

FORECASTING PRODUCTION DEMAND IN A RESIDENCE
HALL FOODSERVICE SYSTEM

by

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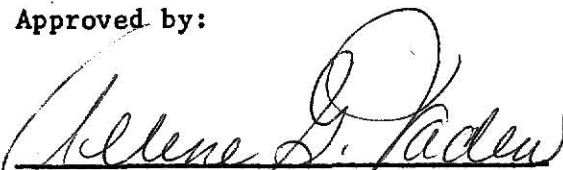
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INTRODUCTION

Production forecasting, an integral aspect of control of a foodservice system, consists of two interrelated basic elements: the population estimate and the food selection prediction (1). The relationship is apparent, since the accuracy of the food selection prediction for a meal depends to a great extent upon the accuracy of the estimated number of patrons present at the meal. The problem of estimating the number of meals to produce in a foodservice is a concern of management whether in a residence hall foodservice, hospital, school lunch, or commercial or industrial plant foodservice.

The residence hall foodservice has a unique problem in that management knows how many students are residents in the halls and how many have paid for meals. Paying for meals in advance does not mean that all meals will be eaten by every student; however, every resident who wishes to eat must be offered a well-balanced, flavorful meal. The budget for residence hall foodservice is established on the premise that meal attendance will be less than one hundred per cent. Residence halls are a self-supporting operation; therefore the budget must be adhered to for the full school year (2,3). An effective estimation procedure will contribute to control of the food cost for the operation. Overforecasting results in food waste, labor time, and management time in planning for the use of overproduction; while underproduction results in low patron morale and production problems (4).

Many factors affect the forecasting procedure for the residence halls; of primary concern to this study are those that affect the population estimate for meals. The foodservice manager considers such things as past records of meal attendance, stratification of residents by classification and sex, class schedules for the semester, day of the week, student and

campus activities, and weather when estimating the number of students attending a meal (5-9). Other considerations are students' meal habits and perceptions of the foodservice and their personal reasons for eating or not eating a meal in the residence hall foodservice. The quantification of student-related factors may be one of the most important factors in predicting meal attendance.

An effective standard estimation procedure for meal attendance in the residence hall foodservices could be developed if the number of residents attending meals on one day compares favorably with the number of students attending meals on a future day. The comparison of certain past days with present days should help to determine a trend in student attendance at meals.

Intuitive estimate is the most commonly used means of forecasting in foodservices. This method consists of a combination of intuition, chance, guessing, and "professional judgment" (1,10). Past records may be used with the intuitive estimate technique, and a person with experience in foodservice may be fairly accurate in forecasting with this technique. Mathematical forecasting models have been developed to facilitate the process of predicting production demand. Prerequisite to development of a model is the need to compile data related to meal attendance and factors affecting participation.

The overall objective of this research was to study present forecasting methods, factors affecting foodservice participation, and to compare meal attendance and forecasting data in a university residence hall foodservice system. More specifically, the objectives were (a) to study the students' food habits while living in the residence halls and their perceptions and opinions of the foodservice as factors influencing whether

students do or do not eat at the foodservice; (b) to study actual meal participation; (c) to compare actual and forecasted participation; and (d) to study the effects of several factors on forecasting and production demand of luncheon and dinner entrees: semester, day of week, campus and hall events, and entree type.

The research was conducted in two phases: Phase I was concerned with studying the food habits and perceptions of the student as a factor affecting forecasting, and Phase II was concerned with prediction of meal attendance and entree selection for a residence hall foodservice system. The literature reviewed relative to the study includes: the definition of forecasting, factors affecting forecasting, mathematical forecasting models, forecasting research in foodservice systems, objectives of college foodservice, development of college foodservice, food habits and attitudes, and food habits of students.

REVIEW OF LITERATURE

Forecasting

Definition of Forecasting

According to Johnson, Kast, and Rosenzweig (11), forecasting is not planning, but is an attempt to anticipate and predict future conditions affecting the organization. Haimann and Scott (12) state that management must make certain assumptions about the future in order to plan properly and these assumptions are based on forecasts. Forecasting, according to Uhrich and Noort (1), is an important framework for management decisions. Forecasting cannot be a substitute for decision making, but it can be a tool for better decision making. Konnersman (4) believes that the value of a forecast is directly related to the amount of time required for preparation, the uncertainty of production demands, and the expense of over- and under-production. In a residence hall foodservice situation, the population forecast and the food preference prediction must be taken into account when forecasting production demand, both of which are constantly shifting variables.

Factors Affecting Forecasting

Many factors, both internal and external to the foodservice system, affect the two elements of production demand forecasting. According to Konnersman (4), the identification of these particular factors is the basic problem of obtaining an accurate forecast. McManis (8) stated the following are important factors affecting forecasting for a residence hall foodservice: popularity of an item, meal count records, weather, events,

sex of students, previous production sheets and plate waste studies, and the classification of students living in the residence halls.

Konnersman (4) listed several menu factors which may affect a particular day's production demand forecast for an item in a hospital foodservice: whether the item appears on the day's menu or not, the complementary items also appearing on the day's menu, and the relative popularity of the item versus the alternate choice. Patient census characteristics which he believed may affect the forecasting procedure include: the number of patients, diet, days of stay, sex, and age. Other factors such as weather and seasonal factors may affect the forecasting procedure.

Dougherty (5) cited several factors as affecting the production demand for the cafeteria at the University of Missouri-Columbia Medical Center: holidays, special events at the university, the time of the month in relation to payday, and the weather. Morgan (9) discussed the following as necessary considerations to provide a realistic forecast: the day of the week, the day of the year, the meal, the competing menu items, the featured specials, and any special events. He also cautioned that weekends and holidays should be treated as factors affecting the production demand forecast. Kotschevar (6) recommended utilizing patient counts in hospitals and weekend residence hall absentee predictions, as well as records of the effect of weather, menu offerings, and the season, when making a production demand forecast.

Mathematical Forecasting Models

Forecasting was described by Haimann and Scott (12) as an art rather than a science, and emphasized there is no infallible means of predicting the future. However, a number of mathematical forecasting models have been

developed to make the art of forecasting more precise. Mathematical forecasting models are based on the assumption that there is a functional relationship between past events and future events (4). These mathematical forecasting models, which can easily be computerized, attempt to remove the combination of intuition, chance, and guessing from the forecasting procedure. According to Uhrich and Noort (1), the intuitive estimate technique is the oldest, least expensive, and most common method of forecasting. Schmitz (13) equated the estimate method with educated guessing and stated that this method allows no way to make the prediction of production demand accurate and also, that the degree of error can be significant. A few studies have been conducted utilizing mathematical forecasting models in hospital foodservice, but reports were not found of mathematical forecasting studies in college residence hall foodservice.

Straight Average. Perhaps the simplest mathematical forecasting model used by foodservice is the straight average of all past demand for a stated period of time (4). However, according to Konnersman (4), simple averaging does not provide accurate forecasts if the demand exhibits significant trend or cyclical behavior. Wood (14) explained that the lack of responsiveness of the model is due to the equal weight of all observations. As the number of observations increases, any attempt to predict a new level shift by recent observations is greatly delayed by the relatively small component of the overall average represented by the recent observation. Because of this lack of responsiveness the simple averaging technique, he believes, is inept at characterizing data that exhibit trend or cyclical behavior.

Moving Average. The moving average technique computes an average by disregarding all data prior to a moving past point by subsequently

dropping the earliest observed point and adding in the latest observed point (4,10). The mathematical representation of the moving average technique is (5):

$$M' = \frac{M_1 + M_2 + \dots + M_n}{n}$$

where, M' = moving average

M_n = mean of the observations for a given time period

n = number of means in the discrete time period

Konnersman (4) stated that the moving average can be viewed as a limited type of weighted average where all data points included are given an equal weight and all the data points excluded are given a weight of zero. The rationale for a moving average technique is the increased relevancy of the recent data to the future behavior of the system. Geoffrion (15) cited the disadvantages of the moving average as the requirement for as many pieces of data stored as there are periods in the average and the tendency to lag behind changes in the time series that is being tracked.

Exponential Smoothing Model. Exponential smoothing is defined by McClain (16) as a method of functionally relating time to a series of observations of a variable. He explained that the simplest method of exponential smoothing fits a horizontal line through the data, but extensions have been made to fit not only a slanted line, but also polynomial and sinusoidal functions. Winters (17) explained the exponential smoothing model as making a forecast of expected sales in a future period by a weighted average of sales in the current period. There is general agreement among several authors (15-20) that the exponential smoothing model is based on the principle that recent data are more relevant to forecasting than

distant data. McClain (16) further explained exponential smoothing as forecasts which make use of averages over all historical data but are calculated with weights that decrease exponentially. Geoffrion (15) compared exponential smoothing to a moving average with weights that decrease with the age of the data. Stated more simply, exponential smoothing is an attempt to increase the sensitivity of response to changes in observations by using fewer averaging periods and smoothing out the random fluctuations with the use of a smoothing constant.

According to Roberts and Reed (19), the ability of a smoothing model to successfully track changes in a time series is dependent upon the value assigned to the smoothing constant. They further elaborated that the smoothing constant determines the stability of the forecasting system by smoothing random changes in the time series of observations. The value of the smoothing constant is always between zero and one (15,21). As explained by Roberts and Reed, Geoffrion, Phillip, and Brown (15,19,21,22), the larger the value given to the smoothing constant (the closer the value is to one), the greater the weight that is placed on the current observation and the less smoothing occurs. The forecast obtained from such a smoothing model will vary as wildly as the input data into the model. On the other hand, the less weight given to the smoothing constant (the closer the smoothing constant is to zero), the greater the weight that will be concentrated on the past data. This will give an extremely stable forecast, regardless of the present data (15,19,21,22). The value of the smoothing constant thus decides the weight assigned the current data (15,19,21). Obviously, the best choice of a smoothing constant value lies between these two extremes.

Phillip (21) stated that by selecting a suitable value for the smoothing constant, a balance can be obtained between stability and sensitivity. Trigg and Leach (23) indicated the value of 0.2 or less is the usual value assigned the smoothing constant. Sposato and Spinner (20) suggested a slightly different approach to selecting the value for the smoothing constant. They believe that an adjustable smoothing constant preselected at the start of each forecasting period to compensate for the presence or absence of foreseeable external influences will give the method a more realistic approach and will integrate human judgment and mathematical precision.

The formula for a simple exponential smoothing model is (1,20):

$$F = a(s) + (1-a)F^1$$

where, F = forecast
 a = smoothing coefficient
 s = last actual demand
 F¹ = last demand forecast

As can be seen from the mathematical formula, the only periodic input required for this model to forecast for future periods is the last actual demand (18).

Winters (17) listed several advantages of the exponential smoothing model compared to other forecasting systems: (a) better forecasts result, (b) less information and storage are required, and (c) sudden shifts in the time series are responded to more rapidly. Geoffrion (15) purported that the exponential smoothing model has the advantages of eventually eliminating computational errors, of stability to changes in the time series, economical data requirements, a readily adjustable rate of response, easy calculation, reasonably effective smoothing of random effects, and the ability to track

the central tendency of a time series. The foregoing discussion describes only the simple exponential smoothing model. A number of modifications and additions have been developed (24-32).

Regression Models. According to Parker and Segura (33), a regression model objectively attempts to define the extent of movement in one variable (such as sales or earnings), over time, relative to others (such as income, population, and new construction). Chambers, Mullick, and Smith (34) defined a regression model as functionally relating sales to other economic, competitive, or internal variables and estimating an equation using the least-squares technique. They also stated that these relationships are usually analyzed with statistical methods.

Parker and Segura (33) pointed out that the main contributions of a regression model are the precision with which these relationships are measured statistically, and the fact that the regression model also will indicate the reliability of these relationships. Also, a much greater amount of data can be analyzed using the regression model than with any other intuitive or manual method. The formula for a regression model is (35):

$$Y = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \dots$$

where, Y = forecast

β = regression coefficients

X = independent variables

The regression coefficients indicate the extent of the relationship between the dependent variable on the left-hand side of the equation and each of the independent variables on the right-hand side of the equation. Parker and Segura (33) pointed out that to realistically estimate the relationships between the dependent and independent variables requires several years of

data in which trends will become obvious. A rule of thumb for the number of years of data needed was five years when one dependent variable is being analyzed and eight years when two variables are being analyzed. An even longer time span of data is needed when three or more variables are being analyzed (33).

Forecasting Research in Foodservice Systems

The majority of studies conducted in foodservices have utilized either modifications of or combinations of the previously discussed mathematical forecasting models. Dougherty (5) studied the feasibility of developing a forecasting model to predict the production demand of the University of Missouri-Columbia Medical Center after determining whether there were reliable patterns in patient census. The objective of that research was to develop a model that would predict total patient census with ± 5 per cent limits 95 per cent of the time. Dougherty developed, tested, and rejected several mathematical forecasting models including historical means, the nine day moving average, a modified nine day moving average, and an adjusted moving average. The fifth forecasting model developed and tested by Dougherty was described as the optimized forecast model. The formula for this model is:

$$X = \frac{A}{B} (C)(b) + a$$

where, X = predicted census

A = actual census for fourth weekday prior to the day for which the forecast is being made

B = nine day moving average of historical means for fourth weekday prior to the day for which the forecast is being made

C = nine day moving average of historical means for the day for which the forecast is being made

a = calculated value of the y intercept

This model incorporates a regression coefficient and y intercept values into the adjusted moving average forecasting model. Dougherty found that the optimized forecast model predicted production demand more accurately than the other four forecasting models; however, the forecasts still did not satisfy the criteria that had been originally established.

Harris (36) studied the efficiency and effectiveness of ten forecasting models based on forecast accuracy, simplicity of computation, and historical data base required at the University of Missouri-Columbia Medical Center to determine the best technique for forecasting patient tray census. The models tested included the manual procedure or intuitive estimate, a moving average with regression, first order and double exponential smoothing, and six smoothing models using a modification of the adaptive alpha technique. He measured the forecasting accuracy by utilizing ten error measurement parameters: U coefficient, W coefficient, cumulative error, bias, mean absolute deviation, standard deviation, maximum over-forecasting error, maximum under-forecasting error, number of forecasts over 5% of demand, and the number of forecasts under 5% of demand. Based on the three criteria--forecast accuracy, simplicity of computation, and historical data base required--a simple exponential smoothing model with the modification of a moderate adaptive tracking signal was found to be the best forecasting method for forecasting daily patient tray census.

Wood's (14) study included characterizing the nature of dietary demand forecasting and comparing forecasting models as to their possibilities and limitations when predicting short term demand for non-selective diet categories. The forecasting models emphasized in this study were modifications of the Box-Jenkins Integrated Autoregressive Moving Average (IARMA). The criteria used to judge the model's effectiveness included the following:

the forecast error distribution characteristics, a proposed coefficient of forecast efficiency, the computational requirements, and the ease of use and updating. A total of six forecasting models were compared using actual data from a two and one-half year period which was collected at the University Hospital at the University of Wisconsin. The models compared included:

- (a) IARMA for patient census data, and first order exponential smoothing for tray count and diet demand as a percentage of patient census;
- (b) same as (a) except cost of error modification added to developed forecasts;
- (c) same as (a) except adaptive exponential smoothing employed on percentage data;
- (d) same as (c) except cost of error modification added to developed forecasts;
- (e) IARMA for patient census, tray count and original data for diets; and
- (f) same as (e) except cost of error modification added to developed forecasts.

The data collected included patient census tray count, and foodservice demand in eight diet categories. Wood found that the IARMA model for patient census, multiplied by forecasts of diet category percentage series developed from regular or adaptive first order exponential smoothing models, was the most accurate in forecasting the demand of nonselective diet categories.

Rochford (35) investigated the development of a model which would predict the number of meals prepared based on five specific variables: patient census, number of patients admitted, number of patients discharged, number of "hold tray" requests, and number of "no tray" requests. A multiple stepwise regression model was developed to analyze the data. A comparison also was made between using only three variables in the regression model and using the five variables to predict patient meals. The use of the three variables, patient census, number of patients admitted, and number of patients discharged from each hospital service, in the regression

model successfully predicted the number of meals prepared as compared with the model using all five variables. A total of eight equations, one for each hospital service, were initially incorporated into the model. Rochford tested the possibility of reducing the number of equations for predicting meals prepared by excluding hospital service as a variable. She found this to be feasible and suggested the use of only one equation that incorporates the three variables previously mentioned.

College Foodservice

Objectives of College Foodservice

Stokes (3) listed the following as the objectives of institutional foodservice: (a) quality food, properly cooked and prepared; (b) prompt and courteous service; (c) well-balanced, varied menus; (d) reasonable prices consistent with the service offered; (e) adequate facilities; and (f) high standards of cleanliness and sanitation. University foodservices tend to establish goals and objectives which have a central theme--benefiting the student. Examples of goals and objectives from various university foodservices follow. Goals of the foodservices at Brigham Young University are: (a) to provide top quality food to patrons at lowest possible costs by courteous and helpful employees in a clean and pleasant atmosphere; (b) to operate the foodservice on sound business principles, receiving no remuneration or budget from the University or Church, but operating from the income generated from services (37).

The goal of the foodservice at Princeton was described as follows: to avoid monotony through the use of flexibility. The foodservice continually changes menus, varieties of food, styling, and the manner of presentation to meet their goal (38). The Virginia Commonwealth University cited the

purpose of their foodservice was to present to students high quality food, with a wide variety of choices prepared in a manner attractive and appetizing to students (35). The philosophy of foodservice at Pennsylvania State University (40) is that a significant part of higher education is the experience that each student has in living and eating with other students. Since the educative process extends beyond the classroom, students must have the opportunity to develop socially as well as academically. To support this philosophy, the university provides well-planned meals for as many students as possible. The goal of the foodservice at North Dakota State University (41) is to provide students with a variety of foods in interesting combinations served under pleasant sociable conditions. To meet this goal the foodservice listed the following objectives: to serve well-prepared, nourishing, and attractive foods; to provide nutritionally balanced, wholesome meals including a variety of adequately seasoned foods; to assure sanitary environment; to provide maximum value at a minimum cost, courteous and friendly service, and comfortable and pleasant surroundings; to be receptive to student's thoughts and suggestions for improving the service; and to constantly search for improved methods of preparing and serving quality foods.

Development of College Foodservice

According to Dobie (42), Yale University has operated a foodservice since 1718 which he believes to be one of the oldest if not the most successful foodservice operation or restaurant in the country. However, Stokes (3) reported that Harvard is not only the oldest university in the country (founded in 1638), but also has the oldest foodservice of any college or university. He also reported that by 1776 there were ten universities

established in the American Colonies, and some form of foodservice was provided by each university from the beginning. During these early days of college foodservice at Yale and Harvard, the meal service was very formal--a printed menu was presented to each seated student, and he ordered from a waiter or waitress. Stokes (3) indicated this was the customary service offered the student in early institutions of learning. This style of service continued at Yale until World War II occurred, at which time the cafeteria line came into being and became the popular method of mass-feeding.

The cafeteria style of serving meals to students appears to be, at this time, the most common service. However, some foodservices modify the cafeteria service to a buffet service as at Woods College (43). Other foodservices vary their service style. York College serves breakfast and lunch in a cafeteria style, but dinner is served using a family style service with a hostess (44). Along with the trend of supplanting seated service with a cafeteria line has been the integration of sexes in the college dining halls. This, in turn, has brought about another change in college foodservice--multiple-selection menus. Differences in food preferences, food sensitivities, and nutritional requirements of men and women have been identified as factors underlying the need for different menus for coeducational dining halls than for single-sex dining halls (45). Therefore, a multiple-selection menu helps to overcome the problems of these differences.

Recently, college foodservices have realized that students are not a captive audience, and efforts have been made to break the monotony of institutional food and provide variation in menus and services to the students (46). Special dinners or functions were discussed by a number of

authors as approaches to relieving this monotony. Usually these special dinners are given a theme, and the food served and the decorations of the dining area are coordinated with the theme (38,42,43,47,48).

College foodservices are experimenting with various other methods to retain the students' satisfaction with the foodservice. One such method is to have a variety of eating places which a student may choose between. Cornell (49) reports that Davidson College has converted three unused fraternity houses into the foodservice facility for the college. Each of these buildings varies in the type of food and service offered: one serves cafeteria style for all meals, one is a delicatessen and grill combination where customers can select and pay for meat and cheese by the ounce, and one serves only lunch at a fixed rate and dinner in a buffeteria style. At Temple University a variety of eating situations for students includes a cafeteria, a vending cafeteria, a "deli" counter, and an "Old New England Fish and Chips" line. Temple University believes such a variety reduces the "take-it-or-leave-it" attitude of some college foodservices (48). The University of the Pacific offers a vegetarian food program to its students (50). Other university foodservices are experimenting with either extended serving hours or continuous serving hours that extend meal times to almost an "around the clock" basis (42,46,51).

According to Chilson and Knickrehm (52), most college foodservice operators believe that the flat-rate or contract system is the best method of handling student board charges. This system supposedly is more economical and yet guarantees more nutritionally adequate meals than most other systems. Students' main dissatisfaction with this system appeared to be the lack of reimbursement for meals not eaten. Therefore several college foodservices, such as Bowling Green State University and Davidson College, have

devised a coupon system in which the student purchases booklets of coupons with which to pay for his meals. There is no penalty for missing a meal--coupons can be used at future meals. The coupons also are transferable between students (49,53). Other universities have offered a modification of the contract system to the student in the form of partial board plans. For example, the University of the Pacific offers students living in residence halls either a fourteen-meal or a twenty-one-meal per week board plan while the University of Tennessee offers a fifteen-meal plan or a twenty-meal plan to its boarding students (50,54). The University of Iowa offers students a choice of a full board plan or two partial board plans, one plan including breakfasts and dinners, the other plan including lunches and dinners (55). One other system which some universities are offering students is the a la carte system with a monthly minimum board charge. Students are charged for the food they take, although they must eat a minimum amount each month (52).

Behavioral Factors Affecting Eating Patterns

One of the most important factors affecting the forecasting for any foodservice is the patron--his/her attitudes, habits, and preferences. In the college foodservice system, what is the pattern of habits that affects participation, how do students view the foodservice? Many studies have been conducted of the food habits and attitudes of people of all ages in many varied situations. This discussion focuses on studies related to college students or young adults of high school and college age.

Food Habits and Attitudes

According to Babcock (56), the meaning of food to an individual is important to the understanding of that individual's other relationships to food, namely food habits and attitudes. Babcock further stated that from the day of birth food is associated with intimacy--it carries not only the feelings of security, protection, love, and developing strength, but also the sense of pain, rejection, deprivation, and the potential terror of starvation. Eppright (57) described food as not food, but the cross-roads of emotion, religion, tradition, and habit. The concept of food habits also includes the whole of human activity involved in the use of food, along with all beliefs, attitudes, and motives associated with food (58).

Brown's (59) work showed that one of the strong determining factors of an individual's food habits is the background of this person; i.e., the individual's parents, place lived, income and family size. Subjects believed the one most important influence upon the early development of food habits was their mother. This finding is supported by Bott (60) when her subjects identified the mother as being the main guide in food selection. Data from Thompson's (61) study indicated that food habits are closely associated with family relationships, and that food habits developed during early childhood are long-lasting and difficult to change. The most important factors in forming childhood food habits were the habits and attitudes of the parents toward food. Peryam (58) also stated that established food habits of an individual or a culture tend to resist change.

According to Nugent (62), freshmen tend to arrive at a university with preconceived negative attitudes towards institutional food of which they are unfamiliar. She purported that young people tend to be unadventurous

in their eating and therefore unfamiliar foods frequently go untouched. Pilgrim (63) likewise attested to the fact that people have a dislike of that which is different or a fear of the unknown.

Food Habits of Students

Cooksey and Ojemann (64) conducted a study in which the fifty-two senior class members of a high school who regularly omitted breakfast were identified and a comparison made with students who regularly ate breakfast. Sixteen factors that were hypothesized as affecting the breakfast omission were used in this comparison. Only four were found to be significantly different between the two groups: the student's conception of his peer group as to breakfast omission, the availability of someone with whom the student could eat, whether the student had to prepare his own breakfast or not, and the availability of quick, ready-to-eat foods. One factor that did not prove to be significantly different between the two groups was the relationship of breakfast omission and sex.

Spindler and Acker (65) interviewed seventy-five high school students concerning their food habits. They found the teens expressed the problem of lack of time to eat as one of the main factors affecting their food habits. Also, approximately five times more girls than boys skipped the breakfast meal. Most of the teen-agers consumed from one to three snacks per day; only four reported having no snacks.

In a survey by Haseba and Brown (66) of 186 college students sixty-three per cent regularly ate breakfast. There was no special avoidance by women students of the breakfast meal; however, the women who regularly ate breakfast on the weekdays often did not eat breakfast on the weekends. A reason for this might be that most of them lived in a residence hall which

did not serve breakfasts on weekends. The reasons given by the students were that they did not feel like eating or that they were too lazy to bother getting anything to eat. The students who did not regularly eat breakfast give as their reasons: lack of time to prepare or eat the breakfast meal or not feeling like eating.

Spangler (67) surveyed the food habits and practices of a random sample of mainly freshmen students from New Mexico State University and studied the relationships between these habits and practices. A significant relationship was found between a mother's preparation of breakfast and a student's eating breakfast and between the mother's preparation of breakfast and the student's liking breakfast. Also, more mothers in rural areas prepared breakfast than in urban areas. The size of the community in which the students lived, the time he/she chose to study, whether or not he/she ate in the school lunchroom in high school, and the sex of the student were found to have no significant relationship to whether the student ate breakfast or not. Those who liked to eat breakfast also ate a regular lunch versus snacking when hungry. Soft drinks were found to be the most commonly consumed snack at college.

Peterson's (68) study of the breakfast habits of students at Texas Woman's University showed that 53.6 per cent of the women usually ate breakfast while at college; 46.4 per cent of the women sometimes or never ate breakfast. No significant difference was found between the freshmen and upperclasswomen's breakfast eating habits. A significantly higher number of women than was expected ate breakfast regularly in college after regularly eating breakfast as teen-agers at home. Reasons given for eating breakfast were: usually hungry, prevents mid-morning letdown, already paid for the meal, provides one-third to one-fourth of the day's nutrients,

habit, and convenient. Reasons given for not eating included: not enough time, not hungry, dieting, do not like foods served, habit formed earlier, makes me sick, breakfast not prepared, no food on menu I can eat, and would rather spend time dressing than eating.

A questionnaire was administered to 269 girls at the Las Cruces high school by Bott (60) to study the quality of food selection patterns and the attitudes of teen-age girls towards food. Bott found that twenty per cent did not eat breakfast, eleven per cent skipped lunch, and nine per cent missed dinner. Bott (60) concluded that not eating breakfast can be attributed to oversleeping, dawdling while dressing, or a lack of variety of breakfast food. The main snack foods of this group were cokes, candy, and cookies.

Spurling (69) surveyed students in eighty-one California high schools to determine whether students skipped breakfast, and if so, why. She found that one-third of the students skipped breakfast always or part of the time, and the remaining two-thirds ate breakfast almost always. Not enough time, breakfast not prepared, do not like the foods served, no food I could eat, and no one to eat with were among reasons given by the students as to why they did not eat breakfast.

Thompson (61) studied factors affecting the development of food habits of Fresno City College women. Fifty women were asked to write papers describing their early childhood experiences with food and the development of food habits. These students also were interviewed individually. The students believed that happy family relationships were related to food enjoyment and food acceptance. The income of parents was related to the variety of food consumed by a student but not to food enjoyment or acceptance. Peer influences were found to begin in grade school, peak in junior

high school, and continue through high school. When the students reached college, they did not feel the need to conform so greatly. The reasons given for hurried or skipped meals were lack of time, pressures of school, and work. Twenty-seven per cent of the students reported skipping breakfast; the reasons being lack of time, not hungry, or dieting.

