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An Exploration of College Students' Cooking Behavior and Factors That Influence That Behavior Using Social Cognitive Theory

Nichelle G. Harris
University of Southern Mississippi

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AN EXPLORATION OF COLLEGE STUDENTS' COOKING BEHAVIOR AND
FACTORS THAT INFLUENCE THAT BEHAVIOR USING SOCIAL
COGNITIVE THEORY

by

Nichelle G. Harris

A Dissertation
Submitted to the Graduate School,
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and the Department of Nutrition and Food Systems
at The University of Southern Mississippi
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

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Approved by:

Dr. M. Kathleen Yadrick, Committee Chair
Professor, Nutrition and Food Systems

Dr. Carol Connell, Committee Member
Professor, Nutrition and Food Systems

Dr. Denise Brown, Committee Member
Associate Professor, Nutrition and Food Systems

Dr. Charkarra Anderson-Lewis, Committee Member
Associate Professor, Public Health

Dr. Elaine Molaison
Chair, Department of Nutrition and Food Systems

Dr. Karen S. Coats
Dean of the Graduate School

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ABSTRACT

AN EXPLORATION OF COLLEGE STUDENTS' COOKING BEHAVIOR AND FACTORS THAT INFLUENCE THAT BEHAVIOR USING SOCIAL COGNITIVE THEORY

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Patterns of weight gain and poor diets in young adulthood, along with associations between cooking involvement, frequency, and skills and improved dietary intake, suggest that exploration of cooking knowledge, attitudes, and behavior among college students is warranted. This research employed a concurrent parallel mixed methods design and a social cognitive theory framework to study cooking perceptions among college students at a public university in a southern state with obesity rates among the highest in the U.S.

Survey respondents (N=159) scored $9.3 \pm 1.1/10$ on cooking knowledge, and mean ratings on SCT-related cooking constructs were $39.2 \pm 7.4/48$ (skill); 8.1 ± 3.2 , 9.3 ± 3.4 , and 10.1 ± 4.2 out of 18 (willingness to invest time, physical effort, and mental effort, respectively); $32.5 \pm 6.9/42$ (outcome expectations); $21.7 \pm 4.0/36$ (attitudes, expectancies, expectations); and $15.7 \pm 3.0/20$ (confidence). In the SCT construct model ($F=5.417$, $R^2=.225$), only cooking skill was a significant predictor of cooking behavior, whereas in the model that also included demographics ($F=5.062$, $R^2=.613$), no SCT constructs were significant and living off-campus was the strongest predictor ($p<.001$) of cooking behavior.

Several themes emerging from focus groups (N=15) suggested approaches that universities might take within the context of wellness programming to encourage healthy eating. Most respondents lacked basic culinary skills, suggesting cooking programs or classes start with the basics. Benefits of cooking identified in both study components could be used in developing and promoting cooking classes. Cooking providing control over what is eaten was most strongly affirmed, and health benefits, desirable social experiences, and opportunities for creativity were other outcome expectations. Outcome expectancies relevant to choosing to cook included the desire to save time and effort in light of other priorities while in school, and cooking as a life skill needed to live on their own. Lack of facilities/equipment in their campus living situation was seen as a barrier to cooking, and media sources like cooking videos and cable television programs provided opportunities for observational learning that could be easily accessed. With many students not acquiring skills in their homes growing up, the inclusion of cooking classes and resources as part of university wellness programming may help young adults develop a life skill important for healthy food consumption.

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DEDICATION

I would like to give special thanks to my family and friends for all the prayers, love, support, and words of encouragement that I have gotten over the years. To my mother, Edith Harris, thank you for your constant love and support; I could not have done this without you.

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CHAPTER I - INTRODUCTION

Today in the United States obesity is a complex health issue that has a negative economic impact in society. The rate of obesity in adults has tripled since 1976 (Eaton et al., 2012; Flegal, Carroll, Kuczmarski, & Johnson, 1998; Flegal, Carroll, Kit, & Ogden, 2012). Obesity is a worldwide epidemic, and in the United States, rates of obesity are above 30 percent in most gender and age groups (Flegal et al., 2012; Flegal, Carroll, Ogden, & Curtin, 2010)). The Centers for Disease Control and Prevention (Centers for Disease Control and Prevention [CDC], 2015a) reported that in 2015, every state in the United States had at least 20 percent prevalence of obesity in adults. The state of Mississippi had the highest obesity prevalence, at over 35% of adults. Over time there are negative health consequences associated with obesity, including heart disease, stroke, diabetes, and certain types of cancer (Centers for Disease Control and Prevention [CDC], 2015b). There are health and economic consequences that are associated with obesity, such as higher healthcare and medical costs (Finkelstein, Trogon, Cohen, & Dietz, 2009). Research and scientific studies of overweight and obesity identify contributing factors such as energy imbalance, high caloric intakes, and not getting enough physical activity, but understanding the complexity of this health issue may help identify more successful ways to intervene before chronic health conditions and their negative consequences develop.

According to Nelson, Story, Larson, Neumark-Sztainer and Lytle (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008) emerging adulthood is an important time in life because of the transition period from leaving home to making decisions independently, suggesting a time for health behavior patterns to be further developed. It

is also a time when adult weight gain typically occurs (Beydoun & Wang, 2009a; Kahn & Cheng, 2008; Zagorsky & Smith, 2011).

A Ford and Dietz (Ford & Dietz, 2013) study determined that a contributing factor for increased obesity rates over time in young adults was increases in energy intake. The high energy intakes among young adults were identified as coming from fats, sugars, and sugar-sweetened beverages, with low consumption of fruits, vegetables, and whole-grain foods contributing to the increases in obesity over the years.

National data on eating away from home also helps to explain changes in food intake and obesity rates. For example, the Coronary Artery Risk Development in Young Adults Study (CARDIA) examined away-from-home consumption in young adults over 7, 10, and 20 year periods, noting associations with increases in BMI (Duffey, Gordon-Larsen, Steffen, Jacobs, & Popkin, 2009)). This study provides evidence that fast food consumption in young adults is a predictor of weight gain later in life.

Examining American diets and how they are prepared may be a key to better understanding of eating behaviors and patterns that contribute to obesity. The Economic Research Service Time Use Survey determined that Americans with normal weight spent more time doing meal preparation activities than those who were obese or overweight (Hamrick, 2011). Another national study about American dietary patterns found that foods prepared away from home provided more calories per eating occasion and were less nutrient dense (Guthrie, Lin, & Frazao, 2002).

Other studies also provide evidence for the shift in home cooking and home food consumption since 1965 (Smith, Ng, & Popkin, 2013). Smith and colleagues (Smith et al., 2013) examined trends in US home food preparation and consumption patterns over a

40+ year period using national survey data, and found a reduction in time spent cooking along with showing a decline in women performing those duties. There was a shift from food prepared at-home to an increase of consumption of convenience/easy-to-prepare and away-from-home foods, generating increased energy intake with poorer nutritional quality (Smith et al., 2013). Mancino and colleagues also found that convenience foods and foods consumed away from the home were linked to poor diet quality and increased obesity rates (Mancino, Todd, & Lin, 2009).

Other evidence suggests that eating food prepared at home and spending more time in meal preparation may be protective against obesity. Hamrick and colleagues (Hamrick, 2011) found that time spent in meal preparation and clean-up varied by weight status, with normal and underweight individuals spending more time than overweight or obese. Zick, Stevens, and Bryant (Zick, Stevens, & Bryant, 2011) reported similar findings in a national sample of U.S. women. Larson and colleagues found that food preparation involvement of young adults was related to overall improved diet quality, along with greater fruit and vegetable consumption, lower fat intake and higher nutrient intake (Larson, Story, Eisenberg, & Neumark-Sztainer, 2006). A Swiss food panel study reported similar findings (Hartmann, Dohle, & Siegrist, 2013). Given the overall trend toward eating away from home and less time spent in cooking, and the risk of weight gain in the young adult years, it may be useful to explore young adults' cooking behavior and perceptions of cooking, to understand better ways to encourage behaviors associated with healthier eating and weight.

Relationships among cooking knowledge, confidence, skills, and behavior have not been studied systematically, and much of the existing research was conducted outside

the US. Several studies have examined relationships between demographics and cooking frequency or time spent cooking, generally finding increased cooking associated with higher income or class, increasing age and education, and female gender (Caraher, Carr-Hill, Lang, & Dixon, 1999; Daniels, Glorieux, Minnen, & van Tienoven, 2012; Hamrick, 2011; Zick et al., 2011). Likewise, cooking confidence and skills were greater in women (Daniels et al., 2012; Hartmann et al., 2013; Winkler & Turrell, 2009) and increased with age (Daniels et al., 2012; Hartmann et al., 2013). Exposure to maternal role modeling of cooking appears to be important in encouraging participation in cooking (Caraher et al., 1999; De Backer, 2013; Jones, Walter, Soliah, & Phifer, 2014; Soliah, Walter, & Antosh, 2006), as does enjoyment of cooking (Hartmann et al., 2013; Jones et al., 2014), and an interest in experimenting with food (Candel, 2001). And lastly, cooking confidence and skill was related to cooking activity (Soliah et al., 2006). The limitations of existing research suggest that further work needs to be done to understand better relationships among cooking behavior and factors such as cooking knowledge, skills, and confidence.

Research Purpose

The purpose of this research study is to explore college students' cooking behavior, and factors that influence that behavior, using constructs derived from Social Cognitive Theory as a framework for inquiry.

Research Questions

1. How do personal factors (i.e. demographics and enjoyment of/preference for cooking) affect cooking behavior?

2. How have family food environment and experiences growing up influenced young adults' cooking and cooking confidence?
3. What role do present family and peer interactions play in cooking expectations and behavior?
4. How has watching others cook, seeing the consequences of cooking, influenced young adults' cooking and cooking competence? In the family growing up? In other settings (food network, community cooking classes, high school curricular and extracurricular)?
5. What outcomes do young adults associate with cooking?
6. What motivates young adults to cook?
7. How have today's young adults developed behavioral capability related to cooking?
8. What contributes to cooking confidence and skill in young adults?

Theoretical Framework

The theoretical framework for the study was Social Cognitive Theory (SCT). SCT was developed by Bandura (Bandura, 1977) to better understand human behavior, motivation, and action. SCT is one of the most widely used theories in nutrition education because the conceptual framework focuses on the complexity of behavior and its determinants, behavioral change, and potential mediators and mechanisms of change (Contento, 2011; McAlister, Perry, & Parcel, 2008). SCT is an interpersonal theory where personal factors, environmental factors, and human behavior reciprocally influence each other. Key constructs of SCT are presented in Table 1. They include outcome expectations, self-efficacy, behavioral capability, observational learning, self-regulation,

and reciprocal determinism. More recent work of Bandura (Bandura, 2004) depicts a structural path model whereby self-efficacy influences health behavior directly, as well as indirectly through its influence on outcome expectations (beliefs about the outcomes of behavior), and on goals, with “sociostructural factors” (personal and environmental facilitators and impediments) influencing goals and in turn behavior.

Table 1

*Social Cognitive Theory Key Constructs**

Theory construct	Definition
Outcome expectations	Beliefs about the likelihood and value of consequences that could be expected from a behavior
Self-efficacy	Belief or confidence in one’s ability to perform a given behavior
Behavioral capability	Knowledge, skills, and tools to perform a behavior
Observational learning	Learning based on observing similar individuals or role models perform a behavior
Self-regulation	Regulating or controlling one’s behavior through approaches such as self-monitoring, goal-setting, self-rewards, and problem solving
Reciprocal determinism	Interaction of environmental factors and an individual’s personal factors with behavior

*adapted from Contento, 2011, p 96, and Health Education Theory, Research, and Practice, Ch. 8, as presented at <http://www.med.upenn.edu/hbhe4/part3-ch8-key-constructs.shtml>

Other studies have used SCT to understand cooking behaviors and as a framework on which to design programs and interventions to develop cooking skills in young adults (Ball & Brown, 2012; Brown & Richards, 2010; Clifford, Anderson, Auld, & Champ, 2009; Levy & Auld, 2004), which in turn have been found to be related to better diet quality (Larson, Perry, Story, & Neumark-Sztainer, 2006). Table 2 illustrates how SCT constructs frame the research questions.

Table 2

Research Questions and Related SCT Constructs

SCT Construct, Definition	Research questions/objectives/purpose
<i>Personal factors:</i> includes things like behavioral capability, outcome expectations, self-efficacy; can also include factors such as demographics, marital status, employment status, living situation	How do personal factors (i.e. demographics and enjoyment of/preference for cooking) affect cooking behavior?
<i>Environment:</i> objective factors external to the individual, including physical (e.g. cooking equipment, facilities) and social (e.g. family members, friends, peers at work or at school, work demands	How have family food environment and experiences growing up influenced young adults' cooking and cooking confidence? What role do present family and peer interactions play in cooking expectations and behavior?
Observational learning	How has watching others cook, seeing the consequences of others cooking, influenced young adults' cooking and cooking competence? In the family growing up? In other settings (food network, community cooking classes, high school curricular and extracurricular)?
Outcome expectations	What outcomes do young adults associate with cooking?
Expectancies: values placed on outcome(s)	What motivates young adults to cook?
Behavioral capability	How have today's young adults developed behavioral capability related to cooking?
Self-efficacy	What contributes, has contributed to cooking confidence, SE, in young adults? How is cooking confidence related to the complexity of cooking?

Limitations

1. The study is limited by the accuracy of participant self-reporting.
2. The study is limited to students enrolled at a single university in south Mississippi.

Definitions

Body mass index (BMI) - A value calculated from a person's weight and height. BMI correlates with body fatness for most people, but it does not directly measure body fatness. BMI is used to screen weight categories that may lead to health problems ("About adult BMI," 2015).

Normal weight for adults is characterized by a BMI of 18.5 to 24.9

Overweight is defined as having BMI a between 25 and 29.9

Obese for adults is characterized by a BMI of 30 or greater

Behavioral factors - SCT behavioral factors include knowledge and skills that one possesses and that potentially influence perceived self-efficacy (Bandura, 1977, 2004). In nutrition education this includes factual information (food and nutrition knowledge), procedural information (how-to-knowledge), and behavioral skills (meal planning, purchasing, and preparation ability) (Contento, 2011).

Cooking confidence – a feeling of self-assurance related to one's cooking/food preparation ability, including such things as cooking from basic ingredients, following a simple recipe, and preparing new foods and recipes (Barton, Wrieden, & Anderson, 2011)

Cooking skills – defined operationally as the ability to prepare certain specific food items (Hartmann et al., 2013) or perform certain food-related tasks including preparation (Winkler & Turrell, 2009).

Dietary habits - automatic or routine behaviors that comprise one's food choices, such as meal planning, food purchasing, meal preparation, money management, and consumption behaviors (Contento, 2011).

Environmental factors - social cognitive theory (SCT) construct including external, social, and physical factors that potentially influence an intended behavior (Bandura, 1977, 2004). Nutrition education environmental factors include social structures (family and cultural systems) and physical structures (built environment, financial resources, and food accessibility) that influence dietary habits (Contento, 2011).

CHAPTER II – REVIEW OF LITERATURE

Obesity and Weight Gain in Young Adults

More than one-third of adults in the United States were obese in 2009-10 and the rate of adult obesity increased over time since about 1976, with some leveling since about 2008 (Flegal et al., 1998; Ogden, Carroll, Kit, & Flegal, 2012). Improvement in obesity rates has been a goal of Healthy People, the U.S. Department of Health and Human Services' (HHS) 10-year goals for improving the health of the nation, since the year 2000 (National Center for Health Statistics (DHHS/PHS) MD., 2001). The Healthy People 2020 goals focus on a 10.0% improvement in obesity prevalence (Office of Disease Prevention and Health Promotion, 2017). Healthy People 2020 includes objectives for reducing the proportion of adults age 20 and older who are obese and also targets rates of obesity in adolescents aged 12 to 19 who are obese, and prevention of inappropriate weight gain in adolescents and adults (Office of Disease Prevention and Health Promotion, 2017).

The specific targeting of obesity and inappropriate weight gain in adolescent and adult years suggests a need to consider older adolescents and young adults in weight gain prevention efforts, in spite of, or in addition to, the current national public health priority of prevention of child obesity (Institute of Medicine (US) Committee on Prevention of Obesity in Children and Youth, 2005; McGuire, 2012). The annual National College Health Assessment sheds light on weight status trends in the college student population (American College Health Association, 2009, 2013). This national survey of students at self-selected 2- and 4-year postsecondary institutions of higher education included 28,237 students in 2012, which represented a mean response proportion of 20% at the

participating institutions. In 2008, 31.3% of students responding were overweight or obese, and that percentage had increased to 32.5% in 2012.

Nationally representative data on young adults from cross-sectional and longitudinal datasets support the weight status trends shown in these annual surveys of college students. National Health and Nutrition Examination Survey data provides information on trends over time based on cross-sectional samples. Data are reported for adults aged 20-39. Obesity prevalence for this age group was 32.6% in 2009-10 (Ogden et al., 2012). In 2007-08, the obesity rate was 27.5% for men and 34.0% for women (Flegal et al., 2010), and prevalence of BMI ≥ 25 (overweight and obese) was 63.5% for men 20-29 and 59.5% for women in this age group. Beydoun and Wang (Beydoun & Wang, 2009a) used NHANES data from 1988-1994 and 1999-2004 to assess shifts in BMI and waist circumference distributions and to project future distributions and obesity prevalence in adults. Between the two time periods, for young adults aged 20-29 years, mean BMI increased 2 units, from normal to overweight status, and mean waist circumference increased by 6.7 cm. Although mean BMI increased linearly with age, the largest absolute increase was in the 20-29 age group. In a longitudinal study comparing obesity in young black and white women enrolled in the CARDIA study, age was positively correlated with BMI and skinfold measures in black women but not in white women (Burke et al., 1992). Kahn and Cheng (Kahn & Cheng, 2008) used three large longitudinal datasets to compare BMI changes over time in different age cohorts, ranging in age from 23-29 to 65-72 at baseline. The greatest annual changes in BMI across age cohorts were in young adults, except for white women. In men the median annual change in BMI at or about age 29 was about +0.2 units/year; for white women it was +0.16 and

for black women, +0.38 units. At age ~29, the incidence of positive change in BMI was 77% for men, and 76% for women in combined racial groups. Data like these support making prevention of weight gain and obesity in young adults a priority, as well as studying possible causes and contributors to identify effective approaches for weight gain prevention.

Some research has examined weight gain over time in young adult college students, since weight gain during the freshman year, the “Freshman 15,” is popularly understood to be a common occurrence. A number of studies have reported significant average weight gain in the early college years, although the periods of time studied varied from about one semester to two years.

Among several studies of weight gain in the first year of college, average weight gain ranged from about 1.1 kg to 3.6 kg. Morrow and colleagues (Morrow et al., 2006) compared outcome measures of body weight, BMI, body composition, and fat distribution measured early in the fall and late in the following spring semesters in a college freshman cohort. Weight gain averaged 1.1 ± 2.6 kg ($p \leq .0001$), and there were significant increases in BMI, percent body fat, total fat, and fat-free mass, and waist and hip circumferences ($p \leq .001$). Hoffman, Policastro, Quick, and Lee (Hoffman, Policastro, Quick, & Lee, 2006) investigated changes in body weight and percent body fat among college first-year students at Rutgers University, who lived in the dorms; health assessments were conducted in September and April. Mean weight gain for men and women was 1.3 ± 4.0 kg. Percent body fat, BMI, fat mass, and fat-free mass also increased. Lloyd-Richardson and colleagues (Lloyd-Richardson, Bailey, Fava, & Wing, 2009) assessed weight gain during the first year of college in freshman at two different

universities and found gains averaging between 1.5 and 3.6 kg. Overweight/obesity rates also increased from the start to the end of freshman year, from 21.6 to 36% for one university cohort and from 14.7 to 17.8% for another.

Other researchers studied weight gain in young college students for shorter time periods. Levitsky and colleagues quantified weight gain among college freshman at Cornell University during their first 12 weeks (Levitsky, Halbmaier, & Mrdjenovic, 2004). Students gained an average of $1.9 \text{ kg} \pm 2.4 \text{ g}$ (158.3 g/week) and BMI also increased significantly from 20.8 ± 2.1 to $21.5 \pm 2.3 \text{ kg/m}^2$. Mihalopoulos, Auinger, and Klein (Mihalopoulos, Auinger, & Klein, 2008) surveyed college freshman at a northeastern university living on campus on social behaviors and weight. Researchers determined change in weight and BMI using self-reported height and weight from the beginning of the students' freshman year to the time of the survey approximately seven months later. The participants gained an average of 2.7 lbs. ($1.2 \text{ kg} \pm 6.4 \text{ kg}$), with half of the participants gaining weight, while 15% lost weight. Cluskey & Grobe (Cluskey & Grobe, 2009) studied weight changes among college students over an 8-week period during their first term in college. Weight-gain occurred in 62% of the 379 students studied; a greater percentage of males than females gained weight, and magnitude of weight gain was also greater for males. A slightly higher percentage of females (40%) than males (36%) maintained or lost weight. In both genders, 62% had weight increases of $>2.3 \text{ kg}$ body weight over the 8-week period.

A few older studies of groups of college students reported no significant weight gain on average (Hodge, Jackson, & Sullivan, 1993; Hovell, Mewborn, Randle, & Fowler-Johnson, 1985). In a small study of weight gain in 61 women during their

freshman year, average weight was the same at six months compared to baseline (Hodge et al., 1993). Of the 18 women (30% of sample) who gained weight, the average weight gain was seven pounds.

A systematic review of freshman weight gain was published in 2009 (Crombie, Ilich, Dutton, Panton, & Abood, 2009) and included 17 studies published between 1985 and 2008, including those already cited that were published during that time period. The findings indicated mean weight increases were 1.3-3.1 kg for the 1st semester while weight gain measured over the entire freshman year ranged from 0.7-2.4 kg. However other studies that reported on only those who gained weight found a mean weight gain of 3.1-3.4 kg.

One study by Racette and colleagues on weight changes followed weight gain over a longer period of time (Racette, Deusinger, Strube, Highstein, & Deusinger, 2008). The study took place at Washington University in St. Louis, MO using a convenience sample of first year freshman. Information was collected from students at the beginning of freshman year and the end of their sophomore year with the average age at baseline being 18.1 years. At the end of their sophomore year, 70% of the 290 reassessed students had gained weight. The average increase for those who gained weight was 4.1 ± 3.6 kg ($p < .001$), with BMI increasing among 69% of students. Prevalence of overweight and obesity increased from 15% to 23%.

