# STRESSFUL LIFE EVENTS AS A FACTOR IN THE DIETARY QUALITY OF UNIVERSITY STUDENTS

by

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TABLE OF CONTENTS

## LIST OF TABLES

Table Page

Table | Page

# INTRODUCTION

Stress is ubiquitous in our modern society. It may originate with various types of stimuli or stressors: biological (illness, injury, substance abuse), psychological (threats to self-esteem, fear of failure), sociological (sexual inequalities, anomic feelings), and philosophical (purpose in life, career goals) (1). The contemporary nature of stressors has been markedly altered; "stressors that were originally thought of as purely somatic in nature--today regarded as secondary stressors--have been outnumbered and largely replaced by non-somatic, primary stressors" (2).

Endocrinologist, Hans Selye, found that regardless of the origin of a stressor the physiological response is basically the same (3). A series of neuroendocrine and metabolic adjustments ensue, resulting in an accelerated cardiac and respiratory rate, increased blood pressure, elevated levels of both blood glucose and lipids, and a disruption in the digestive processes (4). Selye has termed this phenomena of stress reactivity as "the non-specific response of the body to any demand" (3). Thus, stress requires every organism to react with some degree of adaptability; the degree is contingent upon the type, magnitude, and number of stressors imposed, genetic predisposition, sex, age, and other "conditioning factors" (5,6). Metabolic adjustments to stress could theoretically alter nutritional requirements (2,7), yet evidence to indicate an increased need for nutrients during stress is lacking (8,9). Good nutritional status, however, is a powerful determinant, or "conditioning factor" that may determine how well an individual will respond to stress (5,10). Nutritional status could actually determine whether exposure to stress would be met by physiological adaptation or contribute to "diseases of adaptation" (5,6).

Psychosocial epidemiological researchers have conceptualized stress as the need to adapt to stressful life events (SLEs) (11,12). Utilizing this concept in their research, these authors have found university populations to be a subpopulation experiencing significant amounts of stress (13-17). One of those stressors may be a change in eating habits (13-17). Stress has been demonstrated to result in either an increased or decreased food intake, depending upon the individual pattern of response (18-20). Sex and age of the respondent are important variables in this response pattern (21). Either response may be indicative of poor dietary practices due to the fact that over-, as well as under-nutrition, is an undesirable health status (22). Studies also show that many individuals, in response to stress, select diets high in fat (particularly saturated fats), sugars and salt, and low in fiber (23). This type of dietary intake pattern is not congruent with present recommendations (24).

Psychosocial epidemiologists have stated that the "objective mediators and/or moderators" of the stress-illness relationship should engage research attention (11,12). Because stress and dietary quality have been found to be independently associated with various disease processes, and because stress has been found to influence appetite and eating behaviors, it was desirable to investigate the relationship between stress levels and dietary quality. The objectives of this study were:

(1) to assess dietary intake data from a university population through the use of a self-administered food frequency instrument.

(2) to assess the level of life stress of university students through the use of a life-change type instrument.

(3) to investigate the relationship between stress and dietary quality of university students.

## REVIEW OF LITERATURE

### Stress and university students

Stressors. In the late 1960s, a longitudinal Study of Student Development (SSD) was conducted at Kansas State University (17). This study was unique in that it emphasized the importance of looking at students as physical, as well as sociopsychological beings. In weekly group discussions during the physiological phase of the SSD, the following stressors were identified: 1) concern with weight control and body image; anxiety appeared to affect food intake, with food sometimes serving as a comfort for the troubled student; 2) sedentary lifestyle; participants frequently mentioned that they had less time for physical exercise than they had prior to entering college; 3) altered sleeping habits; 4) psychological fatigue; students often experienced a loss of energy linked to inability to cope successfully with boredom, fear, worry, and indecision. Selye (4) conceptualized the physiological stress response as being triphasic in nature: 1) alarm reaction (the familiar 'fight or flight' response); 2) stage of resistance; a homeostatic response; 3) stage of exhaustion. The above-mentioned loss of energy is characteristic of the third, and final, response stage to stressors.