Wise (70) also studied factors which influence college students' food habits. She found that forty per cent of the students skipped breakfast when they lived at home; whereas, sixty per cent skipped breakfast at college. The most frequent reason given for skipping breakfast at college was "don't get up in time." The study indicated that the students did not feel harassed or forced by their parents to eat their meals or try new foods. While at home students reported snacking mainly in the evenings; however, they did snack in the afternoons, also. The students consumed many more snacks in the evening while at college, with the most popular being carbonated beverage.

Food Preferences

Pilgrim (71) believed that food preferences (the like or dislike for food) is an area of food attitudes and is an important predictor of food consumption. In Pilgrim's study few vegetables were well liked while grilled steak, ice cream, french fries, and hot biscuits were among the best liked food items; food preferences fell into distinct patterns--respondents liked or disliked fruit in general rather than a specific fruit; foods were preferred without sauces or other additions even if the food was not well-liked to begin with; and food preferences varied with age and section of the country in which a person was raised.

Einstein and Hornstein (72) conducted a study in which the objective was to identify nutritionally significant foods that are disliked by college students. Food preference questionnaires were distributed to 50,000 college students across the country. The food items in the survey were separated into ten classes: breakfast items, appetizers, soups, salads, sandwiches, entrees, vegetables, desserts, breads, and beverages. The most popular class of foods was found to be bread, followed in order by beverages, desserts, sandwiches, appetizers, entrees, salads, breakfast items, vegetables, and soup. In the entree class students preferred beef, pork, chicken, veal, fish, lamb, and liver in descending order. Combination dishes were less well liked than plain entree items. A greater preference for salads and vegetables was noted for women than for men. No particular preferences for men were indicated. The greatest regional differences noted in food preferences were in the South.

Schuck (73) studied the food preferences of 120 South Dakota College students with a food preference list. She found that milk and butter were rated the highest in acceptability by both sexes and by both urban and rural dwellers. Fruits and certain meat items including beef, pork, fowl, and fresh fish were ranked next in acceptability by the students, followed by vegetables, lamb and organ meats. More women than men would eat fruits often; although more men than women would eat vegetables and meat frequently. Students from urban homes ranked the acceptability of most foods higher than those students from rural homes.

Capps (74) studied the relationships between several variables affecting students' food patterns, including personal adjustment, food likes and dislikes, educational level of parents, size of family, and age of participant. The students were divided as to whether they were home economics

majors or non-home economics majors in the analysis. For home economics majors, Capps found: a significant correlation between dietary intake and total food dislikes; students with the better educated fathers had better diets; and students with better personal adjustment had the most food likes. The findings for the non-home economics majors included: students who were well-adjusted personally had more food likes, the students accepting a high number of various food had fewer dislikes, and younger students showed more food dislikes than older students.

To determine the frequency that students would accept various menu items, Knickrehm et al. (75) presented a questionnaire of foods served in a university residence hall foodservice to 3,993 University of Nebraska students. Returned and usable questionnaires numbered 1,479. No significant differences were found in the frequency that students would accept various menu items based on class, residence hall, or sex of the student. Very few items were rated as acceptable twice a day, every day, every other day, or twice a week. The only menu items students would accept twice a day were fresh fruit, fruit juices, fruit combinations, and tossed green salad. The most often students would accept any of the other menu items was twice a week. Fewer than half of the students were found to accept roast beef, broiled steak or hamburger on a bun as often as twice a week. Of the thirty-three menu items that twenty-five per cent of the students would not eat, over twelve of them were vegetables.

Warren (76) studied the major food preferences of students eating in university dining halls at Langston University. A questionnaire was distributed to 384 students at the university. Some of her findings included: no major difference was found between food preferences of males and females; students from rural areas were found to have fewer dislikes than those from

urban areas; students who had traveled extensively had more dislikes than students who had not traveled extensively; a wide variation in food preferences was found between younger (18 years) and older (25 years) students; income level made little difference in food preferences; as the education level of the mother increased, the food dislikes of students increased; and freshmen were found to have food preferences comparable to juniors and seniors, whereas sophomores had many more food dislikes.

Verzosa (77) studied the food preferences of college students and the differences between the food preferences of college men and women. Questionnaires were distributed to 203 freshmen men and women living in residence halls at Fresno State College; 142 usable questionnaires were analyzed. Some of her findings included: desserts and beverages on the whole were well liked by all the students; the food items least liked by the students were mostly vegetables and entrees; the women had more food likes while the men had more dislikes, however the men were familiar with more foods than the women.

The purpose of White's (78) research was to study the frequency of acceptance of food items of students living in residence halls at Oklahoma State University. Questionnaires of 125 food items were distributed to 3200 students living in residence halls. From 994 usable questionnaires White found that no food item was acceptable to students twice a day or even once a day. Only five food items were found to be acceptable to students every other day: fresh fruit, tossed green salad, ice cream, fruit pie, and cake. The popular entrees, fried chicken, roast beef, and chicken fried steak, were acceptable to the students only once a week. A significant difference was found between the acceptance of food items for males and females; males had a higher acceptance for whole meat items,

while females had a higher acceptance for desserts, salads, and vegetables. Contract board respondents were found to have a higher acceptance of desserts, snack foods, and soups than the a la carte respondents. A significant difference was also found between the food acceptance of freshmen, sophomores, juniors, seniors, and graduate students.

Long's (7) study was to determine the patterns and factors affecting the pattern of food consumption of young men living in a residence hall at the University of Connecticut. Data were collected by food preference lists, actual food consumed, and plate waste. Records also were kept during the study of outside temperature, weather, activities, and special events. The weather was found to have no effect upon the consumption of hot or cold foods, while outside temperature and activities did have a minor effect. Attendance at meals and consumption of food were found to increase during academic examination periods. Weather and/or temperature were found to have very little effect upon either attendance at meals or consumption of foods. Turkey, chicken, and beef were found to be preferred by the students over pork, veal, or fish. The young men preferred familiar, easily identifiable forms of food.

Barlow (79) studied the food preferences of college men and women by distributing a check list of food items to 240 students living in residence halls at Kansas State University. Significant differences were found between the preferences of males and females for some of the food classes; however, there was no significant difference found between the sexes for preference of meat and poultry items. Meats and poultry were found to be the most popular class of foods. Beef, bacon, ham, turkey, chicken, and veal were liked by seventy-nine per cent of the students; whereas tongue and heart were disliked by forty-five per cent. Liver was liked by

fifty-three per cent of the students and lamb, by sixty-seven per cent. Trout, shrimp, and fish were liked by at least eighty per cent of the students while oysters and clams were highly disliked. The size of the home community was found to have very little effect upon students' likes and dislikes.

Peryam (80) studied the food preferences of men in the armed forces by distributing a questionnaire of food preferences. The foods were categorized into eleven classes: accessory foods, beverages, breads, desserts, cereals, fruits, main dishes, potatoes and other starches, salads, soups, and vegetables. Breads ranked the highest in preference; main dishes had a broad range of preference; and vegetables were ranked the lowest of all classes with soups ranked as the next lowest. Fruits were ranked fairly high in preference; desserts were ranked near the top. The best liked main dish was grilled steak while the least liked was baked fish. The meat subclasses in the main dish category were ranked by the men in the following order of descending preference: fowl, pork products other than ham and sausage, ham, ground beef, veal, beef, frankfurters, cold cuts and sausages, lamb, meat combinations, liver, and fish. Peryam also compared the five factors, age, length of service, education, size of town, and region of origin of the men, with food preferences. Length of service was associated with decreasing preferences for most classes of foods; while age and region of origin were found to affect preferences differently for different food classes.

Measurement of Attitudes and Opinions

Edwards (81) stated a working definition for attitudes as how a person feels about a psychological object (any symbol, person, institution, job,

food, etc.) and whether a person likes or dislikes that particular psychological object. There are various methods of measuring attitudes, and one of these methods is by using an attitude scale made up of statements (81). Pilgrim (63) suggested two methods to be effective in attitudinal studies: a questionnaire concerned with the degree of preference for foods using a hedonic scale in the rating, and an interview concerning feelings about and knowledge of various food items.

A specific type of an attitude scale, the Q-Sort Technique, is explained by various authors (82-84). In the Q-Sort Technique, the individual is given a set of cards which contain statements about a psychological object. The individual is then asked to sort these cards into a specified number of piles according to his own view of or attitude toward the object. The criterion for placing the statements in various piles is the degree of favorableness or unfavorableness the individual feels toward the object and, consequently his agreement or disagreement with the statements. There is usually a restriction upon the number of cards that may be placed in a specific pile, which causes a roughly normal distribution to occur.

Krech and Crutchfield (85) proposed that an opinion is one of three categories of beliefs, which are differentiated according to verifiability. They purported that an opinion is a belief that cannot be verified at the particular time. If a belief can become verified, it then becomes knowledge. Kassarian and Robertson (86) defined an opinion as a verbal expression of an attitude. They further stated that all attitudes are composed of beliefs, but that all beliefs are not attitudes.

Interviewing

Interviewing is one of the most important aspects of any survey, and it is critical that interviewers ask the questions properly, record the replies verbatim, and probe meaningfully (87). The respondent must realize that the survey is important and worthwhile--that it is worthy of his time. When contacting the interviewee the first time, the interviewer should introduce himself/herself and state who is being represented. The interviewer should briefly explain to the respondent what the survey is concerned with, how the respondent was chosen, and that the respondent's answers will be confidential. The ultimate goal of the interviewer is a good rapport with the respondent. The characteristics of a good interviewing relationship consist of: warmth and responsiveness in regards to the interviewer, a permissive atmosphere, and freedom from any pressure or coercion.

Questionnaires used in surveys should be based on the objectives of the research; be designed to help an interviewer establish rapport; and help to standardize the interview. Several techniques have been suggested when using a questionnaire in an interview: informally utilize the questionnaire so that questions are read smoothly and with no hesitancy, ask the questions exactly as they are worded in the questionnaire, ask the questions in the order they appear in the questionnaire, ask every question as specified in the questionnaire, repeat and clarify misunderstood or misinterpreted questions, utilize transition statements between groups of cohesive questions, and keep track of any changes made in the questionnaire (87).

METHODOLOGY

The Research Site

The study was conducted on the campus of a large land-grant university located in the midwest section of the United States. The university has a total enrollment of approximately 16,400 students enrolled in eight colleges and the Graduate School. There are nine residence halls on the campus housing approximately 4,100 students. Each residence hall has close access to a foodservice; two residence halls are served by a central foodservice, a complex of four residence halls is served by one central foodservice, and three small residence halls have self-contained foodservices. The foodservices are under the jurisdiction of the Associate Director of Housing and the Assistant Foodservice Director who are housed, along with the Administrative Assistant in charge of Purchasing and an Administrative Dietitian in charge of menus, in a centrally located building on campus. Each foodservice has a professional staff of dietitians, as well as full-time and student employees.

The newest and largest residence hall foodservice on campus was selected for the study. This centralized facility provides foodservice to students living in four residence halls that house 2,254 students. One hall houses 646 male students; two house only females and accommodate 647 and 316 students, respectively; one is a coeducational hall with 645 students. The foodservice personnel complement includes a professional staff of four registered dietitians; approximately eighty full-time employees, including seven first-line supervisors; twelve hourly employees; and approximately 126 student employees.

Three meals a day are served to students, except on Sunday when no evening meal is served. Employees, full-time, hourly, and student, and invited guests also may eat in the foodservice. A total of approximately 5000 meals are served per day; approximately 800 students at breakfast, 2200 at lunch, and 2000 at dinner. The number of students served on weekends is usually considerably less.

The foodservice has seven serving lines; three lines are open for breakfast, five lines for lunch, and six for dinner. A full regular breakfast is served between 6:30 and 8:15 a.m. followed by a continental breakfast from 8:30 to 9:15 a.m. A hamburger line opens at 10:00 a.m. and closes at 1:00 p.m. The regular luncheon menu is served from 10:45 a.m. to 1:15 p.m. and dinner, from 4:50 to 6:10 p.m. The meal hours are modified somewhat on weekends.

The menus used by the foodservice are centrally planned and are used by all the residence hall foodservices on campus. These menus are planned at least two months in advance of service. A copy of the tentative menu is sent to all the dietitians who review the menus, note production problem areas, and make recommendations. The menus are finalized, and copies of the final menu are sent to the foodservices one month in advance of the serving date. A nine-week luncheon and dinner entree cycle with varying complementary foods is used when planning the menus. The cycle is not strictly adhered to, however.

The residence hall foodservices have as their purposes: to serve quality food that is nutritious, palatable, attractive, and safe; to assist students in the direction of good food habits; and to cooperate in and support the social and educational programs within the residence halls. These goals are met by emphasizing high quality food through the application

of changing technological developments and close supervision and control of sanitation practices. The student's knowledge is increased by introducing new foods, serving attractive well-seasoned foods, and utilizing varying styles of service (88).

Data Collection: Phases I and II

Phase I of the study was concerned with studying the food habits of students and their perceptions and opinions of the residence hall foodservice as factors affecting forecasting. Phase II was concerned with the prediction of meal participation and entree selection for a residence hall foodservice system.

The Associate Director of Housing for the university and the manager of the foodservice unit were consulted prior to beginning the study and periodically throughout the study, orally and in writing, to obtain their suggestions and to provide information on the progress of the research (refer to sample correspondence in Appendix A). Approval for both Phase I and Phase II of the research project was sought and received from the Director and Associate Director of Housing. Since Phase I of the study concerned interviewing students in the residence halls, approval of the hall presidents and the Hall Governing Boards also was secured (Appendix A).

Phase I: Study of Student-Related Factors Affecting Forecasting

Students' food habits and perceptions of the foodservice are extremely important factors in forecasting for a residence hall foodservice. Attendance or non-attendance at a meal has an immediate and direct effect upon the accuracy of the forecast. In Phase I of the study the students' reasons for attending or not attending a meal in the foodservice were

studied in an interview-survey in which students were asked to relate their food habits and perceptions of the residence hall foodservice.

The approach for the interview-survey was modified from the Q-Sort Technique (83). The approach involved having the interviewer present the interviewee with a card listing the predetermined response categories and an "other" response category for each question asked. The interviewer, likewise, had a card for each question that stated both the question to be asked and the response categories. For each question asked the interviewee had the option of selecting one of the predetermined responses or the "other" response. If the "other" response was chosen, the interviewee's own response was recorded by the interviewer. In this way, most of the responses to questions could be easily checked off by the interviewer on a form; however, the interviewee had the opportunity to give a response not listed.

Development of the Instrument. The instrument was developed from the results of preliminary interviews with a stratified random sample of twenty students living in one of the four residence halls previously described. Because the residence halls do not house the same number of students, the sample of students selected from each residence hall was proportionate to the number of residents living in each hall. The sample was stratified by floor of the residence hall and wing of the floor, as well as by residence hall. The room selected for the sample was the third room on the left-hand side of the randomly selected wing and floor of the various residence halls. The names of the students living in these rooms were obtained, and the students were contacted. The student who accepted the telephone call was asked to participate in the interview. If the person refused, the roommate was asked to participate. If neither would consent to be interviewed, the

students in the third room on the left-hand side of the opposite wing were contacted.

The interview consisted of sixty-one open ended questions that considered past food habits, present food habits, and perceptions of the residence hall foodservice. These questions were reviewed by the Associate Director of Housing and the faculty advisor to the project prior to being used in the interviews. Appointments were made with the students to be interviewed, and the interviews were conducted either in the student's room or in the lobby where the atmosphere was a relaxed and comfortable one conducive to honest and sincere answers. The tape-recorded interviews were approximately one-half hour in duration.

When the interviews were completed, the tape recordings were analyzed and the responses were recorded for each question. The information obtained from these interviews was used to develop the final instrument (Appendix B) which consisted of fifty-five questions with categories of responses for each question. Questions were reviewed by the faculty advisor and an education research specialist and revisions were made prior to printing the interview cards. Each question with the appropriate responses was printed on a blue card (the interviewer's card), and the list of responses corresponding to the question was printed on a yellow card (the interviewee's card) (Appendix C). The two contrasting colors were used for the cards so that they would be easily distinguishable to the interviewer. Sets or decks of cards were prepared with alternating interviewer/interviewee cards to facilitate the interview process. A biographical and demographic information form was developed to secure the following data: the residence hall living in; sex; present age; student classification; major; urban or

rural home town; geographic region; number of communities, cities, or towns lived in; and number of semesters living in a residence hall (Appendix B).

Selection of the Sample. A stratified random sample of approximately ten per cent of the student population of the four residence halls was chosen. The sample was stratified so that the sample chosen was proportional to the number of students living in each hall (Table 1). The sample also was stratified by floor and wing to compensate for the trend in some of the residence halls of an entire wing of a floor being inhabited by students who share common interests and/or are in similar curricula. Also, it was noted from the results of the pretest of the interview-survey that students tended to eat meals only with students living on the same wing as themselves. By stratifying the sample by wings, chances were decreased of selecting all the students from one floor or wing where the opinions might be common to all students on the wing. A listing of all the inhabited rooms according to wing and floor in each of the four residence halls was obtained from the Department of Housing. Consecutive numbers were assigned to the lists of rooms--one or two numbers to a room, depending on whether it was a single or double room. The sample was randomly selected from these numbers. After randomly selecting the sample numbers, the names of the students corresponding to these numbers were obtained from the residence halls. Alternates were also randomly selected using the same method. A total of 203 students composed the sample for the interview-survey.

Interview Process. Thirteen students were employed to help with the interviewing, since it was desirable to have all the interviews conducted in a short span of time. The researcher met with the interviewers a week before the interviews were to begin to orient them to the interview procedures and answer questions they might have (Appendix D). The

Table 1: Comparison of study sample and hall population

	student population		study sample ¹	
	N	%	N	%
residence hall:				
Ford	636	28.7	58	28.6
West	307	13.8	33	16.3
Moore	640	28.8	56	27.6
Haymaker	638	28.7	56	27.6
total	2,221	100.0	203	100.0
sex:				
males	1,079	48.6	96	47.3
females	1,142	51.4	107	52.7

¹Random sample stratified by residence hall, wing, and floor.

background of the study was explained to the interviewers, instructions were given as to how to contact the students initially, and the procedure to follow during the actual interview. Also the sampling plan was explained.

Packets were prepared for the student interviewers containing a list of students and alternates to be interviewed, a set of interview cards, coding forms, instructions for the student interviewers when making the initial contact and introducing the interview, information concerning background of the study, and a memo concerning acceptable responses from the interviewees (Appendix E).

The interviews were conducted beginning mid-week following spring break which was during the ninth week of the spring semester. The interviews were not conducted until Wednesday since the students had been on vacation for a week and needed time to re-establish campus routines. The students were contacted by the interviewers and an appointment was made to meet either in the student's room or in one of the residence hall lobbies; therefore, the interviews were conducted in a quiet, relaxed atmosphere. Twenty-one alternates were used in the sample. Biographical and demographic data were collected from each student interviewed by having the student read through the questions on the form provided and check the appropriate response.

Coding and Analysis. Coding forms were developed to correspond exactly with the items so that the responses were directly entered on the coding forms by the student interviewers during the progress of the interview (Appendix F). These coding forms were reviewed by the researcher prior to key punching and decisions were made where responses required judgments. Interviewers circled questions in red which they believed

required review to facilitate the review process. When there were a number of similar "other" responses, additional categories were established after review and consensus was reached by a panel of two.

Computer cards were keypunched from the coding forms and frequency distribution tables were compiled for each question. Relationships between various questions were studied using chi-square tests (89).

Phase II: Approaches for Predicting Meal Attendance and Entree Selection

The collection of data for Phase II began the sixth week of the fall semester. The first five weeks of the semester allowed the students to establish habits of attending meals at the foodservice. The total length of the data collection period was seventeen weeks, beginning with the sixth week of the semester. The weeks of the semesters were numbered consecutively with the week of registration numbered as the first week. The data collection continued uninterrupted from week six to week fifteen which was Thanksgiving vacation. Data collection was begun again with week sixteen and ended the semester with week seventeen. During the second semester, data collection was begun with week three and continued uninterrupted through week eight.

Data collected included: meal attendance for all meals; for lunch and dinner, initial forecast, adjusted forecast, portions produced, and portions not served for each preplanned entree, additions to preplanned entrees and reasons for adjustments and additions; and for each day campus and residence hall activities. Information was recorded on the forms included in Appendix G.

Meal Attendance. The number of students attending breakfast, lunch, and dinner each day for a period of seventeen weeks was recorded. Records

of meal counts are regularly kept by the foodservice. Therefore, forms recording pertinent data as to the number of meal tickets punched, the number of paid guests, and the number of unpaid guests were already being filled in by the student employees responsible for punching meal tickets. Each student employee responsible for punching meal tickets was briefed to explain the study and to encourage the employee to be as accurate as possible when punching meal tickets and recording figures. Information was retrieved from these forms each day by the researcher. Schedules were checked to record the number of employees, both full-time and student, for each meal.

Initial Forecast. Records of the initial forecasts for entrees for both lunch and dinner were kept for the seventeen week data collection period (Appendix H). The initial production demand for an entree is forecasted by the production dietitian one to two weeks previous to the day the entree will be served in the foodservice. The initial forecast is an intuitive estimate based on the production dietitian's knowledge of the student body and the capabilities of the foodservice and upon past records of production demand.

Adjusted Forecast. Adjusted forecasts for entrees for lunch and dinner also were recorded for the data collection period. The initial forecast for an entree is adjusted by the production dietitian one to two days previous to service of the entree. The adjusted forecast, if made, is based on short-term factors such as an unexpected influx or outflux of students or the addition of an entree item which must be used. If the forecast was not adjusted, the initial forecast was used as the adjusted forecast for data analysis.

Portions Produced. The number of portions produced of each entree for lunch and dinner was recorded during the seventeen week data collection period. Even though an amount to be produced of each entree is forecasted, the actual amount of each entree produced may differ from this forecasted amount. This difference may be related to the recipe yield of an item, or it may be that the food item is a quickly prepared item and can be cooked as needed on the serving lines. Demand may differ from forecasts. The supervisors record the portions produced on the production sheet (Appendix I).

Portions not Served. The number of portions not served of each entree for lunch and dinner were recorded for the data collection period. The number of portions not served of each item also is recorded by the supervisors on the production sheet. This number can be subtracted from the number of portions produced for the item to determine the number of portions served for each meal.

Addition of Entrees. Records were kept of any addition of entrees to planned choice of entrees for lunch and dinner during the data collection period. An addition to the choice of entrees may be made because a less expensive entree item can be added to the more expensive established choices to reduce costs. Also, portions not served of an entree item from a previous meal may be offered again in the same or a different manner.

Reasons for Adjustment and Additions. The reasons given by the dietitian for any adjustments in the forecasts and for any additions to the established entree choices were recorded. If the reasons for the adjustments or additions were not apparent from comments written on the production sheet, the dietitian was interviewed by the researcher to determine reasons.

Campus and Residence Hall Activities. Campus and residence hall activities were recorded for the seventeen week data collection period. The residence hall foodservice maintains an activities calendar of residence hall events. This calendar was used for information of hall events. The daily listing of campus events in the university newspaper was clipped as a record of campus activities.

Hall Population. The total weekly population figures of the four residence halls in the study were retrieved from the occupancy reports prepared each Friday by the Director of Housing.

Coding and Analysis of Data. Data were coded according to categories established (Appendix J) for each of the variables to be considered in the statistical analysis: semester, week, hall population, day, campus and hall events, meal, number of patrons served, and forecast and production information. Entrees were classified into sixteen categories representing broad types of main dish menu items (e.g., chicken--fried or roasted, cold sandwiches, fish--fried or baked). Percentages were calculated for each of the entrees on lunch and dinner menus during the data collection period as a ratio of total entree portions served per meal. Categories of entrees were established by grouping similar entree types, taking into account the ratio information. These ratios were considered popularity indexes for the various items. The entrees also were coded according to the situation in which they occurred; i.e., a planned entree, sufficient amount was coded, 1; a planned entree, insufficient amount was coded, 2; and an addition to the menu was coded, 3. These categories were used to study variances among forecasts and demand for differing types of entrees.

Means and standard deviations of attendance by meal and day of the week as recorded by meal ticket checkers were computed. In addition, the percentage of students attending meals in relation to the hall population was determined. Other means computed by meal and day of week included: total initial forecast (sum of initial forecasts of all entrees on menu or added to menu); total adjusted forecast (sum of adjusted forecasts of all entrees); and production record of total portions served (total of production quantities - portions not served for all entrees on menu). Differences computed for comparison of forecasts and production demand were:

- (a) total initial forecast - checkers' records of meal attendance
- (b) total initial forecast - production record of portions served
- (c) total adjusted forecast - checkers' records of meal attendance
- (d) total adjusted forecast - production record of portions served
- (e) production record of portions served - checkers' records of meal attendance

Means and standard deviations were computed by meal and day. Mean percentage differences also were determined.

Unequal subclass analysis of variance (90) was used to study the effects of semester, day of week, campus events, and entree type on initial and adjusted forecasts and on production and portions served of various types of entrees. Data categories for this analysis were described above.

RESULTS AND DISCUSSION

Phase I: Students' Practices and Opinions Related to Residence Hall Foodservice

Description of Interview Sample

Each student interviewed provided demographic and biographical information. The 203 students interviewed were fairly evenly distributed between the four residence halls and the sample was proportional to the number of students residing in each hall (Table 2). Of these students, 47.3 per cent were males, while 52.7 per cent were females. The majority of students were in the age range of 17-19 years; however, a large number of the students were also in the range of 20-21 years. Most of the students in the sample were freshmen or sophomores; fewer juniors, seniors, and graduate students were interviewed. The sample compares quite favorably with the overall residence hall population on the campus according to classification (Table 3). The largest number of students were enrolled in Arts and Sciences, followed by Agriculture, Home Economics, Business Administration, Education, Architecture, Engineering, and Veterinary Medicine. These percentages of students in the various colleges were somewhat comparable to the overall campus enrollment among colleges.

The majority of the students responded that they lived most of their lives in an urban area (Table 2). Since the terms urban and rural were not defined in the question, apparently most students believed that they lived in an urban area if they lived in a town, no matter how small. The majority of students were from the Midwest; the other sections of the country and outside of the U.S. were fairly evenly represented by students in the sample. Most of the students had lived in only one community during

Table 2: Description of interview sample

residence hall (N=203) ¹		community most of life (N=203)	
	%		%
Ford Hall	28.6	urban area	61.6
West Hall	16.3	rural area	38.4
Moore Hall	27.6		
Haymaker	27.6		
sex (N=203)		regional location most of life (N=201)	
	%		%
male	47.3	west	3.5
female	52.7	southwest	2.5
		midwest	84.6
		northeast	4.0
		southeast	3.0
		outside U.S.A.	2.5
present age in years (N=203)		number of communities lived in prior to college (N=203)	
	%		%
17-19	50.7	only 1	52.2
20-21	41.9	2-3	27.1
22-23	5.4	4-6	14.8
24 and over	2.0	more than 6	5.9
student classification (N=203)		semesters in residence hall (omit current semester) (N=203)	
	%		%
freshman	36.9	none before this semester	7.4
sophomore	31.5	1 semester	44.8
junior	19.7	2-3	30.5
senior	8.9	4-6	14.3
graduate student	3.0	more than 6	3.0
major (N=202)			
	%		
agriculture	15.8		
architecture	7.9		
arts and sciences	34.2		
business			
administration	10.4		
education	9.4		
engineering	6.9		
home economics	13.9		
veterinary			
medicine	1.5		

¹ N varies because all students did not respond to all questions.

Table 3: Comparison of sample and campus residence hall population by classification

classification	sample ¹ (N=203)	campus residence ² hall population (N=4135)
	%	%
freshmen	36.9	44.2
sophomores	31.5	26.1
juniors	19.7	15.7
seniors	8.9	10.8
graduate students	3.0	3.2

¹Sample was randomly selected from four residence halls.

