72081

*Regression Analysis- Main Question: Anova Output Table*

Anova <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	<i>P</i>
1	Regression	3.242	4	.811	2.206	.071 <sup>b</sup>
	Residual	54.001	147	.367		
	Total	57.243	151			
<p>a. Dependent Variable: Main Question</p> <p>b. Predictors: (Constant), NumberofRoommates, CodedGender, BMI, Age</p>						

*Regression Analysis- Main Question- Coefficients Output Table*

Coefficients <sup>a</sup>									
	Model	Unstandardized Coefficients		Standardized Coefficients	t	P	Correlations		
		$\beta$	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	5.813	.901		6.454	.000			
	CodedGender	.171	.116	.121	1.477	.142	.156	.121	.118
	BMI	-.011	.010	-.093	-1.136	.258	-.133	-.093	-.091
	Age	-.077	.044	-.145	-1.751	.082	-.177	-.143	-.140
	NumberOfRoommates	-.016	.096	-.013	-.164	.870	.015	-.014	-.013
a. Dependent Variable: MainQuestion									

*Regression Analysis- Sub-Question One: Anova Output Table*

Anova <sup>a</sup>						
Model		Sum of Squares	Df	Mean Square	F	<i>P</i>
1	Regression	6.625	1	6.625	9.256	.003 <sup>b</sup>
	Residual	107.368	150	.716		
	Total	113.993	151			
c. Dependent Variable: Mean Score Question 1						
d. Predictors: (Constant), BMI						

*Regression Analysis- Sub-Question One: Coefficients Output Table*

Coefficients <sup>a</sup>						
		Unstandardized Coefficients		Standardized Coefficients		
Model		$\beta$	Std. Error	Beta	T	<i>P</i>
1	(Constant)	5.289	.334		15.817	.000
	BMI	-.041	.014	-.241	-3.042	.003
a. Dependent Variable: Mean Score Question 1						

*Regression Analysis- Sub-Question Two: Anova Output Table*

Anova <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	<i>p</i>
1	Regression	.548	1	.548	.645	.423 <sup>b</sup>
	Residual	127.567	150	.850		
	Total	128.115	151			
e. Dependent Variable: Mean Score Question 2						
f. Predictors: (Constant), BMI						

*Regression Analysis- Sub-Question Two: Coefficients Output Table*

Coefficients <sup>a</sup>						
		Unstandardized Coefficients		Standardized Coefficients		
Model		$\beta$	Std. Error	Beta	t	<i>P</i>
1	(Constant)	4.420	.364		12.126	.000
	BMI	-.012	.015	-.065	-.806	.423
a. Dependent Variable: Mean Score Question 2						