Although the majority of researchers have approached the study of weight gain in young adults from the perspective of weight gain in college, recently published findings from a nationally representative longitudinal dataset would seem to confirm that weight gain in young adults is not just an occurrence in college students or a phenomenon

associated with the freshman year and transitions to college. Zagorsky and Smith (Zagorsky & Smith, 2011) analyzed longitudinal data on the 1997 cohort of the National Longitudinal Survey of Youth, through the 2007 annual survey. This analysis included 7418 young adults, 22-28 years at the time of the 2007 survey, and included 4409 who attended college and 3009 who never attended. They used multivariate linear regression to predict freshman and total college weight gain, simulations to compare non-college students with college students, and conducted longitudinal analysis of weight gain in the cohort before, during, and after college. The median freshman weight gain for women was 2.4 lbs. and 3.4 lbs. for men. The median weight gain during all college years in women was 6.5 lbs. and in men, 12.1 lbs. At the same time, the average weight gain for freshmen women with a 2-year degree was 3.6 lbs. versus 2.8 lb. for those seeking a 4-year degree. When examining differences in living arrangements by gender, women who ever lived in a dorm had 2.7 lbs. of weight gain as compared to 3.5 lbs. for those who didn't live in dorms. Men who ever lived in a dorm experienced a mean 4.1 lb. gain versus 3.0 lbs. for those who didn't. A number of other variables studied, including marital status, poverty status, and weeks worked in the past year, were not related to freshman weight gain or to total college weight gain. The number of years in college was the only predictor of total college weight gain with an average of 3 lbs. weight gain per year; those attending 2-year colleges gained approximately 2 lbs. more than those in 4-year colleges over their entire college career. The male non-attendees gained 4.49 lbs. between age 18 and 19 while college attendees gained 5.53 lbs., whereas non-attendee females experienced a 3.54 lb. gain versus 3.55 lbs. for attendees.

The largest body of literature on weight gain in young adults has focused on college attendees in their first year, suggesting that the weight gain is a phenomenon of that environment and the transition. However, as shown, longitudinal studies and those including young adult non-college attendees suggest otherwise. The young adult years seem to be a time of high risk for weight gain. Other sections of this review explore factors that may account for this weight gain.

Dietary Intake of Young Adults

Overview

Over the last 20 years, many environmental changes/conditions have occurred that may contribute to the weight gain seen in the total population, like increased availability of convenience foods, automobile usage, and television entertainment (Jeffery & Utter, 2003). Although many individual, social, and environmental factors are understood to influence obesity, at the individual level there are two modifiable behaviors that play a role, physical activity and dietary intake (Centers for Disease Control and Prevention [CDC], 2016). This review focuses further on aspects of food intake, but physical activity is not within the scope of this review.

Energy intakes increased over the period 1971-75 to 2003-04, with consumption changing from 1972 kcal/d to 2267 kcals/day. In young adults aged 20-39, caloric intake trended upward from 1971-75 (2153 ± 22.8 kcal/day) to 2005-06 (2429 ± 39.6 kcal/day), peaked in 2003-04, and has more recently begun to trend downward, to a mean of 2304.9 ± 30.2 in 2009-10 (Ford & Dietz, 2013).

The unfortunate fact about obesity is that this disease is preventable and can be controlled by modifying dietary habits including increasing fruit and vegetable intake,

nutrient dense foods and beverages, and whole grains, just to name a few. The Dietary Guidelines for Americans (DGA) of 2010 provides guidance and sound advice on how Americans can improve their diets and eat for their health, while reducing the risk of developing obesity and other chronic diseases like diabetes, heart disease, and some cancers (McGuire, 2016; Millen et al., 2016).

Previous research examining twenty-four-hour recall data from the National Health and Nutrition Examination Survey (NHANES) III 1988-1994 found that 89% of Americans consumed less than five fruits and vegetables a day (Casagrande, Wang, Anderson, & Gary, 2007). The 1999-2000 NHANES revealed that only 40% of Americans ate an average of five or more fruits and vegetables a day (Guenther, Krebs-Smith, Reedy, & Dodd, 2006). Although there was little improvement in fruit and vegetable consumption between 1988-1994 and 1999-2002, the later data did show increases. In 2013, only 13.1% of adults met fruit intake recommendations, and 8.9% met vegetable recommendations (Moore & Thompson, 2015).

Young Adults' Dietary Patterns

National trends in food consumption have been implicated as an important factor in increases in obesity prevalence. Food choices and dietary patterns during the young adult years are considered here. It is important to recognize that young adults are forming independence and developing eating patterns which may persist throughout their lives (Lau, Quadrel, & Hartman, 1990; Nelson et al., 2008).

Unhealthy dietary habits and behaviors among college students are not new to the U.S. (Anding, Suminski, & Boss, 2001; Silliman, Rodas-Fortier, & Neyman, 2004), but poor diets in young adults are not unique to college students. The National Cancer

Institute reported on young adult dietary intakes using 2007-10 NHANES data (Epidemiology and Genomics Research Program website, 2015). Mean daily intakes of various food groups for males and females aged 19-30 were included. Selected mean intakes for males included total fruit, 0.9 ± 0.05 cup equivalents; total vegetables, including beans and peas, 1.7 ± 0.06 cup equivalents; whole grains, 0.7 ± 0.05 oz. equivalents; and energy from solid fats and added sugars, 769.4 ± 19.98 kcal; for females, fruits, 0.9 ± 0.05 cup equivalents; total vegetables including beans and peas, 1.4 ± 0.04 cup equivalents; whole grains, 0.6 ± 0.03 oz. equivalents; energy from added fats and sugars, 556.3 ± 15.6 kcals. Fruit, vegetable and whole grain intakes were below the recommended amounts, and energy from added fats and sugars was excessive. Older data from the 1995 nationally representative Youth Behavior Risk Surveillance National College Health Risk Behavior Survey, self-reported by college students, found that almost three fourths had failed to eat five or more servings of fruits and vegetables on the day preceding the survey, and 23% had eaten three or more servings of high-fat foods (“Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey - the United States, 1995,” 1997). Additionally, in 2015, the National Youth Risk Behavior Survey found that high school students had unhealthy dietary behaviors. For example, 5.2% of students had not eaten fruit/fruit juice and 6.7% vegetables during the seven days prior to the survey (Kann et al., 2016). Over the period 1995-2015, a significant linear decrease occurred in the prevalence of not having consumed fruit or juices (5.4%-5.2%), whereas the prevalence of consuming one or more times per day did not change. For vegetables over the same time period, there was an increase in prevalence of not having

eaten vegetables (4.2%-6.7%) and no change in the prevalence of consumption one or more times per day.

Some smaller studies of college students also reported data on dietary intakes. Huang et al. (Huang et al., 2003) surveyed 738 college students aged 18 to 27 years at the University of Kansas, to study rates of overweight and obesity and diet and physical activity behaviors. On average students reported consuming 4.2 servings of fruits and vegetables per day and 18 grams of fiber per day, with 69.4% and 67.1% of students, respectively, consuming less than recommended amounts. These mean intakes were higher than those reported nationally. Rose, Hosig, Davy, Serrano, and Davis (Rose, Hosig, Davy, Serrano, & Davis, 2007) measured whole-grain intake in college students enrolled in an introductory nutrition course and its association with BMI. Of 485 enrolled students, 159 met all the study criteria. Of the 159, those who were overweight or obese (33%) consumed an average of 5.4 servings of grain-based food per day, with only 13% from whole-grain food (0.7 servings/day). Seventy percent of the whole-grain intake was from ready-to-eat cereals and wheat bread. A higher whole-grain intake, as well as a higher proportion of whole grain to total grain intake, was found in the normal weight students than in the overweight or obese participants. The normal weight students also had higher fiber intake.

Among the weight gain studies in college students reported earlier, a few studied dietary factors that predicted weight gain. In the Cornell students who experienced an average gain of 1.9 ± 2.4 kg during their first three months of college, a multiple regression model controlling for initial body weight explained 71% of the total variance in weight gain (Levitsky et al., 2004). The strongest predictors were eating junk foods

(24%), meal frequency on weekends (17%), and recent dieting (9%). Eating in an ‘all-you-can-eat’ dining hall was associated with eating larger meals. Adams and Rini (Adams & Rini, 2007), who studied weight gain at a Midwestern university using historic health risk appraisal data from 1992-94, found that women who gained weight were more likely to consume alcohol, caffeine and eat high-cholesterol foods, and less likely to eat fiber and cruciferous vegetables. There were no significant predictors of BMI increase for men.

Family Experiences

Family experiences and traditions growing up, as well as life transitions occurring in young adulthood, may offer insight into eating habits that affect weight status, and are of particular interest to this researcher. Understanding family influences related to food is relevant to applying social cognitive theory to understanding of young adults’ cooking behavior and influencing factors. The family environment is a setting in which observational learning can take place, self-efficacy and behavioral capability built, and outcome expectations established.

A group of Minnesota researchers has studied family influences on eating in a multi-phase longitudinal study called Project EAT (“Project EAT,” n.d.). A multi-ethnic sample of adolescents originally enrolled at ages 11-18 (mean 14.9) in 1998-1999, was followed in Project EAT-II in 2003-04 as two age cohorts, one with a mean age of 17.2 and the other with a mean age of 20.4. Of the original cohort, 1030 men and 1257 women participated in the EAT-III follow-up survey in 2008-09, when one-third of participants were aged 20-25 and two-thirds were 26-31. Larson and colleagues (Larson, Neumark-Sztainer, Hannan, & Story, 2007) used data from Project EAT to examine if

family meal frequency during adolescent years had associations to diet quality, meal frequency, meal selection, and meal structure in early young adulthood. Participants in the study completed surveys and FFQs in 1998-1999 (Time 1) and 2003-2004 (Time 2). Family meal frequency at Time 1 was related to greater intakes of healthy foods and nutrients at Time 2, as well as to a higher priority for social eating and meal structure at Time 2.

Hammons and Fiese (Hammons & Fiese, 2011) conducted a meta-analysis examining the relationship of the frequency of shared family meals with weight and dietary outcomes in children and adolescents. They found a protective effect of sharing family meals three or more times per week related to weight status and eating healthy foods. For the four longitudinal studies reporting on weight outcomes, only one reported significant associations, although the significant meta-analysis odds ratio for these studies suggested that shared family meals were associated with a 7% odds of reduction of future overweight.

De Backer (De Backer, 2013) conducted research on family meal traditions, providing insight on how food habits of meal consumption and meal preparation transmit from one generation to the next. The study used a convenience sample of 104 undergraduate students enrolled in Belgian universities. The study's goal was to investigate if reported childhood food habits predicted the food habits of university students at the present. Two hypotheses developed from previous literature were 1) family meal frequency in childhood would predict current commensality ("the practice of eating together" [Merriam-Webster]) among students, and 2) students who perceived parents and grandparents as frequent cooks would cook more themselves. A three-part

survey was developed asking students about: present eating and cooking habits, childhood eating habits, along with parents and grandparent cooking habits, and demographic questions. Frequency of having breakfast and dinner with others currently was related to frequency of childhood family breakfasts and dinners, respectively. Mothers' frequency of home cooking was related to frequency of students cooking for themselves only for students currently living independently, but not for students living at home. Fathers' cooking during childhood was related to male students cooking for themselves. These studies suggest the importance of family meal frequency and practices to future meal and cooking practices as young adults become responsible for their own meals, and that family practices may play a role in young adult outcomes that include weight status and healthy eating. Other research on young adult eating focuses on life transitions, college attendance, and living environments.

Young Adult Life Transitions and Living Environments

Transitions occurring when young adults begin living independently of their families, in a college or other setting, typically present a new set of environmental factors likely to interact with personal factors and influence behavior related to food and eating. Self-efficacy and behavioral capability, as well as changing outcome expectations associated with eating, may impact food-related and eating behavior.

Cluskey & Grobe (Cluskey & Grobe, 2009) interviewed 19 students using a college life transition perspective and how it influences eating and exercising behaviors. The qualitative findings established themes around the selected concepts of the life-course perspective, to include trajectories, transitions, linked lives, timing in lives, and strategies. Although the students viewed college attendance as being important, they were

in agreement about their difficulty in the transition related to their health. Participants identified environmental influences, lack of family support, and absence of established routines and regular physical activity as reasons for changes related to healthy lifestyle behaviors. Maintaining and eating healthful diets was the participants' biggest challenge in their college transition. The students perceived campus food selections as being unhealthy while the off-campus students were amazed at the high cost and time required to fix healthful meals at home.

Driskell and colleagues compared eating and physical activity habits of lower level and upper level undergraduates to better understand the changes that may occur when students are exposed to a new environment with resources (recreational and dining facilities, wellness programs and courses) that may not have been available to them prior to coming to college (Driskell, Goebel, & Kim, 2005) . Questionnaires were completed by 114 lower-level and 147 upper-level university students 19 to 25 years old enrolled in an introductory nutrition course at a Midwestern university. Lower-level and upper-level students had similar eating patterns including snacking patterns and choices of snacks, with one exception: a higher proportion of upper-level students reported consuming an afternoon snack. Convenience, taste and cost were the greatest influences on food choices, and over 90% of students reported eating meals at fast food restaurants six to eight times weekly. Further, 74.8% of lower level and 84.4% of upper level students reported not typically eating meals in university cafeterias, whereas two thirds reported eating meals in their homes/dormitories at least six to eight times weekly. Locations selected for eating may play a role in food choices and dietary intake, although this study did not examine those relationships.

Nelson, Larson, Barr-Anderson, Neumark-Sztainer, and Story (Nelson, Larson, Barr-Anderson, Neumark-Sztainer, & Story, 2009) compared differences in meal patterning, dietary intake, and home availability environments among young adult (average age, 20.5) non-students and two- and four-year college students, using the Project Eating among Teens II (EAT_II) data and Youth-Adolescent Food Frequency Questionnaire. Variables studied included meals consumed per week, food servings per day, energy and fat intake, and home food availability of healthful and unhealthful foods. Researchers assessed differences in diet-related outcomes by student status including socio-demographics, college attendance, home food environment, and living arrangements; models examined were unadjusted, adjusted for socio-demographics and additionally adjusted for living arrangement. The unadjusted models determined that the majority of young adults did not meet the national recommendations for dietary intake. There were differences among college-status groups for both men and women for intakes of vegetables, whole grains, soft drinks, and percent calories from saturated fat, with four-year students generally having better intakes. These relationships persisted when controlling for socio-demographics. Considering meal frequency, models adjusted for socio-demographics and living situation found non-student men consumed fewer breakfast and lunch meals and whole grains, more soft drinks, and a higher percent of calories from saturated fat; non-student women consumed more fast food meals and soft drinks, fewer dark vegetables and whole grains, and a higher percent of calories from fat and saturated fat, when compared to four-year students. There were differences in home food availability of healthful and unhealthful foods among college-status groups for women, but not for men. Some group differences apparent in unadjusted models and

those using socio-demographics as a covariate were no longer significant when adjustments for living situation (with parents, renting an apartment, or on campus) were made, suggesting that living situation does play a role in dietary behavior of young adults. These included dinner frequency, and intake of vegetables, calcium-rich foods, and whole grains for men and breakfast and lunch intake for women, but model coefficients were not reported.

Pelletier and Laska (Pelletier & Laska, 2012) examined perceived time constraints for healthy eating and work, school, and family responsibilities among young adults to get a better understanding of these factors in college students who perceive time as the greatest barrier to improving dietary behavior. Researchers recruited a convenience sample of students enrolled at a 2-year community college and a large, public 4-year university in Minnesota for the Student Health and Wellness Study, a study of nutrition and weight-related issues among college students. A cross-sectional survey was issued to a total of 1201 (598 two-year community college and 603 four-year public university) students. Participants' height, weight, and body composition were measured. Participants from both schools included minorities: 60% at the 2-year college and 48% at the university. The students at the 2-year college were younger than the overall student population: 18% were under 19 years old compared to 6% among all enrolled students, 20% were over 24 years old compared to 41% of all enrolled students. The major perceived time constraint with young adults in the study was that they were too busy with school to maintain a healthy life balance (57.9%); however, 37.1% felt that they had a healthy life balance. Thirty-seven percent of students reported it being hard to find time to sit down and eat a meal and 46.4% perceived that the time spent on preparing healthy

meals would take away from doing other activities but if they were less busy, they would eat a healthier diet (44.9%). Most reported confidence that they could prepare healthy meals (57.6%). There were three measures of perceived time constraints and demographic characteristics that had significant associations. In general, being a woman and a 4-year college student were associated with a higher time constraint ($p < .001-.002$) and time constraints affected diet-related behaviors ($p < .001$). The students with lower SES were less likely to have a healthy balance ($p \leq .003$). Finally, having a heavy course load and working longer hours were important predictors of time constraints among men ($p < .001-.004$), but living situation and being in a relationship were more important among women ($p = .002-.003$).

Larson, Nelson, Neumark-Sztainer, Story, and Hannon (Larson, Nelson, Neumark-Sztainer, Story, & Hannan, 2009) studied meal structure in a cross-sectional sample of 1687 young adults with a mean age of 20.5 who were participants in Project EAT (Eating Among Teens)-II. Participants self-reported via surveys and food frequency questionnaires in 2003-2004. A higher percentage of female participants than males strongly agreed that they enjoyed social eating (62.1% versus 42.3%) and viewed it as important to partake in those social experiences (41.1% vs. 29.8%). Approximately 59.6% of the female subjects somewhat and/or strongly agreed that they ate on the run, while half of male subjects felt the same way. The young adults recognized the value with consuming regular meals but 35% of males and 42% of females reported time as a barrier to sitting down and eating meals. Of interest is the fact that meal behaviors like eating on the run and social eating were associated with dietary intake and fast-food intake. Social eating was associated with higher intakes of fruit, vegetables, and dark

green and orange vegetables among both sexes. Females reporting social eating had lower fat intakes and males had higher intakes of energy, calcium, sodium, and fiber. Eating on the run was associated with higher intakes of soft drinks, fast food, total fat, and saturated fat in both males and females, with lower intakes of fruit, vegetables and fiber in females, and with lower intakes of whole grains and higher intakes of energy in males.

Smith and colleagues (Smith et al., 2011) examined whether the level of involvement in meal preparation was associated with BMI and abdominal obesity in Australian young adults aged 26 to 36 in the Childhood Determinants of Adult Health Study. This study was a follow-up of children that participated in the 1985 Australian Schools of Health and Fitness Survey, a nationally representative sample of 7- to 15-year-old children. In 2001-2002, there were 6840 (80%) original participants successfully traced and 5170 (61%) agreed to participate in the Childhood Determinants of Adult Health Study. Four years later clinics were held in the years of 2004-2006 to capture the participants' anthropometric measurements, demographic information, diet, food habits, and physical activity, when the participants were 26 to 36 years old. In men, when age, education, and leisure time physical activity were accounted for, sharing meal preparation was associated with a reduced prevalence of moderate abdominal obesity (prevalence ratio=.92; 95% CI: .86 to .99), compared to when others prepared the meal. Diet quality did not change this association among these male subjects. No association was found between sole responsibility of meal preparation and being overweight or BMI. In women, there was no association with level of involvement in meal preparation with moderate abdominal obesity or being overweight or with BMI (shared responsibility prevalence

ratio=.93; 95% CI: .84 to 1.02). Although the strength of the study was the large population of young adults and the use of trained staff, a few limitations were with the follow-up study sample not being nationally representative and no clear definition was given for the term ‘meal preparation,’ leaving study participants to come up with their own personal definition. Also, there was no clear definition of what “shared meal preparation responsibility” was among participants.

Fast Food Consumption

Frequent fast food consumption may play a role in unhealthy food intake and obesity rates, and is among the societal trends addressed in the next section. National data on fast-food consumption in free-living adults from the USDA Continuing Survey of Food Intakes by Individuals (CSFII 1989-1991) found that 26.5 % of respondents reported eating fast food on 24-hr recalls (Bowman & Vinyard, 2004). For those who consumed fast food, it provided more than one-third of the day’s energy, total fat and saturated fat for both men and women, and was also high in energy density. According to NHANES data from 2007-2010, fast food consumption accounted for 11.3% of calories consumed in adults 20 and older, compared to 15.3% in young adults 20-39 (Fryar & Ervin, 2013). There were differences in consumption by race and ethnicity and by poverty status in this age group. Non-Hispanic blacks consumed a higher percentage of calories from fast food, at 21.1% than non-Hispanic whites (14.6%) or Hispanics (14.5%). Young adults at less than 130% of poverty level consumed 16.6% of energy from fast foods, compared to 15.8% for those at 130-350% poverty level, and 13.8% for those above 350% poverty level, a significant linear trend.

Researchers from Project EAT also examined young adults' frequency of eating at different restaurant types in relationship to dietary patterns and weight status (Larson, Neumark-Sztainer, Laska, & Story, 2011). The overall goal was to examine socio-demographic differences in the frequency of eating at different types of fast-food and full-service restaurants. The study population was 1030 men and 1257 women who participated in the third wave of the observational study Project EAT-III (Eating and Activity in Teens and Young Adults). The sample was ethnically and socio-economically diverse, and the age range was from 20-31 years of age. The findings indicated that young adults ate from restaurants an average of 3-4 times weekly. Of the entire sample, 88% ate at any fast food restaurant at least once per week, compared with 32.7% for any sit-down restaurant, 30.5% for a burger-and-fries restaurant, and 29.4% for a sandwich or sub restaurant. Within restaurant types, percentages reporting once a week patronage of fast food restaurants varied by sex, age, race/ethnicity, employment status, and weight status. For example, higher percentages of overweight and obese respondents, compared to normal weight respondents, reported eating at fast food and at burger-and-fries restaurants at least once a week. A higher frequency of burgers-and-fries restaurant use was associated with lower intakes of fruits, vegetables, milk products, whole grains, fiber, and calcium, with higher intakes of sugar-sweetened beverages, and with a higher prevalence of overweight/obesity. Such associations were not found with sandwich/sub shop use.