²Campus residence hall population includes nine residence halls.

their childhood; however, over one-fourth of the students had lived in two to three different communities before beginning college. The largest number of students had lived in the residence halls only one semester previous to the current semester while the next largest number of students had lived in the residence halls for two to three semesters.

Student-Related Factors Affecting Forecasting

Appendix K details the complete results of the interview survey categorized by major topics: breakfast habits; lunch habits; dinner habits; snacking habits; and other perceptions, practices, and habits of students related to residence hall foodservice. In this section, the major findings are summarized; tables present data pertinent to interrelationships among questions and relative to biographical factors.

Breakfast Habits. Of the 203 students responding to the question of frequency of breakfast consumption, 40.9 per cent said they never or seldom ate breakfast during the weekdays; however, 27.1 per cent of the students

responded that they ate breakfast two to three times during the weekdays, and 32.0 per cent replied that they usually ate breakfast during the weekdays. The percentage of students in this study who regularly ate breakfast is lower than data reported by Haseba and Brown (66) or Peterson (68). However, Peterson (68) reported 46.4 per cent of her sample sometimes or never ate breakfast, which compares quite closely with the percentage of students in this study who seldom or never ate breakfast. Bott (60), Spurling (69), and Thompson (61) reported percentages of students not usually eating breakfast lower than those for this study; while Wise (70) reported a substantially higher percentage of students not eating breakfast. This may be due to the fact that Wise studied a cross-section of all students on the campus and therefore of all types of living facilities. Students living in apartments or a situation where they must prepare their own breakfast will probably tend to skip breakfast more often than students who have access to a prepared breakfast as in a residence hall.

The students' classification and sex were studied in relation to breakfast habits while living in the residence halls (Table 4). A significant difference was found between both the student's classification and sex and the number of times he/she ate breakfast at the foodservice. The largest percentage of freshmen and sophomores reported they never or rarely ate breakfast in the foodservice while the largest percentage of upperclassmen and graduate students ate breakfast four or five times during the weekdays. The reason for this may be that upperclassmen and graduate students tend to live in residence halls for the services that are offered (i.e., prepared meals, linen service) more so than freshmen or sophomores who may very well be living in a residence hall due to parental pressure or

university regulation. Freshmen and sophomores also tend to be scheduled in classes later in the morning than upperclassmen.

Table 4: Classification and sex differences in weekday breakfast habits of college students

		present weekday breakfast habits			
	N	never or rarely eat breakfast	eat 2-3 times per week	eat 4-5 times per week	χ^2
		%	%	%	
student classification:					
freshman	75	48.0	32.0	20.0	11.91*
sophomore	64	43.8	25.0	31.3	
upperclassman and graduate	64	29.7	23.4	46.9	
sex:					
male	96	33.3	25.0	41.7	8.12*
female	107	47.7	29.0	23.4	

*P < .05

The largest percentage of males in the study eat breakfast four or five times in the foodservice during the weekdays; the largest percentage of females, never or rarely. This finding is supported by Spindler and Acker's (65) study where more girls than boys skipped the breakfast meal. However, the findings of Cooksey and Ojemann (64), Haseba and Brown (66), and Spangler (67) showed that there was no significant relationship between sex of the student and not eating breakfast.

To the question concerned with eating a regular (hot) or a continental (cold) breakfast, 70.7 per cent of the students who ate breakfast at least sometimes indicated that they did eat the regular breakfast which is served

at an earlier hour than the cold breakfast. The results of this study indicate that if a student does eat breakfast, he/she will get up early enough to eat the regular, full breakfast.

The majority of students (76.7 per cent) responded that they did not usually eat breakfast in the foodservice on the weekends; however, if a student did eat, he/she was more likely to eat breakfast both days rather than just Saturday or Sunday. Haseba and Brown's (66) study showed that women who generally ate breakfast during the weekdays did not eat breakfast on weekends. However, the reason for this situation was explained by the fact that no breakfast was served in the foodservice on the weekends.

An opportunity to sleep late was the most frequent response (76.5 per cent) for not eating breakfast at the foodservice. Other reasons given by the students included: dieting (1.1 per cent), I don't like breakfast foods such as bacon and eggs (2.8 per cent), no early classes (8.9 per cent), and don't have time, don't feel like it, not enough food, and habit (10.6 per cent). The reasons given by students in this study are similar to those found in the literature. Spindler and Acker (65) reported that a lack of time to eat was responsible for missed meals. The reasons for not eating breakfast reported by Haseba and Brown (66) were not enough time or didn't feel like eating. The students in Peterson's (68) study gave as reasons for not eating breakfast: not enough time, not hungry, dieting, do not like foods served, habit formed earlier, makes me sick, breakfast not prepared, no food on menu I can eat, and would rather spend time dressing. Bott (60), Spurling (69), and Thompson (61) reported similar reasons.

Most of the students (91.6 per cent) indicated that they usually or sometimes checked the posted menus in the residence halls before going to

the foodservice for breakfast. A very small percentage (8.4 per cent) replied that they seldom or never checked the menus.

The favorite breakfast item of the students was scrambled eggs. This was followed by french toast, pancakes, sausage, bacon, sweet roll, juice, fried eggs, cold cereal, poached eggs, toast, hamburger patty, hot cereal, fruit, and boiled eggs in descending order. When asked to list the two least favorite breakfast items, the following pattern of responses resulted: a hamburger patty and poached eggs followed by boiled eggs, hot cereal, pancakes, fried eggs, cold cereal, sausage, sweet roll, scrambled eggs, french toast, bacon, fruit, toast, and juice in descending order (Table 5). Bott (60) found that students preferred orange juice, eggs, meat, and toast for breakfast but did not like hot cereal, milk, and bread. Spangler (67) found students liked milk, fruit or juice, meat, eggs, cereal, and toast as part of their breakfasts, but that cold breakfast cereal, eggs, oatmeal, and coffee were given as the most disliked breakfast foods. These results indicate students tend to prefer traditional types of breakfast foods.

Of the students who ate breakfast, most of them ate with someone, either friends from their floor, a roommate, or other friends. Cooksey and Ojemann (64) found in their study that having someone to eat with affected whether students ate breakfast or not.

When asked what would make breakfast more appealing to the students at the foodservice, the number of students giving each response was fairly evenly distributed. The responses given by the students included: more juice offered, larger portions, more choices on a given day, more variety from day to day, serve hot breakfast later. Approximately one-fifth of the

Table 5: Most and least favorite breakfast items of students

breakfast food items	most favorite ¹	least favorite
	%	%
scrambled eggs	24.1	4.0
boiled eggs	1.2	9.7
fried eggs	7.0	7.9
poached eggs	2.2	18.6
french toast	12.7	3.7
pancakes	10.5	8.7
bacon	8.0	2.2
sausage	9.7	4.4
hamburger patty	1.7	18.8
sweet roll	7.7	4.4
toast	2.1	1.0
hot cereal	1.7	9.7
cold cereal	2.5	5.2
fruit	1.7	1.2
juice	7.2	0.5

¹Two most favorite and two least favorite foods were selected by each respondent.

students offered no suggestions. A few students suggested having only a cold breakfast, serving non-breakfast foods, and better coffee, and having friendlier employees on the serving line.

When asked about their past breakfast habits, 60.6 per cent of the students said they generally had eaten breakfast at home, 22.2 per cent responded that they had not usually eaten breakfast, and 16.7 per cent replied that they had eaten breakfast about half the time at home. The percentage of students skipping breakfast while living at home in this study was lower than that found by Wise (70). Perhaps students who are used to eating breakfast at home gravitate towards residence hall living where breakfasts are regularly prepared for them.

The students' breakfast habits while living in the residence halls were compared with their previous breakfast habits. A significant relationship was found between the number of times students ate breakfast during the week while living in the residence halls and the number of times they ate breakfast while living at home (Table 6). Many students had varied their breakfast habits since high school days; for example, 43.4 per cent of the students who reported they never eat breakfast, regularly ate breakfast prior to coming to college. This may indicate a change in life style and perhaps the independence from home affects eating habits. This implication was supported by the data reported above relative to the fewer numbers of lower-classmen who ate breakfast compared to upperclassmen.

Table 6: Relationship of college students' weekday breakfast habits presently and prior to college

present weekday habits	N	breakfast habits during high school		
		generally ate breakfast	ate about half the time	didn't usually eat breakfast
		%	%	%
never or rarely eat breakfast	83	43.4	22.9	33.7
eat 2-3 times per week	55	65.5	18.2	14.5
eat 4-5 times per week	65	78.5	7.7	13.8

$$\chi^2_{23.99}, P < .001$$

Lunch Habits. When questioned about their present lunch habits, 78.8 per cent of the students interviewed said that they always ate lunch at the foodservice on class days (Monday through Friday); 15.3 per cent of the

students, three to four times, and only 5.9 per cent of the students ate lunch never or one to two times. The majority of students interviewed who ate lunch at the foodservice stated that the usual time for eating was 11:30 a.m.; next largest group, at 12:30 p.m. The foodservice is open for service continuously from 10:45 a.m. to 1:15 p.m.; however, the class schedules at the university are arranged so that classes end and begin on the half hour. The early lunch hour is influenced, perhaps, by many students' failure to eat breakfast.

Over 85 per cent of the students interviewed checked the posted luncheon menus in the residence halls either sometimes or regularly. The majority of students checked the menus whether they ate in the foodservice or not. The majority of students who normally check the posted menu, stated as their main reason for doing so, "to decide whether to go through the hamburger line or not." Curiosity and to decide which main dish to take were the next two most prominent reasons given. A few students gave other reasons, such as checking calorie points and seeing if they liked what was being served.

When asked how often they ate lunch at places other than the foodservice, 87.4 per cent of the students replied that they never ate other places. Approximately 10 per cent of the students said they ate lunch at other places one or two times per week; however, less than 3 per cent of the students said they ate lunch at some place other than the foodservice more often than one to two times a week. The responses concerning place of eating lunch other than the foodservice indicated fast food restaurants was the most frequent choice followed by the student union, and another residence hall foodservice on campus. A few students named other situations, including patronizing vending machines at various locations and carrying a

sack lunch. The students who did not usually eat lunch at the foodservice were questioned as to the main reason for this. Most of the students responded that missing lunch at the foodservice was due to a class conflict. Other reasons given were: off campus at lunch time, dieting, dislikes food served at foodservice, not enough time to eat, not hungry, and studying.

To the question of how often they patronized the hamburger line during the week, the majority of students (63.5 per cent) responded that they hardly ever go through the hamburger line. Thirty-four per cent said they patronized the hamburger line two to three times a week, while less than three per cent of the students chose the hamburger line more often. Apparently the hamburger line offers an alternative when unpopular luncheon items are served, but is not the regular luncheon of the majority of students.

When asked what type of lunch served at the foodservice was preferred, 55.7 per cent of the students responded that they preferred sandwiches, 33.5 per cent preferred casseroles, and 10.8 per cent preferred cold plates. This same finding was reinforced by findings of least favorite foods (Table 7). A comparison of male and female students' luncheon entree

Table 7: Students' most and least favorite type of lunch item

lunch item	most favorite	least favorite
	%	%
sandwiches	55.7	7.4
casseroles	33.5	31.5
cold plates	10.8	61.1

N = 203

preferences (Table 8) indicated a significant relationship between the sex of the student and the type of luncheon entree he/she preferred. The largest percentage of both males and females preferred sandwiches; however, a larger percentage of females than males preferred cold plates and conversely, a larger percentage of males preferred casseroles.

Table 8: Male and female college students' luncheon entree preferences

sex	N	type of lunch preferred			χ^2
		sandwiches	casseroles	cold plates	
		%	%	%	
male	96	58.3	38.5	3.1	11.61*
female	107	53.3	29.0	17.8	

*P < .05

The students were asked what changes they would make in the foodservice to increase the appeal of the lunch served at the foodservice. Approximately 25 per cent of the students believed that sandwiches should be served more often, and approximately 20 per cent believed that there should be a larger variety of salads or that larger portions should be served. The findings were compatible with the preference question discussed above. More variety in general was suggested as a change by 4.5 per cent of the students. A few students had other suggestions, such as better food and soup offered more often.

School lunch was the response given most often by the students (44.8 per cent) when asked where they had eaten lunch during the school year of their last year at home. At home (23.6 per cent) was the next most

prevalent response, followed by a sack lunch at school (15.8 per cent) at a fast food restaurant, and did not eat lunch.

Dinner Habits. When asked about their present dinner habits, 75.9 per cent of the students interviewed responded that they ate dinner at the residence hall foodservice five times during the weekdays. Three or four times a week was given as a response by 21.7 per cent of the students; 2.5 per cent of the students ate at the foodservice only one or two times a week. No students responded that they never ate dinner at the foodservice. These results differ from the results obtained by Bott (60); 9 per cent of her sample reported skipping the dinner meal.

Weekday dinner habits of the students living in the residence halls were compared among males and females and by student classification (Table 9). Significant relationships were found with both comparisons. Although large percentages of students, regardless of classification, ate dinner in the foodservice, upperclassmen ate more frequently than did freshmen or sophomores. Also, more males than females ate dinner in the foodservice five times a week; however, fewer females than males ate only one or two times a week.

Students were asked how often they ate dinner outside the residence hall foodservice during the week (Monday through Friday). "Never" was the response given by 70.6 per cent of the students and one to two times was the answer given by 26.3 per cent. Only 3.1 per cent of the students responded that they ate dinner outside the foodservice three to four times during the week and no student gave the response of five times a week. Results indicate that although a few students miss the lunch and dinner meals at times, the large majority of students eat these meals in the residence hall and seldom eat other places.

Table 9: Classification and sex differences in weekday dinner habits of college students

		weekday dinner habits			
	N	five times	3-4 times	1-2 times	χ^2
		%	%	%	
student classification:					
freshman	75	70.7	28.0	1.3	
sophomore	64	67.2	28.1	4.7	
upperclassman and graduate	64	90.6	7.8	1.6	12.91*
sex:					
male	96	84.4	11.5	4.2	
female	107	68.2	30.8	0.9	12.66*

*P < .05

The students who said they did eat outside the residence hall foodservice were asked where they would normally eat. A fast food restaurant was the response given by over 50 per cent of these students (N=57). Another response given by the students was "at the sorority" (17.5 per cent). Other responses included: at home, at work, or at a friend's house or apartment. Of the students who do not usually eat at the residence hall foodservice, approximately the same number of students gave as their reason why, either they desired a change of routine or they had extracurricular activity commitments. A few students responded: they were invited out, they were dieting, they did not believe they could afford to take the time from studying, they were at work, they did not like the food offered, or lines were too long.

Most of the students (69.8 per cent) indicated they ate dinner at the foodservice between 5:00 and 5:30 p.m. The remainder replied that they ate

dinner between 5:30 and 6:00 p.m. Although they were not asked why, it was presumed that the early lunch habits and time for activities and study in the evening were influencing factors.

When asked which line at the foodservice the students usually patronized, two pairs of lines, C,D or E,F were given by the majority of students as the lines most commonly used. For each pair of serving lines there is one common student employee who punches the students' meal tickets. The students can then proceed through either of the serving lines. Even though the foodservice has seven lines, C,D and E,F lines are the only two pairs that have both of the serving lines open during the entire serving time. The students were then asked why they chose to patronize the line that they did. Approximately equal percentages of the students responded to the question with, "closest to the residence hall where I live," "habit," or "used by students on my floor." Fewer students responded that it was the shortest line. Other reasons given by the students: the line goes faster, meets other friends there, and the mixture of men and women is attractive.

When asked with whom they usually ate dinner, the majority of students (55.2 per cent) responded that they usually ate with friends other than a roommate; although 28.6 per cent ate with their roommate and 11.8 per cent, with roommate and other friends. Few students (1 per cent) answered that they ate alone.

The favorite type of dinner entree item was the category of grilled steak or roast beef (Table 10). This was followed by the categories: Italian and Mexican foods; poultry, beef items other than grilled steaks or roast beef; fried fish; sandwiches, casseroles, cold plates, and other extended items; pork; and baked fish. The results of this study are supported by the literature with regard to beef being a favorite entree item.

Long (7) found that poultry and beef were preferred over pork and fish in her study, which is supported by this study. However, Einstein and Hornstein (72), Schuck (73), and Peryam (80) reported that pork products ranked very high as a favorite entree item. The studies done by Einstein and Hornstein (72) and Peryam (80) sampled a nationwide population. Apparently, midwesterners do not prefer pork as an entree as much as the rest of the nation. The least favorite dinner entree item was beef items other than grilled steaks or roast beef. This was followed by the categories: baked fish; other items such as rabbit or liver; sandwiches, casseroles, cold plates, and other extended items; poultry; Italian and Mexican foods; pork; grilled steaks and roast beef; and fried fish. These results tended to be supported by Peryam's (80) study in which beef ranked well down the list of favorite entree items, and meat combinations, liver, and fish ranked even lower.

Table 10: Students' most and least favorite dinner entree items

dinner entree item	most favorite	least favorite
	%	%
beef--grilled steaks and roast beef	37.5	2.5
beef--other solid items	9.0	22.2
pork--solid items	5.0	5.1
poultry--solid items	15.0	7.6
Italian and Mexican foods	18.0	5.6
sandwiches, casseroles, cold plates, and other extended items	6.0	17.7
fish--baked	2.0	19.7
fish--fried	7.5	1.0
other	0.0	18.7

N = 200

Less greasy meat was the suggestion chosen by 28.5 per cent of the students as the most appealing change in the dinner foods served at the foodservice. Other suggestions were: larger portions; hotter food; more variety of vegetables, salads, and entrees; fewer starchy foods; and shorter serving lines. A few students (7.5 per cent) offered no suggestions.

When asked their opinions of the special dinners served in the residence hall foodservice, 46.3 per cent of the students responded that they were good; whereas, 42.9 per cent rated the events very good. The suggestion given by 38.4 per cent of the students to improve the special dinners was to have them more often, 33 per cent of the students had no suggestions for improvement. Some students believed the special dinners should be less crowded and disorganized, and some students suggested serving larger portions. Special dinners are meals that are scheduled once a month where one food is emphasized such as Steak Night or Taco Night, or meals once a semester where a theme is planned and foods and decorations are coordinated to the theme.

The large majority of students (89.2 per cent) responded to the question concerning their normal dinner style while living at home that they usually ate dinner with their families. Very few of the students ate dinner as a snack or in a restaurant.

Snacking Habits. When asked if they usually ate snacks in the morning, 76.7 per cent of the students replied "seldom" or "never." "Occasionally" was the response given by 17.8 per cent of the students and only 5.4 per cent said that they usually snacked in the mornings. Of the students who usually snacked in the mornings, 57.7 per cent reported snacking in the residence halls, and 32.7 per cent said they snacked at the union. Approximately 17 per cent of these students chose a doughnut, roll,

or soft drink. Less popular items were coffee, candy, and fruit or juice. Several students chose more than one item for their snacks and several listed other foods, such as yoghurt, cookies, and chips.

The students were asked if they patronized the student union foodservice during the morning; 73.5 per cent replied that they hardly ever patronized the union, 20.5 per cent said they did only once in a while, and only 6 per cent replied that they patronized the union foodservice every day or every other day. Apparently the students who patronize the union are not the residence hall dwellers, but are those who live off campus. To socialize or relax was the main reason given by students who usually patronized the union. "They felt hungry" was the next most important reason given. Several students said they patronized the union foodservice to get a table for studying. The snack most often consumed was a soft drink, followed by a doughnut or roll, coffee or tea, and two of the above mentioned foods. A few students listed milk and yoghurt. The reason given by most of the students for choosing these foods was that they felt hungry or thirsty, followed by: it looked good, the price was reasonable, and it was not served at the foodservice.

When asked what they generally ate or drank in the afternoons, 24.6 per cent replied that they ate or drank nothing; 31.5 per cent of the students responded that they usually had a soft drink; 17.2 per cent, fruit; 2.5 per cent, candy, ice cream, or potato chips; and 5.9 per cent responded that they usually ate or drank a combination of the above mentioned food items. A few students listed other foods, such as milk, tea, or coffee; cookies; and crackers. The most common place for these snacks was the student's room; however, a few students reported snacking in the basement of the residence halls or in the union. Other places listed

for afternoon snacks were the library, Aggieville (the business area close to campus), and the campus dairy bar.

Approximately 80 per cent of the students said they ate a snack after dinner either two or three times a week or nearly every night; whereas only 24.1 per cent of the students responded that they rarely ate an evening snack. The most common place for the snack was the student's room, followed by the basement of the residence halls, off campus, and two of the above mentioned locations. Soft drinks, popcorn or chips, and ice cream or milk were the most frequently consumed snacks (Table 11). It was of interest however, that over 10 per cent of the students ate pizza or hamburgers two or three times a week. Perhaps the early dinner hour encouraged evening snacking, although other reasons were cited as well. Most of the students (46.5 per cent) reported that they snacked to relieve hunger as their main reason for eating in the evening; 26.8 per cent snacked to relax from study pressures; 11.5 per cent, to socialize with their friends; 5.7 per cent snacked while watching television; and 5.7 per cent reported a combination of factors.

The results from this research supports Spindler and Acker's (65) study in which they found students consuming from one to three snacks a day. Wise (70) reported that students snacked much more frequently in the evenings than in the afternoons. However, in this study, almost the same number of students snacked in the afternoons as in the evenings. Spangler (67), Bott (60), and Wise (70) found that students' most popular snack was soft drinks, which was corroborated by the findings of this study. A recent Gallup Survey (91) also reported carbonated beverages were the most popular snack drinks and pizza, the most popular snack food.

Table 11: After dinner snacking habits of college students

food item selected for snacks	frequency		
	hardly ever	two or three times	nearly every night
	%	%	%
candy	83.3	13.5	3.2
soft drinks	30.8	51.3	17.9
pizza	83.9	16.1	0.0
popcorn or chips	45.5	46.2	8.3
ice cream or milk	64.1	31.4	4.5
hamburgers	87.2	12.2	0.6

N = 156

When asked how often they purchased vending machine items, 30.7 per cent responded "less than once a week," 39.1 per cent said "once a week," and 27.7 per cent replied that they purchased vending machine items daily. Only 2.5 per cent of the students replied that they purchased vending machine items more than once a day. Over 77 per cent of the students said they usually or occasionally kept food or drink in their rooms and the remainder of students, rarely. Small refrigerators designed for residence hall rooms are available for rent by students in the residence halls. Approximately 78 per cent of the students interviewed had access to a refrigerator, either one in their rooms or in a friend's room. Although when asked how access to a refrigerator affected eating habits and meals, 97.5 per cent of the students replied that it had no effect.

These findings related to snacking between meals and in the evening lend further credence to descriptions of national eating habits--the U.S.A. is a nation of "snackers," the ready availability of food being a key influence (92).

Other Perceptions, Practices, and Habits Related to Residence Hall

Foodservice. When asked whether they viewed cleanliness as a problem in the dining room, 45.5 per cent of the students replied, "never"; 39.6 per cent, "seldom"; and 14.9 per cent responded that cleanliness was sometimes a problem. No student thought cleanliness was almost always a problem. In the residence hall foodservice, efforts are directed continually to maintaining high standards of sanitation; apparently this is reflected in these responses.

The dining areas closest to lines C,D and E,F were the most frequented areas by the students. There were very small differences in the percentage of students who patronized each line and who frequented the dining area opening from each line. The main reason given by the students for frequenting a specific dining area was that the members of their floor regularly sat there. Another fairly common reason was that the end of the line they went through was in that dining area. A few students gave other reasons: one dining area was less crowded than others; habit; and there was an attractive mixture of men and women in a certain area.

The students interviewed were asked if they thought the atmosphere of the dining room could be improved. Most of the students (46.8 per cent) replied that they did not think the atmosphere needed improvement, 36.8 per cent of the students thought the atmosphere should be improved, while 16.4 per cent of the students were undecided. More music and brighter walls and curtains were the main suggestions for improvements (88.8 and 79.7 per cent, respectively); although 33.8 per cent preferred smaller groupings of tables.

When questioned as to their weekend habits, 44.1 per cent of the students replied that they were out of town one or two times a semester,

excluding vacations; 34.7 per cent of the students, once a month. About twice a month was the response given by 14.9 per cent of the students, while only 6.4 per cent replied that they were out of town almost every weekend. Those students who were usually in town on the weekends were asked how often they ate at the foodservice. The majority of students (54.5 per cent) responded that they ate every meal except breakfasts at the foodservice; 18.3 per cent ate every meal; and Saturday and Sunday lunches only were eaten by 16.3 per cent of the students. Reasons for not eating at the foodservice on weekends were: "I prefer to go out" (34.1 per cent); "I'm usually invited out" (29.3 per cent); "I'm usually off campus" (15.9 per cent); and 11.6 per cent responded that they would rather sleep. These students also were asked where they usually ate their meals on weekends, if not at the foodservice. Most of the students (40.0 per cent) replied they ate in a fast food restaurant, 33.5 per cent said they patronized a restaurant, and fewer percentages of students replied that they ate at a friend's home or apartment, with parents or relatives, or that they simply did not eat.

When asked for their opinions on having an evening meal on Sunday, 42.9 per cent of the students said they would like to have a meal served at the foodservice and would regularly eat there. The present arrangement was preferred by 27.1 per cent of the students, 16.7 per cent said it made no difference to them, and 8.9 per cent said they wished an evening meal was served but probably would not eat there regularly.

Many students (46.8 per cent) did not have activities that kept them from eating at the foodservice during regularly scheduled meal hours. Fewer students (12.8 per cent) reported that intramural sports, studies (15.8 per cent), and sorority activities (4.4 per cent) kept them from

eating. Other activities interfering with meal schedules included: work, classes, and varsity sports.

The majority of students indicated hot foods were generally hot and cold foods were generally cold when served at the serving line. When asked how appetizing the food appeared on the cafeteria line, 60.6 per cent of the students replied that it sometimes looked appetizing, 29.6 per cent said the food appeared appetizing almost always, and only 9.9 per cent of the students said they found the food rarely appeared appetizing.

The students were asked to evaluate the attitudes of the servers. The two most common attitudes which the students perceived the servers as conveying were pleasantness and boredom. Only a few (5.4 per cent) thought the servers conveyed a "grouchy" attitude. The percentage of students rating the servers as interested (46.3 per cent) was very close to the percentage of students rating the servers as uninterested (53.7 per cent); whereas, a much larger percentage of students rated the servers as friendly (88.4 per cent) than unfriendly (11.6 per cent). Likewise, more students rated the servers as serving the food carefully (87.1 per cent) than serving the food sloppily (12.9 per cent). These findings were somewhat puzzling; while many viewed servers as uninterested, they did not view them as unfriendly or sloppy in work habits.

When the students were asked if they asked the servers about the food, 42 per cent replied seldom or never; 46.5 per cent said that they occasionally asked about the food, and only 11.4 per cent said they often asked the servers about the food. The most common question asked by the students (61.1 per cent) was: "What is it?" A few (19 per cent) students indicated they queried servers about the ingredients composing an

item--or "What is it made of?"--and others (4.8 per cent), "What does it taste like?"

The students were asked what suggestions they had made concerning the food or service at the residence hall foodservice. Most of the students (71.9 per cent) replied that they had made no suggestions; while 4.9 per cent of the students said that they had suggested larger portions. Other recommendations included: less greasy food; longer serving times or faster service; and an adequate supply of silverware, trays, and ice. These results were of interest because earlier portions of the interview that dealt with specific suggestions related to menus for various meals and to other aspects of the foodservice indicated the students did have ideas for changes. Apparently they either are not dissatisfied to the degree they will verbalize a complaint or they are not sure of the procedure or to whom to voice a complaint. Students may at any time approach a serving line supervisor or dietitian to voice a comment or complaint. Also, there is an established food committee with elected representatives from each residence hall which meets regularly with the unit manager and dietitians of the foodservice. Students may voice comments concerning the foodservice, new ideas, or complaints to this committee which will then be relayed to the professional staff of the foodservice. The minutes from these meetings are sent to the residence halls to be posted. Even though a mechanism exists for gaining student input into the system, perhaps many students are not aware of its existence.