The Social Readjustment Rating Scale (SRRS) was devised by Holmes and Rahe (25) to measure the perceived impact of various life-change events in terms of the degree of readjustment required. Anderson (14) administered the SRRS to university students in order to determine the relevance of the SRRS events to this population, omitting those events deemed irrelevant, e.g., son or daughter leaving home, and including those determined relevant, e.g., change in dating habits. Anderson then presented the revised SRRS to 284 college students, instructing them to provide estimates of the amount of readjustment required for each of 47 events in relationship to the readjustment associated with entering college. College was arbitrarily assigned the value of 500. Mean event scores were then divided by ten to obtain more workable figures. Spearman rho coefficient of correlation showed a high agreement among male and female university students as to the amount of readjustment required (0.945). Anderson's revised SRRS with its population specific life-change event values was called the College Schedule of Recent Experience (CSRE) (Appendix A).

Stress level was measured by Greenberg (13) in a Northeastern university population through the use of the CSRE. His results reaffirmed those of the Kansas State university researchers some ten years earlier. He concluded that stress management/intervention should pertain to the management of life situations found to change as a result of the college experience, for example, how to adjust recreation, eating, sleeping, and work in order to minimize the destructive consequences of stress.

Life-change event data were collected from a midwestern university population for the purpose of examining the relationships between life event measures and grade point average (GPAs) over a three-year period (26). Significant negative correlations were determined between life stress scores and both first and second year GPAs. A threshold effect was found whereby those individuals experiencing 12 or more events had a significantly greater negative linear relationship to GPAs compared to those experiencing less than 12 events. Results indicated that three events occurred frequently among poorer students: 1) change in recreation, 2) change in work responsibilities, 3) change to new line of work.

Contemporary life-change event values from a university population for the 43 events on the original SRRS were collected in a study conducted in 1984 (27). The Spearman rank-difference correlation between the readjustment values determined by Holmes and Rahe (25) and this study was 0.86 ($p<0.001$), suggesting that, in general, perceptions of readjustment were relatively constant over time and between the older Holmes and Rahe sample and this college-age populace. Substantial differences, however, were detected in readjustment values assigned to specific events. Mean values provided by the university sample were more than 30 units greater, as compared to original SRRS values, for three events: 1) death of close friend, 2) pregnancy, 3) foreclosure of mortgage or loan. Overall, college students rated the stressfulness of the 43 items an average of 15.56 units more stressful than the older respondents in 1967. This finding also is in agreement with that reported by Anderson (14). A second focus of this research project was to examine the relationship between life-change event scores and indices of classroom performance, e.g., exam grades and total course points. All indices of student performance were associated negatively with life events stress, supporting the previous findings of Lloyd et al. (26).

Strang (28) measured time management anxiety in 490 undergraduate students with a ten-item time management anxiety scale (TMAS). Female students consistently demonstrated more anxiety associated with their management of personal time. A chi-square analysis found a difference ($p<0.02$) in male/female frequencies of high, low and indeterminant associations with the TMAS. Mean anxiety scores on eight of the ten items were lower for males compared to females, with four of the comparisons yielding statistically significant differences: 1) I feel guilty when I take off time to relax. 2) I feel as if I am a slave to time. 3) Wasting time disturbs me. 4) It embarrasses me when I am at a checkout counter in a store and my interaction with the cashier takes longer than usual, thus holding up other patrons. Strang concluded that additional knowledge must be sought pertaining to whether time management anxiety translates into behavioral outcomes.

<u>Stress responses</u>. Stress responses in male and female engineering students were investigated by Collins and Frankenhaeuser (29). Previous research, in which neuroendocrine response upon exposure to psychosocial stress was examined, revealed significant sex differences. These researchers postulated that female engineering students might be less likely to exhibit a neuroendocrine pattern of response influenced to a great extent by learned sex-role patterns of behavior/ response. Fourteen male and fourteen female students were subjected to a "cognitive-conflict task"; heart rate, serum cortisol, adrenaline, noradrenaline, and self-reports served as stress indices. These parameters were then compared to those obtained under control conditions. Females performed slightly better than males in the