The longitudinal CARDIA study in young adults related away-from-home (restaurant and fast food) consumption to changes in health outcomes 13 years later, over years 7 to 20 of the study (Duffey et al., 2009). For the 3643 CARDIA participants with

longitudinal data, as the cohort aged, BMI and rates of overweight and obese status increased. Compared to those in the lowest quartile of fast food consumption at baseline, those in the highest (≥ 2.5 times per week) weighed more and had higher waist circumference 13 years later. In adjusted regression models, fast food consumption at baseline was a significant predictor of weight 13 years later.

Societal Trends Affecting Food Preparation and Consumption

Over the years in which obesity rates have increased in the general population and in young adults, there have been significant societal changes that could influence eating patterns, food intake, and in turn, obesity. This section briefly explores some of those societal changes as well as what could be viewed, from the framework of SCT, as the reciprocal trends in food-related and eating behavior.

An American Dietetic Association task force issued a report on sustainable food systems in 2007, suggesting that the U.S. food system is experiencing a health and farm crisis that is influenced by federal, local, and state food and agriculture policies, with these policies determining what food is grown, traded, processed, labeled, and available for consumption (American Dietetic Association Sustainable Food System Task Force, 2007). The report discussed trends in population demographics, agricultural production, processing and distribution, food access and retailing, health and consumption, and waste management that were of concern to the dietetics profession. Among these were that the current production system does not meet nutrition needs as recommended by the Dietary Guidelines for Americans (inadequate fruit, vegetable, and milk production); agricultural, manufacturing and retail markets are concentrated among a small number of companies; horizontal and vertical integration of the global food system has occurred; and monies

spent on marketing of food, beverages, and candy vastly dwarf the nutrition education budget. Further, although this food system delivers a larger variety of nutritious food, improved safety, and greater convenience than ever before, consumers have opted for larger quantities, greater calorie-density, and low-cost foods.

In an article published in 1990, Senauer (Senauer, 1990) predicted four major consumer trends that would affect the food system: demographic changes, working women, eating patterns and safety/health concerns. Senauer summarized:

The U.S. population is aging, growing more slowly, residing in smaller households, moving regionally, and the ethnic mix is shifting. More women are in the labor force, eating patterns are shifting, and food safety and health concerns are increasing. These trends are having a dramatic effect on consumers' food demands, with major implications for food retailers, distributors, processors and ultimately, farmers.

Alongside the trends described by Senauer, the food system has transformed into vertically integrated corporations influencing production and transport of food products (Dyson, 2000; Senauer, 1990). At the same time, with consumer demand for convenience and variety, food companies have shifted production from basic commodities to food products needing little to no preparation. Dyson (Dyson, 2000) provides a historical perspective on some of these changes in a *Food Review* article titled, "American Cuisine in the 20th Century." Basically, in the 1900s, the population wanted the "American" plate fixed by mothers: meat, potatoes, and desserts, with the core or center of the meal being any type of meat - pork, beef, chicken. During the 1950s,

“frozen food” provided the American family with different options for preparing meals, either from scratch cooking or using these original convenience foods.

As suggested by Senauer (Senauer, 1990), the increase in women working outside the home has influenced meal preparation and food choices over the last half of the 20th century and into the 21st. The labor force participation rate of women rose from 32.7% in 1948 to a high of 60% in 1999, falling to 56.7% in 2015 (“Facts over time: women in the labor force,” 2016). Sharp increases in labor force participation over time (Bowers, 2000; Hayghe, 1997) affected families’ eating habits and home food preparation (Guthrie et al., 2002). In the 1960s-1970s, trends towards convenience became more popular to include ‘fads’ for crockpots, blenders, food processors, and juicers, with many of these gadgets being shipped with cookbooks. Time constraints led families to ‘eat out’, with fast food restaurants becoming more of an option, and sales growing to \$102 billion in 1998 (Dyson, 2000). The 1990s also brought greater availability of fully prepared dishes in grocery stores for those who could afford these items.

Guthrie et al. (Guthrie et al., 2002) examined trends over time by comparing the quantity and nutritional quality of food Americans ate that was prepared at home versus away from home in 1977-78 vs. 1994-96. The study data were from USDA’s 1977-78 National Food Consumption Survey and its 1994-96 Continuing Survey of Food Intakes by Individuals (CSFII). These surveys collected food intakes of Americans two years of age and older at all seasons of the year and for all days of the week. Home and away foods were defined by where the food was prepared, not where it was eaten. Food that was purchased at retail stores, like grocery, convenience, and supermarkets, was defined as “home food.” Food prepared at restaurants or other food establishments was

considered to be “away foods.” Authors distinguished home and away foods on the basis of the location of preparation rather than consumption because they believed the nutritional content of home foods as categorized was more under the control of consumers, and also because the data as collected did not allow for a more refined categorization. The authors compared calories per eating occasion, percent of calories from total and saturated fat, and nutrient density for cholesterol, sodium, fiber, calcium, and iron for foods prepared at home versus those prepared away from home at the two time periods. The amount of calories consumed per eating occasion was greater for away food than for home food in both time periods examined. During 1977-78, 16% of all meals and snacks (eating occasions) consisted of food from away sources, while 18% of total calories were derived from those meals and snacks, in contrast to 25% and 32%, respectively, in 1994-96. For 1994-96, home food had better nutrient density than away food for all nutrients studied. Likewise, over time, the proportion of calories obtained by adults from fast food establishments increased from 4 to 12%, and from restaurants from 4 to 10%, with young adults 18-39 years old obtaining a higher percentage of total calories from fast food (17% for males and 13% for females). Examining food consumption survey data provides information about food prepared outside the home and its nutritional impacts on the American population. This national data suggests the detrimental nutritional effects of eating foods prepared away from home. Data on home food preparation over time can also explain trends that may have contributed to the obesity and other health problems faced by the U.S. population.

Recently, Smith, Ng, and Popkin (Smith et al., 2013) examined how patterns of home cooking and home food consumption have changed from 1965 to 2008 by socio-

demographic groups, attempting to understand in more detail the shift Americans have made toward eating out more and cooking at home less. Trends were examined from two sets of nationally representative cross-sectional surveys from 1965-1966 to 2007-2008, one set for home food consumption (6 US dietary surveys) and another for home food preparation (6 time-use studies). The data included 38,565 dietary surveys and 55,424 time-use surveys, from individuals 19 to 60 years of age. “Home” food included food purchased from a store, convenience store, or grocery/deli, and any foods not meeting these criteria were considered away-from-home food sources. From the time use studies, time spent in food preparation included both time preparing food and cleaning up after food preparation.

Comparing energy intake between 1965-1966 and 2007-2008, mean daily intake increased for women by 738 kJ/day but showed no change for men. For men and women, the percentage of energy consumed from home-source food decreased 24.5% and 23.9% respectively. Likewise, energy intake increased over time for each of the three income groups (low, middle, and high) studied, and energy from home food sources decreased by approximately 23% for all income groups combined, with the majority of decline occurring prior to 1994-1996 and no further change occurring in the 2000s. The lowest income group consumed the highest proportion of home-source food across all years, and conversely, the highest income group consumed the least amount of food from home sources across all of the years.

The proportion of men who cooked increased from 29% in 1965-1966 to 42% in 2007-2008, and of those who cooked, time spent increased from 37.4 min/day to 45.0 min/day. Conversely, women who cooked declined from 92% in 1965-1966 to 68% in

2007-2008, and those who did cook showed a decrease in time spent from 112.8 min/day in 1965-1966 to 65.6 min/day in 2007-2008. Fewer people cooked in 2007-2008 compared to 1965-1966 for all income groups, although the lowest income group showed the largest decline in the proportion cooking, from 67% in 1965-1966 to 56% in 2007-2008.

In their discussion, Smith et al. (Smith et al., 2013) noted that although the frequency of eating away-from-home foods increased over time for all groups, home food sources remained the top source of energy for all groups, accounting for 65 to 72% of total daily energy, although only 54 to 56% of time use survey respondents reported cooking. Although some limitations to these analyses exist, particularly that the food intake and food preparation data come from separate datasets, preventing any relational analyses, this study contributes greatly to our understanding of how eating out and time spent on cooking have changed over the past 40 years, perhaps contributing to an explanation of increasing obesity prevalence over the same time period.

Cooking Skills and Time Invested in Cooking

Given the changes in meals at home and away from home, in the proportion of individuals reporting engaging in cooking, and in the time spent in cooking over the past 40 years, it seems appropriate to explore food preparation further by considering cooking skills. From an SCT perspective, cooking skills could be theorized to be a function of self-efficacy and behavioral capability related to food preparation. Research examining cooking skills is limited, and even defining cooking skills is problematic, given the increased popularity and/or use of processed foods (Lang & Caraher, 2001; Short, 2003a, 2003b). Some authors believe domestic cooking in the home has changed over the years

because cooking skills have been “routinized, deskilled or devalued” when food industries developed ready-prepared foods (Ritzer, 2011; Short, 2003a, 2003b). Cooking skills have been defined as a set of techniques and mechanical abilities like grilling, broiling, and chopping vegetables (Caraher et al., 1999; Short, 2003b). In the Merriam Webster dictionary, the verb cook is defined as, “to prepare food for eating especially by means of heat.”

In her research study, “Domestic cooking practices and cooking skills - findings from an English study,” Short (Short, 2003a) attempts to fill in the gaps about domestic cooking and cooking skills while developing a theoretical description. She conducted a two-stage qualitative study to explore and develop theory around domestic cooking practices and skills. In the first phase, she conducted semi-structured interviews with seven couples aged 30-50 from diverse backgrounds, and had them keep cooking diaries. From this phase, themes were developed, and then further explored and refined in the second stage through interviews with 16 individuals representing a broader range of age, cooking experience and household structure. The working definition of a *domestic cook* was “a person, who has on at least one occasion prepared food, any food, for themselves or for others.” Cooking skills were seen as complex and more than just a set of mechanical abilities, because of the relationship between cooking abilities and different approaches to cooking. Two terms, perceptual and conceptual, were identified with cooking practices. Perceptual involves understanding of food properties like taste, color, and texture, and conceptual skills related to adjusting recipes, reducing food waste, and using creativity. Other domestic cooking skills identified by informants were menu planning, cooking under pressure, and the skill set to cook foods according to people’s

taste and preferences. The term *domestic cooking culture* was identified by the author, referring to the previously noted broad themes that held true about cooking across a diverse group of informants, but who possessed a wide range of cooking skills. The term domestic cooking was used contextually, but broadly to refer to preparation of all foods (including pre-prepared foods), heating of food, use of more fresh or raw foods, and applying more effort with cooking. Terms like pre-prepared, basic ingredients, and from scratch did not have consistently understood meanings or definitions. It was also revealed that the participants did not purposefully learn how to cook. Many reported getting ideas from cooking articles/magazines, informal conversations with friends, or, depending on the cooking event, they would use a specific recipe. Many of them cooked alone and viewed cooking as an important hobby or interest. Using recipes was considered as being “right and proper,” as a vital process to cooking. The informants also felt that the “ability to cook with raw foods” was beneficial for health, social, and recreational reasons, but even so did not view this ability as very important. The majority of informants classified being able “to use different foods as being ‘novel’ and preparing food ‘correctly’ or ‘professionally more highly than the ability to prepare, cook, and provide nutritious food efficiently and economically on a daily basis.” Another theme revealed from the study was the informants’ cooking individualism; they identified themselves with different cooking approaches. Creators or providers were terms applied to multiple individuals, whereas learner, ‘gadget mad,’ and cooking as something to ‘tackle’ each characterized an individual respondent.

Short described the relationship among participants’ approaches toward domestic cooking, their cooking skills, and their cooking practices and food choices as complex.

Cooking practices and experiences developed skill and knowledge, which in turn influenced confidence and ease of cooking, affecting practices and food choices, and then further influencing skills and knowledge. This qualitative study provides rich detail about the difficulty that exists with classifying and understanding domestic cooking practices and cooking skills.

To shed further light on societal changes and cooking skills, several authors discuss changes in the traditional home economics curricula in schools, including a focus that no longer emphasizes cooking skills. In “Cooking skills: a diminishing art?” authors Furey, McIlveen, Strugnell, and Armstrong (Furey, McIlveen, Strugnell, & Armstrong, 2000) researched cooking skills and their exclusion from the National Curriculum in England and Wales, since home economics had been incorporated into a theoretical and technological framework of “life skills.” Northern Ireland and Scotland retained their home economics curriculum to include preparation of food commodities, healthy eating themes and food preparation using different cooking techniques. However, in other areas of the United Kingdom (U.K.), the “hands-on” approach had been removed from the curriculum, and basic home economics no longer existed. Because home economics has been “optionalized” and considered as part of a theoretical and technological framework of life skills, a social policy debate has developed in the U.K. focusing on health implications, skill competency, and inequity in the food choice debate.

Furey and colleagues (Furey et al., 2000) considered this issue from a Northern Ireland perspective, by interviewing a sample of 732 heads of household from that region. Researchers used a stratified random sample and an interviewer-assisted questionnaire to obtain information on whether or not respondents studied home

economics at school, how they rated their cooking skills, and meal time solutions for the household. In this sample which was 29.8% male, and for which the modal age category was 25 - 34 years old, 55% of the respondents had studied home economics at some stage in their school experience. The majority (53%) reported some competency and enjoyment when cooking, while 13.1% reported they were good cooks but didn't enjoy cooking, almost 16% reported not being good cooks, and 17.2% reported never cooking or cooking only when they had to. Regarding evening mealtime routine, 51% reported they would cook a meal using a mixture of raw and processed ingredients, almost one third would use basic, unprocessed ingredients, 14.5% would defrost a ready meal, and almost 2% would order take away food. Significant relationships were found between gender, age, and occupation and cooking ability and mealtime routines. Women were more likely to have studied home economics at school, and had greater self-reported cooking skills, but reported disliking cooking tasks. Younger respondents were more likely to have had the opportunity to study home economics in school. Higher income consumers reported regularly purchasing takeaways and ready meals, although as the degree of cooking competency increased, fewer take-outs and ready meals were purchased, and there was more reliance on food preparation from basic ingredients using a mixture of both processed and unrefined foodstuffs. Overall, this study published in 2000 showed a fairly high self-rating of cooking skills (2/3 rated them as good) and rate of preparing meals from raw ingredients (83%). Other countries like British Columbia, Quebec, and the United Kingdom have identified the social and economic shifts that have influenced their food system, driving the need to focus on both food preparation and cooking skills in their public health system.

Empirical data have also been gathered on cooking skills and practices using large, representative samples in several countries. Caraher et al. (Caraher et al., 1999) explored the impact of income, social class, gender, and age on differences in domestic cooking skills using data from the 1993 Health and Lifestyle Survey of England, which examined access to food supplies, eating, cooking, and shopping in a nationally representative sample of 16-74 year olds in England. At the time of the survey, cooking was part of the English National Curriculum. Most respondents (76% of women, 58% of men) reported they learned to cook from their mothers, although nearly half of males 16-19 years old reported cooking classes at school as a source, compared to only 2.4% of 55-74 year olds. Across social classes, mothers were the first source of learning cooking skills, but school cooking classes were reported as a source more frequently by lower than upper classes. Females and those with higher education were more likely to report using cookbooks.

This study also examined the frequency of cooking by respondents, although the authors acknowledged that the survey did not ask about whether another household member cooked instead of the respondent. Less than half of the total sample, including 67.9% of females and 18.4% of males, reported cooking every day, and women cooked on average 5.8 days per week vs. 2.5 days per week for men. Income and class affected use of ready-prepared food for the main meal, with 28.5% of the most affluent vs. 17.4 % of the least reporting doing so within the last week. The authors also studied confidence of respondents in particular cooking techniques. Highest rates of confidence in using techniques were reported for boiling (90%), oven-baking/roasting (80.9%), and pan frying (75.4%), whereas rates for steaming, deep-frying, poaching, stewing/braising,

microwaving, and stir-frying ranged from 55.3% to 67.4%. Women had higher rates of confidence in cooking specific types of food than men for all food categories, and generally, confidence rates increased with age. Cooking skills were perceived as a lesser barrier to food choices than other factors, including food storage, transport from stores, and spoilage. Although this study does not explore the relationship of self-reported cooking skills to diet quality or health status, the authors suggest that the relatively low rates of cooking among certain groups should be considered in national health and food policy and health promotion.

Researchers analyzed how domestic cooking practices have different meanings for different people depending on the cooking occasion (the social context) and the moment of the time for cooking (the temporal context) (Daniels et al., 2012). Data from the Flemish time-use surveys conducted by the TOR (*Tempus Omnia Relevant*) research group were used from the years 1999-2004 to examine people's views on cooking. The authors pooled data from two studies, TOR99 and TOR04, to produce a sample of 2178 people from those studies who reported participating in home cooking. Students were excluded from this sample because of having different living conditions. Using Flemish time-use data allowed researchers to understand how people use time for food preparation. Study respondents recorded all their activities during an entire week, including their social context. Respondents also reported on socio-demographic characteristics and categorized each food preparation episode using four categories: obligation (have to), sense of duty (to please others), necessity (for example, in order to be able to eat), or pleasure (enjoyment).

Overall, respondents spent about 4 ½ hours per week on average in food preparation. Necessity was the greatest motivation (50.7%), followed by pleasure (22.7%), duty (14.8%), and obligation (7.7%). Overall, women spent almost twice as much time cooking as men (over 5 hours vs. 3). Those under 24 spent about 3 hours per week compared with an average of 4 for 24-44 year olds, and more for older age groups. The family situation played an important role in the way home cooks perceived their cooking practices. At the same time, preparation of food among cohabiting couples with children in the home was more time consuming and had a higher social meaning. This group reported cooking out of an expression of love and care, unlike people who lived alone who approached cooking as a sense of obligation or a household task. The cohabiting couples with children, considered to be domestic cooks, felt more forced to prepare food for others as compared to other household types. Women spent more time than men cooking although there were no significant differences in the meaning of cooking. It was found that men and women experience food differently depending on their family situation. Men were more motivated to cook (30.7%) by the desire to gain more pleasure when they live together with a partner and have children (23.8%), but women get more pleasure out of cooking when they live alone (28.1%) and less enjoy doing so when having a family. These data suggest the role of outcome expectations in cooking.

In summary, results suggest that people consider cooking primarily as a household chore. Preparing food can also be a way to please others, as well as themselves. Also people's feelings of time pressure and the family situation are clearly related to men's and women's cooking experiences. The meaning of cooking tends to be

influenced by individual, family, and cooking-related determinants. Other influencing factors are family situation, employment status, and educational level, attitudes towards traditional gender roles, convivial cooking, and time pressure.

More recently, empirical research has explored aspects of cooking skills as both a dependent and an independent variable. Winkler and Turrell (Winkler & Turrell, 2009) examined the relationship between confidence to cook, socio-demographic characteristics, and household vegetable purchasing using a cross-sectional survey in Australia in 2004. Participants were selected from six districts that were within the Index of Relative Socioeconomic advantage/disadvantage and were the primary person responsible for most of the food preparation in the household. The response rate for the study was 43%, with 426 returning the questionnaire. All socio-demographic information collected for the study was self-reported. Since the outcome variable, domestic cooking, was difficult to define, the questionnaire used the term *food preparation*, defined as, “preparing food means anything you might do to make the food suitable to eat (for example, make a salad from it).” Confidence to cook was also examined because it increases participants’ chances of performing that action versus attempting to quantify skill level. The respondents were asked to rate how confident they felt about vegetable preparation and cooking techniques; the ratings were 1=not confident at all to 6=very confident. Results indicated that of the respondents, 78.1% were solely responsible for cooking in the household, while 21.2% shared that responsibility. The odds of having very low confidence to prepare vegetables and to use cooking techniques were greater for those with low income or with low education, and for males vs females. Women with higher education, income, and an English speaking background had greater confidence to

prepare vegetables and people with lower confidence to cook vegetables purchased them less. When the chef was an older female, their households purchased a greater variety of vegetables and the respondents had higher confidence to prepare that food.

Hamrick et al. (Hamrick, 2011) used data from the Eating and Health Module of the American Time Use Study 2006-08 to report on time Americans living in households spend on food. Adults spent an average of 66.9 minutes per day in primary eating and drinking (no other activities while eating and drinking), and 88.7 minutes per day in secondary eating and drinking (while engaging in another activity like driving or watching TV). Those 18-24 spent more time in secondary eating and drinking than those 15-17, 25-64, or 65+, although statistical comparisons were not reported. For those 15 and older, 67.5% of primary eating occurrences were in their own home or yard, compared to 48.6% of all secondary eating/drinking occurrences. For those 18 and older, the mean primary/eating drinking occurrences on an average day were 2.05, and the mean secondary eating occurrences 0.83. In single person households, 71% of eating occurrences were alone, whereas in multi-person households, 56% were with household members and 27% alone. Those 18-24 spent an average of 4.1 minutes per day on grocery shopping, compared to 6.1 minutes for those 25-64. The 18-24 group spent an average time of 15.2 minutes per day in meal preparation, compared to 33.0 minutes for the total population. The amount of time spent in meal preparation and clean-up varied by weight status group, listed in descending order of time spent: underweight, normal weight, obese, overweight (Hamrick, 2011).

Zick et al. (Zick et al., 2011) investigated the relationship between time use choices, including time spent on eating and food preparation, and healthy body weight

using data from the 2006 and 2007 American Time Use Surveys (ATUS). The sample, limited to respondents 25-64 years old, included 7,586 males and 8,856 females, and was weighted to compensate for oversampling of demographic groups and weekend days, and for differential group response rates. Average age of the weighted sample was 44 years, with 14 years of formal schooling. Of males, 71% were married or cohabiting compared to 69% of females. For males 75% were either overweight or obese, compared to 57% of females. Of males, 39% were the primary meal preparer and 53% the primary grocery shopper, compared to 83% and 90% respectively for females. Of males, 43% reported any time spent in food preparation over 24 hours, compared to 71% of females. Men reported an average of 18.6 ± 38.7 minutes spent in food preparation over 24 hours, compared to 47.9 ± 60.8 minutes for women. For women, time spent in food preparation and serving as the primary meal preparer were negatively associated with BMI, but not in men. Variation in time spent on food-related activities among age, gender, and weight groups in studies of Hamrick et al. (Hamrick, 2011) and Zick et al. (Zick et al., 2011) could reflect differing outcome expectations, as well as different levels of self-efficacy and behavioral capability.