When asked to rate the foodservice in general, 4.4 per cent of the students rated the foodservice excellent, while only 3.4 per cent rated the foodservice poor. The majority of students rated the foodservice either acceptable (33 per cent) or good (59.1 per cent). This overall reaction to

the foodservice may explain why few students have voiced suggestions--in general, they tended to be fairly well satisfied.

Phase II: Comparison of Meal Attendance and Forecasting Data

Hall Population during Study Period

The population of the four residence halls utilized in this research was fairly stable throughout the seventeen weeks of data collection (Table 12). During the first semester data collection period, there was a total difference of fourteen students living in the residence halls from week two (the highest population) until the end of the semester (the lowest population). There was a total difference of only seven students from the beginning of the data collection period in the second semester until the end of the period.

Table 12: Residence hall population during data collection period

data collection week	week of semester	residence hall population ¹
1	first semester: 06	2251
2	07	2254
3	08	2250
4	09	2249
5	10	2250
6	11	2248
7	12	2249
8	13	2247
9	14	2245
10	16	2245
11	17	2240
12	second semester: 03	2238
13	04	2237
14	05	2237
15	06	2234
16	07	2234
17	08	2231

¹Hall population is recorded on Friday of each week.

Meal Attendance at the Residence Hall Foodservice

Breakfast Attendance. The mean attendance at breakfast was substantially higher Monday through Friday than on weekends (Table 13). The attendance at breakfast Tuesday through Thursday and Saturday and Sunday varied much less than the attendance at breakfast on Mondays or Fridays. Figure 1 plots the breakfast attendance by day of the week throughout the data collection period. Weekend travel probably affected Monday and Friday participation. Many students may extend the weekend by leaving campus on Thursday evening or Friday or returning to the campus on Monday rather than Sunday. Monday breakfast variability also was affected because students were released from classes on one Monday (week 6) for a holiday--making a long weekend. However, the residence halls and foodservice remained open for those students who did not wish to leave campus. Obviously, the meal attendance on that Monday breakfast was much lower than usual as shown on Figure 1. The small variability in the attendance at Saturday and Sunday breakfasts seems to suggest that even though the numbers attending these meals are small, they are nevertheless, faithful. The overall attendance at breakfast was 31.8 per cent of the hall population, varying from 10.7 on Sunday to 43.1 on Wednesday. Comparing student reports of breakfast attendance from the interviews, it was estimated that about 40 per cent of the students ate breakfast during the weekdays. The actual data indicate 42 per cent ate breakfast, on the average, Monday through Friday. These data are quite similar; particularly if actual figures were adjusted for employee meals served.

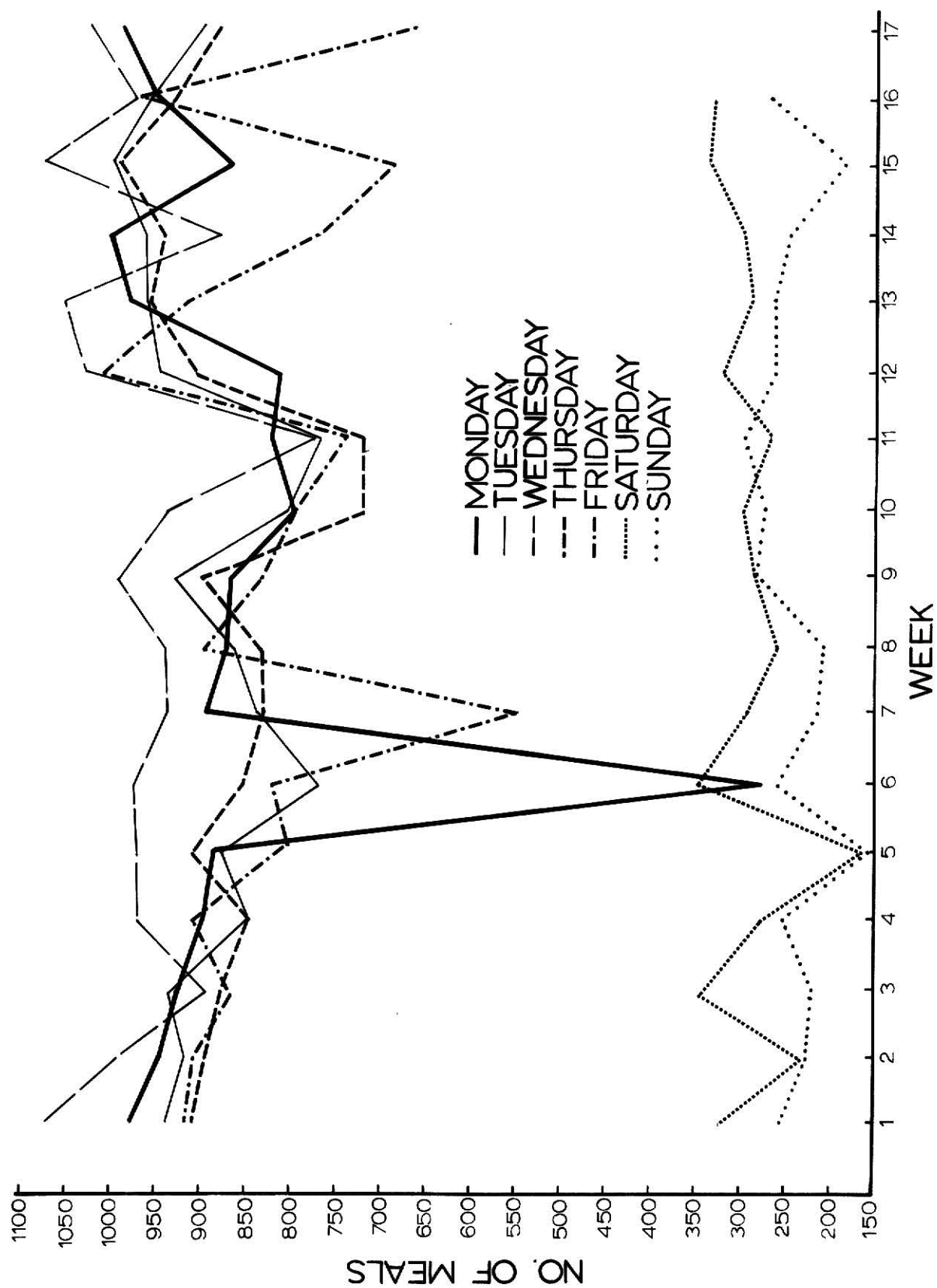
Lunch Attendance. The mean meal attendance at lunch was fairly similar Tuesday through Thursday, but was lower on Monday, Friday, Saturday, and Sunday (Table 13). The variability was quite small for Tuesday

Table 13: Mean attendance at foodservice meals by day of week

day of week	breakfast		lunch		dinner ¹	
	% attendance ²		% attendance		% attendance	
	mean and s.d.	mean and s.d.	mean and s.d.	mean and s.d.	mean and s.d.	mean and s.d.
Monday	865.29±163.55	38.57±7.31	1964.00±263.77	87.54±11.73	1982.94±159.72	88.39± 7.12
Tuesday	890.76± 69.84	39.71±3.16	2039.76± 33.06	90.92± 1.44	1999.29± 56.36	89.12± 2.50
Wednesday	965.76± 75.81	43.05±3.40	2044.35± 39.95	91.12± 1.56	1878.65± 46.24	83.73± 1.85
Thursday	871.47± 72.83	38.85±3.29	2022.82± 25.96	90.16± 0.97	1934.94± 74.14	86.24± 3.25
Friday	822.65±118.48	36.69±5.27	1920.53±164.72	85.64± 7.23	1345.94±336.50	60.02±14.99
Saturday	289.63± 46.46	12.91±2.08	1676.94±355.05	74.76±15.80	1446.73±295.17	65.00±12.87
Sunday	240.38± 36.74	10.72±1.65	1698.13±340.75	75.72±15.24		

¹No evening meal is served on Sunday.²% attendance = $\frac{\text{number attending meal}}{\text{hall population}}$.

Fig. 1. Breakfast Attendance throughout Study Period



through Thursday lunch attendance but was larger for Monday, Friday, Saturday, and Sunday. Once again, the effect of the holiday increased the variability of the Monday meal attendance. The variability of the Monday, Friday, and weekend lunches appeared to be greatly influenced by weekend campus events, particularly varsity football and basketball games scheduled on campus. When a game was not scheduled on the home campus, more students tended to leave for the weekend. For example, Saturday football or basketball games were scheduled on weeks 1, 3, 6, 7, 9, 10, and 16 of the data collection period. Figure 2 indicates weekend attendance tended to be higher on these days. Attendance also was high on the weekend of week 11 which was just prior to final examination period. Week 17 provided another notable fluctuation; attendance was very low at the end of the week which was before the spring mid-semester vacation. Luncheon attendance, overall, was 86.8 per cent of the hall population; Saturday lunch was lowest, with 74.8 per cent attendance. Again, these figures tended to verify interview data--the difference was approximately 2 per cent.

Dinner Attendance. The mean meal attendance at the dinner meals was similar Monday through Thursday but was lower on Friday and Saturday (Table 13). The mean attendance on Wednesday was slightly lower than on Monday, Tuesday, or Thursday. Sorority members living in the residence halls eat dinner at their sorority houses on Wednesday which probably explains this fluctuation. The greater variability of Monday dinner attendance when compared with other weekdays may be attributed, once more, to the holiday. Both the lower mean meal attendance and the greater variability of attendance on Friday and Saturday can probably be explained in a similar manner as for breakfast and lunch--weekend campus events and weekend travel are major influencing factors. Figure 3 plots the data for

Fig. 2. Lunch Attendance throughout Study Period

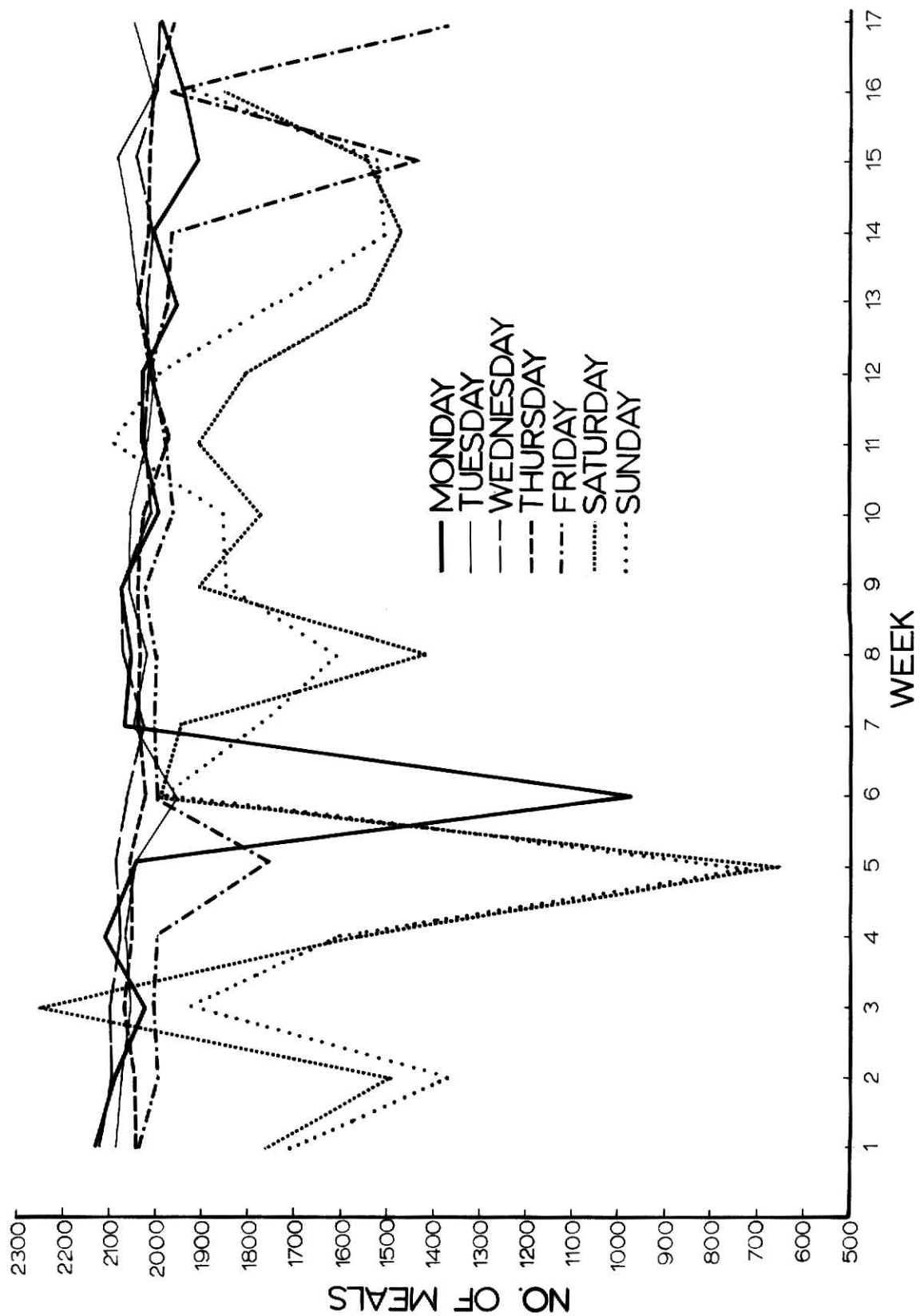
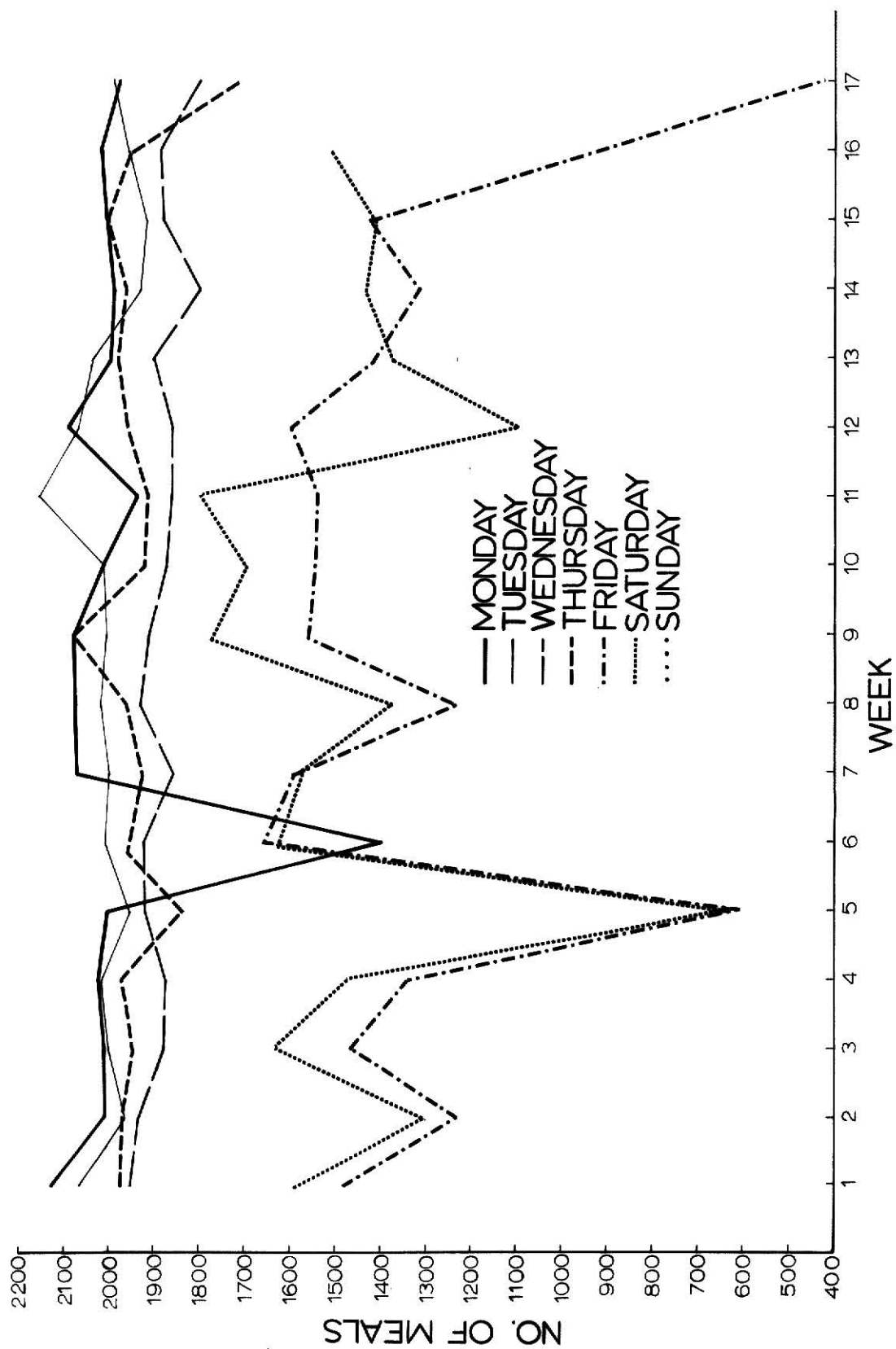


Fig. 3. Dinner Attendance throughout Study Period



attendance at dinner meals. Dinner attendance as a percentage of hall population was slightly lower than lunch; 78.5 per cent attended the evening meal. Friday and Saturday ratios were lowest (60.0 per cent and 65.0 per cent, respectively).

Events Affecting Meal Attendance. Of the campus and hall events that were monitored, the events that appeared to have a major effect on meal attendance were the varsity ballgames, both football and basketball, and any special event connected with the games (e.g., homecoming on Saturday of week 7). Minor campus events occurred regularly (organizational meetings, special lectures, recitals, etc.), and frequently there also was either a hall event (special dinners, dinner meetings, hall get-togethers, etc.) or a major campus event (Landon Lectures, auditorium attractions, etc.). No effects on meal attendance were readily apparent from events other than ballgames.

Comparison of Meal Attendance and Forecasting Data

Tables 14 and 15 summarize forecast, meal attendance, and production data for lunch and dinner. The forecast and production information are aggregate data computed from other records. In forecasting for meals, a total attendance per se is not projected for each meal by the production dietitian. Approximate figures of meal attendance are used as a basis for forecasting production demand for specific menu items. These general estimates are: breakfast, 800 attendance; lunch, 2200; and dinner, 2000. Therefore, the total forecast figures (initial and adjusted) are an accumulative sum of the forecasts for all of the entrees at a particular meal. Data for total portions served were determined from production records by summing the number of portions served for each entree. Differences were computed for comparison and analysis of the various data.

As explained in the method section, two types of estimates are involved in production forecasting for the residence halls. The initial forecast, which is a one- to two-week in advance prediction, is the basis for procurement of food supplies. The adjusted forecast, one to two days prior to service, is the basis for production.

Reasons for adjustments to initial forecasts were studied and additions to the planned entrees also were noted for the analysis of forecast data. Adjustments of forecasted amounts and additions of food items were made before actual production for various reasons. The reason given most often for the addition of a food item was that over-production from a previous meal needed to be used. Other reasons given for the addition of food items included: to provide a cushion for another food item because of concern the amount was insufficient; to provide a fill-in for an item that ran out; or to reduce food costs if planned items were high-cost items. The reasons given for an adjustment of the initial forecast or for variation of production amounts from forecasts were that the anticipated meal count was expected to be lower than initially projected; that the food item could be cooked as needed on the line or prepared as needed; that students preferred one menu item over another; or that the batch preparation or recipe size over- or under-produced the forecasted amount. The weekend meals usually were overforecasted purposefully because food is delivered to the foodservice from the central food center before the weekend, with no possibility of obtaining more food during the weekend. This overforecasting is to insure an adequate food supply.

Luncheon Meal. Estimates were not available for the number of students who would go through the hamburger line at the luncheon meal; therefore total forecasts (initial and adjusted) from other entrees were revised to

include data from actual counts of students served hamburgers. Appendix H details the percentage breakdowns of portions of the various entrees served by meal. Data indicate that the mean percentage of students selecting hamburgers was 21.2; the percentage varied from 10.0 to 40.0. These data compare favorably with reports by students discussed previously.

The mean initial forecasts differed very little among days of the week; the mean forecast for Saturday was slightly lower than for the other days (Table 14). Small differences were noted in initial and adjusted forecasts; in all but one instance, mean adjustments were to decrease initial estimates of production demand.

The mean difference between the initial forecast and the meal attendance was compared by day (Table 14). Tuesday and Wednesday were the two days when the least initial overforecasting occurred. Overforecasting on Saturday and Sunday was much higher than on any other day. The percentage varied from 2.86 per cent on Wednesday to 20.95 per cent on Sunday. The variability of the means was quite high; however, the most variability occurred on Friday, Saturday, and Sunday. Both the overforecasting and high variability on weekends probably can be explained by the schedule of campus activities as discussed in a preceding section. Also, the purposeful weekend overforecasting no doubt contributed to these findings.

When mean differences between the initial forecast and the production records of portions served were compared (Table 14), the initial forecast was between 6.21 to 15.13 per cent greater than the portions served. The variability of the mean differences also was quite high with the lowest variability occurring on Wednesday and Thursday.

A comparison was made between the mean differences of the production records of portions served at lunch and the meal attendance recorded by

Table 14: Comparison of initial and adjusted total forecasts, meal attendance, and production reports of meals served for luncheon meals

day of week ¹	initial forecast ²		adjusted forecast ³		checkers' record of meal attendance ⁴		production record of portions served ⁵		difference (initial forecast - meal attendance)	
	mean and s.d.		mean and s.d.		mean and s.d.		mean and s.d.		mean and s.d.	% and s.d. ⁶
Monday	2099.41±203.95		2064.12±336.86		1964.00±263.77		1923.06±259.48		135.41±187.14	8.67±16.02
Tuesday	2105.06±157.45		2116.53±172.48		2039.76±33.06		1964.47±168.66		65.29±165.87	3.25±8.21
Wednesday	2103.41±152.62		2099.29±130.23		2044.35±39.95		1960.65±111.55		59.06±136.55	2.85±6.68
Thursday	2143.82±144.67		2111.94±108.15		2022.82±25.96		1983.65±124.41		121.00±136.57	5.96±6.70
Friday	2021.88±174.72		2009.53±175.51		1920.53±164.72		1869.94±196.97		101.35±254.78	6.31±16.31
Saturday	1890.63±456.77		1890.09±452.44		1676.94±355.05		1712.81±376.37		213.69±287.70	13.42±16.22
Sunday	2008.88±348.95		1953.56±366.12		1698.13±340.75		1698.19±339.56		310.75±299.26	20.95±20.15

day of week	difference (initial forecast - portions served)		difference (adjusted forecast - meal attendance)		difference (adjusted forecast - portions served)		difference (portions served - meal attendance)	
	mean and s.d.	% and s.d. ⁷	mean and s.d.	% and s.d. ⁶	mean and s.d.	% and s.d. ⁷	mean and s.d.	% and s.d. ⁸
Monday	176.35±209.52	8.43±10.74	100.12±136.88	4.70±6.86	141.06±173.87	5.97±7.51	-40.94±88.87	-1.97±4.35
Tuesday	140.59±224.05	6.21±10.31	76.76±179.19	3.80±8.84	152.06±231.81	6.65±10.58	-75.29±154.09	-3.73±7.54
Wednesday	142.76±128.24	6.54±5.66	54.94±121.62	2.68±5.99	138.65±106.87	6.46±4.89	-83.71±94.64	-4.12±4.67
Thursday	160.18±177.70	7.15±7.64	89.12±97.62	4.39±4.79	128.29±140.02	5.93±6.41	-39.18±113.32	-1.96±5.60
Friday	151.94±207.07	7.22±9.81	89.00±252.50	5.64±16.26	139.59±189.35	6.71±9.20	-50.59±263.48	-1.76±14.79
Saturday	177.81±252.53	7.21±16.21	213.06±289.25	13.61±16.72	177.19±248.20	7.42±15.29	35.88±225.92	4.15±18.13
Sunday	310.69±299.43	15.13±14.03	255.44±255.69	17.03±17.72	255.38±250.52	12.93±11.31	0.06±28.39	0.05±1.68

¹In computation of means data from 16 weeks available for Saturday and Sunday; data from 17 weeks for other days.

²Initial forecast = sum of forecasts of entree items one to two weeks prior to day of service.

³Adjusted forecast = sum of forecasts of entree items one to two days prior to day of service.

⁴Meal attendance recorded by meal ticket checker at beginning of service line.

⁵Total number of portions of entree items served computed from production records.

$6\% = \frac{\text{difference}}{\text{meal attendance}}$ $7\% = \frac{\text{difference}}{\text{forecast}}$ $8\% = \frac{\text{difference}}{\text{portions served}}$

meal ticket checkers (Table 14). The mean differences show that for all days except Saturday and Sunday, the actual portions served were reported to be from approximately 2 per cent to 4 per cent less than the meal attendance. On Saturday, however, the mean portions served were approximately 4 per cent greater than the mean meal attendance. The largest variability in the mean differences occurred for Friday and Saturday. Besides recording errors, one explanation for these discrepancies between records of portions served and meal attendance for Monday through Friday is that the only food items monitored were the entrees. Also, in a companion study to this research in which actual choices from the cafeteria line were recorded, Johnson (93) noted that quite a number of students refused an entree. Likewise, an explanation for the greater number of portions served than meal attendance for Saturday is that a Sandwich Bar was served on one occasion where students made their own sandwiches using as many portions of meat as they pleased.

When differences in adjusted forecasts and meal attendance were analyzed it was found that the mean differences were fairly similar for Monday through Friday; the mean differences for Saturday and Sunday were quite large. Percentage mean differences were very similar to the percentage mean differences for initial forecast and meal attendance on Tuesday, Wednesday, and Saturday; Thursday and Friday percentage differences were slightly less for the adjusted forecast figures; and the percentage differences for Sunday and Monday were approximately 4 per cent less. These production estimates reflected a more realistic forecast than the initial, or purchasing, forecasts. Mean differences in the adjusted forecasts and production records of portions served showed that overforecasting varied

between approximately 6 and 7 per cent, except on Sunday, when the difference was almost 13 per cent.

Dinner Meal. Initial and adjusted forecasts were very similar when compared by day (Table 15). Weekend forecasts were lower than for weekday dinner meals, particularly for Friday evening.

Comparisons of the mean differences for the initial forecast and the meal attendance for dinner by day indicated overforecasting varied from approximately 11 per cent to approximately 35 per cent. The largest mean difference was on Friday, while the lowest occurred on Thursday. Friday dinner seems to be the first meal of the weekend in relation to the number of students who are remaining on campus for the weekend, since most students leave before dinner on Friday if they are going out of town. The variability of the mean differences was greatest on Friday and Saturday. The fluctuating meal attendance on weekends was discussed previously, as was the overforecasting for purchasing purposes. The variability of the mean difference for Tuesday also was quite high. A possible explanation for this is that a special dinner was served on one Tuesday during the data collection period where students could return as often as they liked for tacos.