cognitive-conflict task; neither sex's performance correlated with any physiological measure. The neuroendocrine variables were very similar across sex in the control condition; under stress, both sexes had higher hormone excretion rates, with significant increases in adrenaline and cortisol for males compared to females. Differences between experimental conditions within each sex group were analyzed by t-tests. Females reported a significant increase in adrenaline ($p<0.01$), whereas the male group's adrenaline ($p<0.001$) and cortisol ($p<0.05$) were significantly increased upon exposure to the stress-inducing situation. Both sexes had significant elevations in heart rate upon exposure to the experimental condition, with the female group's mean heart rate significantly elevated above the male group's rate under stress. Self-reported measures, e.g., perceived effort, concentration, interest, fatigue, sense of time pressure, irritation, revealed that males reported greater increases, compared to females, in these parameters during stress as compared with the control condition, as well as more pronounced changes within the stress session as compared to their female counterparts. This subjective involvement with the performance task exhibited by male students, however, was not reflected in more efficient performance.

Twenty college students were followed for a 2½ month academic quarter by Francis (30), who collected biochemical indicators of stress (serum cortisol; high-density lipoprotein cholesterol, HDLC; and low-density lipoprotein cholesterol, LDLC) in conjunction with psychometric measures of stress at bimonthly intervals. Peak periods of stress occurred at the beginning of the academic quarter, at midterm, and during final examinations. Data indicated that peak periods of stress were followed closely with significant elevations in total serum cholesterol and significant decreases in the ratio of HDLC/total cholesterol. Observed changes in serum cortisol were correlated positively with changes in anxiety and depression, increasing in like manner with peak periods of measured stress. Francis suggested that although internal psychophysiological mechanisms undoubtedly influence standard risk factors associated with the pathogenesis of coronary heart disease, this influence may be mediated through behavioral compensations, e.g., diet, exercise, and stress-management techniques.

Flynn et al. (31) at the University of Missouri conducted a longitudinal prospective study to investigate the effects of emotional pressure associated with exams on blood pressure, blood lipids [serum total cholesterol (TC), HDLC, and serum triglyceride (TG)] of 26 male medical students consuming a controlled diet with and without egg consumption. Each subject served as his own control during the six month study; two eggs were eaten daily for 3 months and no eggs were eaten during the other 3 month period. Subjects consumed three meals daily, which supplied the Recommended Dietary Allowances, in a clinical research unit. During the study, students did not change their life style or exercise patterns, and were expected to maintain their weight within one kilogram of baseline weight. Eating eggs daily and the stress of final exams resulted in no significant difference in mean serum TC compared to baseline values. This finding was in contrast to that reported by Francis (30); the discrepancy may be explained by the fact that Flynn et al. assayed for TC when exams were in progress, whereas Francis found a rise in TC approximately 10-12 days following a peak period of exam-induced stress. Likewise, the mean values for HDLC did not differ from baseline with egg ingestion or with the addition of examination stress. When eggs were not eaten, however, mean HDLC was significantly less at exam time. The researchers acknowledged that the lowering of this cholesterol fraction may not be beneficial based upon its theorized function as a transport entity for cholesterol from peripheral tissues to the liver for metabolic degradation. Egg consumption, in conjunction with exam pressure, also appeared to contribute to an increase in serum TG compared to baseline values. Blood pressures were not statistically different during the experiment.

Humphrey and Everly (32) administered the State Measurement Scale, a 43-item paper and pencil inventory of varied psychological and somatic states, to 200 male and 199 female university students. The students were asked to indicate how they felt while experiencing stress. Data were factor analyzed, by sex, to reveal the existence of three underlying perceptual factors within each of the two subject groups. The three male subsets explained 68.4% of the total variance: 1) active musculoskeletal domain, which included symptoms of stress involving active dysfunctions of the striate musculature and explained 44.8% of the variance; 2) cardiovascular domain, e.g., I feel my heart beating; accounted for 16.0% of the male variance; 3) gastrointestinal domain, e.g., my stomach hurts; 7.6% of the variance. Female data generated two statistically independent factors that were similar enough to warrant the same factor: 1) musculoskeletal; accounted for 7.5% of total female variance; 2) cardiovascular, e.g., I feel faint; contributed 17.2% to variability. The factor, which contributed the most to total female variance (49.8%), was termed "negative affective domain," and was characterized by female subjects as feeling anxious, nervous, and high-strung. This last factor, which accounted for most of the variance associated with female responses to the State Measurement Scale, is of interest because negative affective emotional responses have been strongly correlated with undesirable behavioral outcomes in women, e.g., compulsive eating (33,34), degree of dieting concerns (33-35), and disturbances in self-image acceptance (35). These behavioral outcomes could conceivably influence the health status of individuals experiencing them.