Recent research on developing cooking skills through classes, programs, and interventions has begun to shed light on how skills that were once gained through experiences in the home and family setting, and for some in home economics classes, can be taught as part of a formal or community-based curriculum or programming. Food knowledge is an important part of understanding basic meal planning and food preparation skills among young adults (Betts, Amos, Keim, Peters, & Stewart, 1997; Larson, Perry, et al., 2006). Reicks, Trodfholz, Stang, and Laska (Reicks, Trofholz,

Stang, & Laska, 2014) completed a review of literature of cooking programs and home food preparation interventions for adults to identify implications for practice and research. The researchers identified studies from 1980 to 2011 that included adults and the keywords: intervention, demonstration, health promotion, and education or class. A total of 373 journal articles were retrieved but for this systematic review 28 studies were included. Study outcomes included dietary intake, cooking knowledge and skills, cooking self-efficacy/ confidence, attitudes, and intentions/behavior and health outcomes. Only 6 of 28 studies were randomized controlled trials, and another 6 used a nonrandomized control group. The lack of rigorous designs, along with the use of a variety of outcomes and measurement tools, including some which were not validated, make it difficult to draw conclusions about findings from this review. Cooking intervention participants did show improvement in a variety of measures across the various study designs. Three studies included in the review, all targeting college students, are discussed in more detail below, two of which were randomized, controlled trials.

Clifford, Anderson, Auld, and Champ (Clifford et al., 2009) developed a nutrition-oriented Social Cognitive Theory (SCT)-driven cooking show designed for college students living off campus, to determine if a series of four, 15-minute episodes influenced knowledge, attitude, and behaviors regarding fruits and vegetables. College upper-level students at a western university from non-nutrition courses were used for the study. The participants were randomly assigned to either an intervention or control group. The intervention group viewed 15-minute cooking programs over a 4-week period, while the control group viewed 5-minute programs on sleep disorders. Participants were assessed at 3 different periods (pre, post, 4-month follow-up) and viewed the programs

over the internet. Good Grubbin' was developed from feedback provided by students who viewed a pilot program and participated in focus groups. Measures for the study included a food frequency questionnaire (FFQ), personal/demographic data, and the intervention group also completed an evaluation survey. Findings indicated that 101 students completed the study with 50 being in the intervention group and 51 in the control group. Descriptive information about all the participants included: 93% lived off campus in an apartment; 73% reported not eating in the dining hall; 52% reported cooking dinner four or more times a week, and 66% reported eating out 3 or more times a week. Compared to the control group, the intervention group experienced a greater gain in knowledge and improvement in cooking motivators and barriers post-intervention, but there were no differences between groups in fruit or vegetable self-efficacy, motivators, and barriers; in cooking self-efficacy; or in fruit and vegetable servings. Of the intervention group, 55% reported making a change in their eating habits as a result of watching the show, of whom 18 reported making changes related to increasing fruits and vegetables; 35% reported attempting to make a recipe they saw on the series and 57% reported visiting the website to get recipes.

In a qualitative study, Brown and Richards (Brown & Richards, 2010) used a new assignment in an introductory nutrition course to promote healthful eating. Social Cognitive Theory (SCT) model constructs were used: environment external to the student was operationalized as the opportunity to prepare an entrée and the social support of serving it to someone; behavioral capacity was developed as students prepared the entrée. Students were asked to taste, evaluate and analyze what was prepared. A limited analysis was conducted, which found that 94% of the 616 enrolled students (33% male) preferred

the assignment of cooking an entrée to an alternative assignment that was offered. Three of the most common responses to open-ended questions were: 1) the students perceived the entrée to be nutritious (46%), easy to prepare (41.5%), and quick (27.9%). The assignment also allowed students to overcome barriers - lack of skill (entrée was easy), and time (entrée was quick to prepare). About 8% identified the social benefits of sharing an entree with someone, and 97.6% indicated that they intended to prepare the entree again.

Levy and Auld (Levy & Auld, 2004) studied whether or not teaching college students cooking classes improves knowledge, attitudes, and behavior towards cooking. First-semester sophomore students from Colorado State University participated in the study in fall and spring semesters. Students were randomly assigned to either a cooking or intervention group. The cooking group received a single 1-hour cooking demonstration, and the intervention group attended four, 2-hour basic cooking skills sessions and a 45-minute supermarket tour over a 4-week period. Researchers used Social Learning Theory (SLT) with the intervention group to determine if they learned from each other by observations, imitation, or modeling. The intervention group received recipes, cooking equipment, and incentives for completing the classes and surveys. Study participants received three different surveys, on eating habits, cooking, and food preparation. A total of 65 students participated in the study, the majority female. The intervention and demonstration groups were significantly different in gender and with fathers in the household who cooked (44% vs 64% for demonstration and intervention groups respectively). Ninety percent of the participants reported knowing how to shop for food and cook. No differences were found between genders when asked if they knew

how to cook prior to the cooking intervention, in previous cooking class experience, or in grocery shopping knowledge. Also, there was no significant difference with weight outcome measures by gender and age. Positive attitudes about cooking, eating healthy, and shopping were reported by the participants; however, they felt neutral about preparing healthy meals. The majority of the participants reported their mothers as the primary food preparers and primary cooking teachers. Fathers also cooked for their families in 75% of households, and taught cooking in 54% of the households. The intervention three-month posttest attitudes were significantly different by group for liking to cook, benefits of cooking, and confidence using various techniques. There was also a positive shift in knowledge of cooking skills (1.3 gain on a 4-item scale) with all the participants.

Hartmann, Dohle, and Siegrist (Hartmann et al., 2013) attempted to identify and understand cooking skills among 4436 participants in the population-based Swiss Food Panel (SFP). Researchers defined cooking skills for this study as “the ability to prepare different foods” that represented food groups (e.g. hot meal, soup, bread), rather than specific foods, developing a 7-item questionnaire based on their prior work. In order for researchers to better understand the influence that cooking skills have on dietary behaviors, goals included to examine the factors that influence cooking skills using socio-demographic and psychological variables as predictors and to examine the associations between the frequency of food group consumption and cooking skills. The population used for the study was generated from the Swiss Food Panel, a longitudinal study examining eating behaviors. Mail surveys were sent out to the SFP in 2010 and 2011, a paper and pencil questionnaire which included a food frequency questionnaire (FFQ), and

cooking skills questions. The findings indicated that females from all age groups rated their cooking skills higher ($M=5.48$; $SD=.7$) than males ($M=4.24$; $SD=1.3$). Most females were responsible for meal preparation weekdays (70.6%) and weekends (64%). The female respondents reported positive attitudes toward cooking in enjoying cooking more, being more health conscious than the men, and consuming more fruits and vegetables. On the other hand, the men consumed more sugar-sweet beverages, meat, and convenience foods. When examining predictors of cooking skills, enjoyment of cooking was the most important for both females and males. Also, it was determined that willingness to invest in mental effort did not predict cooking skills. In men six factors accounted for 57.5% of the variance in cooking skills ($F(5,1933) = 292.89, p < .0001$). These predictors included enjoyment of cooking, age, willingness to invest time, willingness to invest physical effort, children in the household, and education. Age and willingness to invest time were negative predictors. For women, five factors accounted for 26.7% of the variance in cooking skills ($F(9,2198)=90.45, p<0.001$). These five included cooking enjoyment, education, children in the household, willingness to invest time, and health consciousness. All factors were positive predictors for females. Researchers evaluated correlations of cooking skills with food group consumption frequency in men and women. When they controlled for health consciousness, there was a small but significant negative correlation between convenience food consumption and cooking skills in men ($r=-0.05$), whereas vegetable consumption was positively correlated ($r=0.09$) and convenience food ($r=-0.24$) and sugar-sweetened beverage consumption ($r=-0.07$) were negatively correlated with cooking skills in women. Researchers acknowledged that defining cooking skills is complex and that cooking skills have different meanings

depending on the cultural context, which could have influenced respondents' cooking skills ratings. It is also important to note that culturally women had higher cooking skills than men because in Switzerland cooking classes for females were obligatory in earlier years but only started in the 80s for males. This study supports previous studies' findings including that being involved in food preparation exposes people to a variety of foods which increases their chances of consuming healthy foods.

Candel (Candel, 2001) studied the consumer's orientation towards meal preparation by conceptualizing and operationalizing the construct of convenience orientation towards meal preparation through the development of a scale. Many stages were used to operationalize this construct, including the assumption based on previous literature that convenience in meal preparation implied the transference of culinary skills from the home kitchen to the food processor/distributor. Scale items were generated from a literature review and structured interviews with primary meal preparers from Dutch communities. The interviews included a two-fold process to determine the definition of convenience orientation from a consumer's perspective; also participants received statements to use in the scale measurement for convenience orientation. The scale was administered to a calibration sample, factor-analyzed, modified and administered to a cross-validation sample of primary meal preparers in multiple provinces in the Netherlands. Then nomological validity of the convenience orientation scale was evaluated to test whether it behaved as expected based on theoretical grounds. The resultant convenience orientation scale included seven items, all of which loaded on a factor labeled "time and energy saving." Five items loaded on a second factor, scores for which were inversely related to the convenience factor. This factor, labeled "variety-

seeking,” may provide some insight into cooking skills or cooking orientation, in that it included items determining preference for making new dishes and meals, and experimenting with recipes.

Soliah, Walter, and Antosh (Soliah et al., 2006) conducted a study on college women to quantify their food preparation knowledge and practices, examine their reasons for preparing certain foods, and determine the frequency of food eaten outside the home. Participants were students enrolled in a Food Science and Nutrition course at a medium size southwestern university. A food preparation skill questionnaire was developed and validated and included foods from 10 categories of common foods that are in the American diet. Participants were asked to evaluate food items by answering the following questions: do you ever eat this food, do you know how to make it, have you ever made it, and if you do not prepare the item, why. Students completed the questionnaire during class time. Results revealed that over 90% reported knowing how to make basic foods like hamburgers, tacos, mashed potatoes, and scrambled eggs, whereas less than 25% of the students knew how to make quiche, pizza sauce, salad dressings, and mayonnaise. Not surprisingly, students were more likely to prepare the foods which they reported the ability to prepare, even for those foods that fewer students knew how to make. However, reasons were also identified why students were unable to prepare certain foods; the two most frequent were never being taught and no interest in learning, whereas the least frequent reasons given were insufficient kitchen resources and no money. Most of the participants (59%) ate out 1-3 days per week, whereas 41% ate out four or more days per week. Findings from this study support the need to further investigate food preparation skills among young adults because of the frequency of responses indicating

that “never having been taught” was the reason for not preparing many foods, which the authors identified as a “knowledge barrier.”

In further study of college students’ food preparation, Soliah and Walter worked with colleagues Jones and Phifer to explore perceived motivators and barriers to home food preparation (Jones et al., 2014). Young adults enrolled at two Texas universities (n=239) participated in a two-phase study to gather information about their food practices-menu planning, acquiring food preparation skills, and home acquisition of food stuffs. Students were first presented with a list of food items that included main entrees, vegetables/salads, egg dishes, sauces, salad dressings, and baked dishes. Questions focused on whether students ate each food, knew how to prepare it, had ever prepared it, and if not, why not. After this information was gathered the motivators and barriers identified were used to develop questions for the focus group sessions. Themes were categorized after compiling responses from the participants. Twelve perceived motivators and four barriers were identified. The perceived motivators to home food preparation were the following: the desire to save money; had a parent who modeled food preparation; familiarity with cooking techniques; had equipment available to use; access to a kitchen with basic items available; desire for healthier, nutritious food; enjoyed cooking; control over the preparation of foods consumed; interest in knowing what they consumed; pride in preparing foods for themselves; ability to organize time for grocery shopping; and had time to plan, organize, and prepare meals. Participants consistently reported time for food preparation activities as motivating. The barriers the participants identified were not having enough time, not having a kitchen or kitchen that was convenient to use, not having the knowledge or skill to prepare foods, and access to the

university cafeteria was convenient and saved time. All participants reported that they did not have enough time to shop for foods, to cook, and they did not have confidence about their cooking techniques. Two factors were unique between the two universities: Baylor students disliked grocery shopping, while the Abilene students communicated that they wished their parents would have prepared more foods at home so they would know how to prepare foods with confidence. This recent study provided some unique insights into factors influencing college students' cooking behavior.

Trends related to increased eating away from home and decreased cooking at home, coupled with rising overweight and obesity in young adults, suggest that there is merit in developing a better understanding of young adults' cooking behavior, particularly in a state like Mississippi where obesity and chronic disease rates are so high. Only limited research explores cooking behavior and skills, particularly in this age group in which young adults are transitioning to independent living. Generally, research on factors influencing food choices and cooking behavior suggests that social cognitive theory may be an appropriate framework from which to consider young adults' cooking behavior. Various studies have identified environmental factors (De Backer, 2013; Hammons & Fiese, 2011; Larson et al., 2007; Levitsky et al., 2004), observational learning (De Backer, 2013; Larson et al., 2007); expectancies (Daniels et al., 2012; Driskell et al., 2005); behavioral capability (Furey et al., 2000; Short, 2003a); and self-efficacy (Levy & Auld, 2004; Pelletier & Laska, 2012) as influencing food consumption and/or preparation. Implicit in other studies is the role of self-efficacy (Jones et al., 2014), behavioral capability (Jones et al., 2014; Soliah et al., 2006), and outcome expectations (Candel, 2001; Hartmann et al., 2013; Jones et al., 2014; Soliah et al., 2006) related to

cooking behavior. This research used social cognitive theory as a framework to study young adults' cooking behavior, and contributing factors in a diverse population of college students in Mississippi at an institution where enrolled students largely come from low- to-middle income households and many are first generation college students.

CHAPTER III - METHODOLOGY

Design of Study

In an effort to explore college students' cooking attitudes and behaviors, and their perceptions of cooking practices experienced in the home, a mixed methods approach was used. Mixed methods is defined as collecting, analyzing, and integrating both qualitative and quantitative data in a single study or a multiphase program of inquiry (Creswell, 2009) to provide a more complete understanding of the research problem than is possible using a qualitative or a quantitative approach alone (Creswell, 2014). Using a pragmatic approach allows the researcher to utilize both qualitative and quantitative methods that are best suited for the research problem, technique, and procedures of the research (Morgan, 2007). Creswell (Creswell, 2009) further explains the paradigm for pragmatism as including the elements of consequences of actions, problem-centered, pluralistic, and real-world practice oriented. Creswell (Creswell, 2014) summarizes other aspects of pragmatism relying on work of his own as well as that of other authors including Cherryholmes (Cherryholmes, 1992) and Morgan (Morgan, 2007). These include that "pragmatism is not committed to any one philosophy or reality," and that it lends itself to mixed methods research, allowing for multiple approaches for collecting and analyzing data that "provide the best understanding of a research problem." This philosophical worldview would seem more appropriate to the research questions of this research, than other qualitative worldviews which frequently undergird common qualitative designs like ethnography, grounded theory, or a phenomenological approach.

Mixed Methods

This study used a convergent parallel mixed methods design (Creswell, 2014). This design is appropriate to use when the assumption is that both qualitative and quantitative data will provide similar or complementary results that can be compared or related to each other. Each form of data collection focuses on the same or parallel constructs or concepts. Qualitative research contributes to understanding the experiences, perspectives, and thoughts of participants, and the meanings people bring about a topic (Harris et al., 2009; Hoepfl, 1997). Quantitative research methods allow the researcher to collect and interpret data in a numerical form to describe characteristics or trends in a population and draw inferences, as well as to determine if differences or relationships exist. The application of each of these approaches in this mixed methods study is described below.

Setting

In the 2013-2014 school year, there were a total of 12,475 undergraduate college students enrolled at the University of Southern Mississippi (*Enrollment Fact Book 2013-2014*, n.d.). The racial statistics for the undergraduate students included: White/Non-Hispanic: 7618; Black/African American: 3951; Hispanic/Latino: 400; Two or More Races/Non-Hispanic: 207; Asian/Non-Hispanic: 156; American Indian/Alaska Native: 102; Non-Resident Alien: 78; and Native Hawaiian/Other Pacific Islander: 12. The sex of the undergraduate students with full-time status was male, 3856, and female, 6928; for part-time students, male, 630 and female, 977. The average age of undergraduates at USM is 23. Over 75% of undergraduates received financial aid and a little under 50%

receive need-based Federal Pell Grants (“The University of Southern Mississippi College Portrait, 2012-13,” n.d.).

Participants

Selection Criteria

The population was limited to undergraduate students enrolled at The University of Southern Mississippi, with no restrictions on gender, ethnicity, enrollment status, or living situation.

Qualitative sample

The intention was to use purposeful sampling to recruit students for focus groups, selecting students from two distinct groups, those who cook frequently and enjoy cooking, and those who do not. Patton defines (Patton, 2002) purposeful sampling as “using cases selected for the study that are selected because they are information rich, that offer useful manifestations of the phenomenon of interest with the sampling being the aim of insight about the phenomenon” (p. 40). However, lack of response to recruitment efforts caused the researchers to abandon this approach in favor of convenience sampling with no criteria for inclusion other than being an undergraduate student aged 18-25.

Quantitative sample

Convenience sampling was used to obtain the quantitative sample, with the intent that the sample be somewhat representative of USM undergraduate demographic and enrollment characteristics. The USM undergraduate population is approximately 64% female; 61% White and 32% Black, and 20% each freshman, sophomore, and junior classification, with nearly 40% having senior classification (“University of Southern

Mississippi,” n.d.). The minimum desired sample size was 95 (Faul, Erdfelder, Buchner, & Lang, 2009b). This was based on a planned regression analysis with cooking behavior as the dependent variable. Since there are no published data available with which to determine sample size, we assumed a moderate effect size of .2, a probability of 0.05, and 80% power, and 11 predictor variables (G*Power, v. 3.1.19.2, (“G*Power: Statistical power analyses for Windows and Mac,” n.d.). A sample size of 136 would yield 95% power.

Recruitment

Participants for focus groups and the online survey were recruited using multiple methods: flyers were posted in the student union, campus student housing units, and classroom buildings throughout campus; a recruitment notice was posted in the campus listserv that targets students; announcements were made in selected general education classes; and emails were sent to the presidents of the 71 of the student organizations listed on the student activities website asking them to post or distribute flyers to their membership. These steps were taken separately for the two portions of the study, a few weeks prior to the conduct of the focus groups in late September, 2016, and mid-semester for the survey which was conducted mid-October through December 2016.

Human Subject’s Protection

The Institutional Review Board (IRB) at the University of Southern Mississippi reviewed and approved the study. As a part of the human subject’s protection, focus group participants reviewed and signed a written consent at the start of the focus group. Participants in the quantitative survey consented electronically before proceeding with the anonymous survey.

Study Instruments

Table 3 provides an overview of study instruments and their relationship to constructs of Social Cognitive Theory and to the research questions. Detailed information about qualitative and quantitative instruments is found in subsections below.

Focus Group Questions

Focus group questions were constructed using guidance provided by Krueger (Krueger, 1998a). Specific focus group questions flow from the theoretical framework and study research questions (Table 4). Questions were ordered using categories suggested by Krueger (Krueger, 1998a) from opening through ending. A copy of the focus group guide is found in the Appendix A. Questions were pretested on a small group of non-participant students, to evaluate for clarity, flow, and time required to administer and adjusted as needed.

Table 3

Theoretical constructs, research questions, and questions from qualitative and quantitative instruments

SCT Construct, Definition	Research questions/objectives/purpose	Qualitative/FG questions*	Quantitative questions
<p><i>Personal factors:</i> includes things like behavioral capability, outcome expectations, self-efficacy; can also include factors such as demographics, marital status, employment status, living situation (or could consider this environmental)</p>	<p>How do personal factors (i.e. demographics and enjoyment of/preference for cooking) affect cooking behavior?</p>		<p>Demographic questions #56-64</p>

Table 3 (continued)

<p><i>Environment:</i> “factors physically external to the person,” “external social context”</p> <p><i>Social environment</i> (e.g. family members, friends, peers at work or at school; living situation; school, family, work demands)</p>	<p>How have family food environment and experiences growing up influenced young adults’ cooking and cooking confidence?</p> <p>What role do present family and peer interactions play in cooking expectations and behavior?</p>	<p>#4,5,6,8</p>	
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Table 3 (continued)

<p>Observational learning: “behavioral acquisition that occurs by watching the actions and outcomes of others’ behavior”</p>	<p>How has watching others cook, seeing the consequences of cooking influenced young adults’ cooking and cooking competence? In the family growing up? In other settings (food network?, community cooking classes, high school curricular and extracurricular)</p>	<p>#5,6,7</p>	
<p>Expectations: “anticipated outcomes of a behavior”</p>	<p>What outcomes do young adults associate with cooking?</p>	<p>#9</p>	<p>Cooking attitudes, questions 20-26</p>
<p>Expectancies: “the values that a person places on a given outcome”</p>	<p>What motivates young adults to cook?</p>	<p>#7,10</p>	<p>Cooking attitudes, questions #11-19, 27-32</p>

Table 3 (continued)

Behavioral capability: “knowledge and skill to perform a given behavior”	How have today’s young adults developed behavioral capability related to cooking?	#6,7,11	Cooking skills, questions #3-10 Cooking knowledge, questions 37-55
Self efficacy: “the person’s confidence in performing a particular behavior”	What contributes, has contributed to cooking confidence, SE, in young adults? How is CC related to complexity of cooking?	#6,7,11	Cooking confidence, questions 33-36
Behavior			Cooking behavior, questions 1, 2

*See Table 4, Focus Group Questions for specific questions, by number. See Appendixes A & B for questionnaires.

Table 4

Focus group questions

Type of question	Question
Opening	1. Tell us your name, your major, and what you plan to do for fall break
Introductory	2. When you think of cooking and preparing meals for yourself, what comes to mind?
Transition	3. What kinds of meals do you usually prepare at home?
Key questions	
Social environment	4. What is the first memory you have of a cooking experience in your childhood?
Observational learning Social environment	5. Tell me about family meal routines you experienced when you were growing up. Describe a typical meal in your family when you were growing up. (Observational Learning) Probe: Who prepared it? Probe: What did you eat? Probe: Who participated? Probe: Who cleaned up?