The mean differences by day for the initial forecasts and production records of portions served were comparable to the mean differences for the initial forecasts and meal attendance. This is due to the fact that there were small differences between the production and the meal attendance records. The variability of the mean differences in the initial forecasts and portions served was greatest for Tuesday and Saturday. The mean differences for the adjusted forecasts and meal attendance on Wednesday and Thursday were similar (approximately 200 overforecast); while the mean

Table 15: Comparison of initial and adjusted total forecasts, meal attendance, and production reports of meals served for dinner meals

day of week ¹	initial forecast ²		adjusted forecast ³		checkers' record of meal attendance ⁴		production record of portions served ⁵		difference (initial forecast - meal attendance)	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Monday	2298.76	±226.26	2233.82	±378.64	1982.94	±159.72	1965.24	±180.84	315.82	±189.07
Tuesday	2281.53	±242.43	2299.18	±245.53	1999.29	±56.36	1970.76	±307.16	282.24	±253.93
Wednesday	2158.76	±210.71	2085.76	±219.52	1878.65	±46.24	1871.76	±75.07	280.12	±196.54
Thursday	2142.88	±133.50	2135.47	±112.39	1934.94	±74.14	1899.53	±165.83	207.94	±163.12
Friday	1759.29	±386.86	1682.94	±434.16	1345.94	±336.50	1347.35	±338.11	413.35	±267.98
Saturday	1849.38	±275.36	1802.50	±237.99	1446.73	±295.17	1467.19	±257.83	391.31	±315.87

day of week	difference (initial forecast - portions served)		difference (adjusted forecast - portions served)		difference (portions served - meal attendance)	
	mean	s.d.	mean	s.d.	mean	s.d.
Monday	333.53	±225.26	14.08	±8.75	250.88	±253.48
Tuesday	310.76	±294.84	13.28	±11.54	299.88	±263.73
Wednesday	287.00	±216.45	12.55	±8.69	207.12	±212.67
Thursday	243.35	±215.73	11.03	±9.65	200.53	±145.33
Friday	411.94	±267.67	21.97	±15.03	337.00	±227.23
Saturday	382.19	±300.19	19.69	±14.88	344.44	±266.83

day of week	difference (initial forecast - meal attendance)		difference (adjusted forecast - meal attendance)		difference (portions served - meal attendance)	
	mean	s.d.	mean	s.d.	mean	s.d.
Monday	-17.71	±81.14	268.59	±282.13	9.42	±16.84
Tuesday	-28.53	±306.50	328.41	±314.44	13.83	±12.26
Wednesday	-6.88	±68.44	214.00	±239.24	9.22	±10.96
Thursday	-35.41	±127.05	235.94	±192.50	10.86	±8.80
Friday	1.41	±20.78	335.59	±221.45	18.64	±12.02
Saturday	10.20	±68.63	335.31	±238.43	18.19	±12.60

day of week	difference (initial forecast - meal attendance)		difference (adjusted forecast - meal attendance)		difference (portions served - meal attendance)	
	mean	s.d.	mean	s.d.	mean	s.d.
Monday	-0.91	±4.05	-17.71	±81.14	-17.71	±81.14
Tuesday	-1.40	±15.82	-28.53	±306.50	-28.53	±306.50
Wednesday	-0.35	±3.67	-6.88	±68.44	-6.88	±68.44
Thursday	-1.91	±6.94	-35.41	±127.05	-35.41	±127.05
Friday	0.12	±1.54	1.41	±20.78	1.41	±20.78
Saturday	1.84	±9.53	10.20	±68.63	10.20	±68.63

¹In computation of means data from 16 weeks available for Saturday and Sunday; data from 17 weeks for other days.

²Initial forecast = sum of forecasts of entree items one to two weeks prior to day of service.

³Adjusted forecast = sum of forecasts of entree items one to two days prior to day of service.

⁴Meal attendance recorded by meal ticket checkers at beginning of service line.

⁵Total number of portions of entree items served computed from production records.

$6\% = \frac{\text{difference}}{\text{meal attendance}}$ $7\% = \frac{\text{difference}}{\text{forecast}}$ $8\% = \frac{\text{difference}}{\text{portions served}}$

differences for the remaining days were larger. When these mean difference percentages were compared with the mean difference percentages for the initial forecast and the meal attendance, there was a decrease for Monday, Wednesday, Friday, and Saturday for the adjusted forecast data; a slight increase for Tuesday; and little change for Thursday for the adjusted forecast data. These findings indicate that in all cases, except for Tuesday, the adjusted forecast did alter the forecasted amount to a number closer to the actual meal attendance.

The mean differences for Monday, Wednesday, and Thursday were comparable for the adjusted forecast and the production records of portions served, while the remaining days had higher mean differences. The variability of the mean differences was quite high for all days; the lowest variability of mean differences occurred on Thursday, indicating perhaps that Thursday is the most predictable day of the week for the dinner meal. A comparison of these mean differences with the mean differences between the initial forecast and portions served showed a decrease for all days from the initial forecasted data to the adjusted forecasted data except for Tuesday. These results indicate that the adjustment in the forecast for the dinner meal was beneficial, overall, for every day of the week except Tuesday to bring the forecast closer to the actual production demand.

Effects of Specific Factors on Forecasting

Multivariate analysis was used to study the effects of various factors on initial and adjusted forecasts; portions produced, not served, and served; and differences between adjusted forecasts and portions served. The various factors studied were: semester, day of week, campus events, and entree type and situation (planned or unplanned entree, sufficient or

insufficient quantity). Means presented in the tables have been adjusted for the effects of semester, day, entree type, and event. Because of the lack of observations in several of the categories in which the data were coded, categories were collapsed for the day, event, and entree situation. The day categories were collapsed so there were only two categories, rather than seven--Monday through Thursday were considered as one category (weekday), and Friday through Sunday were considered the second category (weekend). The event categories were collapsed so there was one category if there was a ballgame (varsity football or basketball), a second category if there was a minor campus event, and a third category if there was a combination of a major campus event, a minor campus event, or a hall event. The entree situation categories were collapsed so that the situations two and three were combined for entree categories having both situations. The collapsed categories for situations were: 1 = preplanned entree, sufficient quantity; 2 = preplanned entree, insufficient quantity or an addition to menu; and 3 = an addition to menu.

Luncheon Meal. Significant differences were found among the entree categories of the luncheon meals for the initial forecast, adjusted forecast, portions produced, portions not served, portions served, and the difference between the adjusted forecast and portions served (Table 16). Semester, day (weekday versus weekend), and campus events did not significantly affect these data.

The means of the initial forecasts of entree items for the luncheon meal indicated that the three types of entrees which were forecasted in the greatest amounts were cold sandwiches, hot sandwiches, and Italian and Mexican foods (Table 17). When comparing the means of the initial forecasts for entree types with the means for the adjusted forecast, there was

Table 16: Analysis of variance of forecast, production, and production demand for luncheon meals

source of variance	d.f.	initial forecast			adjusted forecast			portions produced		
		mean squares	F	prob.	mean squares	F	prob.	mean squares	F	prob.
semester	16	45005.07	0.76	0.74	45497.03	0.76	0.73	63732.17	0.95	0.51
day	1	135.26	0.00	0.96	25.10	0.00	0.98	40600.43	0.61	0.44
event	2	153613.88	2.58	0.08	135437.25	2.28	0.10	117640.44	1.76	0.17
entree	13	3574221.00	59.97	0.00***	3495760.00	58.73	0.00***	3606903.00	54.01	0.00***
residual	281	59600.61			59523.71			66781.44		

	portions not served			portions served			difference (adjusted fore- cast - portions served)		
	mean squares	F	prob.	mean squares	F	prob.	mean squares	F	prob.
semester	4549.77	0.34	0.99	66347.63	1.04	0.42	11011.17	0.50	0.95
day	2507.04	0.19	0.67	63279.93	0.99	0.32	60786.12	2.77	0.10
event	23938.95	1.77	0.17	112465.63	1.76	0.17	6695.89	0.31	0.74
entree	62725.94	4.64	0.00***	3210119.00	50.27	0.00***	101882.38	4.65	0.00***
residual	13529.20			63853.38			21910.72		

*P < .05

**P < .01

***P < .001

Table 17: Mean initial forecast, adjusted forecast, portions produced, portions not served, portions served, and difference between adjusted forecast and portions served by entree category for lunch

entree ¹	situation ²	N	initial forecast		adjusted forecast		portions produced		portions not served		portions served		difference (adjusted forecast - portions served)	
			mean	std error	mean	std error	mean	std error	mean	std error	mean	std error	mean	std error
pork, other	1	2	572.43±179.34		564.89±179.23		490.51±189.84		109.94± 85.45		380.57±185.63		184.32±108.74	
poultry, other	1	3	326.18±145.74		320.35±145.65		283.61±154.27		85.18± 69.44		198.43±150.85		121.91± 88.37	
salad plate	1	31	287.61± 44.84		283.47± 44.81		277.54± 47.46		44.63± 21.36		232.91± 46.41		50.56± 27.19	
salad plate	3	3	278.46±146.23		271.70±146.14		209.93±154.79		47.22± 69.67		162.70±151.36		108.99± 88.66	
cold sandwich	1	17	1106.73± 61.77		1116.06± 61.73		1077.49± 65.39		246.16± 29.43		831.33± 63.94		284.73± 37.45	
cold sandwich	2	2	245.60±177.30		244.75±177.18		202.00±187.67		3.48± 84.47		198.51±183.51		46.22±107.50	
hot sandwich	1	57	1330.81± 33.25		1314.06± 33.23		1321.78± 35.20		70.17± 15.84		1251.61± 34.42		62.45± 20.16	
hot sandwich	2	14	415.95± 67.90		416.86± 67.86		413.95± 71.88		49.21± 32.35		364.74± 70.28		52.12± 41.17	
hamburger	1	84	444.74± 28.96		444.00± 28.94		431.90± 30.66		19.61± 13.80		412.30± 29.98		31.70± 17.56	
casserole, creamed dish, and extended main dish	1	49	605.34± 36.33		596.44± 36.30		583.50± 38.45		90.32± 17.31		493.18± 37.60		103.25± 22.02	
casserole, creamed dish, and extended main dish	2	14	192.95± 67.42		203.98± 67.37		226.47± 71.36		10.10± 32.12		216.37± 69.78		- 12.39± 40.88	
Italian and Mexican	1	19	1050.07± 59.60		1048.27± 59.56		1135.80± 63.08		63.75± 28.39		1072.05± 61.69		- 23.78± 36.13	
Italian and Mexican	2	7	370.63± 97.91		365.46± 97.84		394.52±103.64		17.38± 46.65		377.14±101.34		- 11.68± 59.36	
other	1	12	336.60± 73.34		333.40± 73.29		420.67± 77.63		67.88± 34.94		352.79± 75.91		- 19.38± 44.47	

¹ Significant differences were found among entree types; other factors studied (semester, day, and event) did not yield significantly different results.

² Situation = 1, preplanned entree, sufficient quantity

2, preplanned entree, insufficient quantity or addition to menu

3, addition to menu

³ Means adjusted for effects of semester, day, entree type, and event.

a general decrease from the initially forecasted amounts with three exceptions in which the two means were very similar: cold sandwiches; hot sandwiches; and casseroles, creamed dishes, or other extended main dishes. These findings indicate that for most luncheon entree items, the initial forecast is usually adjusted to a smaller number if an adjustment is made, as was shown in the previous analysis.

A comparison between the means of the adjusted forecasts of luncheon entree items and the means of the portions produced of entree items showed production quantities generally were lower than forecasts (Table 17). Exceptions included the following categories: hot sandwich, situation 1; casserole, creamed dish, or extended main dish, situation 2; Italian and Mexican foods, situations 1 and 2; and other entrees, situation 1. One reason for the increase in the hot sandwich entree category between means for the adjusted forecasts and the portions produced may be that the hot sandwiches usually are quickly prepared items and can be produced as they are needed; therefore an accurate forecast is not critical. The other entree category also may have contained food items which need little preparation time. Both the casserole, creamed dish, or other extended main dish entree and the Italian- and Mexican-type entree often were added to the menu as extra choices. It is possible that the forecast for such an entree was made on an estimated number of servings of the item rather than on actual number of servings.

A comparison of portions produced of luncheon entrees and of portions served showed a substantial decrease in the means from production to service (Table 17), with no exceptions. These findings indicate that, generally, more portions of luncheon entrees were produced than served. In comparing differences in adjusted forecast and portions served, it was apparent

overforecasting was greatest for the following categories of entrees: pork; poultry; cold sandwich; salad plate; and casserole, creamed dish or extended main dish item.

Dinner Meal. Significant differences were found among the dinner entrees for the initial forecast, adjusted forecast, portions produced, portions not served, portions served, and the difference between the adjusted forecast and portions served. Day (weekday versus weekend) also had a significant effect upon portions produced and portions served, while semester and event were not significant variables (Table 18).

The means of the initial forecasts of entrees showed that the entrees forecasted in the greatest amounts initially were: roast beef; steak or cutlet; pork chop or ham; poultry, fried or roasted; fried fish; and Italian and Mexican foods (Table 19). A comparison of the means of the initial forecasts with those of the adjusted forecasts of dinner entrees generally indicated decreases in adjusted forecast data with several exceptions. The entree categories which were exceptions included: roast beef, situation 3 (addition to menu); ground beef, situation 1 (preplanned entree, sufficient amount); pork chop or ham, situation 3; fried or roasted poultry, situation 2 (preplanned, insufficient, or addition); fried fish, both situations 1 and 2; hot sandwich, both situations 1 and 3.

A comparison between means of the adjusted forecasts and of the portions produced showed production quantities tended to be lower than forecasted amounts (Table 19). When items were added to the menu, exceptions often occurred; e.g., for roast beef, pork chop or ham, and hot sandwich. Other exceptions were for two preplanned entree categories, Italian and Mexican foods and the other category. A possible explanation for the

Table 18: Analysis of variance of forecast, production, and production demand for dinner meals

source of variance	d.f.	initial forecast		adjusted forecast		portions produced	
		mean squares	F	prob.	mean squares	F	prob.
semester	16	106037.13	0.71	0.79	103200.56	0.70	0.79
day	1	676742.13	4.50	0.03*	953198.38	6.49	0.01
event	2	102730.81	0.68	0.51	86612.75	0.59	0.56
entree	20	4749215.00	31.56	0.00***	4369765.00	29.75	0.00***
residual	277	150477.31			146886.31		
						138544.88	1.07 0.38
						2113490.00	16.34 0.00***
						64704.80	0.50 0.61
						4110824.00	31.79 0.00***
						129320.38	

	portions not served		portions served		difference (adjusted fore- cast - portions served)	
	mean squares	F	prob.	mean squares	F	prob.
semester	8482.17	0.73	0.76	129609.13	1.09	0.37
day	16926.96	1.46	0.23	1752133.00	14.67	0.00***
event	6369.07	0.55	0.58	52365.92	0.44	0.65
entree	65048.73	5.60	0.00***	3376188.00	28.26	0.00***
residual	11609.73			119457.63		
					26675.22	0.77 0.72
					120659.06	3.46 0.06
					54030.92	1.55 0.21
					122389.63	3.51 0.00***
					34828.06	

*p < .05

**p < .01

***p < .001

Table 19: Mean initial forecast, adjusted forecast, portions produced, portions not served, portions served, and difference between adjusted forecast and portions served by entree category for dinner

entree ¹	situation ²	N	initial forecast		adjusted forecast		portions produced		portions not served		portions served		difference (adjusted forecast - portions served)
			mean ³	std error	mean	std error	mean	std error	mean	std error	mean	std error	
roast beef	1	10	1644.56±125.08		1597.79±123.58		1581.03±115.95		114.94± 34.74		1466.09±111.44		131.70± 60.18
roast beef	3	47	258.05± 59.38		265.22± 58.66		274.44± 55.04		21.78± 16.49		252.65± 52.90		12.58± 28.57
steak or cutlet	1	37	1402.40± 65.10		1349.34± 64.32		1338.26± 60.35		130.37± 18.08		1207.90± 58.00		141.44± 31.32
ground beef	1	15	791.59±103.15		973.20±101.92		958.68± 95.63		205.00± 28.65		753.69± 91.91		219.52± 49.63
pork chop or ham	1	20	1602.63± 89.15		1580.56± 88.08		1446.98± 82.65		112.05± 24.76		1334.93± 79.43		245.63± 42.89
pork chop or ham	3	24	124.03± 81.67		124.72± 80.69		132.49± 75.71		15.56± 22.68		116.93± 72.77		7.80± 39.29
pork, other	1	16	912.97± 99.84		867.12± 93.64		818.34± 92.55		175.43± 27.73		642.91± 88.96		224.21± 48.03
poultry, fried or roast	1	13	1561.42±109.54		1459.68±108.22		1458.21±101.55		110.70± 30.43		1347.51± 97.60		112.17± 52.70
poultry, fried or roast	2	23	193.70± 83.71		206.39± 82.70		209.58± 77.60		3.74± 23.25		205.84± 74.58		0.54± 40.27
poultry, other	1	4	749.73±198.92		742.18±196.53		797.22±184.41		167.02± 55.25		630.20±177.24		111.92± 95.70
fried fish	1	13	1038.11±109.39		1640.51±108.07		936.72±101.41		46.73± 30.38		889.99± 97.46		150.52± 52.63
fried fish	2	19	125.34± 92.02		140.61± 90.92		110.35± 85.31		6.09± 25.56		104.26± 81.99		36.35± 44.27
baked fish	1	10	300.68±125.99		282.29±124.47		276.26±116.79		59.70± 34.99		216.56±112.25		65.73± 60.61
salad plate	1	8	121.60±140.15		114.14±138.47		84.39±129.92		- 4.39± 38.93		88.78±124.87		25.36± 67.42
hot sandwich	1	8	911.14±139.94		921.16±138.26		878.93±129.73		171.79± 38.87		707.15±124.68		213.99± 67.32
hot sandwich	3	3	603.76±230.98		623.77±228.21		666.34±214.13		17.47± 64.16		648.86±205.80		- 25.10±111.12
casserole, creamed dish, and extended main dish	1	13	782.71±114.14		761.08±112.77		638.75±105.81		135.94± 31.70		502.81±101.69		258.26± 54.91
casserole, creamed dish, and extended main dish	2	4	240.71±201.39		216.70±198.97		151.90±186.69		27.95± 55.94		123.94±179.43		92.76± 96.89
Italian and Mexican	1	7	1197.49±151.47		1086.58±149.65		1160.33±140.42		128.06± 42.07		1032.27±134.93		54.30± 72.87
other	1	14	218.87±106.12		218.30±104.85		218.35± 98.38		25.42± 29.48		192.93± 94.55		25.37± 51.05
other	3	9	91.97±133.89		86.96±132.29		77.75±124.13		6.35± 37.19		71.40±119.30		15.56± 64.42

¹ Significant differences were found among entree types; day (weekend vs weekday) also had a significant effect on portions produced and portions served. No effect was found for semester or event.

² Situation = 1, preplanned entree, sufficient quantity
2, preplanned entree, insufficient quantity or addition to menu

³ Means adjusted for effects of semester, day, entree type, and event.

increases from the adjusted forecasts to the portions produced for the entree categories with a situation of two or three may be that the entree items were an addition to the menu, and the forecast may have been only estimated servings available rather than actual servings. Recipe yields may account for other differences.

Means for portions produced were greater than means for portions served among all entree types with only one exception, the salad plate category. These findings indicate that generally more portions of the dinner entree items are produced than are served.

SUMMARY AND CONCLUSIONS

Production forecasting, a concern of any foodservice management, consists of two basic, interrelated elements: the population estimate and the food selection prediction. Accurate forecasting relies on both elements in the estimation process. Possibly one of the most important factors affecting the process of population estimation is the patron's reasons for eating or not eating meals at the foodservice.

The focus of this study was three-fold: to study present forecasting methods, to study student-related factors affecting foodservice participation, and to compare meal attendance and forecasting data in a university residence hall foodservice system. The research site was a residence hall complex, including foodservice facilities, located on the campus of a large midwestern university. Four residence halls housed a total of 2254 students; the foodservice supplied three meals a day to the students except on Sunday when no evening meal was served.

The study was conducted in two phases: Phase I was concerned with students' food habits, opinions, and perceptions of the foodservice. Phase II was concerned with the comparison of meal attendance and forecasting data. To study the students' food habits and perceptions and opinions of the foodservice that might influence meal participation and ultimately, meal demand, an interview-survey was conducted of a 10 per cent stratified random sample of students living in one of the four residence halls served by the foodservice. A modified Q-sort technique was used to conduct the interview-surveys. For each of the fifty-five questions asked, the interviewer presented the student with a card listing the predetermined response categories and an "other" response category. The student had the option

of choosing one of these categories. If the "other" response was chosen, the student's own response was recorded by the interviewer. In this way, most of the responses to questions could be easily checked off on a coding form for ease in analysis of data; however, the student did have the opportunity of giving a free response to most questions. The instrument was developed from the results of tape recorded interviews in which twenty randomly selected students were asked sixty-one open-ended questions concerning the foodservice.

In Phase II records were kept for a period of seventeen weeks of the number of students attending meals on each day of the week at the residence hall foodservice. During the data collection period of meal attendance, the following data also were collected: the initial forecasted amount of each entree for lunch and dinner, the adjusted forecasts for entrees, the number of portions actually produced of each entree, the number of portions not served, any additions that were made to the choice of entrees, and the dietitian's reasons for both the adjustment of the initial forecast and the additions made to the entree choices. Records were kept of campus and hall activities during this period. Data were coded according to categories established for each of the variables to be considered in the statistical analysis: semester, week, hall populations, day, campus and hall events, meal, number of patrons served, and forecast and production information. Entrees were classified into sixteen categories representing broad types of main dish menu items; these categories were used to study variances among types of entrees. Multivariate analysis was used to study the relationships of semester, day, entree type, and event on initial and adjusted forecasts; portions produced, not served, and served; and differences between adjusted forecasts and portions served.

In the interview-survey the majority of students responded that they rarely or never ate breakfast during the weekdays at the foodservice. Chi-square analysis of the responses to the interview-survey showed a significant difference between both the student's classification and sex and the number of times breakfast was eaten at the foodservice. Upperclassmen and men ate breakfast more often in the foodservice than freshmen and sophomores and women. The most common response given by the students for not eating breakfast was that they would prefer to sleep late. A significant relationship was found between the number of times students ate breakfast at the foodservice and the number of times students regularly ate breakfast while living at home. These results indicated that there were changes in the students' food habits from high school--a large percentage of students who never eat breakfast at college ate breakfast regularly at home.

A large percentage of the students attested to always eating lunch at the foodservice during the weekdays. Thirty-four per cent of the students reported they rarely patronized the hamburger line; however, the main reason given by students for checking the posted menus was to decide whether to go through the hamburger line or the lines serving the regular luncheon menu. The majority of students responded that they ate dinner at the foodservice five times during the weekdays. A significant relationship was found between both sex and classification of students and the dinner habits of students. Upperclassmen ate dinner more frequently than underclassmen and more males than females always ate dinner at the foodservice. According to students' responses, snacking played an important role in their food habits, particularly in the evenings. Carbonated beverages were the most frequently consumed snacks.

Students tended to eat all meals in the same dining area and with the same people. Pleasantness and boredom were the most common attitudes students perceived the servers on the line as conveying; very few respondents considered the servers to be grouchy. Most of the students rated the foodservice as good or acceptable. However, students had a number of specific suggestions: larger portions, longer regular breakfast serving time, sandwiches and soup more often at lunch, more music, and brighter walls and curtains.

The interview-survey technique utilized in Phase I of the study provided an approach that was interesting for the students being interviewed, provided data that was easily coded, yet permitted freedom of responses. The results obtained in Phase I seemed to be reliable when data were checked against available data from Phase II of the study (e.g., reports of meal frequency and actual attendance data). These results also pointed out student related influences on forecasting and specific information of students' perceptions and opinions of the foodservice.

The mean meal attendance for all meals was found to be substantially lower on weekends than weekdays. Overall meal attendance was 64.9 per cent, varying from 31.8 at breakfast, 86.8 at lunch and 78.5 at dinner. Overforecasting occurred for all days for luncheon and dinner meals both for the initial and adjusted forecast and was greatest for weekends. For dinner meals in particular the adjusted forecast did lower the forecasted portions to a level closer to the meal attendance for most days.

For lunch, significant differences were found among the entree categories for the initial and adjusted forecasts, portions produced, not served, and served, and the difference between the adjusted forecast and portions served. Generally, the means for each entree category decreased

from initial to adjusted forecast to portions produced to portions served. Overforecasting was found to be greatest for these entree categories: pork; poultry; cold sandwich; salad plate; and casserole, creamed dish, or other extended main dish.

Significant differences also were found among the dinner entrees for both types of forecasts and for production data. A general decrease was noted for the means from initial to adjusted forecast to portions produced to portions served. The greatest overforecasting occurred for the categories: roast beef; steak or cutlet; ground beef; pork; poultry; fried fish; hot sandwich; and casserole, creamed dish, or other extended main dish. Because of this perpetual overforecasting leading to overproduction, a cyclical effect seems to have developed. The previously overproduced menu item must be added to the current menu thus making adjustments in the forecasts necessary to compensate for these added food items.

These data provide valuable background information and a basis for further study. Work should be continued on the forecasting research, with the ultimate goal of developing a mathematical prediction model.

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APPENDIXES

APPENDIX A

Sample Correspondence

Phase I

Department of Institutional Management
Justin Hall
Manhattan, Kansas 66506
Phone: 913 532-5521

September 6, 1975

To: Jean Riggs
Director of Food Service

From: Mary Ann Shriwise
Graduate Research Assistant

Allene Vaden
Asst. Professor of Institutional Management

As we discussed, a project is being planned in which student participation in the residence hall foodservice will be studied. Eventually we hope to develop models for prediction of future meal counts and student decisions concerning food choices.

As one phase of this overall project, we are planning an interview survey of an approximate twenty per cent sample of the students living in the four residence halls served by Derby Food Center. This survey would focus on students' opinions and perceptions of the foodservice, their reasons for eating or not eating meals in Derby Food Center, and their general reactions to the foodservice. We plan to employ students from the residence halls to conduct these interviews. Ideally, these interviews will take place in the interviewee's room with a relaxed atmosphere that will be conducive to honest and sincere answers. In developing the interview instrument, a smaller group of students will be interviewed in an unstructured manner to determine the most pertinent areas of concern and to aid in developing pertinent questions. As a later phase of the project we plan to elicit responses from a sample of students concerning their decision making relative to food choices.

We understand from our conversation that this project would require approval from the Department of Housing and Food Service and perhaps others. We would appreciate your efforts to facilitate this approval. If you need additional information, please advise us.

Department of Institutional Management
Justin Hall
Manhattan, Kansas 66506
Phone: 913 532-5521

March 6, 1975

(Correspondence to Associate Director of Housing
and Unit Manager)

To:

From: Mary Anne Shriwise
Graduate Research Assistant

Please note the enclosed copy of the revised instrument which will be utilized to gain information concerning students' food habits while eating at Derby Food Center and their opinions and perceptions of the foodservice. Revision of the instrument were made following pretest and suggestions of Dr. Donald Hoyt, Professor of Educational Research. This instrument will be used during a series of interviews of a stratified random sample of students living in the four residence halls served by Derby Food Center. A total of 203 students will be interviewed with fifty-seven students sampled from Ford Hall, thirty-three students from West Hall, fifty-seven students from Moore Hall, and fifty-six students from Haymaker Hall. The interviews will begin on Wednesday, March 19, and will be completed by approximately March 26, 1975.

Department of Institutional Management
Justin Hall
Manhattan, Kansas 66506
Phone: 913 532-5521

October 21, 1974

(First Correspondence to Hall Presidents)

To:

From: Mary Anne Shriwise
Graduate Research Assistant

Allene Vaden
Asst. Professor of Institutional Management

The Department of Institutional Management is planning a project in which student participation in the residence hall foodservice will be studied. This is one part of an overall project in which eventually we hope to develop computerized models for prediction of future meal counts and student decisions concerning food choices.