Stress/health status relationship. For nearly 30 years researchers have investigated the relationship of life-events stress to illness by comparing the magnitude of SLEs experienced with indicators of health status. Because prior research (12) indicated that SLE instruments needed to be population-specific, Marx et al. (15) utilized the CSRE (14) to investigate the relationships between CSRE data; physical health problems experienced during a 60-day retrospective period; Langner's 22-Item Psychiatric Impairment Scale, an index to current mental health; and subjectively-reported stress. The CSRE was administered to 82% of the 1972 freshman class at the University of Kentucky. A total SLE score was computed for respondents and grouped into high, medium, and low categories. The association between life-change category and the magnitude of the mean values for each of the physical and emotional measures of health was examined by one-way analysis of variance. High life-change respondents reported significantly greater health outcome variable scores compared to the medium-change subjects; the downward trend of a direct relationship of life-change category to physical and emotional parameters continued into the low life-change group. Analysis of variance also revealed statistically significant differences between subjectively-reported mean stress scores concerning family life and school work and level of life-change stress; these self-reported stressors also were found to increase with greater exposure to SLEs. The variables of age and sex were examined for their relationship to experimental variables. Using age as a variable, freshman students over 30 years of age had significantly more stress related to school work than younger students. There was a significant sex difference in the physical health outcome variable, mean number of illness days, with women indicating a greater mean number of illness days in the preceding two-month period than men. When this last relationship was examined by life-change category, the significant sex difference was lost.

Garrity et al. (37) analyzed the student responses to the physical and emotional health outcome scores obtained in the 1972 University of Kentucky study (15) for the purpose of clarifying Holmes' hypothesis (38) that life-event stress scores are capable of predicting minor health problems earlier than more serious ones. CSRE data were collected at the beginning of the fall semester; three, six, and nine months later health interviews were conducted during which 314 students reported health changes which had occurred in the previous 60 days. Pearson correlation coefficients were computed between the five health-outcome measures (Langner index, number of separate health problems, number of health problem episodes, number of days on which a health problem was experienced, and number of disability days) and the life-change scores associated with each subject. The Langner index, which is sensitive to the presence of minor illness symptoms, revealed a strong correlation ($p<0.001$) with the CSRE scores at the three-month interval. This relationship was maintained at six and nine months, indicating that minor illness symptoms may manifest shortly following life-events stress and persist in duration with time. Two health outcome variables considered to be more predictive of severe health problems (number of disability days and total number of days with a health-related malady) were found to increase significantly over time. These researchers concluded that their findings supported the concept that there is a substantial latency period between life-change and the observation of more severe illness.

Contemporary human stress researchers are directing their efforts into formulating causal pathways concerning the stress-illness relationship, and examining variables that are hypothesized to moderate and/or mediate that relationship (11,12,39,40). Garrity et al. (41) utilized their 1972 data to examine their hypothesis that psychophysiological strain, as measured by Langner's 22-Item Psychiatric Impairment Scale, is an intervening variable in the stress-strain model depicting the causal relationship between SLEs and illness onset:

SLEs ⟶ psychophysiological strain ⟶ adverse health changes

Linear correlations computed between the previously identified physical health outcome variables, psychophysiological strain, and life-change event scores, revealed a stronger association between strain and health outcomes. Partial correlations were used to control for the influence of the Langner index on the zero order correlations subsequently computed between life-change scores and health outcome measures. The zero order correlations between CSRE scores and the four measures of physical health were reduced substantially when strain was controlled, to the extent that one of the measures (number of days with a health problem) was no longer statistically related to extent of life-change experienced. Zero order correlations also were computed between the Langner index and the four health outcome scores, with partial correlations controlling for the degree of life stress. The magnitude of the linear relationship between strain and health outcome also was lessened by controlling for SLEs, indicating that both life-events stress and strain, independently, explained some of the variance in health outcomes. It was suggested that the Langner measure may be considered to provide an index of the psychophysiological costs associated with the struggle to cope with changing life circumstances; strain may be an efficient predictor of adverse health outcomes attributable to psychosomatic causes.