Table 4 (continued)

<p>Observational learning</p> <p>Social environment</p> <p>Self-efficacy</p> <p>Behavioral capability</p>	<p>6. What role did you have in cooking when you were growing up?</p> <p>How did your role change as you got older?</p>
<p>Transition</p>	<p>Now we want to shift gears and talk about the cooking you do as a young adult. You talked a little when we started about the meals you usually prepare at home.</p>
<p>Key Questions</p>	
<p>Observational learning</p> <p>Social environment</p> <p>Self-efficacy</p> <p>Expectancies</p> <p>Expectations</p> <p>Behavioral capability</p>	<p>7. Thinking about your involvement with cooking, what exposures have influenced the cooking you do today, and in what ways?</p> <p>Probes: 4H, FHA, high school home economics, college, community, social/visual media (e.g. Food Channel, YouTube cooking videos)</p>
<p>Social environment</p>	<p>8. How do your present interactions with family and friends influence the cooking you do today?</p>

Table 4 (continued)

Outcome expectations	9. We have been discussing cooking and experiences with cooking. On the paper in front of you, write down three benefits you see as associated with cooking. When you're finished we'll share this with each other.
Outcome expectancies	10. When young adults enter college, they experience an increase in responsibilities. What do you think are the factors that would motivate young adults to spend time cooking?
Behavioral capability Self Efficacy	11. Now I'd like to get an idea about your experiences with meal preparation. Tell me about the most complicated item you ever prepared. Probe: How did you approach the experience? Probe: How confident were you that your dish would turn out successfully?
Ending	12. Is there anything else you would like to share about your cooking experiences?

Quantitative Instruments

A quantitative instrument related to the research questions was constructed using elements of other validated instruments (see Appendix B). First, a literature search was conducted to identify instruments that had been used in previous studies about cooking and cooking skills. Several instruments were obtained and reviewed (Barton et al., 2011; Brunner, van der Horst, & Siegrist, 2010; Candel, 2001; Clifford et al., 2009; De Almeida Costa, 2013; Hartmann et al., 2013; Scripa, 2013; Ternier, 2010). Questions and scales

were selected from among those included in other instruments to align with research questions and the theoretical framework (Table 3). The first version of the instrument included questions on cooking behavior (1 question from Barton et al.(Barton et al., 2011); 1 question from Clifford et al.(Clifford et al., 2009); skills (8 questions total, 4 from Hartmann et al.(Hartmann et al., 2013); 4 from Ternier (Ternier, 2010); attitudes (22 questions total, 13 from Hartmann et al. (Hartmann et al., 2013); 6 from Clifford et al.(Clifford et al., 2009); confidence (4 questions from Barton et al. (Barton et al., 2011); and knowledge (19 from Scripa (Scripa, 2013). Two questions under Cooking Skills were slightly modified to use more culturally appropriate wording (e.g. from “I am able to prepare gratin” to “I am able to prepare rice and potatoes). Three questions on cooking attitudes, specifically outcome expectancies (#24-26) were developed based on the qualitative work of Jones and colleagues (Jones et al., 2014). Response categories were modified for the behavior question taken from Clifford et al. (Clifford et al., 2009) to tailor to the USM campus. Some information was provided on validity and reliability of scales in the original publications. The original 7-item cooking skills questionnaire from Hartmann et al. (Hartmann et al., 2013) had a Cronbach’s alpha of 0.91, but because the questions were developed for use in Switzerland, some of the questions were not suitable for an American audience, and others required modification. No reliability data were reported by Ternier on cooking skill items (Ternier, 2010). The three item scales from Hartmann et al. (Hartmann et al., 2013) on willingness to invest time, physical effort, and mental effort had Cronbach’s alphas of 0.82, 0.82, and 0.83 respectively. The four items on cooking outcome expectations taken from Hartmann et al. (Hartmann et al., 2013) had

a Cronbach's alpha of 0.95. Clifford reported that Cronbach's alpha's were above 0.70 for attitude and behavior scales, but did not provide internal consistency data for specific scales or sets of questions. Barton and colleagues (Barton et al., 2011) reported a Cronbach's alpha of 0.86 for the cooking confidence scale. The questionnaire compiled/adapted for this study was pretested on students enrolled in a basic nutrition course during the summer, 2016 term. Fifty-eight students completed the questionnaire. Cronbach's alphas were calculated for scales on the pretest sample. All scales except knowledge had moderate to strong internal consistency (Grove, Burns, & Gray, 2013). The 19-item knowledge scale had a Cronbach's alpha of 0.48. Item reduction was undertaken, yielding a 10-item scale with a Cronbach's alpha of 0.669.

Demographic questions

All participants completed 10 demographic questions covering age, race/ethnicity, marital status, classification, academic major, employment, and living arrangements. All but the academic major question were adopted from other sources, primarily the American College Health Association National College Health Assessment (American College Health Association, 2013).

Research Procedures

Focus Groups

Krueger and Casey (Krueger & Casey, 2000) define focus groups as "a carefully planned series of discussions designed to obtain perceptions on a defined area of interest in a permissive, non-threatening environment" (p. 2). Decisions on number of groups, group size, and group composition were made using guidance from Krueger and Casey

(Krueger & Casey, 2010) and Morgan (Morgan, 1998). Krueger and Casey (Krueger & Casey, 2010) suggest that the number of participants in focus group sessions should be between 5-10 people, with 5-8 as the preferred number. Focus groups should be comprised so that members of each focus group are compatible, and free to discuss, in a comfortable environment (Morgan, 1998).

For this study, focus groups were conducted in a meeting room on campus around mid-day and early evening, with a light meal served to each group. Target size for each focus group was 5-10 (Krueger & Casey, 2010). Groups were initially planned to be segmented such that separate groups would be held with students who enjoyed cooking and cooked frequently and those who did not, with two groups of each planned, yielding a minimum of about 20 participants, with groups to be added as necessary to achieve theoretical saturation (Glaser & Strauss, 1967). Because of challenges with recruitment response and concerns about resources to continue recruiting to achieve saturation, the plan for separate “cook” and “non-cook” groups was abandoned in favor of scheduling four less homogenous groups.

Krueger and Casey (Krueger & Casey, 2009) recommend using a moderator and facilitator that are knowledgeable about the topic and trained on how to facilitate focus groups. For this study, a faculty member trained by Krueger in focus group techniques served as moderator, and the researcher, who received training as part of a qualitative methods graduate course, served as facilitator, assisting with session logistics, taking comprehensive notes, including observing body language, and operating the digital recorder, used to record all discussion. The researcher developed a standardized

reporting form for use as facilitator, using recommendations of Krueger (Krueger, 1998b). At the conclusion of each focus group, the moderator and facilitator debriefed and recorded notes on additional observations related to focus group content and process. The audiotapes were transcribed verbatim by the researcher in preparation for analysis.

Administration of Quantitative Instrument

The quantitative survey was administered electronically using Qualtrics (Qualtrics, Provo, UT). Students were provided a link to the survey and a QR code during recruitment. To attempt to minimize item nonresponse, questionnaires were formatted by shading alternate rows of questions. Alerts were included in questionnaire programming to call respondents' attention to incomplete items, but forced completion was not used, in keeping with appropriate human subjects protection.

Data Analysis and Interpretation

Focus Group Data

Content analysis is a process that includes organizing, classifying, and summarizing focus group /interview data as a process to understand rich information (Harris et al., 2009). Qualitative data analysis followed the general steps suggested by Creswell (Creswell, 2014). The focus groups were prepared for analysis by transcribing them word for word. The transcripts were reviewed to obtain an overall sense of their content, and then coded, following Tesch's eight steps as reported in Creswell (Creswell, 2014), to form codes. Two independent coders reviewed and coded the data, one of whom was the researcher. Following initial coding, themes and patterns were identified from the coded data. The two coders then engaged in a process of consensus coding to

resolve any differences in coding and theme identification. The researcher used reflectivity (Creswell, 2014) to help insure validity, specifying how her own biases might influence interpretation of the findings.

Quantitative Data Analysis

Quantitative data were analyzed using IBM SPSS version 22. Frequencies were calculated for all categorical data. Means, standard deviation, and Cronbach's alpha were determined for all scales, after reverse coding where appropriate. A cooking behavior variable, adapted from Clifford et al. (Clifford et al., 2009) was calculated by summing the number of times in a week a student indicated s/he "cook[s] or prepare[s] meals for breakfast, lunch, and dinner, yielding a score range of 0-21 (0 = cooks or prepares no meals; 21 = cooks or prepares all meals). Clifford and colleagues found that 50% of their sample reported cooking dinner four or more times a week, but they did not report any data on variability, or whether students reported "cook[ing] or prepar[ing]" breakfast or lunch, which was defined to include preparing cereal or making sandwiches.

Linear regression was used to determine the predictive effect of the measured SCT constructs and demographic variables on cooking behavior. Three separate regression analyses were run, first using SCT construct scales only, secondly using demographic variables only, and finally, using both SCT construct scales and demographics.

Using guidance from Schlomer and colleagues (Schlomer, Bauman, & Card, 2010), the proportion of missing data was determined and reported. Both the amount and pattern of missing data were considered in deciding to omit or impute missing data.

Mixed Methods Analysis

Creswell (Creswell, 2014) provides an overview of analysis for research using a convergent mixed methods design. Analysis includes a comparison of qualitative and quantitative data. Approaches mentioned by Creswell include a side-by-side approach, where results are compared in a discussion section, first reporting one than the other set of findings, drawing comparison in the discussion itself. A second approach, for which Creswell cites Onwuegbuzie and Leech (Onwuegbuzie & Leech, 2006), can include data transformation of either quantitative or qualitative data for a more direct data comparison. A third approach referenced by Creswell is that of Li and colleagues (Li, Marquart, & Zercher, 2000). The authors refer to this as a parallel tracks analysis, and it is depicted in Figure 1. Data are first reduced and transformed using methods appropriate for each type of data, then jointly displayed in a table or matrix, facilitating comparison of findings from the qualitative and quantitative analysis. The researcher used the parallel tracks approach, particularly with regard to data reduction and comparison/integration. Themes emerging from qualitative data were compared and contrasted with findings from quantitative data analysis. Social cognitive theory constructs were applied in discussion of findings.

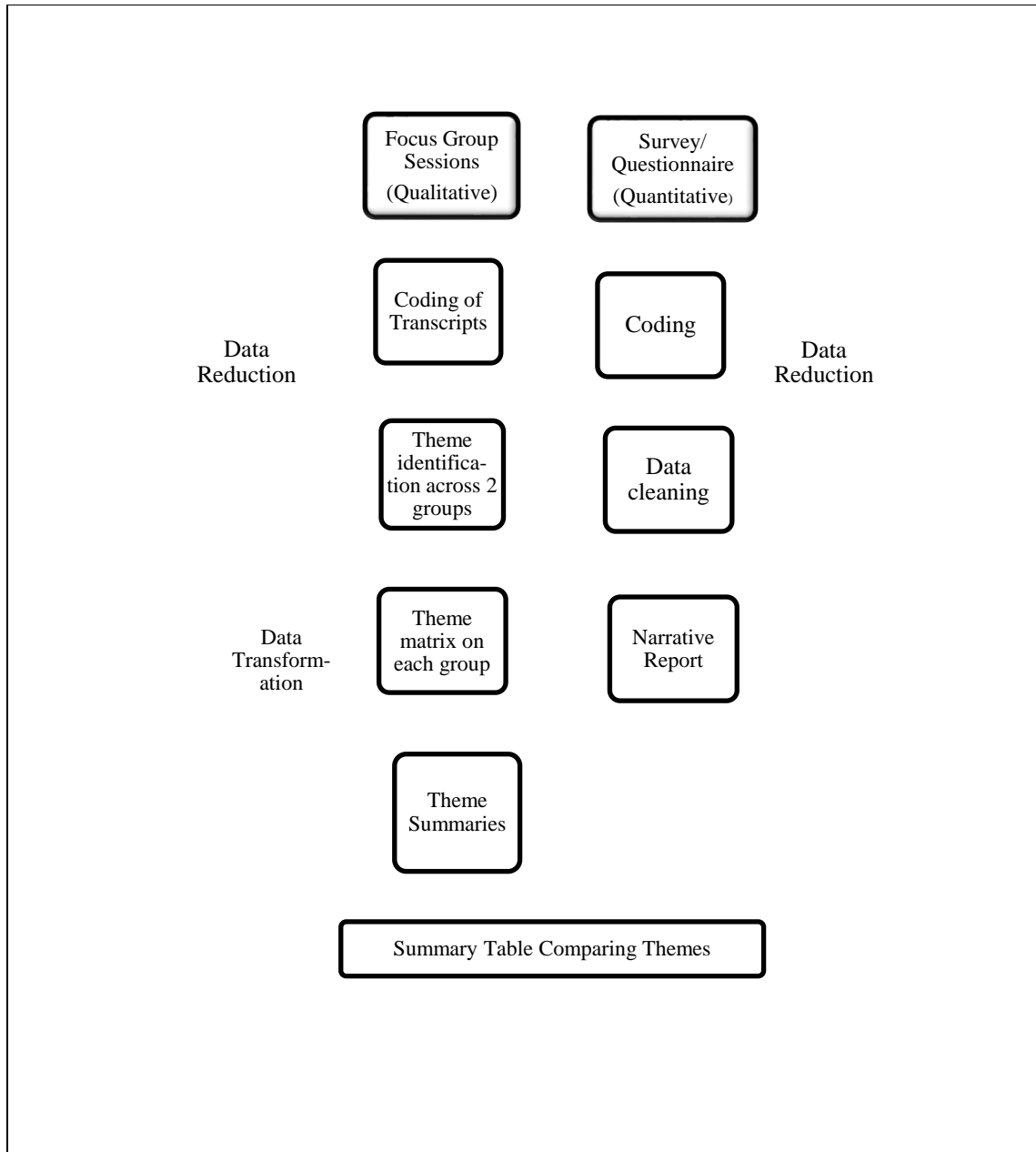


Figure 1. Mixed methods data analysis scheme

CHAPTER IV – MANUSCRIPT 1

Obesity and weight gain are a concern among young adults, given that young adulthood is a time when adult weight gain typically occurs (Beydoun & Wang, 2009b; Kahn & Cheng, 2008; Zagorsky & Smith, 2011). Beydoun and Wang (Beydoun & Wang, 2009a) used NHANES data from 1988-1994 and 1999-2004 to assess shifts in BMI and waist circumference distributions and to project future distributions and obesity prevalence in adults. Between the two time periods, for young adults aged 20-29 years, mean BMI increased 2 units, from normal to overweight status, and mean waist circumference increased by 6.7 cm. Although mean BMI increased linearly with age, the largest absolute increase was in the 20-29 age group. Longitudinal datasets from the Coronary Artery Risk Development in Young Adults study (CARDIA), the Atherosclerosis Risk in Communities Study (ARIC), and the Cardiovascular Health Study (CHS) comparing BMI changes over time suggest that the greatest annual changes in BMI across age cohorts occur in young adults, ranging from +0.15 units per year in white women to +0.38 units for black women (Kahn & Cheng, 2008). At age ~29, the incidence of positive change in BMI was 77% for men, and 76% for women in combined racial groups. Obesity prevalence in 20-39 year olds was 32.6% in 2009-10 (Ogden et al., 2012). In the National College Health Assessment, 32.5% of students self-reporting height and weight were overweight or obese in 2012, compared to 31.3% in 2008 (American College Health Association, 2009, 2013). Weight gain among college students is a common concern, and a systematic review of freshman weight gain (Crombie et al., 2009) found mean weight increases over the entire freshman year ranged

from 0.7-2.4 kg. A 10-year longitudinal study of 7418 young adults, aged 22-28 at the time of follow-up, reported median weight gains during freshman and all college years of 2.4 and 6.5 lbs. for women, and 3.4 and 12.1 lbs. for men (Zagorsky & Smith, 2011).

Young adult dietary intakes may in part be responsible for these weight trends. Levitsky and colleagues (Levitsky et al., 2004) found that eating junk foods accounted for 24% of the variance in a Cornell University sample of students' weight gain in their first three months of college. Pelletier and Laska (Pelletier & Laska, 2013) found that source and type of food/meal selection of college students affected diet quality, with frequent purchasing of food from campus venues associated with higher fat and added sugar intake, whereas bringing food from home was associated with higher quality intake. Nelson and colleagues (Nelson et al., 2009) studied meal patterning, dietary intake, and home availability environments among young adult (average age, 20.5) non-students and two- and four-year college students in a longitudinal study of Minnesota adolescents/young adults, and found that the majority of young adults did not meet the national recommendations for dietary intake. NHANES data on adults aged 19-30 (*Usual dietary intakes: Food intakes, U.S. population, 2007-10, n.d.*), mean daily intakes for males included total fruit, 0.9 ± 0.5 cup equivalents; total vegetables, including beans and peas, 1.7 ± 0.06 cup equivalents; whole grains, 0.7 ± 0.05 oz. equivalents; and energy from added fats and sugars, 769.4 ± 19.98 kcal; for females, fruits, 0.9 ± 0.5 cup equivalents; total vegetables including beans and peas, 1.4 ± 0.04 cup equivalents; whole grains, 0.6 ± 0.03 oz. equivalents; energy from added fats and sugars, 556.3 ± 15.6 kcals. Fruit, vegetable and whole grain intakes were below the recommended amounts, and

energy from added fats and sugars was excessive. Further, fast food consumption accounted for 15.3% of calories in young adults, compared to 11.3% for all adults (Fryar & Ervin, 2013).

Recently, there has been considerable interest in the relationship between cooking and diet quality. In a study of 1049 Irish adults, cooking skills predicted saturated fat and fiber intake (McGowan et al., 2016). Berge and colleagues (Berge, MacLehose, Larson, Laska, & Neumark-Sztainer, 2016), using data from a large population-based observational study of adolescents in Minnesota, reported that adolescents' involvement in food preparation for their families was associated with several markers of better diet quality and better eating patterns. In a large study of New Zealand youth (n=8500), respondents' self-identified cooking ability was associated with a better quality diet and a greater likelihood of meeting fruit and vegetable recommendations (Utter, Denny, Lucassen, & Dyson, 2016). A qualitative study of college students living off-campus found that lack of cooking skills was a barrier to healthy eating, and that knowledge of balanced diet principles did not translate into food choices/cooking practices (Murray et al., 2016). Further, these students reported relying heavily on processed/prepared foods.

Emerging adulthood is a transition period that has typically involved leaving home and development of independent decision-making, suggesting a time when health behavior patterns may be further developed (Nelson et al., 2008), and that eating patterns that are acquired or reinforced may persist into adulthood (Lau et al., 1990). Given the pattern of weight gain and poor dietary intakes among college students, and recent

literature suggesting cooking frequency and skills may be associated with improved diets, exploration of cooking behavior and skill among college students may contribute to understanding of ways to address these issues at a time in which life habits may be developing and college students are moving toward a period of building a mode of adult living (Levinson, 1986). Therefore, the purpose of this research was to explore college students' cooking behavior, and factors that influence that behavior. A secondary objective was to determine the relationship of demographic characteristics, and of cooking knowledge, attitudes, knowledge, confidence, and skill, with cooking behavior. Social Cognitive Theory (Bandura, 1977) was used as a framework for inquiry, given existing literature on the role of constructs such as observational learning, self-efficacy, and behavioral capability related to cooking and meal preparation in relationship to cooking behavior and healthy diets (Berge et al., 2016; Brooks & Begley, 2014; De Backer & Hudders, 2016; Larson et al., 2007; Reid, Worsley, & Mavondo, 2015).

Methodology

This study used a convergent parallel mixed methods design (Creswell, 2014). This design is appropriate to use when the assumption is that both qualitative and quantitative data will provide similar or complementary results that can be compared or related to each other.

The setting for the research was a mid-sized public university in the southeastern U.S. In fall 2016, the undergraduate student population was approximately 61% White, non-Hispanic and 29% Black or African American, non-Hispanic, the average age was 23, and about 74% of students were determined to have financial need. Convenience

sampling was used for both arms of the study, with the only eligibility criterion for participation being undergraduate student status. The minimum desired sample size for the quantitative portion of the study was 95 (Faul, Erdfelder, Buchner, & Lang, 2009a), based on a planned regression analysis with cooking behavior as the dependent variable. Since there were no published data available with which to determine sample size at the time of planning for data collection, we assumed a moderate effect size of .2, a probability of 0.05, and 80% power, and 11 predictor variables (G*Power, v. 3.1.19.2, Heinrich-Heine-Universität Düsseldorf, Germany). A sample size of 136 would yield 95% power.

Recruitment

Participants for focus groups and the online survey were recruited using multiple methods: flyers were posted in campus buildings including the student union, housing units, and classroom buildings; a recruitment notice was posted in the campus student listserv; announcements were made in selected general education classes; and emails were sent to presidents of 71 student organizations listed on the student activities website. Participants were recruited separately for the two arms of the study in fall 2016. A drawing for a gift card to an online merchant was offered in each study arm. The Institutional Review Board (IRB) at the University of Southern Mississippi reviewed and approved the study.

Study Instruments

Study instruments were developed using constructs of Social Cognitive Theory. Focus group questions were constructed and ordered for flow using guidance from

Krueger (Krueger, 1998a), and pretested on a small group of non-participant students, to evaluate for clarity, flow, and time required to administer, and adjusted as needed.

A quantitative survey was constructed using elements of other validated instruments identified through a literature search and aligned to selected SCT constructs. The first version of the instrument included questions on cooking behavior (Barton et al., 2011; Clifford et al., 2009); skills/behavioral capability (Hartmann et al., 2013; Ternier, 2010), attitudes/outcome expectations/expectancies (Clifford et al., 2009; Hartmann et al., 2013), confidence/self-efficacy (Barton et al., 2011), and knowledge (Scripa, 2013). Two questions from Hartmann et al. (Hartmann et al., 2013) were modified to use more culturally appropriate wording/foods and three questions on outcome expectancies were developed based on the qualitative work of Jones and colleagues (Jones et al., 2014) and added to the Hartman outcome expectancy subscale. Response categories were modified for the cooking behavior question (Clifford et al., 2009) to tailor to the local campus dining options. The survey instrument was pretested on students enrolled in a basic nutrition course during summer, 2016. Cronbach's alphas were calculated for scales using the pretest sample of 58, and all but one had moderate to strong internal consistency (DeVellis, 1991). The 19-item knowledge scale, with a Cronbach's alpha of 0.48, was subjected to item reduction, yielding a 10-item scale with a Cronbach's alpha of 0.669. All participants completed 10 demographic questions covering age, race/ethnicity, marital status, classification, academic major, employment, and living arrangements, most adapted from the National College Health Assessment (American College Health Association, 2013).