In order to study the student participation in the residence hall foodservice, we are planning an interview survey of approximately twenty per cent of the students living in the four residence halls served by Derby Food Center. This survey will focus on students' opinions and perceptions of the foodservice, their reasons for eating or not eating meals in Derby Food Center, and their general reactions to the foodservice. We plan to employ students from the residence halls to conduct these interviews. Ideally, these interviews will take place in the interviewee's room with a relaxed atmosphere that will be conducive to honest and sincere answers. In developing the interview instrument, a smaller group of students will be interviewed in an unstructured manner to determine the most pertinent areas of concern and to aid in developing pertinent questions. As a later phase of the project we plan to elicit responses from a sample of students concerning their decision-making relative to food choices.

This project has been approved by the Department of Housing. Jean Riggs, Associate Director of Housing believes the results of this study will be of value to Residence Hall foodservices. We were advised by the Department of Housing that it is necessary for us to also obtain the approval of the Hall Governing Boards before embarking on the project. We would appreciate your efforts to obtain this approval. If you have any questions concerning the project, please call us at 532-5521 (Department of Institutional Management).

Could we check with you by October 29--we hope to proceed with the project in November.

Department of Institutional Management
Justin Hall
Manhattan, Kansas 66506
Phone: 913 532-5521

March 6, 1975

(Second Correspondence to Hall Presidents)

To:

From: Mary Anne Shriwise
Graduate Research Assistant
Department of Institutional Management

As you may recall, you were approached last semester for your approval of the departmental research project that will include interviewing students living in the four residence halls served by Derby Food Center. These interviews will be conducted to gain information concerning students' food habits while eating at Derby Food Center and their opinions and perceptions of the foodservice. Please note the enclosed copy of the instrument that will be used in these interviews of a stratified random sample of a total of 203 students: fifty-seven students will be sampled from Ford Hall, thirty-three students from West Hall, fifty-seven students from Moore Hall, and fifty-six students from Haymaker Hall. The interviews will begin on Wednesday, March 19, and will be completed by approximately March 26, 1975. Students have been employed by the department to conduct these interviews.

APPENDIX B
Final Instrument

<p>1. How often do you eat breakfast during the week (Monday through Friday)?</p> <ol style="list-style-type: none"> 1. never 2. once 3. two to three times 4. four to five times 5. always <p>IF "NEVER", OMIT QUESTIONS 2 & 3</p>	<p>IF "ALWAYS" IS RESPONSE IN QUESTION 1, OMIT QUESTION 4</p> <p>4. If you do not eat breakfast at Derby, why not?</p> <ol style="list-style-type: none"> 1. sleep in 2. dieting 3. I don't like breakfast foods such as bacon and eggs 4. no early classes 5. other (specify) 																		
<p>IF "NEVER", OMIT QUESTIONS 2 & 3</p> <p>2. Do you generally eat a cold or a hot breakfast?</p> <ol style="list-style-type: none"> 1. hot 2. cold 3. about an equal number of hot and cold 4. I don't generally eat breakfast 	<p>5. Do you check the menus in the residence halls before going to Derby?</p> <ol style="list-style-type: none"> 1. usually 2. sometimes 3. seldom or never 																		
<p>3. When you are in Manhattan, do you eat breakfast on the weekends?</p> <ol style="list-style-type: none"> 1. not usually 2. Saturday only 3. Sunday only 4. both Saturday and Sunday 	<p>6.a) From the list I'm handing you, which are your 2 most favorite breakfast items?</p> <p>b) Which are your 2 least favorite?</p> <table border="0"> <tr> <td>1. scrambled eggs</td><td>10. sweet roll</td></tr> <tr> <td>2. boiled eggs</td><td>11. toast</td></tr> <tr> <td>3. fried eggs</td><td>12. hot cereal</td></tr> <tr> <td>4. poached eggs</td><td>13. cold cereal</td></tr> <tr> <td>5. french toast</td><td>14. fruit</td></tr> <tr> <td>6. pancakes</td><td>15. juice</td></tr> <tr> <td>7. bacon</td><td></td></tr> <tr> <td>8. sausage</td><td></td></tr> <tr> <td>9. hamburger patty</td><td></td></tr> </table>	1. scrambled eggs	10. sweet roll	2. boiled eggs	11. toast	3. fried eggs	12. hot cereal	4. poached eggs	13. cold cereal	5. french toast	14. fruit	6. pancakes	15. juice	7. bacon		8. sausage		9. hamburger patty	
1. scrambled eggs	10. sweet roll																		
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5. french toast	14. fruit																		
6. pancakes	15. juice																		
7. bacon																			
8. sausage																			
9. hamburger patty																			

<p>7. With whom do you usually eat breakfast?</p> <ol style="list-style-type: none"> 1. roommate 2. friends from my floor 3. other friends 4. alone 5. other (specify) 	<p>10.a) Do you eat a snack in the mornings?</p> <ol style="list-style-type: none"> 1. seldom or never 2. occasionally 3. usually IF "SELDOM OR NEVER", OMIT QUESTIONS B & C <p>b) Where would this most frequently be?</p> <ol style="list-style-type: none"> 1. Union 2. residence hall 3. other (specify) <p>c) What would this generally be?</p> <ol style="list-style-type: none"> 1. coffee 2. soft drink 3. candy 4. fruit 5. doughnut or roll 6. other (specify) 7. two of the above
<p>8. Which, if any, of the following would make breakfast at Derby more appealing to you?</p> <ol style="list-style-type: none"> 1. more variety from day to day 2. more choices on a given day 3. larger portions 4. more juice 5. other (specify) 6. no suggestions 	<p>11.a) Do you patronize the Union foodservice between classes in the morning?</p> <ol style="list-style-type: none"> 1. every day 2. every other day 3. once in a while 4. hardly ever IF "HARDLY EVER", OMIT QUESTIONS b, c, & 12 <p>b) What is the main reason for this?</p> <ol style="list-style-type: none"> 1. I feel hungry 2. mostly, just to socialize or relax 3. to get a table for studying 4. other (specify) <p>c) What do you usually eat or drink at the Union?</p> <ol style="list-style-type: none"> 1. doughnut or roll 2. candy 3. soft drink 4. coffee or tea 5. other (specify)
<p>9. When you were living at home, going to school, did you eat breakfast?</p> <ol style="list-style-type: none"> 1. yes, generally 2. about half the time 3. not usually 	<p>12. Why do you choose this (these) snack at the Union?</p> <ol style="list-style-type: none"> 1. it is not served at Derby 2. it looks good 3. I feel hungry 4. its price is reasonable 5. other (specify)

<p>13. How often do you eat lunch at Derby during the week (Monday through Friday)?</p> <ol style="list-style-type: none"> 1. always 2. three to four times 3. one to two times 4. never <p>IF "ALWAYS", OMIT QUESTION 17</p>	<p>16.a) How often do you eat lunch at other places? (Monday through Friday)</p> <ol style="list-style-type: none"> 1. never 2. one to two times a week 3. three to four times a week 4. almost always IF "NEVER", OMIT QUESTION b <p>b) If you don't eat lunch at Derby, where would you most likely eat?</p> <ol style="list-style-type: none"> 1. Union 2. fast food restaurant 3. Kramer or one of the small halls 4. other (specify)
<p>14. When do you generally eat lunch at Derby?</p> <ol style="list-style-type: none"> 1. 10:00 2. 11:00 3. 11:30 4. 12:00 5. 12:30 6. 1:00 	<p>IF "ALWAYS" IS RESPONSE TO QUESTION 13, OMIT QUESTION 17</p> <p>17. What is your main reason for not eating lunch at Derby?</p> <ol style="list-style-type: none"> 1. class conflict 2. lost meal card 3. off campus 4. other (specify)
<p>15.a) Do you check the menus before going through the lines?</p> <ol style="list-style-type: none"> 1. usually 2. sometimes 3. seldom or never <p>b) What is the main reason you check the menus?</p> <ol style="list-style-type: none"> 1. to decide whether to go through the hamburger line or not 2. to decide on which main dish to take 3. curiosity 4. other (specify) 	<p>18. How often do you go through the hamburger line during the week?</p> <ol style="list-style-type: none"> 1. hardly ever 2. two to three times 3. four to five times

<p>19. Of the lunches served at Derby, which type do you prefer-- sandwiches, casseroles, cold plates?</p> <ol style="list-style-type: none"> 1. sandwiches 2. casseroles 3. cold plates 	<p>20. Which is your least favorite type of lunch at Derby?</p> <ol style="list-style-type: none"> 1. sandwiches 2. casseroles 3. cold plates 	<p>21. Which, if any, of the following changes would make the lunch at Derby more appealing to you?</p> <ol style="list-style-type: none"> 1. sandwiches offered more often 2. more variety of salads offered 3. larger portions 4. other (specify) 5. no suggestions
<p>22. During the last year you lived at home, where did you generally eat lunch during the school year?</p> <ol style="list-style-type: none"> 1. school lunch program 2. fast food restaurant 3. home 4. sack lunch at school 5. other (specify) 	<p>23. a) What do you generally eat or drink in the afternoon?</p> <ol style="list-style-type: none"> 1. soft drink 2. candy 3. fruit 4. ice cream 5. potato chips 6. other (specify) <p>b) Where would this generally be?</p> <ol style="list-style-type: none"> 1. my room 2. basement of residence hall 3. Union 4. other (specify) 	<p>24. How often do you generally eat dinner at Derby during the week (Monday through Friday)?</p> <ol style="list-style-type: none"> 1. five times 2. three or four times 3. one or two times 4. never <p>IF "FIVE TIMES", OMIT QUESTION 26</p>

<p>25. a) Generally, how often do you eat dinner outside the residence halls during the week (Monday through Friday)?</p> <ol style="list-style-type: none"> 1. never 2. one or two times 3. three or four times 4. five times <p>b) Where would this normally be?</p> <ol style="list-style-type: none"> 1. sorority 2. fast food restaurant 3. other (specify) 	<p>IF "FIVE TIMES" IS RESPONSE TO QUESTION 24, OMIT QUESTION 26</p> <p>26. If you do not eat dinner at Derby, what is the most likely reason?</p> <ol style="list-style-type: none"> 1. change of routine 2. can't afford to take time from studying 3. dieting 4. invited out 5. extra curricular activities commitment 6. other (specify) 	<p>27. When do you generally eat dinner at Derby?</p> <ol style="list-style-type: none"> 1. 5:00 to 5:30 2. 5:30 to 6:00
<p>28. a) What line do you usually go through?</p> <ol style="list-style-type: none"> 1. A, B 2. C, D 3. E, F 4. G <p>b) What is the main reason for this?</p> <ol style="list-style-type: none"> 1. shortest line 2. closest to the residence hall where I live 3. habit 4. used by students living on my floor 5. other (specify) 	<p>29. With whom do you usually eat?</p> <ol style="list-style-type: none"> 1. roommate 2. other friends 3. alone 4. other (specify) 	<p>30. What is your favorite and least favorite dinner main dishes served at Derby? (Select one favorite, one least favorite)</p>

<p>31. Which, if any, of the following changes would make dinner at Derby more appealing to you?</p> <ol style="list-style-type: none"> 1. more variety of salads 2. more variety of vegetables 3. meat less greasy 4. hotter food 5. larger portions 6. other (specify) 7. no suggestions 	<p>33.c) How often does your evening snack include each of the following?</p> <table> <tr> <td>candy</td> <td>(1) hardly ever</td> <td>(2) 2-3 times per week</td> </tr> <tr> <td>soft drink</td> <td></td> <td></td> </tr> <tr> <td>pizza</td> <td>(3) nearly every night</td> <td></td> </tr> <tr> <td>popcorn or chips</td> <td></td> <td></td> </tr> <tr> <td>ice cream, milk</td> <td></td> <td></td> </tr> <tr> <td>hamburger</td> <td></td> <td></td> </tr> </table>	candy	(1) hardly ever	(2) 2-3 times per week	soft drink			pizza	(3) nearly every night		popcorn or chips			ice cream, milk			hamburger		
candy	(1) hardly ever	(2) 2-3 times per week																	
soft drink																			
pizza	(3) nearly every night																		
popcorn or chips																			
ice cream, milk																			
hamburger																			
<p>32. When living at home while attending high school, what was your normal dinner style?</p> <ol style="list-style-type: none"> 1. dinner eaten with my family 2. dinner eaten as a snack whenever I was hungry 3. dinner eaten in a restaurant 4. other (specify) 	<p>33.d) What is the main reason you snack in the evening?</p> <ol style="list-style-type: none"> 1. while watching tv 2. to socialize or be with my friends 3. to relax from study pressures 4. to relieve hunger 5. other (specify) 																		
<p>33.a) Do you eat anything after dinner?</p> <ol style="list-style-type: none"> 1. hardly ever 2. two or three times a week 3. nearly every night IF "HARDLY EVER", OMIT QUESTIONS b, c, & d <p>b) Where, most often?</p> <ol style="list-style-type: none"> 1. own room 2. basement of residence hall 3. off campus 4. other (specify) 	<p>34. How often do you purchase vending machine items?</p> <ol style="list-style-type: none"> 1. more than once a day 2. about once a day 3. once a week 4. less than once a week 																		

<p>35. How often do you keep food or drink in your room?</p> <ol style="list-style-type: none"> 1. hardly ever 2. occasionally 3. usually 	<p>38. What do you think about the special dinners served at Derby?</p> <ol style="list-style-type: none"> 1. they are very good 2. they are good 3. they are not really very special 4. other (specify)
<p>36. Do you have access to a refrigerator?</p> <ol style="list-style-type: none"> 1. yes; I have one or my roommate does 2. my friends let me use theirs 3. no <p>IF "NO", OMIT QUESTION 37</p>	<p>39. What changes and/or suggestions do you have for them?</p> <ol style="list-style-type: none"> 1. none 2. have them more often 3. other (specify)
<p>IF "NO", OMIT QUESTION 37</p> <p>37. If yes, how does this affect your eating habits and meals?</p> <ol style="list-style-type: none"> 1. it doesn't 2. I am not as hungry at mealtimes, therefore I eat less 3. I am not as hungry at mealtimes, therefore I skip meals 4. other (specify) 	<p>40. Do you think cleanliness is a problem in the dining room?</p> <ol style="list-style-type: none"> 1. almost always 2. sometimes 3. seldom 4. never

<p>41. In what area do you usually eat?</p> <ol style="list-style-type: none"> 1. A, B 2. C, D 3. E, F 4. G 	<p>42. What is the main reason for this?</p> <ol style="list-style-type: none"> 1. the end of the line I go through is in that area 2. the floor members sit there regularly 3. other (specify) 	<p>44. How often are you out of town on the weekends, not counting the vacations?</p> <ol style="list-style-type: none"> 1. one or two times a semester 2. about once a month 3. about twice a month 4. almost every weekend 									
	<p>45. If you are in town on the weekends, how often do you eat at Derby?</p> <ol style="list-style-type: none"> 1. every meal 2. every meal except breakfasts 3. Saturday and Sunday lunches 4. Saturday dinner 										
	<p>IF "EVERY MEAL", OMIT QUESTIONS 46 a&b</p>										
<p>43.a) Do you think the atmosphere of the dining room should be improved?</p> <ol style="list-style-type: none"> 1. yes 2. no 3. undecided IF "NO OR UNDECIDED", OMIT QUESTION b <p>b) If yes, do you agree or disagree with the following suggestions?</p> <table border="0"> <tr> <td>smaller groupings of tables</td> <td>1. agree</td> <td>2. disagree</td> </tr> <tr> <td>more music</td> <td>1. agree</td> <td>2. disagree</td> </tr> <tr> <td>brighter walls and curtains</td> <td>1. agree</td> <td>2. disagree</td> </tr> </table>	smaller groupings of tables	1. agree	2. disagree	more music	1. agree	2. disagree	brighter walls and curtains	1. agree	2. disagree		<p>46.a) If you don't eat at Derby on the weekends when in town, what is the most important reason?</p> <ol style="list-style-type: none"> 1. I prefer to go out 2. I'm usually invited out 3. I'm usually off campus 4. other (specify) <p>b) If you don't eat at Derby on weekends, where are you most likely to eat?</p> <ol style="list-style-type: none"> 1. fast food restaurant 2. restaurant 3. friend's home or apartment 4. parents or relatives 5. other (specify)
smaller groupings of tables	1. agree	2. disagree									
more music	1. agree	2. disagree									
brighter walls and curtains	1. agree	2. disagree									

<p>47. How do you feel about having a meal served on Sunday night?</p> <ol style="list-style-type: none"> 1. I wish one were served and would regularly eat there 2. I wish one were served, but I would probably not eat there regularly 3. it makes no difference to me 4. I prefer the present arrangement 5. other (specify) 	<p>50. How appetizing does the food look on the line?</p> <ol style="list-style-type: none"> 1. almost always appetizing 2. sometimes appetizing 3. hardly ever appetizing
<p>48. What activities keep you from eating at Derby during the scheduled meal hours?</p> <ol style="list-style-type: none"> 1. none 2. intramural sports 3. studies 4. sorority 5. other (specify) 	<p>51. What attitude do servers on the line typically convey?</p> <ol style="list-style-type: none"> 1. pleasant 2. bored 3. grouchy 4. other (specify)
<p>49.a) Is your hot food hot when you select your food on the serving line?</p> <ol style="list-style-type: none"> 1. generally 2. sometimes 3. seldom <p>b) Is your cold food cold?</p> <ol style="list-style-type: none"> 1. generally 2. sometimes 3. seldom 	<p>52. How would you rate the servers?</p> <ol style="list-style-type: none"> 1. interested or 2. uninterested 1. friendly or 2. unfriendly 1. serve the food carefully or 2. serve the food sloppily

<p>53.a) Do you ever ask the servers about the food?</p> <ol style="list-style-type: none">1. often2. occasionally3. seldom or never IF "SELDOM OR NEVER", OMIT QUESTION b. <p>b) What do you ask, typically?</p> <ol style="list-style-type: none">1. what is it2. what does it taste like (is it good)3. what is it made of4. other (specify)	<p>54. What suggestions, concerning the food or service at Derby, have you made lately?</p> <ol style="list-style-type: none">1. none2. other (specify)	<p>55. In general, how would you rate Derby Food Center?</p> <ol style="list-style-type: none">1. excellent2. good3. acceptable4. poor
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KANSAS STATE UNIVERSITY

Department of Institutional Management
 Justin Hall
 Manhattan, Kansas 66506
 Phone: 913 532 5521

STUDY OF FOOD HABITS OF COLLEGE STUDENTS

I.D. no. _____ (Col 1-3
 Card 1)

PLEASE CHECK:

Col 4 1. Residence Hall living in

- _____ (1) Ford
 _____ (2) West
 _____ (3) Moore
 _____ (4) Haymaker

Col 5 2. Sex

- _____ (1) Male
 _____ (2) Female

Col 6 3. Present age in years

- _____ (1) 17-19
 _____ (2) 20-21
 _____ (3) 22-23
 _____ (4) 24 and over

Col 7 4. Student classification

- _____ (1) Freshman
 _____ (2) Sophomore
 _____ (3) Junior
 _____ (4) Senior
 _____ (5) Graduate Student

Col 8 5. Major

- _____ (1) Agriculture
 _____ (2) Architecture
 _____ (3) Arts & Sciences
 _____ (4) Business Administration
 _____ (5) Education
 _____ (6) Engineering
 _____ (7) Home Economics
 _____ (8) Veterinary Medicine

Col 9 6. Where have you lived
 most of your life?

- _____ (1) Urban area
 _____ (2) Rural area

Col 10 7. In what section of the country
 have you lived most of your life?

- _____ (1) West
 _____ (2) Southwest
 _____ (3) Midwest
 _____ (4) Northeast
 _____ (5) Southeast
 _____ (6) Outside U.S.A., please
 specify _____

Col 11 8. In how many different comm-
 unities, cities, or towns have
 you lived before you started
 to college?

- _____ (1) Only 1
 _____ (2) 2-3
 _____ (3) 4-6
 _____ (4) More than 6

Col 12 9. Number of semesters in KSU
 Residence Hall (omit current
 semester)

- _____ (1) None before this
 semester
 _____ (2) 1 semester
 _____ (3) 2-3
 _____ (4) 4-6
 _____ (5) More than 6

APPENDIX C

Interview Cards

INTERVIEWER'S CARDS

IF "ALWAYS" IS RESPONSE IN QUESTION 1, OMIT QUESTION 4

4. If you do not eat breakfast at Derby, why not?
1. sleep in
 2. dieting
 3. I don't like breakfast foods such as bacon and eggs
 4. no early classes
 5. other (specify)

11.a) Do you patronize the Union foodservice between classes in the morning?

1. every day
2. every other day
3. once in a while
4. hardly ever IF "HARDLY EVER", OMIT QUESTIONS b, c, & 12

b) What is the main reason for this?

1. I feel hungry
2. mostly, just to socialize or relax
3. to get a table for studying
4. other (specify)

c) What do you usually eat or drink at the Union?

1. doughnut or roll
2. candy
3. soft drink
4. coffee or tea
5. other (specify)

24. How often do you generally eat dinner at Derby during the week (Monday through Friday)?

1. five times
2. three or four times
3. one or two times
4. never

IF "FIVE TIMES", OMIT QUESTION 26

RESPONDENT'S CARDS

- Ques 4. 1. sleep in
2. dieting
3. I don't like breakfast foods such as bacon and eggs
4. no early classes
5. other (specify)

- Ques 11.a) 1. every day
2. every other day
3. once in a while
4. hardly ever

- Ques 11.b) 1. I feel hungry
2. mostly, just to socialize or relax
3. to get a table for studying
4. other (specify)

- Ques 11.c) 1. doughnut or roll
2. candy
3. soft drink
4. coffee or tea
5. other (specify)

- Ques 24. 1. five times
2. three or four times
3. one or two times
4. never

APPENDIX D

Outline--Training Session for Interviewers

Outline--Training Session for Interviewers

- I. Background of study and why conducting the interviews
- II. Channels we have gone through to receive approval for interviews:

Mr. Frith and Miss Riggs
Hall Presidents and HGB
Committee for Research Involving Human Subjects

- III. Making initial contact--interviews take 15-20 minutes, so interviewers should set interviews up accordingly.

Read through initial contact instructions

Remind interviewers to be firm and positive about needing students in the sample but never be obnoxious

Initial contact can be made anytime but do not start interviews until Wednesday of the week after spring break. Remind interviewers to come see me and pick up their packets sometime on the Monday or Tuesday of that week.

- IV. Actual interview

Read through introduction to interview

Show cards and explain how they will be used

--notice the instructions concerning omitting certain questions based on previous responses

--be sure to ask all questions on a card and to ask the questions exactly as they are written

--be sure to clearly state each question. The students do not see the questions, so the interviewers must read them clearly to them. Also be sure that the students clearly understand that we are interested in how often they eat lunch and dinner at Derby.

Coding forms

- emphasize I.D. number which interviewers will get from the list of names
- Mechanics of using clip board and felt tip pen
- Work through coding form

V. Sampling Plan

Show interviewers a sample list of students to be interviewed plus alternates. Explain that each interviewer will receive such a list and that students have been selected by a random sample, so it is very important to use only the people on this list. Explain that the interviewers should attempt to receive the consent of the students to be interviewed with the I.D. numbers beside their names. However, if a student should refuse, substitute the first alternate listed for each student who refuses. Emphasize that the I.D. number of the student refusing to be interviewed must then be transferred to the alternate used.

The interviewers will be paid \$3.00 per interview, however this must be translated into hours for bookkeeping purposes. The interviewers will receive a check that says they worked almost two hours per interview, rather than a specific number of interviews.

APPENDIX E

Interview Instructions

Introduction to Study

I. Initial Contact Instructions

My name is _____, and I am a representative of the Department of Institutional Management which is in the College of Home Economics. We are currently conducting a series of interviews of a random sample of students living in the four residence halls served by Derby Food Center to determine students' perceptions of the foodservice and the food habits of students eating at Derby Food Center. [The information gathered from these interviews will be used for research being conducted by the Department of Institutional Management on planning in a residence hall foodservice.] Would you please consent to an interview--it would take only 15-20 minutes of your time and I would really appreciate it. (If a student is reluctant to be interviewed, emphasize that he/she has been randomly selected and therefore needs to be included in the sample for it to be representative.)

II. Introduction to Interview

During this interview I will be asking you questions about your past and present food habits and your perceptions of Derby Food Center. As I ask each question I will hand you a card with a list of responses. If any of these responses express your feelings or ideas, choose that response. However, notice that for some of the questions, you are given the option of choosing the "other" category if none of the listed responses agree with your feelings or ideas. If you do choose the "other" category for a response, please specify the response that you wish to make. I will be recording your answers on a coding form which will be treated as confidential material. You have the right to withdraw from the interview at any time.

Background of Study

The interviews we are currently conducting concerning students' perceptions of the foodservice and the food habits of students eating at Derby Food Center are a part of the departmental research being conducted at this time. The departmental research is concerned with attempting to develop a computerized forecasting model which can be used in forecasting the production demand for a residence hall foodservice. There are many factors which affect the forecasting for a residence hall foodservice, but we believe that one of the most important factors is the student himself--his meal habits while eating at the foodservice and his reasons for eating or not eating meals there.

A total of 203 students will be interviewed from the four residence halls served by Derby Food Center. These students have been randomly sampled from listings of the rooms in each of the four residence halls.

March 17, 1975

To: Student Interviewers

From: Mary Anne Shriwise

When conducting the interviews, be sure to emphasize that the student should respond to the question with what he/she generally does in the particular situation. Unless there is an "other" category listed, the responses are a forced choice situation. The exception to this is if one of the responses listed absolutely will not express the student's ideas or feelings--then write down the response the student gives, circle it in red, and leave me a note explaining what happened.

If you need help or answers to questions, come by and see me or call.

Home phone: 776-5539

Office phone: 532-5521

APPENDIX F

Coding Form for Interviews

Coding Form

_____ ID No.

Present Breakfast Habits

- Col 13 1. How often do you eat breakfast during the week (Monday through Friday)?
 _____ 1. _____ never
 _____ 2. _____ once
 _____ 3. _____ two to three times
 _____ 4. _____ four to five times
 _____ 5. _____ always
- Col 14 2. Do you generally eat a cold or a hot breakfast?
 _____ 1. _____ hot
 _____ 2. _____ cold
 _____ 3. _____ about an equal number of hot and cold
 _____ 4. _____ I don't generally eat breakfast
- Col 15 3. When you are in Manhattan, do you eat breakfast on the weekends?
 _____ 1. _____ not usually
 _____ 2. _____ Saturday only
 _____ 3. _____ Sunday only
 _____ 4. _____ both Saturday and Sunday
- Col 16 4. If you do not eat breakfast at Derby, why not?
 _____ 1. _____ sleep in
 _____ 2. _____ dieting
 _____ 3. _____ I don't like breakfast foods such as bacon and eggs
 _____ 4. _____ no early classes
 _____ 5. _____ other (specify) _____
- Col 17 5. Do you check the menus in the residence halls before going to Derby?
 _____ 1. _____ usually
 _____ 2. _____ sometimes
 _____ 3. _____ seldom or never
- a) Col 18-21 6.a) From the list I'm handing you, which are your 2 most favorite breakfast items?
 _____ b) Which are your 2 least favorite?
 _____ 01. _____ scrambled eggs
 _____ 02. _____ boiled eggs
 b) Col 22-25 03. _____ fried eggs
 _____ 04. _____ poached eggs
 _____ 05. _____ french toast
 _____ 06. _____ pancakes
 _____ 07. _____ bacon
 _____ 08. _____ sausage
 _____ 09. _____ hamburger patty
 _____ 10. _____ sweet roll
 _____ 11. _____ toast
 _____ 12. _____ hot cereal
 _____ 13. _____ cold cereal
 _____ 14. _____ fruit
 _____ 15. _____ juice
- Col 26 7. With whom do you usually eat breakfast?
 _____ 1. _____ roommate
 _____ 2. _____ friends from my floor
 _____ 3. _____ other friends
 _____ 4. _____ alone
 _____ 5. _____ other (specify) _____

Col 27 8. Which, if any, of the following would make breakfast at Derby more appealing to you?