The influence of physical fitness (aerobic capacity) as a moderator variable of the SLEs/health status relationship was investigated by Roth and Holmes (42). They administered a SLE instrument, the Life Experiences Survey, to 112 undergraduate students at the University of Kansas. Aerobic capacity of each participant was determined with a submaximal bicycle ergometer test and the Astrand-Rhyming nomogram. Then students were instructed to keep a nine-week record of prospective data concerned with the dependent variables, physical and psychologic health. At the end of the study each subject also completed the Beck Depression Inventory and submitted completed Health Record Forms to the research team. The interrelationships of the SLE scores, physical fitness, and health outcomes were analyzed by entering the independent variables into a prediction equation in the following sequence: 1) life-stress scores, 2) sex-specific scores for physical fitness, 3) scores reflecting the interaction of life-change and physical fitness. Both life-stress (p=0.008) and fitness (p=0.050) were reliable independent predictors for a "total severity score" derived from the data on the Health Record Forms. The interaction of SLEs and fitness level also was found to reliably predict the severity ratings attributed to recorded health problems (p=0.033). The hypothesis that lower levels of physical fitness may interact with SLE levels to facilitate more problems with physical health was supported; indeed, those students with a high level of fitness appeared to be impacted negligibly by life stress. A regression analysis also was conducted, as described above, to examine for the power of the independent variables to predict scores obtained from the Beck Depression Inventory. The life-stress scores (p=0.000) and the interaction variables (p=0.073) were predictors of measured depression. A graphic representation of these data indicated that among those subjects who experienced high levels of life stress, those with lower levels of physical fitness reported higher levels of depression. The researchers concluded that moderator variables, such as fitness level, may have some important implications for the prevention of health problems.

University seniors, who three years previously had high life-change scores and high illness rates (43), volunteered to participate in a series of supportive, problem-solving group sessions in order to test the hypothesis that group exploration of ideas, peer learning, and social support will reduce the likelihood of illness in students who face above average demands for adaptation (44). Twenty students were assigned to the intervention group; a series of ten, one and one-half hour sessions were conducted. Ten subjects acted as a control group. An analysis of variance was computed to examine for treatment effects upon physical health indexes. Students participating in the group therapy reported significantly decreased numbers of illness episodes and disability days, whereas the control group reported increases in each of these health indicators. These results suggest yet another way in which the impact of SLEs on well-being may be controlled.

## Nutrition and university students

Stress-related food intake. University students have been subjects in numerous studies in which the relationships between stress and eating behavior were investigated. Slochower et al. (18) assessed the impact of an irrefutable stress associated with college life (final examinations) on the eating behavior and self-reported anxiety levels of 37 obese and normal weight female undergraduate students. A two-session repeated measures design was employed; session one was scheduled no more than five hours prior to an examination, whereas session two was conducted three weeks following each subject's last exam. At both sessions subjects were asked to complete 13 mood scales for the purpose of investigating their degree of "self-perception." The scales focused on the students' current emotional state and assessed their degree of distress, e.g., anxiety level, loss of control over feelings, and self-esteem. In addition to the mood scales, students were instructed to participate in a "thinking task," of which an index to eating was a covert component. Several objects were placed in front of the subject, one of which was an open container of candy. Subjects were encouraged to touch the objects, doodle, and eat the candy as they completed the thinking task. The students' weight category had no effect on the self-reported mood scale results. A repeated measures analysis of variance confirmed that during exams both obese and normal weight subjects experienced more negative affect ($p<0.0001$) compared with the post-exam period. The impact of the negative parameters associated with final exams on eating behavior also was examined as described above. As predicted, the obese students ate significantly more during than after exams, whereas the normal weight subjects had nonsignificant decreases in consumption behavior. Linear correlations were computed among anxiety levels, degree of perceived control over feelings, various mood indices, and eating behavior. Obese students' food intake was related significantly and positively to their degree of anxiety reported at both sessions. These subjects also increased their consumption in response to a reported loss of control over their emotions. Normal weight women showed a similar, but nonsignificant, increased food intake in response to loss of control. None of the mood indices were correlated with eating behavior at exam time. At session two, however, obese subjects' eating was correlated positively with four indices (depression, worthlessness, unhappiness, anger), whereas the normal weight group exhibited a positive correlate with a sole index, depression. The researchers concluded that normal weight students' eating was considerably less reactive than that of obese students with regards to anxiety level. A relationship between a hyperphagic tendency, perceived loss of control, and depression suggests, however, that certain aversive emotional stimuli may alter the eating behavior of both obese and non-obese individuals.