Research procedures

Students were recruited to participate in one of four focus groups, held in a centrally located campus meeting room at mid-day and early evening, with a light meal served. Target size for each focus group was 5-10 (Krueger & Casey, 2010). Groups were initially planned to be segmented into separate groups for students who self-identified as enjoying cooking and cooking frequently and those who did not, but because of challenges with recruitment response, four non-segmented groups were scheduled.

A faculty member served as moderator, and the researcher served as facilitator, assisting with session logistics, reviewing the procedures and the consent document prior to start, obtaining signed consent, taking comprehensive notes using a standardized reporting form developed for this study (Krueger, 1998b), observing body language, and operating a digital recorder which recorded all discussion. Both moderator and facilitator had been trained and had prior experience in conducting focus groups. At the conclusion of each focus group, the moderator and facilitator debriefed and recorded notes on additional observations related to focus group content and process.

The anonymous quantitative survey was administered electronically using Qualtrics (Qualtrics, Provo, UT). Students were provided a url web link and a QR code during recruitment. To attempt to minimize item nonresponse, questionnaires were formatted by shading alternate rows of questions. Alerts were included in questionnaire programming to call respondents' attention to incomplete items, but forced completion was not used, in keeping with appropriate human subjects protection. Consent was obtained by having respondents click on a statement of agreement after reading the

consent document. Students who declined to participate were instructed to exit the survey.

Data analysis and Interpretation

The analysis of qualitative and quantitative data followed a parallel tracks approach (Li et al., 2000), using separate, but parallel, data reduction steps. Analysis of focus group data followed the general steps suggested by Creswell (Creswell, 2014). The audiotapes were transcribed verbatim by the researcher in preparation for analysis. The transcripts were reviewed to obtain an overall sense of their content, and then coded, following Tesch's eight steps as reported in Creswell (Creswell, 2014). Two independent coders reviewed and coded the data, one of whom was the researcher. Following initial coding, themes and patterns were identified from the coded data. The two coders then engaged in a process of consensus coding to resolve any differences in coding and theme identification. The researcher used reflectivity (Creswell, 2014) to help insure validity, specifying how her own biases might influence interpretation of the findings.

Quantitative data were analyzed using IBM SPSS version 22. Guidance from Schlomer and colleagues (Schlomer et al., 2010) was used to evaluate the amount and pattern of missing data. Of the 192 individuals who consented to participate by clicking I agree, 24 responded to no (0) questions. These individuals were considered non-respondents and were deleted. An additional 9 respondents who answered fewer than 22% of the survey questions were also deleted from analysis, leaving an n of 159 in the analytical dataset.

Frequencies were calculated for all categorical data. Means, standard deviations, and Cronbach's alphas were determined for all scales, after reverse coding where appropriate. A cooking behavior variable, adapted from Clifford et al. (Clifford et al., 2009) was calculated by summing the number of times in a week a student indicated s/he "cook[s] or prepare[s] meals for breakfast, lunch, and dinner," yielding a score range of 0-21 (0 = cooks or prepares no meals; 21 = cooks or prepares all meals). Clifford and colleagues found that 50% of their sample reported cooking dinner four or more times a week, but they did not report any data on variability, or whether students reported "cook[ing] or prepar[ing]" breakfast or lunch, which was defined to include preparing cereal or making sandwiches.

Linear regression was used to determine the predictive effect of the measured SCT constructs and demographic variables on cooking behavior. Three separate regression analyses were run, first using SCT construct scales only, secondly using demographic variables only, and finally, using both SCT construct scales and demographics.

Finally, findings were triangulated within a social cognitive theory framework. Quantitative and qualitative findings were compared and contrasted, considering points at which they converged, diverged, or complemented each other.

Results

Participant demographics are reported in Table 5, with data on all university undergraduates in Fall 2016 presented for comparison purposes. For the 155 of 159 survey respondents who completed demographic questions, the majority were female

(n=127, 81.9%), white (n=94, 60.6%) or black/African American (n=43, 27.7%), and between 18- and 21-year-old (n=96, 61.0%). They were mostly full-time students (n=141, 91.6%), never married (n=135, 87.1%), and living off-campus (n=105, 67.4%). Nearly 49% (n=86) lived with (a) roommate(s) or friend(s). When asked how many hours they worked per week, 40.6% indicated none, but a third reporting working 20 hours or more. Respondents' majors were distributed across the six colleges of the university, and represented a distribution of classification status, though about 55% were second or third-year undergraduates.

The four focus groups included 15 participants, who were mostly female (n=11), Black or African American (n=7) or White (n=6), enrolled full-time (n=14), between 18 and 21 years old (n=12), and never married (n=15). Eight worked 10 or more hours per week, 8 lived on- and 7 off-campus, 10 with (a) roommate(s) or friend(s). Nine of 15 were first or second-year students, and as with survey respondents, their majors were distributed across all colleges of the university.

Results on cooking behavior and factors influencing cooking from the survey and focus groups are presented in an integrated fashion, organized by social cognitive theory construct. Table 6 presents means and/or medians for cooking/mealtime behavior from both samples, along with means for cooking knowledge, skill/behavioral capability, attitude/outcome expectancies, outcome expectations, and confidence for the survey sample. The survey did not include questions related to influences of the social environment on cooking (except for a single question on living situation), or about observational learning related to cooking, and no focus group questions specifically

addressed cooking knowledge. The mean knowledge score was 9.3(1.1)/10. The range of incorrect responses for questions was 4-21.

Cooking/mealtime behavior

Cooking/mealtime behavior was assessed quantitatively in both samples. Among the five alternatives offered for procuring meals, cooking was the most frequent choice in the survey sample (6.7+5.5 meals/week), compared with eating in a campus dining facility/food venue for focus group participants (7.4+7.3 meals per week, median 5). Survey participants obtained 3-4 meals per week each from campus dining facilities; off-campus restaurants/fast food establishments/take-out; pre-made meals like breakfast bars/frozen heat-and-serve; and skipping or eating snacks from convenience outlets/vending. Focus group participants reported a median of 5 times per week for cooking meals, 4 for eating off campus, and 1 each for pre-made meals and skipping meals/use of convenience outlets/vending.

Focus group participants were asked about their cooking experience memories growing up and meal routines. Responses were relevant to two SCT constructs, environmental influences, in this case family environment, and observational learning.

Table 5

Characteristics of Survey Respondents (n=155) and Focus Group Participants (N=15)

Characteristic	Survey		Focus groups		USM UG, fall 2015
	n	%	n	%	%
Sex*					
Male	26	16.8	4	26.7	36.3
Female	127	81.9	11	73.3	63.7
Prefer to self-describe	2	1.3			
Race*					
White	94	60.6	6	40	61.1
Black or African American	43	27.7	7	46.7	30.2
Hispanic, Latino, or Spanish Origin	3	1.9			3.1
American Indian/Alaska Native	2	1.3			0.4
Asian	8	5.2	1	6.7	1.2
Native Hawaiian/Pacific Islander	2	1.3			0.0
Two or more race/ethnicities	3	1.9	1	6.7	2.1
Age*					
18-19 years old	51	32.1	8	53.3	17.5
20-21 years old	46	28.9	4	26.6	26.8
22-25 years old	34	21.4	2	13.4	26.1
Over 25 years old	28	17.6	1	6.7	27.7

Table 5 (continued)

Marital Status*					
Never Married	135	87.1	15	100	
Married	11	7.1			
Separated/Divorced	9	5.8			
Enrollment Status*					
Full-Time	141	91.6	14	93.3	87.0
Part-Time	13	8.4	1	6.7	13.0
Hours Worked Per Week*					
0 hrs	63	40.6	6	40.0	
1-9 hrs	15	9.7	1	6.7	
10-19 hrs	25	16.1	4	26.7	
20-29 hrs	28	18.1	3	20.0	
30-39 hrs	12	7.7	1	6.7	
40 hrs	7	4.4			
Over 40 hrs	5	3.2			
Residence*					
College Residence Hall	43	27.7	7	46.7	
Fraternity or Sorority House	7	4.5	1	6.7	
Off-Campus House or Apartment	85	54.8	6	40	
Parent's/Guardian's Home	18	11.3	1	6.7	
Other	2	1.3			

Table 5 (continued)

Living Situation*					
Alone	28	15.9	4	26.7	
with spouse/domestic partner	22	12.5			
with roommate(s)/friend(s)	86	48.9	10	66.7	
with parent(s)/guardian(s)	26	14.8	1	6.7	
with other relatives	5	2.8			
with my children	8	4.5			
with siblings	1	0.6			
Major*					
Arts & Letters	22	14.2	5	33.4	21.2
Business	16	10.3	1	6.7	17.3
Education & Psychology	24	15.5	1	6.7	12.7
Health	35	22.6	3	20	14.2
Nursing	36	23.2	2	13.3	9.2
Science & Technology	22	14.2	3	20	24.7
Year in School*					
First Year Undergraduate	27	18.1	5	33.3	19.4
Second Year Undergraduate	44	29.2	4	36.7	16.7
Third Year Undergraduate	39	26.2	4	26.6	23.9
Fourth Year Undergraduate	25	16.8	2	13.3	37.1
Fifth Year Undergraduate	5	3.4			
Sixth or More Year Undergraduate	9	6.0			

*Demographic data for the survey, except Year in School, are based on n=155. Four respondents did not complete any demographic questions. Year in School is based on 149 responses. Living situation percentages exceed 100 because multiple responses were possible.

Table 6

Scores for Cooking Constructs Based on Social Cognitive Theory

Cooking Construct*	Survey (N=159)		Focus Groups (N=15)		
	Mean	SD	Mean (n=13)	SD	Median
Cooking/mealtime behavior (times per week)**					
Cook or prepare meals	6.7	5.5	5.2	5.2	5
Eat in campus dining facility/food venue	3.9	5.0	7.4	7.3	5
Eat off campus (fast food, restaurant, take-out)	4.4	3.3	4.8	3.6	4
Eat pre-made meals (e.g. breakfast bar, frozen heat and serve)	3.1	2.9	1.6	2	1
Skip or eat snacks from convenience store/vending	3.0	3.1	2	2.5	1
Cooking knowledge ($\alpha=0.47$)	9.3	1.1			
Cooking Skill ($\alpha=0.859$)	39.2	7.4			
Cooking Outcome Expectancies/Expectations total ($\alpha=0.898$)	60.1	13.4			
Willingness to invest time ($\alpha=0.755$)	8.1	3.2			
Willingness to invest physical effort ($\alpha=0.786$)	9.3	3.4			
Willingness to invest mental effort ($\alpha=0.921$)	10.1	4.2			
Outcome Expectations ($\alpha=0.890$)	32.5	6.9			

Table 6 (continued)

Outcome Expectancies/expectations ($\alpha=0.74$)	21.7	4.0			
Cooking Confidence ($\alpha=0.738$)	15.7	3.0			

Scales are derived from the following sources: cooking behavior (Clifford et al., 2009); cooking knowledge (Scripa, 2013); cooking skill (Hartmann et al., 2013; Ternier, 2010); cooking attitudes (Hartmann et al., 2013); outcome expectations (Clifford et al., 2009); cooking confidence (Barton et al., 2011)

*# of meals per week cooked or prepared (Cook), eaten in campus dining facility (Campus), eaten using pre-made foods like frozen dinners (Premade); eaten off-campus at fast food, restaurant or take-out (Off-campus); skipped or eaten from vending or convenience store (Skipvend). Range = 0-21. Cooking knowledge (0-10); cooking skill (8-48); cooking attitude (9-54); willingness to invest time, physical effort, mental effort (3-18 each); outcome expectations (7-42); cooking attitude, Clifford (6-36); cooking confidence (4-20)

**cooking behavior for focus group participants is based on 13 respondents; 2 completed the question incorrectly

Family environment

Two main themes emerged. The first was family bonding, expressed as cooking as a family affair and for holidays or special occasions.

“... especially for holidays my whole family would just bring a dish we all would cook in the kitchen together. That made me enjoy cooking as a whole-everyone [was] so happy.”

“Reconnect with family...It was a way to make sure we are not mad at each other.”

“For me what comes to mind usually is home and family settings, it brings me back to cooking for my brothers and parents.”

“Both grandmothers cook seeing them cook for the whole family especially for holidays.”

A second theme that came up less frequently was family medical needs, reflected in this quote:

We have a lot of diabetics in the family. We have to limit the amount of seasonings and what we cook.

Observational learning

Participants explained that watching a grandparent or parent cook growing up helped them learn about cooking. Six participants mentioned learning by observing a parent or grandmother, whereas only two mentioned being directly involved with cooking. Grandmothers seemed to play a greater role than others for these students. Mothers were the next important influence, and five mentioned dads, grandfathers, or parents together cooking specific foods (e.g. lasagna, Shepherd's pie, salmon patties).

"I went to my grandmother's because my mother didn't like cooking...my grandmother cooked every day, my mom cooked once a week...I watched my grandmother cook, that's how I learned to cook, [to] try new things"

"Our main meal was lunch my mom cooked, we were 9 kids, I have 6 sisters would each take a day or cook everyday, for the most part my mom cooked rice it is a staple or a wheat product like a dough, we ate (one plate-family style). We had no choice but to eat together."

"I watched/observed...how they cooked certain things, for example, I would watch my dad cook ribs for 4th of July. It would make me mad because he would never tell me how to do it so I didn't have a recipe. I just saw what my parents did. I mainly started cooking when I moved to my apartment [and] started cooking things I saw my parents made."

Participants were also asked more generally about influences on their cooking behavior growing up and in other settings besides the family. Media influences were mentioned several times, including watching cooking videos online, googling recipes,

and watching cooking shows on cable television, for example, *“I watch cooking shows every morning.”*

Social environment

Focus group participants also discussed the limitations of their current social environment on their cooking behavior. Two themes were mentioned: on-campus facilities for cooking and, less frequently, peers not knowing how to cook. Students who lived in residence halls, although they were suite-style apartments, suggested that not having access to adequate equipment was a barrier, for example: *“I can’t cook noodles [to make pasta] in the oven; if you cook [them] in the microwave [they] won’t come out right”* or *“in the dorms you can’t cook so it encourages them to get Ramen noodles or ...microwave food...when you face that like in 4 years if you don’t have any friends [whose apartment you can cook at], it will really influence what you learn to make. One of my friends who is a chef...at his school they have a kitchen so he can use it to cook [which would] encourage students to cook.”* A few participants suggested that their peers’ defaulting to eating out because of not having exposure to cooking growing up, discouraged them from cooking.

Outcome expectations

The mean survey score for the 7-item outcome expectations scale (Hartmann et al., 2013) was 21.7 (4.0) out of a possible 42. The most strongly affirmed items were “when I cook, I know what’s in the food I am eating” (79.8% totally agree or agree); cooking allows me to eat more healthy, nutritious food (74.8%), and cooking allows me to save

money (66.9%). Cooking as relaxation, a source of joy, and a way to play out creativity were affirmed by 44.2, 51.5, and 54.0% respectively.

Focus group participants identified outcome expectations by listing three benefits they perceived to be associated with cooking. Honoring personal food preferences, having control over what is consumed, and ensuring its quality were mentioned most frequently (n=11). Next in frequency was the opportunity to eat healthier, more nutritious meals (n=9). Social experiences around cooking were noted seven times, and opportunities for creativity six times. Saving money was listed twice.

Expectancies

Mean scores on willingness to invest time, physical effort, and mental effort were 8.1(3.2), 9.3(3.4), and 10.1(4.2) respectively on an 18-pt scale. Higher scores indicated greater willingness to invest time or effort. Three questions on the Clifford scale (Clifford et al., 2009) addressed outcome expectancies, with 27.2% agreeing and 35.8% disagreeing that cooking takes too much time; 20.4% agreeing but 40.7% disagreeing that cooking is expensive, and 14.2% agreeing and 58.6% disagreeing that cooking is hard.

When focus group participants were asked about factors that influence the cooking they do today, two main themes related to expectancies emerged. The first was cooking takes time and effort, given that when students may have other priorities for their time, the effort may not pay off relative to other alternatives for meals. Representative quotes include

“I’m always busy [so] it’s hard for me to prepare things

“I feel like when you are young you don’t realize all the hard work [that] goes into cooking” and the food may *“not come out right”* after investing time and effort.

A more dominant theme related to expectancies was cooking as an important life skill which more students would use if they knew how. Participants also identified barriers to cooking in their present university environment and suggested ways that cooking could be promoted in that environment.

“in the dorms you can’t cook so it encourages [students] to get Ramen noodles or...microwave food. When you face that [over] four years...it will really influence what you learn to make, what you know when you graduate from college. My friend does not know how to cook...now she lives on her own [and] can’t cook” and *“it’s easier for students ‘cause they don’t know how to cook, just go pick something up.”*

Ideas for promoting cooking were shared: *“If here at college they provided a way for them to cook, more people would; or cooking classes that would make more people cook;”* *“I think it would be teaching students how to cook-like in my junior college it was mandatory to take speech, like it should be mandatory to learn how to cook nothing fancy just the basics, include money thing...build their confidence. I think that would be helpful”* *“...because one day they will have to know how to cook for themselves.”*

Behavioral capability

The mean score was 39.2(7.4) out of a possible 48 for the 8-item cooking skill/behavioral capability scale. Responses on individual items ranged from 84.3% agree/totally agree for “I am able to prepare rice and potatoes” to 51.2% for “I make a grocery list, plan food for the week

Common themes identified in the focus groups were increased cooking skill associated with practice cooking as a child or adolescent, independent living, being able to develop creative meals, and exposure to cuisine of different cultures. Practice cooking had three sub-themes. Helping parents with food/meal preparation was reflected in *“I am a hands-on person. I [helped and watched] my grandmother; now I can put ingredients together.”* Learning specific skills was reflected in *“my grandmother taught me how to cook gravy one summer from scratch like real gravy for a turkey.”* The third theme involved a parent either defaulting to the child’s cooking, as in *“it brings me back to cooking for my brothers and parents...automatically had to cook and prepare meals,”* or having the child gradually assume the role of cooking for the family: *“it started with me; [I] gradually helped with cooking now it alternates with mom and me.”* Cooking associated with living independently was reflected in this quote: *“I mainly started cooking when I moved into my apartment...cooking things that I saw my parents made.”* Exploring creativity and foods from other cultures also contributed to developing behavioral capability. This ranged from successfully preparing a Blue Apron meal kit (*“in the box there was chicken, asparagus, lettuce, I was like ‘good Lord,’...this is so complicated, they had set it up so that all you had to do was slice everything but somehow I made it so complicated I was not used to so many ingredients”*) to preparing stuffed grape leaves (*my family makes grape leaves...it was my first time [to] make it for Christmas – you got to cook the rice, cook the leaves...roll it, etc...I was like ‘oh my gosh where do I start’.*”

Self-Efficacy/Cooking Confidence

The mean score for cooking confidence/self-efficacy was 15.7(3) on a scale of 4-20. Among the four scale items, 91.8% indicated they were extremely confident or confident they could follow a simple recipe, versus 69.0% for cook from basic ingredients, 64% for prepare and cook new foods and recipes, and 57.0% for tasting foods not eaten before.

During the focus group session, participants were asked about their confidence related to “the most complicated meal that they had prepared.” There was a high degree of variation in what participants related as their most complicated meal, from Ramen noodles and a poke cake (cake mix with Jell-O), to a lamb rice dinner and lasagna. Generally, participants indicated a willingness to try preparing the items they mentioned, suggesting a certain level of confidence, but often didn’t seem to have the requisite knowledge or skills to produce a successful product (*“I agreed to cook [a meal for my friends] but didn’t know how.”*) Many described that they didn’t understand the cooking techniques needed to be successful with preparing the item (*“I tried to make French toast – didn’t understand the concept...just got bread, put it on a plate, poured milk on it, put it in the microwave.”*) A few mentioned ways they addressed lack of confidence, such as calling an aunt, or recalling how a parent had prepared a dish (*“I was like oh my gosh, where do I start, so I called my aunt to ask her where I start,”*) and others just jumped in and hoped for the best. Some participants expressed clear confidence in their cooking abilities (*“I am really good [with] desserts,” “everything I make most people would find complicated, but to me personally what is complicated is really easy,”*) but most were

more doubtful of their abilities (“I was like fake confident [when my mom asked me to cook Alfredo]” and “[watching my parents make meals] *prepared me because I saw how easy cooking is, [but] I didn’t think I could do myself.*”

The ability of the SCT constructs to predict cooking behavior (meals cooked per week) was of interest, along with the role of demographic variables as predictors. Three regression analysis were run on the survey sample, with meals cooked/week as the dependent variable. Models are presented in Tables 7-9. The first model included the SCT measures cooking knowledge; skill; attitudes, comprised of willingness to invest time, physical effort and mental effort, and outcome expectations; attitudes (including questions on expectancies, expectations, and self-efficacy); and cooking confidence. The model predicted 22.5% of variability in the outcome ($F=5.417, p<.0001$). Only cooking skill was a significant predictor. The second model included the socio-demographic variables age, sex, race/ethnicity, hours worked per week, enrollment status, year in school, academic major, residence, marital status, and living situation. The socio-demographic model accounted for 50.6% of variability in meals cooked per week ($F=5.495, p<.0001$). Hours worked per week, year in school, and location of residence were significant predictors. The third model included both SCT constructs and socio-demographic variables and accounted for 61.3% of variability in meals cooked per week ($F=5.062, p<.0001$). In this model, only socio-demographic predictors were significant. Second and third-year undergraduates cooked fewer meals per week than first-year undergraduates; students who were arts and letters majors cooked more meals than health majors; and students living off-campus cooked more than those living on-campus.

Discussion

This parallel mixed methods study provided quantitative and qualitative findings that were mostly complementary. Findings from each approach in some cases were divergent.