1. ☐ more variety from day to day
 2. ☐ more choices on a given day
 3. ☐ larger portions
 4. ☐ more juice
 5. ☐ other (specify) _____
 6. ☐ no suggestions

Past Breakfast Habits

Col 28 9. When you were living at home, going to school, did you eat breakfast?

1. ☐ yes, generally
 2. ☐ about half the time
 3. ☐ not usually

Morning Snacks

Col 29 10.a) Do you eat a snack in the mornings?

1. ☐ seldom or never
 2. ☐ occasionally
 3. ☐ usually

Col 30 b) Where would this most frequently be?

1. ☐ Union
 2. ☐ residence hall
 3. ☐ other (specify) _____

Col 31 c) What would this generally be?

1. ☐ coffee
 2. ☐ soft drink
 3. ☐ candy
 4. ☐ fruit
 5. ☐ doughnut or roll
 6. ☐ other (specify) _____
 7. ☐ two of above

Col 32 11.a) Do you patronize the Union foodservice between classes in the morning?

1. ☐ every day
 2. ☐ every other day
 3. ☐ once in a while
 4. ☐ hardly ever

Col 33 b) What is the main reason for this?

1. ☐ I feel hungry
 2. ☐ mostly, just to socialize or relax
 3. ☐ to get a table for studying
 4. ☐ other(specify) _____

Col 34 c) What do you usually eat or drink at the Union?

1. ☐ doughnut or roll
 2. ☐ candy
 3. ☐ soft drink
 4. ☐ coffee or tea
 5. ☐ other (specify) _____

Col 35 12. Why do you choose this (these) snack at the Union?

1. ☐ it is not served at Derby
 2. ☐ it looks good
 3. ☐ I feel hungry
 4. ☐ its price is reasonable
 5. ☐ other (specify) _____

Present Lunch Habits

Col 36 13. How often do you eat lunch at Derby during the week (Monday through Friday)?

1. ☐ always
 2. ☐ three to four times
 3. ☐ one to two times
 4. ☐ never

Col 37 14. When do you generally eat lunch at Derby?

1. ☐ 10:00 4. ☐ 12:00
 2. ☐ 11:00 5. ☐ 12:30
 3. ☐ 11:30 6. ☐ 1:00

Col 38 15.a) Do you check the menus before going through the lines?

1. ☐ usually
 2. ☐ sometimes
 3. ☐ seldom or never

Col 39 b) What is the main reason you check the menus?

1. ☐ to decide whether to go through the hamburger line or not
 2. ☐ to decide on which main dish to take
 3. ☐ curiosity
 4. ☐ other (specify) _____

Col 40 16.a) How often do you eat lunch at other places? (Monday through Friday)

1. ☐ never
 2. ☐ one to two times a week
 3. ☐ three to four times a week
 4. ☐ almost always

Col 41 b) If you don't eat lunch at Derby, where would you most likely eat?

1. ☐ Union
 2. ☐ fast food restaurant
 3. ☐ Kramer or one of the small halls
 4. ☐ other (specify) _____

Col 42 17. What is your main reason for not eating lunch at Derby?

1. ☐ class conflict
 2. ☐ lost meal card
 3. ☐ off campus
 4. ☐ other (specify) _____

Col 43 18. How often do you go through the hamburger line during the week?

1. ☐ hardly ever
 2. ☐ two to three times
 3. ☐ four to five times

Col 44 19. Of the lunches served at Derby, which type do you prefer--sandwiches, casseroles, cold plates?

1. ☐ sandwiches
 2. ☐ casseroles
 3. ☐ cold plates

Col 45 20. Which is your least favorite type of lunch at Derby?

1. ☐ sandwiches
 2. ☐ casseroles
 3. ☐ cold plates

Col 46 21. Which, if any, of the following changes would make the lunch at Derby more appealing to you?

- 1. ☐ sandwiches offered more often
- 2. ☐ more variety of salads offered
- 3. ☐ larger portions
- 4. ☐ other (specify) _____
- 5. ☐ no suggestions

Past Lunch Habits

Col 47 22. During the last year you lived at home, where did you generally eat lunch during the school year?

- 1. ☐ school lunch program
- 2. ☐ fast food restaurant
- 3. ☐ home
- 4. ☐ sack lunch at school
- 5. ☐ other (specify) _____

Afternoon Snack

Col 48 23.a) What do you generally eat or drink in the afternoon?

- 1. ☐ soft drink
- 2. ☐ candy
- 3. ☐ fruit
- 4. ☐ ice cream
- 5. ☐ potato chips
- 6. ☐ other (specify) _____

Col 49 b) Where would this generally be?

- 1. ☐ my room
- 2. ☐ basement of residence hall
- 3. ☐ Union
- 4. ☐ other (specify) _____

Present Dinner Habits

Col 50 24. How often do you generally eat dinner at Derby during the week (Monday through Friday)?

- 1. ☐ five times
- 2. ☐ three or four times
- 3. ☐ one or two times
- 4. ☐ never

Col 51 25.a) Generally, how often do you eat dinner outside the residence halls during the week (Monday through Friday)?

- 1. ☐ never
- 2. ☐ one or two times
- 3. ☐ three or four times
- 4. ☐ five times

Col 52 b) Where would this normally be?

- 1. ☐ sorority
- 2. ☐ fast food restaurant
- 3. ☐ other (specify) _____

Col 53 26. If you do not eat dinner at Derby, what is the most likely reason?

- 1. ☐ change of routine
- 2. ☐ can't afford to take time from studying
- 3. ☐ dieting
- 4. ☐ invited out
- 5. ☐ extra curricular activities commitment
- 6. ☐ other (specify) _____

Col 54 27. When do you generally eat dinner at Derby?

1. ☐ 5:00 to 5:30
2. ☐ 5:30 to 6:00

Col 55 28.a) What line do you usually go through?

1. ☐ A, B
2. ☐ C, D
3. ☐ E, F
4. ☐ G

Col 56 b) What is the main reason for this?

1. ☐ shortest line
2. ☐ closest to the residence hall where I live
3. ☐ habit
4. ☐ used by students living on my floor
5. ☐ other (specify) _____

Col 57 29. With whom do you usually eat?

1. ☐ roommate
2. ☐ other friends
3. ☐ alone
4. ☐ other (specify) _____

Col 58-59 30. What is your favorite and least favorite dinner main dishes served at Derby?
(Select one favorite, one least favorite)

☐ ^m most _____ least _____

Col 60 31. Which, if any, of the following changes would make dinner at Derby more appealing to you?

1. ☐ more variety of salads
2. ☐ more variety of vegetables
3. ☐ meat less greasy
4. ☐ hotter food
5. ☐ larger portions
6. ☐ other (specify) _____
7. ☐ no suggestions

Past Dinner Habits

Col 61 32. When living at home while attending high school, what was your normal dinner style?

1. ☐ dinner eaten with my family
2. ☐ dinner eaten as a snack whenever I was hungry
3. ☐ dinner eaten in a restaurant
4. ☐ other (specify) _____

Evening Snacks

Col 62 33.a) Do you eat anything after dinner?

1. ☐ hardly ever
2. ☐ two or three times a week
3. ☐ nearly every night

Col 63 b) Where, most often?

1. ☐ own room
2. ☐ basement of residence hall
3. ☐ off campus
4. ☐ other (specify) _____

c) How often does your evening snack include each of the following?

Col		(1) <u>hardly ever</u>	(2) <u>2-3 times per week</u>	(3) <u>nearly every night</u>
64	_____ candy	_____	_____	_____
65	_____ soft drink	_____	_____	_____
66	_____ pizza	_____	_____	_____
67	_____ popcorn or chips	_____	_____	_____
68	_____ ice cream, milk	_____	_____	_____
69	_____ hamburger	_____	_____	_____

Col 70 d) What is the main reason you snack in the evening?

1. _____ while watching tv
2. _____ to socialize or be with my friends
3. _____ to relax from study pressures
4. _____ to relieve hunger
5. _____ other (specify) _____

Col 71 34. How often do you purchase vending machine items?

1. _____ more than once a day
2. _____ about once a day
3. _____ once a week
4. _____ less than once a week

Col 72 35. How often do you keep food or drink in your room?

1. _____ hardly ever
2. _____ occasionally
3. _____ usually

Col 73 36. Do you have access to a refrigerator?

1. _____ yes, I have one or my roommate does
2. _____ my friends let me use theirs
3. _____ no

Col 74 37. If yes, how does this affect your eating habits and meals?

1. _____ it doesn't
2. _____ I am not as hungry at mealtimes, therefore I eat less
3. _____ I am not as hungry at mealtimes, therefore I skip meals
4. _____ other (specify) _____

Special Dinners

Col 75 38. What do you think about the special dinners served at Derby?

1. _____ they are very good
2. _____ they are good
3. _____ they are not really very special
4. _____ other (specify) _____

Col 76 39. What changes and/or suggestions do you have for them?

1. _____ none
2. _____ have them more often
3. _____ other (specify) _____

Dining Room

Col 77 40. Do you think cleanliness is a problem in the dining room?

1. _____ almost always
2. _____ sometimes
3. _____ seldom
4. _____ never

ID _____ (Col 1-3)
Card 2 (Col 4)

7

Col 5 41. In what area do you usually eat?

- ____ 1. _____ A, B
2. _____ C, D
3. _____ E, F
4. _____ G

Col 6 42. What is the main reason for this?

- ____ 1. _____ the end of the line I go through is in that area
2. _____ the floor members sit there regularly
3. _____ other (specify) _____

Col 7 43.a) Do you think the atmosphere of the dining room should be improved?

- ____ 1. _____ yes
2. _____ no
3. _____ undecided

Col 8 b) If yes, do you agree or disagree with the following suggestions?

- | | | |
|--------------------------------------|---------------|------------------|
| 8 _____ smaller groupings of tables | 1 _____ agree | 2 _____ disagree |
| 9 _____ more music | 1 _____ agree | 2 _____ disagree |
| 10 _____ brighter walls and curtains | 1 _____ agree | 2 _____ disagree |

General Weekend Habits

Col 11 44. How often are you out of town on the weekends, not counting the vacations?

- ____ 1. _____ one or two times a semester
2. _____ about once a month
3. _____ about twice a month
4. _____ almost every weekend

Col 12 45. If you are in town on the weekends, how often do you eat at Derby?

- ____ 1. _____ every meal
2. _____ every meal except breakfasts
3. _____ Saturday and Sunday lunches
4. _____ Saturday dinner

Col 13 46.a) If you don't eat at Derby on the weekends when in town, what is the most important reason?

- ____ 1. _____ I prefer to go out
2. _____ I'm usually invited out
3. _____ I'm usually off campus
4. _____ other (specify) _____

Col 14 b) If you don't eat at Derby on weekends where are you most likely to eat?

- ____ 1. _____ fast food restaurant
2. _____ restaurant
3. _____ friend's home or apartment
4. _____ parents or relatives
5. _____ other (specify) _____

Col 15 47. How do you feel about having a meal served on Sunday night?

- ____ 1. _____ I wish one were served and would regularly eat there
2. _____ I wish one were served, but I would probably not eat there regularly
3. _____ it makes no difference to me
4. _____ I prefer the present arrangement
5. _____ other (specify) _____

Activities

Col 16 48. What activities keep you from eating at Derby during the scheduled meal hours?

1. ☐ none
 2. ☐ intramural sports
 3. ☐ studies
 4. ☐ sorority
 5. ☐ other (specify) _____

Service

Col 17 49.a) Is your hot food hot when you select your food on the serving line?

1. ☐ generally
 2. ☐ sometimes
 3. ☐ seldom

Col 18 b) Is your cold food cold?

1. ☐ generally
 2. ☐ sometimes
 3. ☐ seldom

Col 19 50. How appetizing does the food look on the line?

1. ☐ almost always appetizing
 2. ☐ sometimes appetizing
 3. ☐ hardly ever appetizing

Col 20 51. What attitude do servers on the line typically convey?

1. ☐ pleasant
 2. ☐ bored
 3. ☐ grouchy
 4. ☐ other (specify) _____

52. How would you rate the servers?

- | | | | | |
|--------|----------------------------|-----------------------------|---------------------------------|-------------------------|
| Col 21 | <input type="checkbox"/> 1 | interested | or 2 <input type="checkbox"/> 1 | uninterested |
| Col 22 | <input type="checkbox"/> 1 | friendly | or 2 <input type="checkbox"/> 1 | unfriendly |
| Col 23 | <input type="checkbox"/> 1 | serve the food
carefully | or 2 <input type="checkbox"/> 1 | serve the food sloppily |

Col 24 53.a) Do you ever ask the servers about the food?

1. ☐ often
 2. ☐ occasionally
 3. ☐ seldom or never

Col 25 b) What do you ask, typically?

1. ☐ what is it
 2. ☐ what does it taste like (is it good)
 3. ☐ what is it made of
 4. ☐ other (specify) _____

General Reactions

Col 26 54. What suggestions, concerning the food or service at Derby, have you made lately?

1. ☐ none
 2. ☐ other (specify) _____

Col 27 55. In general, how would you rate Derby Food Center?

1. ☐ excellent
 2. ☐ good
 3. ☐ acceptable
 4. ☐ poor

APPENDIX G

Recording Forms for Meal Attendance and Production Records

Lunch	Initial Forecast	Adjusted Forecast	Reasons for Adjustment	Portions Produced	Portions not Served
Entree 1					
Entree 2					
Additions					
(indicate why items were added)					
Dinner	Initial Forecast	Adjusted Forecast	Reasons for Adjustment	Portions Produced	Portions not Served
Entree 1					
Entree 2					
Additions					
(indicate why items were added)					

Campus

Hall

Activities:

Date _____

Day _____

APPENDIX H

**Entree Menus for Data Collection Period as Percentages
of Total Portions Served**

Entree Menus for Data Collection Period as Percentages
of Total Portions Served

Week of Semester	Day	Lunch Entree	% of Total Portions Served ¹	Dinner Entree	% of Total Portions Served ¹
06	M	Beef Burger Pie	23.0	Swiss Steak	76.0
06	M	Ham on Hoagy Bun	42.5	Yoghurt Cold Plate	6.0
06	M	Hamburger Line	19.5		
06	T	Hamburger on Bun	74.5	Fried Lake Perch	51.0
06	T	Plum Delicious Plate	6.0	Pork Ribs with Sauerkraut	45.0
06	T	Hamburger Line	19.5		
06	W	Beef Chop Suey on Rice	37.0	Baked Coated Chicken	84.0
06	W	K-State Salad Bowl	18.0		
06	W	Hamburger Line	27.0		
06	Th	Corn Beef Slices on Cabbage	5.0	Roast Beef	79.0
06	Th	Pork Cutlet on Bun	71.5	Meat Loaf Sandwich	21.0
06	Th	Hamburger Line	23.5		
06	F	Salmon Patty with Mushroom Sauce	26.0	Spaghetti and Meat Sauce	87.0
06	F	Shepherd's Pie	34.0	Meat Balls and Gravy	13.0
06	F	Hamburger Line	40.0		
06	S	Foot Long Hot Dog	69.5	Grilled Steak	67.0
06	S	Pacific Omelet	30.5	Bar-B-Que Hamburger on Bun	33.0
06	Su			Baked Ham with Cherry Sauce	97.5
07	M	Pizza	62.0	Beef Stew	66.0
07	M	Turkey a la King	19.0	Fried Catfish Fillet	34.0
07	M	Hamburger Line	16.0		

¹Percentages for a meal may not add up to 100%; unplanned entrees may have been added.

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
07	T	Beef and Pork Casserole	40.0	Baked Butterfly Pork Chop	78.5
07	T	Corned Beef on Rye	28.0	Lamb Patty	21.5
07	T	Hamburger Line	32.0		
07	W	Chicken Giblets on Rice	11.0	Country Fried Steak	77.0
07	W	Submarine Sandwich	60.0	Dietitian's Choice	23.0
07	W	Hamburger Line	23.0		
07	Th	Creamed Chipped Beef	11.0	Sweet and Sour Spareribs	100.0 ²
07	Th	Hamburger on Bun	68.0	Savory Roast Beef	100.0 ²
07	Th	Hamburger Line	21.0		
07	F	Beef, Tomato, Macaroni Casserole	58.0	Roast Turkey	94.5
07	F	Autumn Hospitality Plate	16.0		
07	F	Hamburger Line	26.0		
07	S	Shaved Beef Sandwich	100.0	Glazed Ham	79.0
07	Su			Baked Cornflake Chicken	100.0
08	M	Deep Sea Dandy	64.5	Pork Loin Roast	55.0
08	M	Meat Salad, Cup of Soup, and Roll	10.0	Beef Turnovers	40.0
08	M	Hamburger Line	25.5		
08	T	Tacos and Refried Beans	71.0	Pepper Steaks	47.0
08	T	Cheese Souffle with Cheese Sauce	10.0		
08	T	Hamburger Line	19.0		
08	W	Corn Dogs	49.0	Sole Amondine	13.0
08	W	Turkey Pot Pie	32.0	Meat Loaf	81.0
08	W	Hamburger Line	19.0		

²For special dinners students were served portions of both entrees.

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
08	Th	Superburger	77.0	Pork Steak	52.0
08	Th	Ham Salad, Melon Wedge, Roll	7.0	Chicken Crepes with Curry Sauce	40.0
08	Th	Hamburger Line	16.0		
08	F	Beef on Noodles	24.0	Fisherman's Platter	68.0
08	F	Bacon, Lettuce, and Tomato Sandwich	60.0	Knockwurst with Sauerkraut	9.5
08	F	Hamburger Line	16.0		
08	S	French Fried Jayhawk	100.0	Roast Beef	55.0
08	S			Lasagne	45.0
08	Su			Grilled Steak	100.0
09	M	Chili	72.0	Baked Ham	60.0
09	M	Salad Bowl	11.0	Jumbo Cheeseburger on Bun	40.0
09	M	Hamburger Line	17.0		
09	T	Sunflower Salad Plate	3.0	Braised Beef Strips	61.0
09	T	Hot Roast Beef Sandwich	84.5	French Fried Ocean Perch	39.0
09	T	Hamburger Line	12.5		
09	W	Texas Straw Hat	20.0	Roast Turkey	81.0
09	W	Pork Cutlet on Bun	62.0		
09	W	Hamburger Line	18.0		
09	Th	Rolled Pancakes/ Cherry Sauce/ Canadian Bacon	30.0	Baked Halibut	13.0
09	Th	Egg Salad Sandwich	11.0	Spaghetti with Meat Sauce	87.0
09	Th	Hamburger Line	27.0		
09	F	Hamburger Bean Bake	6.0	Roast Beef	95.0
09	F	Cheeseburger	77.0	Cottage Cheese Salad Bowl	5.0
09	F	Hamburger Line	17.0		

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
09	S	Thin Sliced Ham on Bun	75.0	Chuck Wagon Steak	79.5
09	S	Beef Burger Pie	25.0	Chili Burger on Bun	20.5
09	Su			Pork Chop	67.5
10	M	Scalloped Ham and Potatoes	16.0	Oklahoma Chicken Loaf	26.0
10	M	Fishwich on Bun	64.0	Swiss Steak	72.0
10	M	Hamburger Line	20.0		
10	T	Weiners and Baked Beans	65.0	Ground Beef Stroganoff	32.0
10	T	Brighten a Blustery Day Plate	9.0	Bar-B-Que Ham Loaf	42.5
10	T	Hamburger Line	26.0		
10	W	Turkey Pot Pie	32.0	Grilled Steak	78.0
10	W	Bacon, Lettuce, Tomato Sandwich	52.0	Dietitian's Choice	15.0
10	W	Hamburger Line	16.0		
10	Th	Macaroni and Cheese	48.0	Weiner Schnitzele	100.0 ²
10	Th	Trio Lunch Plate	17.0	English Fish and Chips	100.0 ²
10	Th	Hamburger Line	28.0		
10	F	Pizzaburger	71.0	Roast Pork Loin	52.0
10	F	Nut Tree Plate	11.0		
10	F	Hamburger Line	18.0		
10	S	Meat Salad Entree Bar	100.0	Hamburger Features	100.0
10	Su			Fried Chicken	100.0
11	M	Fishwich on Bun	62.0	Spaghetti	96.0
11	M	Omelet with Diced Ham	38.0		

²For special dinners students were served portions of both entrees.

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
11	T	Grilled Cheese Sandwich	58.5	Chicken Fried Steak	100.0
11	T	Egg Salad Plate	12.5		
11	T	Hamburger Line	29.0		
11	W	Beef Pot Pie	32.0	Pork Chop	82.0
11	W	Tuna Salad Bowl	10.0	Grilled Liver with Onions	18.0
11	W	Hamburger Line	25.0		
11	Th	Hot Turkey Sandwich	66.0	Roast Beef	100.0
11	Th	Kraut Hamburger Bake	8.0		
11	Th	Hamburger Line	26.0		
11	F	Veal Cutlet on Bun	68.0	Smothered Steak	90.0
11	F	Cling Peach Sherbet Bowl	9.0		
11	F	Hamburger Line	23.0		
11	S	Sandwich Bar	100.0	Roast Chicken with Dressing	61.0
11	S			Cheeseburger on Bun	35.0
11	Su			Super Meat Loaf	46.0
11	Su			Fried Shrimp Shapes	51.5
12	M	Poor Boy Sandwich	59.0	Country Fried Chicken	66.0
12	M	Hamburger Kraut Bake	4.0	Chili with Crackers	25.0
12	M	Hamburger Line	24.0		
12	T	French Dip Sandwich	75.0	Roast Fresh Ham	44.0
12	T	Banana Split Salad Bowl	2.0	Meat Croquettes with Mushroom Sauce	28.5
12	T	Hamburger Line	23.0		
12	W	Creole Spaghetti	63.0	Grilled Steak	84.0
12	W	Sausage Links and Fried Apples	15.0	Dietitian's Choice	10.5
12	W	Hamburger Line	22.0		

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
12	Th	Hamburgers on Bun	68.0	Fisherman's Platter #3	63.5
12	Th	Cheese Rarebit on Toast	12.0	Beef Stew	31.5
12	Th	Hamburger Line	20.0		
12	F	Chicken Cutlet on Bun	32.5	Smoked Pork Chop	49.0
12	F	Pizza	49.5	Meat Loaf	42.0
12	F	Hamburger Line	11.0		
12	S	Smoked Bar-B-Que Beef on Bun	100.0	Breaded Beef Cutlet	62.0
12	S			Bacon, Lettuce, Tomato Sandwich	27.0
12	Su			Baked Ham	100.0
13	M	Reuben Sandwich	62.0	Baked Flounder	16.0
13	M	Greens with Cottage Cheese Bowl	8.0	Grilled Ground Beef Steak	77.0
13	M	Hamburger Line	30.0		
13	T	Tuna Noodle Casserole	30.0	Roast Turkey	97.0
13	T	Cheese Balls on Pineapple Ring	6.0		
13	T	Hamburger Line	25.0		
13	W	Tacos	73.0	Pork Chop	88.0
13	W	Fruit Sampler Plate	6.0	Yoghurt Fruit Plate	12.0
13	W	Hamburger Line	21.0		
13	Th	Grilled Weiners on Bun	60.0	Roast Beef	84.5
13	Th	Beef Biscuit Roll	18.0		
13	Th	Hamburger Line	22.0		

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
13	F	Macaroni and Cheese	34.0	Fried Rabbit	17.0
13	F	Pork Cutlet on Bun	49.0	Dietitian's Choice	83.0
13	F	Hamburger Line	17.0		
13	S	Neopolitan Noodles	65.0	Swedish Meat Balls	47.0
13	S	Cold Cuts on Rye	35.0	Scrambled Eggs with Ham Pieces	50.0
13	Su			Grilled Steak	100.0
14	M	Chicken Tetrazzini	24.0	Chuck Wagon Steak	39.0
14	M	Chili	59.0	French Fried Shrimp	59.5
14	M	Hamburger Line	16.0		
14	T	Bar-B-Que Beef on Bun	62.0	Baked Veal Cutlet	89.0
14	T	Spanish Rice	14.0	Meat Salad, Cup of Soup, Roll	8.0
14	T	Hamburger Line	15.0		
14	W	Creamed Southern Ham on Toast	8.0	Baked Beef Brisket	55.0
14	W	Fish Square on Bun	48.0	Ravioli	31.0
14	W	Hamburger Line	24.0		
14	Th	Bacon, Lettuce, Tomato Sandwich	60.0	Baked Ham Steak	100.0
14	Th	Turkey Chow Mein	24.0		
14	Th	Hamburger Line	16.0		
14	F	Grilled Cheese Sandwich	54.0	Roast Pork	61.0
14	F	Tuna Fish Salad Bowl	8.0	Curried Chicken on Rice	36.0
14	F	Hamburger Line	26.0		
14	S	Hot Roast Beef Sandwich	60.0	Country Fried Chicken	81.0
14	S	Ham Sandwich	40.0	Buffalo Burger on Bun	19.0

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
14	Su			Pork Chop	100.0
16	M	Weiners on Bun	56.5	Beef Stew	48.0
16	M	Chicken a la King	22.0	Deep Fat Fried Lake Perch	49.5
16	M	Hamburger Line	21.5		
16	T	Pizza	62.0	Swiss Steak with Gravy	41.0
16	T	Corned Beef on Rye	15.0	Cheeseburger	59.0
16	T	Hamburger Line	18.0		
16	W	Submarine Sandwich	63.0	Breaded Pork Chop	78.0
16	W	Chicken Giblets on Rice Pilaf	10.0	Egg Salad Cold Plate	8.0
16	W	Hamburger Line	22.0		
16	Th	Creamed Chipped Beef	13.0	Chuckwagon Steak	83.0
16	Th	Grilled Cheese Sandwich	62.0	Brunswick Stew	16.0
16	Th	Hamburger Line	25.0		
16	F	Beef, Tomato, Macaroni Casserole	54.0	Country Fried Steak	73.5
16	F	Hospitality Plate	17.0	Dietitian's Choice	26.5
16	F	Hamburger Line	29.0		
16	S	K-State Hamburger on Bun	71.0	Glazed Ham	98.0
16	S	Texas Straw Hat	29.0		
16	Su			Baked Cornflake Chicken	70.0
17	M	Deep Sea Dandy	61.0	Pork Loin Roast	33.0
17	M	Meat Salad, Cup of Soup, Roll	13.0	Beef Cutlets with Dressing	67.0
17	M	Hamburger Line	26.0		

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
17	T	Tacos and Refried Beans	61.0	Filet Mignon	100.0 ²
17	T	Tuna Noodle Casserole	21.0	Jumbo Ocean Prawn	100.0 ²
17	T	Hamburger Line	18.0		
17	W	Corn Dogs	53.0	Meat Loaf	58.0
17	W	Scalloped Chicken	16.0	Sole Almondine	22.0
17	W	Hamburger Line	20.5		
17	Th	Superburger	67.0	Pork Steak	25.0
17	Th	Dutch Treat Plate	18.0	Beef Brisket	50.0
17	Th	Hamburger Line	15.0		
17	F	Beef on Noodles	29.0	Fisherman's Platter	54.0
17	F	Bacon, Lettuce, Tomato Sandwich	54.0	Fried Rabbit	13.0
17	F	Hamburger Line	17.0		
17	S	College Joe	61.0	Roast Beef with Gravy	88.0
17	S	Peach of a Dairy Salad Bowl	11.0		
17	Su			Grilled Steak	71.0
17	Su			Smoked Sausage	29.0
03	M	Poor Boy Sandwich	58.0	Country Fried Chicken	71.0
03	M	Sausage Links and Apples	19.0	Salisbury Steak	28.0
03	M	Hamburger Line	23.0		
03	T	Bar-B-Que Beef on Bun	74.0	Roast Rib of Beef	100.0
03	T	Peach of a Dairy Plate	8.0		
03	T	Hamburger Line	18.0		

²For special dinners students were served portions of both entrees.