Students in the quantitative sample reported cooking/preparing meals about seven times a week, vs five times a week for focus group participants, a higher proportion of whom lived in campus housing (53.4% vs 32.3% for survey participants). This group also reported a slightly higher frequency of eating meals in campus food venues (mean=7.4+7.3, median 5 vs 3.9+5.0 for survey participants). Among Canadian university students living independently off-campus, 51% prepared a meal 4-6 times a week or daily (Wilson, Matthews, Seabrook, & Dworatzek, 2017), consistent with data reported by Clifford and colleagues from a single U.S. university (Clifford et al., 2009), who reported that 53% of their mostly off-campus-living sample cooked dinner four or more times a week. In a national survey conducted in the United Kingdom, over half of adults aged 19-34 prepared a main meal 5+ days a week (J. Adams et al., 2015). Both samples in this study reported eating about four meals each week off campus (fast food, restaurants, take-out), consistent with 20-31-year-old participants in the third wave of the EAT-III observational study (Larson, Neumark-Sztainer, Laska, & Story, 2011).

Table 7

Regression Analyses for Social Cognitive Theory Constructs Predicting Cooking

Behavior (N = 159)

Cooking Variable	<i>B</i>	<i>SE B</i>	β
Knowledge	.310	0.392	.060
Skill	.216	0.081	.290**
Invest Time	-.312	0.193	-.182
Invest Physical Effort	.386	0.222	.240
Invest Mental Effort	.060	0.143	.046
Outcome Expectancies	.157	0.088	.197
Attitude	-.110	0.162	-.079
Confidence	-.107	0.179	-.059

$F=5.417, R^2=.225$

* $p < .05$. ** $p < .01$.

Table 8

*Regression Analyses for Socio-Demographic Variables Predicting Cooking Behavior**(n=155)*

Variable	<i>B</i>	<i>SE B</i>	β
Age			
20-21 vs 18-19	1.092	1.091	.098
22-25 vs 18-19	3.316	1.138	.244
≥ 26 vs 18-19	2.598	1.689	.182
Sex			
Female vs male	.329	.894	.025
Race/ethnicity			
Black/African-American vs white	-.089	.908	-.008
Other ethnicity vs white	.584	1.204	.037
Hours worked per week			
1-9 vs 0	-1.135	1.214	-.066
10-29 vs 0	-1.834	.869	-.168*
Enrollment status			
Full-time vs part-time	2.675	1.432	.141
Year in school			
2 nd yr undergrad vs 1 st	-.756	1.040	-.067
3 rd yr undergrad vs 1 st	-2.776	1.139	-.237*
4 th yr undergrad vs 1 st	-2.797	1.255	-.203*
>5 th yr undergrad vs 1 st	-1.897	1.322	-.130

Table 8 (continued)

Major			
Arts & letters vs health	1.820	1.202	.118
Business vs health	-.600	1.237	-.036
Education/psychology vs health	-1.534	1.082	-.111
Nursing vs health	-.435	1.046	-.036
Science & technology vs health	-.347	1.171	
Residence			
Campus vs off-campus	-6.706	.894	-.022***
Marital Status			
Married vs unmarried	1.408	1.660	.071
Separated/divorced vs unmarried	-.891	1.719	-.039

Table 8 (continued)

Living situation			
Alone vs roommate/friend	-.636	.973	-.047
Spouse/domestic partner vs roommate/friend	.537	1.328	.037
Parent/guardian vs roommate/friend	-.308	.910	-.023
Other relatives vs roommate/friend	.487	1.893	.017
Children vs roommate/friend	-1.236	1.808	-.054
Other vs roommate/friend	7.351	4.092	.116

$R^2=.506$, $F=5.495$

* $p < .05$. ** $p < .01$. *** $p < .001$

Table 9

*Regression Analyses for Cooking Constructs and Socio-Demographic Variables**Predicting Cooking Behavior (n=155)*

Variable	<i>B</i>	<i>SE B</i>	β
Cooking constructs			
Knowledge	.208	.319	.044
Skill	.086	.075	.119
Invest Time	.174	.174	.070
Invest Physical Effort	.368	.195	.237
Invest Mental Effort	-.077	.120	-.062
Outcome Expectancies	.052	.077	.066
Attitude	-.025	.139	-.019
Confidence	-.158	.162	-.091
Demographic variables			
Age			
20-21 vs 18-19	.519	1.071	.047
22-25 vs 18-19	2.262	1.147	.177
≥ 26 vs 18-19	2.635	1.740	.185
Sex			
Female vs male	.339	.887	.026

Table 9 (continued)

Race/ethnicity			
Black/African-American vs white	-.008	.921	-.001
Other ethnicity vs white	.993	1.160	.063
Hours worked per week			
1-9 vs 0	-.319	1.182	-.019
10-29 vs 0	-1.343	.855	-.123
Student status			
Full-time vs part-time	2.082	1.426	.110
Year in school			
2 nd yr undergrad vs 1 st	-.950	1.017	-.084
3 rd yr undergrad vs 1 st	-2.772	1.123	-.237*
4 th yr undergrad vs 1 st	-3.073	1.255	-.224*
>5 th yr undergrad vs 1 st	-1.476	1.269	-.102
Major			
Arts & letters vs health	2.417	1.170	.157*
Business vs health	-.130	1.217	-.008
Education/psychology vs health	-1.050	1.041	-.076
Nursing vs health	-.450	1.047	-.037
Science & technology vs health	-.435	1.139	-.028
Residence			
Campus vs off-campus	-6.608	.953	-.601***

Table 9 (continued)

Marital Status			
Married vs unmarried	1.408	1.660	.071
Separated/divorced vs unmarried	-.891	1.719	-.039
Living situation			
Alone vs roommate/friend	-.978	.968	-.072
Spouse/domestic partner vs roommate/friend	-.075	1.336	-.005
Parent/guardian vs roommate/friend	-.431	.947	-.031
Other relatives vs roommate/friend	-.415	1.842	-.015
Children vs roommate/friend	-1.666	1.811	-.073
Other vs roommate/friend	7.635	3.945	.121

$R^2 = .613$, $F = 5.062$

* $p < .05$. ** $p < .01$. *** $p < .001$

Focus group participants' discussion of family influences on cooking suggested few actual cooking experiences growing up, whereas observing a parent or grandparent cooking was more common. De Backer (De Backer, 2013) found that Belgian college undergraduates' frequency of cooking was related to their mothers' and fathers' frequency of cooking during childhood (as recalled by the student). Focus group participants reported observing grandmothers cooking more frequently than mothers, dads or grandfathers. This might be explained by a generational decline in women

cooking. Smith et al. (Smith et al., 2013) reported a decrease in the proportion of women cooking from 92% in 1965-66 to 68% in 2007-08 and a decline in time women spent cooking over the same time period from 112.8/min/day to 65.5 min/day. Besides family influences, media was mentioned as a source of learning about cooking for the young adults in this study, including accessing cooking recipes and videos on the web and cooking programs on cable television. A mixed methods study by Wolfson (Wolfson, Frattaroli, Bleich, Smith, & Teret, 2017), that included a nationally representative survey (n=1112) and focus groups, found that 66% of Americans reported learning to cook from their parents, 67% reported teaching themselves to cook, 57% of women and 38% of men reported learning from using cookbooks and online recipe websites, and 28% learned by watching cooking shows.

Both samples identified or affirmed a number of benefits associated with cooking. The benefit most strongly affirmed by both groups was related to having control over what they ate, in terms of being able to eat foods they preferred, and knowing what was in the foods they ate. Both groups also agreed that cooking provided the opportunity for eating healthier, more nutritious food. Cooking as a social or creative act was affirmed by about half the participants of each sample. About 70% of the survey sample agreed that cooking provided an opportunity to save money, whereas it was listed as a benefit of cooking by only two focus group participants. A number of studies of various designs link cooking with higher quality diets. These include studies in which adolescents' involvement with family food preparation (Berge et al., 2016) and their self-identified cooking skills/abilities (Utter et al., 2016), as well as U.S. and Australian adults' food

management practices (Reid et al., 2015), were associated with better diet quality. Evidence from cooking intervention studies suggests that diet quality increased along with improvement in cooking self-efficacy and perceived cooking ability (Brooks & Begley, 2014), and cooking confidence (Flego et al., 2014; Hutchinson, Watt, Strachan, & Cade, 2016).

Time and effort involved in cooking were barriers to cooking for both samples in this study, a finding which is extensively supported in the literature. In a qualitative study of 239 students at two Texas universities, participants consistently reported time for food preparation activities as motivating, and not having enough time as a barrier to cooking (Jones et al., 2014). Nearly half of a large sample of Minnesota community college and university students agreed that time spent on preparing healthy meals would take away from other activities (Pelletier & Laska, 2012). A nationally representative study of U.S. adults' time use in food preparation reported a 42% decline in time women spent cooking between 1965-66 and 2007-08 (Smith et al., 2013), and adult respondents under 24 (which did not include students) in a national Flemish time-use study conducted in 1999-2004 reported spending about 3 hours per week in food preparation (Daniels et al., 2012). Time spent in meal preparation has been associated with healthier food consumption (Monsivais, Aggarwal, & Drewnowski, 2014).

Focus group participants, in spite of identifying time and effort as a barrier, believed that cooking was an important life skill. In the past 15-20 years, discussion and debate has increased about the value and importance of cooking skills as life skills (Furey et al., 2000). More recently the focus of this debate has been on the relationship of

cooking skills and frequency with diet quality and health. Given that most focus group participants had not acquired cooking skills growing up, opportunities to learn such skills before young adults establish a household would be beneficial. Focus group participants suggested that lack of cooking facilities and equipment on campus limited their ability to cook foods other than those that could be heated in a microwave or oven, which were available in residence halls. Students from two Texas universities also identified not having a kitchen that was convenient to use as a barrier to cooking (Jones et al., 2014). Although recently universities have begun to actively promote a culture of health (Kanauss & Shupe, 2014; Macnak & Por Vida!, 2016; Tyson-Jones, 2010), they may not include educational or environmental approaches that support students' learning to cook. One focus group participant reported the community college she previously attended provided a kitchen for students to use, and another suggested that cooking could become a mandatory part of the curriculum.

In terms of behavioral capability (knowledge and skills) and self-efficacy (cooking confidence), survey participants' scores were relatively high. Their knowledge score was 9.3(1.1) out of 10, cooking skill, 39.2(7.4) out of 48, and cooking confidence, 15.7(3.0) out of 20). Since respondents completed the survey online, they may have chosen to look up correct responses to the knowledge questions. Canadian students rating themselves on seven individual food/cooking skills each on an 11-pt scale, had an average score of 473±146 out of 700 (Wilson et al., 2017). Cooking confidence scores in this study were similar to those on the 7-item scale from which ours was derived (Hartmann et al., 2013), with a mean item score of 4.9 in this study vs 4.91-4.95/6 in the

original study. When focus group participants were asked about “the most complicated meal that they had prepared,” items such as Ramen noodles, poke cake (cake mix with Jell-O), French toast, and eggs were mentioned, and the majority of students shared stories of trying to prepare items from very simple to more complex and not having the knowledge or skills to produce a successful product. Texas university students reported knowing how to cook basic foods like hamburgers, tacos, mashed potatoes, and scrambled eggs, but less than 25% knew how to make more complicated foods like quiche or pizza sauce (Soliah et al., 2006). Among Canadians aged 12-29, 31% characterized their cooking skills at the level of being able to prepare simple meals, boil and egg, or cook a grilled cheese sandwich (Slater & Mudryj, 2016).

Focus group participants in this study discussed ways that they developed skill through practice with cooking while growing up, independent living, applying creativity in cooking, and exposure to different cuisines. Focus groups participants in the study by Wolfson et al. (Wolfson et al., 2017) discussed learning specific recipes and techniques from their mothers, as did some of our participants. They also shared that learning to cook from family members was not sufficient, similarly to our participants. Learning associated with independent living was a theme in our study and reported by Wolfson and colleagues as well.

Both samples in this study identified similar things as the important benefits or outcome expectations associated with cooking. Knowing what is in the foods they eat, and having control over what they consume had the highest frequency of responses in both samples. Qualitative data from Texas university students also identified these

factors among motivators to home food preparation (Jones et al., 2014). Participants also associated cooking with healthier eating.

Although in the regression model that included only social cognitive theory constructs, cooking skill was a significant predictor of cooking frequency, in the combined model, only three demographic variables were significant. The strongest predictor was living off-campus vs on-campus. Nelson et al. (Nelson et al., 2009) reported that living situation (with parents, renting apartment, or on campus) of young adult students and non-students affected significance of other variables on diet quality, but did not report its specific effects. In this study, somewhat surprisingly first year undergraduates reported higher cooking frequencies than second- or third-year, and arts and letters majors had a higher frequency of cooking than health majors. At the university where this study was conducted, freshmen are required to live in university housing, whereas other students are more likely to live off-campus. It's possible that other responsibilities associated with maintaining an independent residence affected the cooking behavior of these students, and/or that they found off-campus food venues more accessible than first-year students. Further analysis to explore possible explanations within the dataset are beyond the scope of this paper.

This study exhibited a number of strengths as well as limitations. A principal weakness of the study was the use of convenience sampling, which may have created a selection bias, and the small number of focus group respondents, as well as the limitation of data being collected at a single university. Participants did reflect a similar

distribution as the university student population as a whole, for those demographic characteristics that could be compared to available data (Table 1).

Among the strengths was that the study methodology was framed using social cognitive theory, and study instruments were selected and developed to apply SCT constructs to explore cooking behavior and influences in college students. The study used a parallel mixed methods design, and findings from the quantitative and qualitative components of the study were largely complementary, with focus group findings expanding on, and suggesting explanations for, quantitative findings. In some cases, findings diverged. Survey findings that indicated greater knowledge, skill, confidence, etc. than reflected in qualitative data may in part be due to a social desirability response bias. Findings were largely consistent with other published literature, and offered possible approaches for cooking interventions aimed at college students and young adults.

CHAPTER V – MANUSCRIPT 2

Obesity trends in the U.S. have contributed to recent interest in cooking and its relationship to diet quality as a means to address the obesity epidemic. Food eaten away from home accounts for an increasing share of food expenditures as well caloric intake, and away-from-home meals are higher in calories and lower in nutrient density (“Food - away-from-home,” 2016). The proportion of women cooking and time spent cooking declined dramatically from 1965-66 to 2007-08 in the U.S. (Smith et al., 2013), and time spent in food preparation and clean-up was inversely related to BMI in women (Zick et al., 2011). Calls for cooking skills education suggest such education can lead to improved dietary intake and thus impact obesity rates (Nelson, Corbin, & Nickols-Richardson, 2013), and a number of recent studies and reviews focused on adults (McGowan et al., 2016), adolescents (Berge et al., 2016; Brooks & Begley, 2014; Utter et al., 2016), and youth (DeCosta, Møller, Frøst, & Olsen, 2017) have found positive relationships between cooking involvement or skills and diet quality.

Although much obesity intervention focus has been on obesity prevention in children, Nelson, Story, and colleagues (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008) have suggested that young adulthood may be another important time to intervene in promoting healthy behaviors. Arnett (Arnett, 2000) and Levinson (Levinson, 1986) describe periods of early adult transition (17-22) and emerging adulthood (18-25), in which individuals become more autonomous and take on adult responsibilities. Young adulthood is also a time of the greatest risk of adult weight gain, with the incidence of positive weight change from age 20 to age 29 at 77-78%, based on data from three

longitudinal datasets (Kahn & Cheng, 2008). With over 10 million undergraduates enrolled in 4-year institutions, and 6.5 million in 2-year institutions during fall 2015, and about 40% of secondary students enrolling in college (“The Condition of Education at a Glance,” 2015), college and university settings may offer opportunities to promote behaviors that favorably impact weight status and lead to prevention of weight gain. Obesity prevention efforts at multiple levels may be particularly important in those states plagued with high child and adult obesity rates, including those in the deep South (*America’s Health Rankings Annual Report: A call to action for individuals and their communities, 2016*, 2016). In Mississippi, combined overweight and obesity rates in elementary school students declined from 2005 to 2013, during a time when environmental interventions promoting healthy eating were occurring in schools, though causal relationships could not be determined (Zhang et al., 2014). Rates in high school students increased over the period 1999-2015 (*The State of Obesity in Mississippi, 2017*). In the 2015 National College Health Assessment (American College Health Association, 2015), 58.6% of students reported receiving information on nutrition from their college or university, and there are recent efforts in some states, including Mississippi, to promote health and wellness cultures on campuses (*Building Healthy Universities and Colleges, University and College Health and Wellness Summit*, n.d.; Price, 2014). An internet search suggests that a few universities have begun to offer cooking classes to students, aimed at promoting healthy eating (“Cooking on campus: a hands on culinary crash course for college students!,” 2017, “Teaching kitchen - cooking classes,” n.d.). Given the decline in cooking skills along with suggestions of a positive relationship between

cooking skills and healthy diet, coupled with the alarming weight gain trajectory for young adults along with interest in intervening around obesity through campus health and wellness interventions, the purpose of this study was to explore perceptions of cooking skills among students enrolled at a public university in the deep South, with a focus on identifying implications for campus-based cooking interventions.

Methodology

This study was part of a larger mixed methods study exploring cooking behavior and factors influencing cooking behavior, the details of which are reported in Chapter IV. This manuscript is based on data from the qualitative portion of the study. A convenience sample of undergraduate students was recruited during Fall 2016 via flyers displayed on campus, electronic means using campus listservs and emails to student organizations, and class announcements. The study was approved by the university Institutional Research Board, and informed consent was obtained from each participant at the start of each of the four focus groups. Participants were eligible for a drawing for a gift card from an online retailer.

Focus group questions and probes were developed using constructs of Social Cognitive Theory, and the flow of questions followed guidance from Krueger (Krueger, 1998b). Questions were pre-tested for clarity, flow, and time to administer on a small group of non-participants.

Focus groups were conducted in a convenient campus location in an academic building. A faculty member served as moderator, and the primary researcher facilitated the sessions, including offering light refreshments, reviewing procedures and obtaining

consent prior to the start of each session, audio-recording the sessions, and taking comprehensive notes using a standardized reporting form developed for this study (Krueger, 1998c). Both moderator and facilitator had prior training and experience conducting focus groups. They debriefed following each group, recording additional observations about group content and process.

Focus group recordings were transcribed, and transcriptions were coded independently by two coders, one of whom was the researcher, using Social Cognitive Theory constructs as the primary codes, and identifying themes within each construct. The two coders then engaged in consensus coding, resolving any differences. Finally, emerging themes were reviewed for their implications for campus-based intervention.

Results and Discussion

Four focus groups were conducted. Focus group participants, numbering 15, were mostly female (n=11), Black or African American (n=7) or white (n=6), full-time students (n=14), between 18 and 21 years old (n=12), and never married (n=15). About half lived on campus (n=8) in a residence hall (n=7) with (a) roommate(s)(n=10), and about half worked 10 or more hours a week (n=7). Nine were first or second-year undergraduates, and their academic majors spanned six different colleges, with five from Arts and Letters as the mode. They reported eating in campus dining facilities/food venues or cooking/preparing their meals each a median of 5 times per week, and eating pre-made meals (e.g. breakfast bar, frozen heat and serve) a median of 4 times per week.

Focus group themes identified that offer ideas for interventions are summarized in Table 10, along with representative quotes, and categorized according to relevant Social

Cognitive Theory construct. We present each theme and discuss its implications, drawing on available literature on the topic of cooking behavior and competency, and particularly in college-age students, where available.

The first theme is that students generally lack the knowledge and skills needed to be successful at cooking. National surveys in Ireland and Canada provide empirical evidence for low cooking skill levels in the population, with Irish adults self-rating their cooking skills and food skills abilities at 47.8/98 and 45.8/133 respectively, and cooking skills scores of 20-39 year olds lower than 40-60 year olds, with 31% of Canadians aged 12-29 characterizing their skill level as able to prepare simple meals, boil an egg, or cook a grilled cheese sandwich (Slater & Mudryj, 2016). Murray et al. (Murray et al., 2016) included lack of knowledge and skill as an influence on culinary and dietary behavior in New Jersey college students who were participants in a focus group study. These data suggest that cooking interventions aimed at college students should begin by teaching basic skills, but in a manner relevant to the students' lifestyles and culture (Murray et al., 2016).

Under the broad area of benefits of cooking, several themes were identified. Those benefits valued by students should be incorporated into programs designed to develop cooking skills, in terms of program content as well as in program marketing efforts. Themes noted by participants in this study considered as benefits of cooking included 1) that cooking gave them control over what they ate and allowed them to eat according to personal preferences and know what was in the food they ate; and that cooking provides 2) health benefits, 3) desirable social experiences, and 4) opportunities

for creativity. Texas college students identified some of the same benefits as motivators to cook, including having control over food preparation and knowing what is in foods consumed, and the desire to eat healthier (Jones et al., 2014). Parents of young children, aged 21 – 45 years old, prioritized learning how to cook usual staple meals in a healthier way, and learning how to cook healthy meals, as the top two items among 16 in a discrete choice experiment related to designing a home food preparation intervention (Virudachalam et al., 2016). Ensuring that content about cooking healthy meals is designed with consideration to lifestyle and cultural relevance is important as well (Murray et al., 2016). Cooking as a desirable social experience was nuanced in our study sample, in that the majority of comments were about family social experiences and bonding with family over shared cooking experiences, while fewer focused on social experiences with friends. New Jersey college students also mentioned sharing family meals as life influences on their own cooking, and Larson et al. (Larson et al., 2007) reported that family meal frequency in adolescence predicted higher regular meal frequency and higher quality diets in young adults. Larson and colleagues also reported that social eating in young adults was associated with higher fruit and vegetable intake. Creativity was another theme affirmed by participants in this study as a benefit of cooking, and supported by data and supported by data from the intervention preferences study of Virudachalam et al. (Virudachalam et al., 2016) in that among the three distinct groups of participants, one group affirmed a preference for intervention content focused on cooking creatively without recipes.

Three themes were noted by participants related to values/outcome expectancies associated with cooking. The first was the desire to save time and effort. In a systematic review of 38 observational studies that considered social determinants of home cooking, time constraints were identified as a barrier to meal planning and preparation (Mills et al., 2017). Time was also identified as a barrier to cooking by Texas college students (Jones et al., 2014), and students from a Belgian university (Deliens, Clarys, Van Hecke, De Bourdeaudhuij, & Deforche, 2013). Those from a New Jersey university (Murray et al., 2016) indicated that cooking was a low priority relative to other demands on their time as students, including class and work schedules and student/university activities.

Participants in the current study also placed value on cooking as a life skill that would be needed once they were living on their own. Murray and colleagues (Murray et al., 2016) in their qualitative work with New Jersey college students, note concerns about the loss of “generational passing of culinary ‘lore,’” contributing to lack of cooking skills among the present young adult generation. Buckley, Cowan, and McCarthy (Buckley, Cowan, & McCarthy, 2007) describe a convenience lifestyle model intended to reduce effort required for food preparation but associated with poor diet and obesity (Begley & Gallegos, 2010). Utter et al. (Utter et al., 2016) promote adolescents learning to cook as a necessary life skill.

Students in this study noted lack of environmental support for cooking in their university setting, mostly in terms of not having facilities or equipment with which to cook. Texas college students also identified this as a barrier (Jones et al., 2014). New Jersey students specifically suggested making cooking classes available to students,

which a few universities are beginning to do (Buck-McFadyen, 2015; “Cooking on campus: a hands on culinary crash course for college students!,” 2017, “Teaching kitchen - cooking classes,” n.d.). Safety considerations present barriers to availability of certain types of appliances in university residences and profitability of campus food services may also be a barrier. Nonetheless, the current interest in and commitment to overall health and well-being of students and others on university campuses suggests that these options should be considered as part of an overall effort to create a campus culture of health.

Media sources may present an environmental facilitator to learning to cook, as well as an opportunity for observational learning. Students in this study mentioned watching cooking programs on cable television and videos on YouTube. Wolfson et al. (Wolfson et al., 2017) found that a high proportion of U.S. adults reported teaching themselves to cook using websites, television shows, or cookbooks, and 60% of high school students in a New Zealand study reported learning cooking skills from the media (Utter et al., 2016). New Jersey college students thought that the use of cooking shows would make cooking seem more exciting and interesting (Murray et al., 2016). Azar et al. (Azar et al., 2013) rated two mobile apps on healthy cooking which employed time management and skills building as behavioral strategies. The authors rated one of these highly on dimensions of interaction, but reported that the two were rated relatively low, at 122 and 174, out of the top 200 iTunes health and fitness apps based on downloads.

Findings from this study add to the body of literature on college students’ cooking skills and perceptions in providing a perspective of an ethnically diverse group of undergraduate students from a university in a region with historically high rates of child

and adult obesity. The small sample and single geographic/university location in which this study was conducted limit generalizability of findings, although findings are consistent with those on college students in other parts of the U.S. Findings from studies on cooking knowledge, skills and behavior in adolescents and young adults likewise support data from this study. As colleges and universities broaden their campus health focus to include an overall culture of wellness, and consider its potentially broad benefits to their students both at present and in the future, providing environmental support for students to develop cooking skills should be an aspect of facilities and programming given consideration.

Table 10

Focus Group Themes and Implications for Cooking Interventions

Topic/theme	Quotes	SCT construct	Implications/ Recommendations for intervention
<i>Cooking knowledge and competence</i>			
Lack of cooking knowledge or basic skills	<p><i>“I tried to make French toast – didn’t understand the concept...just got bread, put it on a plate, poured milk on it, put it in the microwave.”</i></p> <p>In response to “Tell me about the most complicated item ever prepared, responses included:</p> <p><i>“[I have] no memory of cooking anything except Hamburger Helper,”</i></p> <p><i>“breakfast foods for dinner like pancakes and eggs”</i></p> <p>upon opening a Blue Apron meal kit <i>“I was like ‘good lord, this is so complicated’”</i>.</p>	Behavioral capability	Start with basic cooking skills and food skills

Table 10 (continued)

<i>Cooking benefits</i>			
<p>Cooking provides control over what we eat, ensures that we know what is in the food we are eating, and that food is prepared according to our personal preferences</p>	<p><i>“There are not mysteries when you are cooking it yourself”</i></p> <p><i>“[I have] complete freedom when I cook it myself, it has what [I] want”</i></p> <p><i>“we had asparagus...[with seasonings] to spice it up instead of making it high in sodium”</i></p> <p><i>“you can pick when you want to eat”</i> vs. using a campus dining facility with set hours</p>	<p>Outcome expectations</p>	<p>Use this/these outcomes/ motivators associated with cooking in designing an intervention.</p> <p>Consider segmenting student market by outcome expectations valued and prioritized; tailor intervention and recruitment accordingly.</p>

Table 10 (continued)

<p>Cooking provides health benefits</p>	<p><i>“I started getting on a healthy kick when I got to college; I was afraid to gain weight like the freshman 15; I started finding healthy foods from my grandmother’s [Mediterranean] culture”</i></p> <p><i>“I feel different when [I] eat fresher foods...I had more energy, as opposed to [eating] fast food, my skin was clearer...if you promote [cooking to] young adults on their physical appearance...”</i></p>		
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Table 10 (continued)

<p>Cooking provides social experiences</p>	<p>Social experiences mentioned in quotes referred to quality time and bonding with family most frequently. Cooking with friends was also mentioned, but less frequently.</p> <p><i>“my whole family especially for holidays would bring a dish, we would all cook in the kitchen together...that made me enjoy cooking as a whole..everyone was so happy.”</i></p>		
<p>Cooking provides creative opportunities</p>	<p>Cooking</p> <p>“...for the fun of it”</p> <p>“...[to] experiment with flavors</p> <p>“...[to] create new recipes”</p>		

Table 10 (continued)

<i>Values related to cooking</i>			
Desire to save time Unwillingness to invest time	<p><i>“It’s easier to pick up something than waste time to cook...[I prefer] to save time instead of money”</i></p> <p><i>“I am a senior...I have a lot of classes...when I have evening classes the last thing I think of is cooking”</i></p>	Outcome expectancies	Focus on preparation of simple meals/recipes with few ingredients
Effort involved in cooking	<p><i>“when you are young you don’t realize all the hard work that goes into cooking.”</i></p>		Focus on preparation of simple meals/recipes with few ingredients
Important life skill	<p><i>“one day they will have to cook for themselves”</i></p>		Focus on cooking for off-campus living prior to students preparing/likely to move off-campus

Table 10 (continued)

<i>Other factors</i>			
Lack of facilities and equipment on campus	<p><i>“in the dorms you can’t cook”</i></p> <p><i>“we don’t have access to equipment”</i></p> <p><i>“there is an oven, but if I wanted pasta, I can’t cook noodles in the oven”</i></p>	Environment	Expand availability of cooking equipment in campus residences.
Media influences	<p><i>“I love Rachel Ray; she is my idol.”</i></p> <p><i>“Kat Kora.”</i></p> <p><i>“I watch YouTube [and] pick a day a month to try things”</i></p> <p><i>“I am an only child, my mom watched cooking shows [when] I was a kid; it definitely influenced my cooking even though my mom didn’t cook a lot when growing up.”</i></p>	Observational learning	Incorporate YouTube videos of cooking into cooking classes

CHAPTER VI –SUMMARY & CONCLUSIONS

Given the weight trajectories and poor dietary intakes of young adults, and recent research showing relationships between cooking skills and diet quality, the purpose of this research was to explore college students' cooking behavior, and factors that influence that behavior. This study used a convergent parallel mixed methods design to evaluate cooking behavior and factors that influence cooking behavior, within a framework of Social Cognitive Theory. Constructs of interest were behavioral capability, including cooking knowledge and skill; outcome expectations or perceived benefits of cooking; outcome expectancies or values associated with cooking behavior; cooking confidence/self-efficacy; environmental influences; and observational learning.

Survey and focus group participants reported cooking about 5-7 meals per week and eating in a campus dining facility/food venue 5-7 times per week, vs. obtaining other meals off-campus, preparing pre-made meals, and skipping meals or selecting snacks from convenience outlets or vending 1-4 times per week. Survey participants received high scores on cooking knowledge, and rated their cooking skill and confidence highly. Focus group data presented a somewhat different picture, with the majority of students sharing information that suggested they possessed limited knowledge, skills and confidence, though they sometimes reported plunging into food preparation with seemingly misplaced confidence in their skills and abilities, and resulting poor outcomes with regard to quality of the product. Parents and grandparents of the focus group participants did not appear to engage in intentional teaching of cooking skills to their children and grandchildren. At best, students had opportunities to observe them cooking and learn through observational learning; at the least, students' mothers or fathers did not cook or cooked a very limited repertoire of

foods. These data suggest an important void in cooking instruction that may need to be addressed to avoid continual reliance on prepared food items and eating away from home as these young adults begin living independently.

Quantitative and qualitative findings were largely consistent with regard to benefits of cooking (outcome expectations) and values associated with cooking (outcome expectancies). Students in both samples identified a number of benefits associated with cooking, suggesting an understanding and appreciation of cooking that could be used to encourage cooking behavior. Likewise, barriers to cooking were identified that were similar to those in the general adult population, and would need to be addressed to have the potential for increasing cooking frequency in this population.

Research on cooking skills in college students is limited, given a much greater interest in the past from the scientific community and the public in the topic of cooking skills as it relates to adults in general, and to children and adolescents in terms of a role in obesity prevention. However, both this study, and a number of others recently published (De Backer & Hudders, 2016; Jones et al., 2014; Lavelle et al., 2016; Murray et al., 2016; Pelletier & Laska, 2012, 2013; Wilson et al., 2017) shed light on cooking behavior and factors influencing that behavior in college students.

Recommendations for Future Research

In the quantitative model, the strongest predictor of cooking frequency was living off-campus, vs. on-campus. Somewhat surprisingly first year undergraduates reported higher cooking frequencies than second- or third-year, and arts and letters majors had a higher frequency of cooking than health majors. At the university where this study was conducted, freshmen are required to live in university housing, whereas other students are more likely to

live off-campus. It's possible that other responsibilities associated with maintaining an independent residence affected the cooking behavior of these students, and/or that they found off-campus food venues more accessible than first-year students. Further analysis of relationships within and among variables used to predict cooking frequency could yield additional understanding of factors relevant to cooking behavior, or have potential for intervention development.

Although the internal consistency of the scales used to measure each construct in this study (except cooking knowledge) were within acceptable range, the instruments used in this study to measure cooking skill and associated factors may not have had sufficient construct validity, given the relatively high self-ratings of cooking skill and confidence. Since finalizing the instruments and collecting data for this study, other measures, such as those used by McGowan et al. (McGowan et al., 2016) and Wilson (Wilson et al., 2017) to measure cooking and food skills ability, have been published, and may allow for more precise measurement of cooking skills in the future. Having a more precise way to measure cooking/food skills, including as applied to preparation of simple vs more complex dishes/recipes, is important to more accurately describe skills, as well as for measuring change associated with an intervention. A mixed methods study better quantifying actual skills complemented by a qualitative description of how those skills are used in cooking could add to the body of knowledge upon which to build interventions. Qualitative findings from this study suggesting young adult cooks just “jump in” to preparing something without understanding the steps involved may imply a need for future study of different ways that people approach cooking; for example, some may learn better following a recipe and others

prefer an approach of cooking without a recipe while learning basic principles of cooking and seasoning food.

Although findings from the qualitative portion of this study support the need for young adults to develop cooking skills, and provide support for the college age years as a time to intervene in development of cooking skills (e.g. as a life skill needed for independent living), more research is needed to explore when and how individuals develop cooking skills and if there is any particular window of opportunity for an intervention.

Implications for Practice

Qualitative data from this study provide a number of important findings relevant to developing and implementing cooking interventions targeting college students.

Recommendations supported by data from this study as well as others, include

1. Emphasize basic cooking skills and food skills, and simple food/recipe preparation
2. Consider positive values students hold related to cooking, such as the ability to have control over and know what they are eating, or that cooking is associated with family bonding time, that might serve as motivators for cooking, and incorporate in intervention planning
3. consider segmenting students by their identified priorities/motivators, and tailoring interventions and recruitment approaches accordingly
4. to address time and effort barriers, focus on preparation of simple meals/recipes with few ingredients
5. emphasize cooking as a life skill, including its short-term relevance to students living in, or planning to move to, off-campus housing

6. expand the availability of and access to cooking facilities on campus and offer cooking classes within the context of campus wellness initiatives
7. incorporate videos and/or cooking apps into intervention programming

Colleges and universities should also consider ways to support students in learning cooking skills and engaging in cooking as part of overall campus health and wellness initiatives.

APPENDIX A – Focus Group Question Schedule

Table A1

Focus Group Question Schedule

<i>Type of question</i>	<i>Question</i>
Opening	1. Tell us your name, your major, and what you plan to do for fall break...what you plan to do for fun this summer...
Introductory	2. When you think of cooking and preparing meals for yourself, what comes to mind?
Transition	3. What kinds of meals do you usually prepare at home?
Key questions	
Social environment	4. What is the first memory you have of a cooking experience in your childhood?
Observational learning Social environment	5. Tell me about family meal routines you experienced when you were growing up. Describe a typical meal in your family when you were growing up. (Observational Learning) Probe: Who prepared it? Probe: What did you eat? Probe: Who participated? Probe: Who cleaned up?

Table A1 (continued)

<p>Observational learning</p> <p>Social environment</p> <p>Self-efficacy</p> <p>Behavioral capability</p>	<p>6. What role did you have in cooking when you were growing up?</p> <p>Probe: How did your role change as you got older?</p>
<p>Transition</p>	<p>Now we want to shift gears and talk about the cooking you do as a young adult. You talked a little when we started about the meals you usually prepare at home.</p>
<p>Key Questions</p>	
<p>Outcome expectations</p>	<p>7. We have been discussing cooking and experiences with cooking. On the paper in front of you, write down three benefits you see as associated with cooking. When you're finished we'll share this with each other.</p>

Table A1 (continued)

<p>Observational learning</p> <p>Social environment</p> <p>Self-efficacy</p> <p>Expectancies</p> <p>Expectations</p> <p>Behavioral capability</p>	<p>8. Thinking about involvement with cooking in your family growing up and in other settings, what exposures have influenced the cooking you do today?</p> <p>Probes: 4H, FHA, high school home economics, college, community, social/visual media</p>
<p>Outcome expectancies</p>	<p>9. When young adults enter college, they experience an increase in responsibilities. What do you think are the factors that would motivate young adults to spend time cooking?</p>
<p>Behavioral capability</p> <p>Self Efficacy</p>	<p>10. Now I'd like to get an idea about your experiences with meal preparation. Tell me about the most complicated item you ever prepared.</p> <p>Probe: How did you approach the experience?</p> <p>Probe: How confident were you about that your dish would turn out successfully?</p>
<p>Ending</p>	<p>11. Is there anything else you would like to share about this topic that we haven't discussed?</p>

APPENDIX B – Survey Questions

1. How many times a week do you... (please write in the number (0-7) for each box – numbers in each row should total 7) (Clifford, 2009)

	Cook or prepare meals*	Eat pre-made meals**	Eat off campus (restaurant, fast food, takeout)	Eat in a campus food venue or dining facility	Skip or eat snacks from vending, convenience store, etc.	Total
Breakfast						=7
Lunch						=7
Dinner						=7

*cook or prepare includes cereal, making sandwiches, and cooking from basic ingredients.

**eat pre-made meal includes breakfast bars, yogurt, frozen dinner, frozen pizzas, etc.

2. When I prepare meals at home, I usually... (check all that apply)

- purchase, prepare, and cook all foods from scratch (use all raw or basic ingredients)
- purchase pre-prepared items to make a meal (e.g. precut/precooked vegetables, sauces, store-roasted chicken, pre-cooked frozen or canned foods)
- purchase and prepare convenience food items (e.g. Kraft Macaroni & Cheese, Hamburger Helper, Stouffer's Lasagna, frozen meals, or take out from restaurants)
- do not cook at all
- Other, please specify _____

Cooking Skills

For each item, choose the response that corresponds to your level of agreement, from do not agree at all (1) to totally agree (6)

General Questions	1 Do Not Agree at All	2	3	4	5	6 Totally Agree
3. I am able to prepare a hot meal without a recipe						
4. I make meals that require more than three ingredients (typically packaged convenience foods).						
5. I am able to bake a cake.						
6. I make a grocery list, plan food for the week, and what meals to make each day.						
7. I am able to create a meal out of leftovers.						
8. I am able to prepare rice and potatoes						
9. I am able to cook vegetables.						
10. I make sure I have the basic ingredients in storage.						

Note: Questions 3, 5, 8 and 9 are taken/adapted from Hartman et al, 2013. Questions 4,6,7 and 10 are taken from Ternier, 2010

Cooking Attitudes

For each item, choose the response that corresponds to your level of agreement, from do not agree at all (1) to totally agree (6)

Belief/Attitude Willingness to Invest Time	1 Do Not Agree at All	2	3	4	5	6 Totally Agree
Willingness to invest time (Hartman, 2013)						
11. Since I'm always under time pressure, I try to save time while cooking.						
12. I prefer to spend as little time as possible on meal preparation.						

13. At home, I preferably eat meals that can be prepared quickly.						
Willingness to invest Physical Effort, (Hartman, 2013)						
14. After a busy day, I find it physically exhausting to prepare a meal.						
15. The less physical energy I need to prepare a meal, the better.						
16. Cooking means physical effort that I try to avoid if possible.						
Willingness to invest Mental Effort (Hartman)						
17. I don't want to think about what to cook for a long time.						
18. I try to minimize the mental effort for preparing meals						
19. The less I have to think about preparing a meal, the better.						
Cooking Outcome Expectations (18-21 from Hartman)						
20. Cooking is an important type of relaxation for me.						
21. Preparing a meal brings joy in my life.						
22. While preparing a meal I can play out my creativity.						
23. Preparing a meal is a satisfactory activity for me.						
24. Cooking allows me to save money						
25. When I cook, I know what's in the food I am eating.						
26. Cooking allows me to eat more healthy, nutritious food.						

Cooking attitudes (Clifford, 2009)

For each item, choose the response that corresponds to your level of agreement, from strongly disagree to strongly agree.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
	1	2	3	4	5
27. Cooking takes too much time.					
28. I enjoy cooking.					
29. Cooking meals is expensive.					
30. If you know how to cook, it is easier to eat more fruits and vegetables.					
31. Cooking is hard					
32. I feel comfortable in the kitchen.					

Cooking Confidence (Barton, 2011)

For each item, check the appropriate box to indicate how confident you feel about...

	Not at all confident		Moderately confident		Extremely confident
	1	2	3	4	5
33. ...being able to cook from basic ingredients					
34. ...following a simple recipe					
35. ...tasting foods that you have not eaten before					
36. ...preparing and cooking new foods and recipes					

Cooking knowledge (from Scripa, 2012)

Select the answer which you think is the best choice for the following questions:

37. How many fluid ounces are in one cup?

- a. 2 fluid ounces
- b. 4 fluid ounces
- c. 6 fluid ounces
- d. 8 fluid ounces

38. Salmonella, a bacteria that can be found in some foods and can cause diseases, can be found in which of the following foods?

- a. cookies
- b. apples
- c. poultry (chicken, turkey, goose)
- d. bread

39. To wash your hands, it is recommended that you first wet your hands and arms with hot water. Then you should scrub your hands for at least:

- a. 20 seconds
- b. 40 seconds
- c. 1 minute
- d. 5 minutes

40. Which kitchen tool would you use to measure flour?



41. Mincing is the process of:

- a. cutting foods into very small pieces
- b. boiling water
- c. greasing a pan
- d. washing fruits

42. Which of these knives would you use to cut bread? (with deleted cutting board)



43. If you have one cutting board available in the house and you have just finished cutting meat on it and now you need to cut vegetables, what should you do?

- a. nothing, keep cutting the vegetables
- b. wash and sanitize the cutting board
- c. use a new knife
- d. throw away the cutting board

44. Which of these two measurements is bigger?

 quart gallon

45. The picture next to the question is that of a whisk.



What is a whisk used for?

- a. beating eggs
- b. washing fruit
- c. peeling vegetables
- d. cutting bread

46. Which of these two measurements is bigger?

 Teaspoon (tsp) Tablespoon (tbsp)

Demographic Questions

To be asked of focus group participants and questionnaire respondents

47. What is your age?

- | | |
|--|----------------------------------|
| <input type="checkbox"/> 17 or younger | <input type="checkbox"/> 22 |
| <input type="checkbox"/> 18 | <input type="checkbox"/> 23 |
| <input type="checkbox"/> 19 | <input type="checkbox"/> 24 |
| <input type="checkbox"/> 20 | <input type="checkbox"/> 25 |
| <input type="checkbox"/> 21 | <input type="checkbox"/> Over 25 |

48. What is your gender?

- Female Male

49. What is your race/ethnicity (mark one or more boxes)

- White
- Black or African American
- Hispanic, Latino, or Spanish origin
- American Indian or Alaska native
- Asian
- Native Hawaiian or Other Pacific Islander
- Some other race or origin _____

50. What is your year in school?

- First year undergraduate
- Second year undergraduate
- Third year undergraduate
- Fourth year undergraduate
- Fifth or more year undergraduate

51. What is your enrollment status?

- Full-time
- Part-time

52. What is your marital status?

- Never been married
- Married
- Civil union/domestic partnership
- Separated
- Divorced
- Widowed

53. With whom do you currently live (check all that apply)?

- a. alone
- b. spouse/domestic partner
- c. roommate(s)/friend(s)
- d. parent(s)/guardian(s)
- e. other relatives
- f. your children
- g. other (_____)

54. Where do you currently live?

- college residence hall
- fraternity or sorority house
- off campus house or apartment
- parent/guardian's home
- other (_____)

55. What is your major?

- Arts and Letters (including English, sociology, political science, history, etc.)
- Business
- Education and Psychology (education, family and child studies, psychology)
- Health (kinesiology, medical laboratory sciences, nutrition, public health, speech and hearing sciences, social work)
- Nursing
- Science and Technology (biology, chemistry, marine science, math, physics)
- other (_____)

APPENDIX C – IRB Approval Letter



INSTITUTIONAL REVIEW BOARD

118 College Drive #5147 | Hattiesburg, MS 39406-0001
Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: CH2-16071905

PROJECT TITLE: An Exploration of College Students Cooking Behavior and Factors that Behavior using Social Cognitive Theory

PROJECT TYPE: Change to a Previously Approved Project

RESEARCHER(S): Nichelle G. Harris

COLLEGE/DIVISION: College of Health

DEPARTMENT: Nutrition and Food Systems

FUNDING AGENCY/SPONSOR: N/A

IRB COMMITTEE ACTION: Expedited Review Approval

PERIOD OF APPROVAL: 09/13/2016 to 09/12/2017

Lawrence A. Hosman, Ph.D.
Institutional Review Board

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