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
03	W	Creole Spaghetti	66.5	Baked Sole Almondine	10.0
03	W	Beef Biscuit Roll	12.0	Six Layer Dinner	10.0
03	W	Hamburger Line	21.5		
03	Th	Grilled Hamburger	65.0	Roast Fresh Ham	76.0
03	Th	Cheese Rarebit on Toast	12.5	Scalloped Chicken	21.0
03	Th	Hamburger Line	19.0		
03	F	Bacon, Lettuce, Tomato Sandwich	52.0	Swiss Steak	83.0
03	F	Pizza	37.0	Meat Croquettes	12.0
03	F	Hamburger Line	10.0		
03	S	Shrimp Louis Salad Bowl	15.0	Grilled Steak	86.0
03	S	Jayhawk Cutlet on Bun	69.0	Cold Meat Loaf and Turkey	14.0
03	Su			Baked Ham	94.0
04	M	Reuben Sandwich	57.0	Red Snapper	35.0
04	M	Western Omelet	22.0	Ham and Beans	29.0
04	M	Hamburger Line	21.0		
04	T	Tacos	70.0	Grilled Hamburger	93.0
04	T	Creamed Chipped Beef	13.0		
04	T	Hamburger Line	17.0		
04	W	Chili and Crackers	81.0	Pork Chop	64.0
04	W	Greens with Cottage Cheese and Fruit	5.0	Hamburger Stroganoff	36.0
04	W	Hamburger Line	14.0		
04	Th	Weiners on Bun	48.0	Bar-B-Que Beef	91.0
04	Th	Turkey and Dumplings	21.0	Dietitian's Choice	9.0
04	Th	Hamburger Line	18.0		

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
04	F	Beef Noodle Casserole	33.0	Baked Chicken	76.0
04	F	Pork Cutlet on Dark Rye	48.0	Snowdrift Squares	13.0
04	F	Hamburger Line	19.0		
04	S	College Joe	83.0	Poached Halibut	18.0
04	S	Cheese Balls on Pineapple Ring	17.0	Swedish Meatballs	53.5
04	Su			Grilled Steak	86.0
04	Su			Waffles and Sausage	14.0
05	M	Chicken Salad Sandwich	26.5	Beef Birds with Gravy	27.0
05	M	Texas Straw Hat	49.5	Yoghurt Fruit Plate	9.0
05	M	Hamburger Line	24.0		
05	T	Beef French Dip	65.0	Veal Piccata	65.0
05	T	Spanish Rice	15.0	Dietitian's Choice	30.0
05	T	Hamburger Line	20.0		
05	W	Hunters Dinner	13.0	Fried Rabbit	14.0
05	W	Cheese Strata	25.0	Baked Catfish	23.0
05	W	Turkey Sandwich	40.0		
05	W	Hamburger Line	22.0		
05	Th	Beef Pot Pie	61.0	Kabobs	29.0
05	Th	Brighten a Blustery Day Plate	12.0	Minute Steak	69.0
05	Th	Hamburger Line	27.0		
05	F	Grilled Cheese Sandwich	59.5	Roast Pork Loin	14.0
05	F	Hamburger Goulash	23.5	French Fried Shrimp	68.0
05	F	Hamburger Line	17.0		
05	S	Southern Ham Shortcake	16.5	Chicken Antoine	62.0
05	S	Egg Salad Plate	62.5	Meat Balls with Gravy	31.0

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
05	Su			Roast Beef	100.0
06	M	Spanish Noodles	22.0	Smothered Steak	100.0
06	M	Thin Sliced Ham on Hoagy Bun	59.0		
06	M	Hamburger Line	19.0		
06	T	Hamburger on Bun	70.0	Fried Lake Perch	42.0
06	T	Plum Delicious Plate	6.0	Pork Ribs with Sauerkraut	36.0
06	T	Hamburger Line	24.0		
06	W	Beef Chop Suey	53.0	Baked Coated Chicken	69.0
06	W	K-State Salad Bowl	21.0		
06	W	Hamburger Line	26.0		
06	Th	Pork Cutlet on Bun	70.0	Roast Beef	82.0
06	Th	Corned Beef Hash	10.0	Liver and Onions	14.0
06	Th	Hamburger Line	20.0		
06	F	Salmon Patty	33.0	Spaghetti and Meat Sauce	89.0
06	F	Shepherd's Pie	22.0	Dietitian's Choice	11.0
06	F	Hamburger Line	26.0		
06	S	Foot Long Hot Dog	69.0	Grilled Steak	52.0
06	S	Omelet with Mushrooms	19.0		
06	Su			Baked Ham	99.0
07	M	Pizza	66.0	Beef Stew	27.0
07	M	Chicken a la King	16.0	Salisbury Steak	62.0
07	M	Hamburger Line	18.0		
07	T	Six Layer Dinner	21.0	Chicken Fried Steak	85.0
07	T	Corned Beef on Rye	35.0	Scrambled Eggs	15.0
07	T	Hamburger Line	31.0		

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
07	W	Submarine Sandwich	68.0	Baked Pork Chop	44.0
07	W	Chicken Giblets on Rice	10.0	Chili with Crackers	40.0
07	W	Hamburger Line	22.0		
07	Th	Creamed Chipped Beef	13.0	Roast Turkey	85.5
07	Th	Bar-B-Que Beef on Bun	58.0	Ham and Beans	14.5
07	Th	Hamburger Line	29.0		
07	F	Beef, Tomato, Macaroni Casserole	55.0	Fisherman's Platter	71.0
07	F	Autumn Hospitality Plate	24.0	Veal Cordon Bleu	22.5
07	F	Hamburger Line	21.0		
07	S	Superburger	100.0	Grilled Ham Slice	77.0
07	S			Dietitian's Choice	15.0
07	Su			Baked Chicken Cornflake	78.0
07	Su			Sausage and Apple Fritters	14.0
08	M	Deep Sea Dandy	64.0	Ground Beef Steak	74.0
08	M	Meat Salad, Cup of Soup, Roll	11.0	Turkey Pot Pie	18.0
08	M	Hamburger Line	25.0		
08	T	Hot Roast Beef Sandwich with Gravy	84.0	Taco Supper	100.0
08	T	Dietitian's Choice	2.5		
08	T	Hamburger Line	13.5		
08	W	Corn Dogs	52.0	Baked Sole Almondine	14.0
08	W	Beef on Noodles	22.0	Meat Loaf with Mushroom Gravy	86.0
08	W	Hamburger Line	15.0		

Week of Semester	Day	Lunch Entree	% of Total Portions Served	Dinner Entree	% of Total Portions Served
08	Th	Pizzaburger	73.0	Roast Pork Loin	47.0
08	Th	Peach of a Dairy Salad Bowl	9.5	Chicken Crepes with Curry Sauce	38.5
08	Th	Hamburger Line	17.5		
08	F	Cheese Souffle with Cheese Sauce	12.0	Fisherman's Plate	47.0
08	F	Bacon, Lettuce, Tomato Sandwich	63.0	Dietitian's Choice	51.0
08	F	Hamburger Line	16.0		

APPENDIX I
Production Sheet

Meal Count _____
Weather _____[illegible]

PREPARATION:

[illegible]

APPENDIX J
Coding Categories

Coding Categories

Column 1 and 2: last digits of the year being coded.

Column 3: semester being coded--first semester=1, second semester=2.

Column 4 and 5: week of the semester. The week of registration will be coded as week 01.

Column 6-9: Hall population per week according to occupancy reports kept by the Director of Housing. This is recorded every Friday.

Column 10: day of the week--Monday=1, Tuesday=2, Wednesday=3, Thursday=4, Friday=5, Saturday=6, and Sunday=7.

Column 11 and 12: event information. Column 11 will be for major events such as ball games, no game=0, football game=1, and basketball game=2. Column 12 will be for other events, none=0, major university event=1, hall event=2, minor campus event=3, and combination of two=4.

Column 13: meal--breakfast=1, lunch=2, and dinner=3.

Column 14-17: total number of patrons served at the particular meal, right justified.

Column 18-20: category of entrees for the meal. Column 18 and 19 will be for the designated 16 categories of entrees. Column 20 will be reserved for the three situations; 1=planned entree, adequate amount; 2=planned entree, ran out during serving time; 3=extra food being offered as an addition to the planned menu.

Column 21-24: initial forecast of the entree, right justified.

Column 25-28: adjusted forecast for the entree.

Column 29-32: portions produced of the entree.

Column 33-36: portions not served of the entree.

Entrees Categories

Categories:

Beef--Roast	01
Steak or Cutlet	02
Ground	03
Pork--Chop or Ham	04
Other	05
Poultry--Fried or Roast	06
Other	07
Fish--Fried	08
Baked	09
Salad Plate	10
Cold Sandwich	11
Hot Sandwich	12
Hamburger	13
Casserole, Creamed Dishes, and Extended Main Dish Items	14
Italian and Mexican Foods	15
Other	16

APPENDIX K

Responses to Interviews

Students' Breakfast Habits and Related Perceptions
of Residence Hall Foodservice

How often do you eat breakfast during the week (Monday through Friday)? (N=203)¹

	%
Never	28.1
Once	12.8
Two to three times	27.1
Four to five times	16.7
Always	15.3

Do you check the menus in the residence halls before going to Derby? (N=203)

	%
Usually	64.0
Sometimes	27.6
Seldom or never	8.4

Do you generally eat a cold or a hot breakfast? (N=150)

	%
Hot	70.7
Cold	16.7
About an equal number of hot and cold	10.0
I don't generally eat breakfast	2.7

From the list I'm handing you, which are your two most favorite breakfast items? (N=402)

	Absolute frequency	% ²
Scrambled eggs	97	24.1
Boiled eggs	5	1.2
Fried eggs	28	7.0
Poached eggs	9	2.2
French toast	51	12.7
Pancakes	42	10.5
Bacon	32	8.0
Sausage	39	9.7
Hamburger patty	7	1.7
Sweet roll	31	7.7
Toast	8	2.1
Hot cereal	7	1.7
Cold cereal	10	2.5
Fruit	7	1.7
Juice	29	7.2

When you are in Manhattan, do you eat breakfast on the weekends? (N=180)

	%
Not usually	76.7
Saturday only	6.7
Sunday only	2.8
Both Saturday and Sunday	13.9

If you do not eat breakfast at Derby, why not? (N=179)

	%
Sleep in	76.5
Dieting	1.1
I don't like breakfast foods such as bacon and eggs	2.8
No early classes	8.9
Other	10.6

¹N varies because all students did not respond to all questions.

²Each student interviewed selected 2 foods; % = % of N.

From the list I'm handing you, which are your two least favorite breakfast items? (N=404)

	Absolute frequency	% ³
Scrambled eggs	16	4.0
Boiled eggs	39	9.7
Fried eggs	32	7.9
Poached eggs	75	18.6
French toast	15	3.7
Pancakes	35	8.7
Bacon	9	2.2
Sausage	18	4.4
Hamburger patty	76	18.8
Sweet roll	18	4.4
Toast	4	1.0
Hot cereal	39	9.7
Cold cereal	21	5.2
Fruit	5	1.2
Juice	2	.5

When you were living at home, going to school, did you eat breakfast? (N=203)

	%
Yes, generally	60.6
About half the time	16.7
Not usually	22.2

With whom do you usually eat breakfast? (N=177)

	%
Roommate	24.3
Friends from my floor	35.6
Other friends	15.3
Alone	19.8
Other	1.1
Two of the above	4.0

Which, if any, of the following would make breakfast at Derby more appealing to you? (N=200)

	%
More variety from day to day	10.8
More choices on a given day	12.8
Larger portions	15.8
More juice	20.7
Other	6.4
No suggestions	18.7
Serve hot breakfast later	8.4
Two of the above	4.9

³ Each student interviewed selected 2 foods; % = % of N.

Students' Lunch Habits and Related Perceptions
of Residence Hall Foodservice

How often do you eat lunch at Derby during the week (Monday through Friday)? (N=203)¹

	%
Always	78.8
Three to four times	15.3
One to two times	4.4
Never	1.5

How often do you eat lunch at other places (Monday through Friday)? (N=198)

	%
Never	87.4
One to two times a week	10.1
Three to four times a week	2.0
Almost always	0.5

When do you generally eat lunch at Derby? (N=194)

	%
10:00	2.1
11:00	14.4
11:30	50.0
12:00	11.3
12:30	21.1
1:00	1.0

If you don't eat lunch at Derby, where would you most likely eat? (N=41)

	%
Union	31.7
Fast food restaurant	41.5
Kramer or one of the small halls	7.3
Other	19.5

Do you check the menus before going through the lines? (N=203)

	%
Usually	62.6
Sometimes	23.2
Seldom or never	14.3

What is your main reason for not eating lunch at Derby? (N=54)

	%
Class conflict	48.1
Lost meal card	0.0
Off campus	13.0
Other	38.9

What is the main reason you check the menus? (N=184)

	%
To decide whether to go through the hamburger line or not	52.7
To decide on which main dish to take	9.8
Curiosity	26.6
Other	6.5
Two of the above	4.3

How often do you go through the hamburger line during the week? (N=203)

	%
Hardly ever	63.5
Two to three times	34.0
Four to five times	2.5

¹ N varies because all students did not respond to all questions.

Of the lunches served at Derby, which type do you prefer--sandwiches, casseroles, or cold plates? (N=203)

	%
Sandwiches	55.7
Casseroles	33.5
Cold plates	10.8

Which is your least favorite type of lunch at Derby? (N=203)

	%
Sandwiches	7.4
Casseroles	31.5
Cold plates	61.1

Which, if any, of the following changes would make the lunch at Derby more appealing to you? (N=199)

	%
Sandwiches offered more often	24.6
More variety of salads offered	19.1
Larger portions	22.6
Other	13.1
No suggestions	16.1
More variety in general	4.5

During the last year you lived at home, where did you generally eat lunch during the school year? (N=203)

	%
School lunch program	44.8
Fast food restaurant	8.4
Home	23.6
Sack lunch at school	15.8
Other	2.5
Didn't eat lunch	4.9

Students' Dinner Habits and Related Perceptions
of Residence Hall Foodservice

How often do you generally eat dinner at Derby during the week (Monday through Friday)? (N=203)¹

	%
Five times	75.9
Three or four times	21.7
One or two times	2.5
Never	0.0

Generally, how often do you eat dinner outside the residence halls during the week (Monday through Friday)? (N=194)

	%
Never	70.6
One or two times	26.3
Three or four times	3.1
Five times	0.0

Where would this normally be? (N=57)

	%
Sorority	17.5
Fast food restaurant	56.1
Other	26.3

If you do not eat dinner at Derby, what is the most likely reason? (N=71)

	%
Change of routine	23.9
Can't afford to take time from studying	1.4
Dieting	8.5
Invited out	9.9
Extra curricular activities commitment	22.5
Other	33.8

What time do you generally eat dinner at Derby? (N=202)

	%
5:00 to 5:30	69.8
5:30 to 6:00	30.2

What line do you usually go through? (N=203)

	%
A,B	13.8
C,D	40.9
E,F	42.9
G	2.5

What is the main reason for this? (N=201)

	%
Shortest line	12.9
Closest to the residence hall where I live	24.4
Habit	25.9
Used by students living on my floor	21.4
Other	10.0
Two of the above	5.5

With whom do you usually eat? (N=203)

	%
Roommate	28.6
Other friends	55.2
Alone	1.0
Other	3.4
Two of the above	11.8

¹N varies because all students did not respond to all questions.

What is your favorite dinner main dish served at Derby? (N=200)

	%
Beef--Grilled steaks and roast beef	37.5
Beef--Other solid beef items	9.0
Pork--Solid pork items	5.0
Poultry--Solid poultry items	15.0
Italian and Mexican foods	18.0
Sandwiches, casseroles, cold plates, and other extended items	6.0
Fish--baked	2.0
Fish--fried	7.5
Other	0.0

What is your least favorite dinner main dish served at Derby? (N=198)

	%
Beef--Grilled steaks and roast beef	2.5
Beef--Other solid beef items	22.2
Pork--Solid pork items	5.1
Poultry--Solid poultry items	7.6
Italian and Mexican foods	5.6
Sandwiches, casseroles, cold plates, and other extended items	17.7
Fish--baked	19.7
Fish--fried	1.0
Other	18.7

Which, if any, of the following changes would make dinner at Derby more appealing to you? (N=200)

	%
More variety of salads	7.5
More variety of vegetables	8.0
Meat less greasy	28.5
Hotter food	11.5
Larger portions	12.5
Other	10.0
No suggestions	7.5
Two of the above	10.5
More than two of the above	4.0

When living at home while attending high school, what was your normal dinner style? (N=203)

	%
Dinner eaten with my family	89.2
Dinner eaten as a snack whenever I was hungry	6.9
Dinner eaten in a restaurant	0.5
Other	3.4

What do you think about the special dinners served at Derby? (N=203)

	%
They are very good	42.9
They are good	46.3
They are not really very special	7.9
Other	3.0

What changes and/or suggestions do you have for them? (N=203)

	%
None	33.0
Have them more often	38.4
Other	19.2
Should be less crowded and disorganized	4.9
Larger portions	4.4

Snacking Habits

Do you eat a snack in the mornings?
(N=202)¹

	%
Seldom or never	76.7
Occasionally	17.8
Usually	5.4

Where would this most frequently be?
(N=52)

	%
Union	32.7
Residence hall	57.7
Other	9.6

What would this generally be?
(N=52)

	%
Coffee	7.7
Soft drink	17.3
Candy	3.8
Fruit or juice	11.5
Doughnut or roll	17.3
Other	23.1
Two of the above	19.2

Do you patronize the Union food-
service between classes in the
morning? (N=200)

	%
Every day	2.0
Every other day	4.0
Once in a while	20.5
Hardly ever	73.5

What is the main reason for this?
(N=53)

	%
I feel hungry	30.2
Mostly, just to socialize or relax	64.2
To get a table for studying	5.7
Other	0.0

What do you usually eat or drink at
the Union? (N=52)

	%
Doughnut or roll	25.0
Candy	0.0
Soft drink	42.3
Coffee or tea	3.8
Other	11.5
Two of the above	17.3

Why do you choose this (these)
snack at the Union? (N=52)

	%
It is not served at Derby	7.7
It looks good	28.8
I feel hungry or thirsty	34.6
Its price is reasonable	9.6
Other	19.2

What do you generally eat or drink
in the afternoon? (N=203)

	%
Soft drink	31.5
Candy	2.5
Fruit	17.2
Ice cream	2.5
Potato chips	2.5
Other	13.3
Nothing	24.6
Two of the above	5.9

Where would this generally be?
(N=153)

	%
My room	64.7
Basement of residence hall	15.0
Union	7.2
Other	13.1

¹N varies because all students did not respond to all questions.

Do you eat anything after dinner?
(N=203)

	%
Hardly ever	24.1
Two to three times a week	52.7
Nearly every night	23.2

Where, most often? (N=157)

	%
Own room	64.3
Basement of residence hall	13.4
Off campus	12.7
Other	4.5
Two of the above	5.1

How often does your evening snack
include candy? (N=156)

	%
Hardly ever	83.3
Two to three times a week	13.5
Nearly every night	3.2

How often does your evening snack
include soft drinks? (N=156)

	%
Hardly ever	30.8
Two to three times a week	51.3
Nearly every night	17.9

How often does your evening snack
include pizza? (N=155)

	%
Hardly ever	83.9
Two to three times a week	16.1
Nearly every night	0.0

How often does your evening snack
include popcorn or chips? (N=156)

	%
Hardly ever	45.5
Two to three times a week	46.2
Nearly every night	8.3

How often does your evening snack
include ice cream or milk? (N=156)

	%
Hardly ever	64.1
Two to three times a week	31.4
Nearly every night	4.5

How often does your evening snack
include hamburgers? (N=156)

	%
Hardly ever	87.2
Two to three times a week	12.2
Nearly every night	0.6

What is the main reason you snack in
the evenings? (N=157)

	%
While watching TV	5.7
To socialize or be with my friends	11.5
To relax from study pressures	26.8
To relieve hunger	46.5
Other	3.8
Two of the above	5.7

How often do you purchase vending
machine items? (N=202)

	%
More than once a day	2.5
About once a day	27.7
Once a week	39.1
Less than once a week	30.7

How often do you keep food or drink
in your room? (N=203)

	%
Hardly ever	22.7
Occasionally	30.0
Usually	47.3

Do you have access to a refrigerator?
(N=203)

	%
Yes, I have one or my room- mate does	47.8
My friends let me use theirs	30.0
No	22.2

If yes, how does this affect your
eating habits and meals? (N=158)

	%
It doesn't	97.5
I am not as hungry at mealtimes, therefore I eat less	1.9
I am not as hungry at mealtimes, therefore I skip meals	0.6
Other	0.0

Other Perceptions, Practices, and Habits Related
to Residence Hall Foodservice

Do you think cleanliness is a problem
in the dining room? (N=202)¹

	%
Almost always	0.0
Sometimes	14.9
Seldom	39.6
Never	45.5

In what area do you usually eat?
(N=202)

	%
A,B	12.9
C,D	42.1
E,F	42.6
G	2.5

What is the main reason for this?
(N=203)

	%
The end of the line I go through is in that area	34.0
The floor members sit there regularly	47.3
Other	18.7

Do you think the atmosphere of the
dining room should be improved?
(N=201)

	%
Yes	36.8
No	46.8
Undecided	16.4

If yes, do you agree or disagree with
smaller groupings of tables? (N=80)

	%
Agree	33.8
Disagree	66.3

If yes, do you agree or disagree with
more music? (N=80)

	%
Agree	88.8
Disagree	11.3

If yes, do you agree or disagree
with brighter walls and curtains?
(N=79)

	%
Agree	79.7
Disagree	20.3

How often are you out of town on the
weekends, not counting vacations?
(N=202)

	%
One or two times a semester	44.1
About once a month	34.7
About twice a month	14.9
Almost every weekend	6.4

If you are in town on weekends, how
often do you eat at Derby? (N=202)

	%
Every meal	18.3
Every meal except breakfast	54.5
Saturday and Sunday lunches	16.3
Saturday dinner	5.9
Other	5.0

¹N varies because all students did not respond to all questions.

If you don't eat at Derby on the weekends when in town, what is the most important reason? (N=164)

	%
I prefer to go out	34.1
I'm usually invited out	29.3
I'm usually off campus	15.9
Other	9.1
Sleep in	11.6

If you don't eat at Derby on weekends, where are you most likely to eat? (N=155)

	%
Fast food restaurant	40.0
Restaurant	33.5
Friends home or apartment	9.0
Parents or relatives	1.3
Other	8.4
Doesn't eat	7.7

How do you feel about having a meal served on Sunday night? (N=203)

	%
I wish one were served and would regularly eat there	42.9
I wish one were served, but I would probably not eat there regularly	8.9
It makes no difference to me	16.7
I prefer the present arrangements	27.1
Other	4.4

What activities keep you from eating at Derby during the scheduled meal hours? (N=203)

	%
None	46.8
Intramural sports	12.8
Studies	15.8
Sorority	4.4
Other	20.2

Is your hot food hot when you select your food on the serving line? (N=203)

	%
Generally	58.1
Sometimes	38.4
Seldom	3.4

Is your cold food cold? (N=202)

	%
Generally	75.7
Sometimes	19.3
Seldom	5.0

How appetizing does the food look on the line? (N=203)

	%
Almost always appetizing	29.6
Sometimes appetizing	60.6
Hardly ever appetizing	9.9

What attitude do servers on the line typically convey? (N=203)

	%
Pleasant	47.8
Bored	36.9
Grouchy	5.4
Other	6.9
Two of the above	3.0

How would you rate the servers' interest? (N=201)

	%
Interested	46.3
Uninterested	53.7

How would you rate the servers' friendliness? (N=199)

	%
Friendly	88.4
Unfriendly	11.6

How would you rate the serving capabilities of the servers?
(N=202)

	%
Serve the food carefully	87.1
Serve the food sloppily	12.9

Do you ever ask the servers about the food? (N=202)

	%
Often	11.4
Occasionally	46.5
Seldom or never	42.1

What do you ask typically?
(N=126)

	%
What is it	61.1
What does it taste like (is it good)	4.8
What is it made of	19.0
Other	7.1
Two of the above	7.9

What suggestions, concerning the food or service at Derby, have you made lately? (N=203)

	%
None	71.9
Other	23.2
Larger portions	4.9

In general, how would you rate Derby Food Center? (N=203)

	%
Excellent	4.4
Good	59.1
Acceptable	33.0
Poor	3.4

FORECASTING PRODUCTION DEMAND IN A RESIDENCE
HALL FOODSERVICE SYSTEM

by

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B.S., Kansas State University, 1973

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Intuitive estimate, the most commonly used means of forecasting in residence hall foodservice at the present time, is a very time consuming, often inaccurate means of forecasting. The objective of this research was to study present forecasting methods, to study student-related factors affecting meal attendance, and to compare meal attendance and forecasting data in a university residence hall foodservice system.

To study students' food habits, and perceptions and opinions of the foodservice that might influence meal participation and ultimately, meal demand (Phase I of the research), an interview-survey was conducted of a 10 per cent stratified random sample of the 2250 students living in four university residence halls on the campus of a large midwestern university served by a central foodservice. A modified Q-sort technique was used to conduct the interview-surveys. For each of the fifty-five questions asked, the interviewer presented the student with a card listing the predetermined response categories and an "other" response category. The student had the option of choosing one of these categories. If the "other" response was chosen, the student's own response was recorded. In this way, most of the responses to questions could be easily checked off on a coding form for ease in analysis of response to most questions. The instrument was developed from the results of tape recorded interviews in which twenty randomly selected students were asked open-ended questions concerning the food-service.

In Phase II of the research records of the number of students attending meals on each day of the week were kept for a period of seventeen weeks. During the data collection period of meal attendance, the following data also were collected: the initial forecasted amount of each entree for lunch and dinner, the adjusted forecasts for entrees, the number of portions

actually produced of each entree, the number of portions not served, any additions that were made to the choice of entrees, and the dietitian's reasons for both the adjustment of the initial forecast and the additions made to the entree choices. Records were kept of campus and hall activities during this period. Sixteen categories of similar entrees were developed to study variances among types of entrees. Multivariate analysis was used to study the relationships of semester, day, entree type, and event on initial and adjusted forecasts, portions produced, not served, and served, and differences between adjusted forecasts and portions served.

Upperclassmen and male students reportedly ate both breakfast and dinner in the foodservice more often than did freshmen and sophomores and women students. One reason for this may be that upperclassmen tend to live in residence halls for the services that are offered (i.e., prepared meals) more so than freshmen or sophomores who may live on campus because of parental pressure. A large percentage of students who never eat breakfast at college reported eating breakfast regularly when living at home. Students on the whole, reported eating lunch and dinner regularly at the foodservice during the weekdays.

The mean meal attendance for all meals was found to be substantially lower on weekends than weekdays. The overall mean percentage of students eating breakfast at the foodservice was 31.84 per cent; for lunch, 86.81 per cent; and for dinner, 78.45 per cent. Overforecasting occurred for all days for luncheon and dinner meals both for the initial and adjusted forecast, although overforecasting was greater for the weekends than weekdays. For all days, the initial, or purchasing forecast was reduced so that the adjusted, or production forecast was closer to production demand. Significant differences were found among the luncheon and dinner entree categories

for the initial and adjusted forecasts, portions produced, not served, and served, and the difference between the adjusted forecasts and portions served.