Ondercin (33) investigated uncontrolled eating not related to hunger (compulsive or binge eating) in 279 female university students. A self-report questionnaire was developed to assess aspects of eating behavior as well as attitudes and feelings related to food and eating. Subjects were categorized into one of three groups on the basis of their response to the question, "Would you label yourself a compulsive eater?"--definitely, sometimes, or no. When classified according to their compulsive eating category, the high group made up 18 percent of the sample, the medium group 51 percent, and the low group 30 percent. High compulsive eating females reported significantly more frequent eating episodes in response to unpleasant emotional states--boredom, loneliness, sadness, anxiety, anger--compared with either the medium or low groups. A chi square analysis revealed that eating when not hungry and experiencing guilt when overeating also were greater for the high compulsive subjects than for the lower groups' members. A stepwise multiple regression analysis produced a multiple 'r' value of 0.68 with compulsive eating for all questionnaire items, with three of those item scores producing a multiple 'r' of 0.66: 1) eating seems to calm me down or make me feel better; 2) I eat when I'm tense or anxious; 3) I eat when I'm sad or depressed. A high proportion of students reported episodes of binge eating (78%). No differences were found between groups in the kinds of food eaten during binges. Sweets, snack foods, and starches were the most popular binging choices for all three groups. Ondercin (33) concluded that compulsive eating/binging was a fairly typical behavior associated with college life rather than an indicator of an eating disorder. These results suggested that food intake may be a frequently used method to cope with unpleasant emotions thought to be precipitated by stressful events associated with the college experience.

A self-report measure of binge eating tendencies (Binge Scale) was developed by Hawkins and Clement (35) to measure the behavioral and attitudinal parameters of an eating behavior that was at one time studied solely in clinical settings. The Binge Scale was administered to female and male college undergraduates in conjunction with a measure of dieting concerns and weight control, a scale assessing degree of negative self-image, and a SLEs scale assessing the frequency of major life changes experienced in the past month. The percentage deviation from the ideal body weight (Metropolitan Life Insurance Tables) for subjects was computed assuming a medium body frame. Clear-cut sex differences were found in the frequency of self-reported occurrences of binge eating. Seventy-nine percent of the women compared with 49 percent of the men reported this pattern of food intake. Binges were reported as frequently among normal weight females as among the overweight women. Seventy-five percent of normal and overweight males and females indicated that their binge eating tendencies manifested between the ages of 15-20 years, indicating that age is a determining variable when investigating the phenomena of stress-related eating. Thirty-three women students stated that they "hated themselves" after a binge, while 47 women reported becoming moderately to severely depressed following a binge. University men did not associate either of these feelings with the tendency to lose control with regards to food intake. For both sexes, severity of reported binge eating was correlated positively ($p \leq 0.001$) with degree of dieting concern, even when body weight percentage was controlled in the analysis. The male data showed positive correlates between weight percentage, dieting concern, a negative self-image, and the number of reported life events. For females, binge eating and dieting concerns were related positively to negative self-image as well as to the number of SLEs experienced. Hawkins and Clement (35) suggested that more severe binge eating problems may coexist with stringent attempts to restrain eating behavior, e.g., dieting, meal-skipping. Implications of such a vicious cycle upon the individual's physical health parameters, i.e., nutritional status, remain to be investigated.

The relationships of compulsive eating behaviors, diet behaviors, stress, and hostility were the focus of a study by Kagan and Squires (34). Three subscales for assessing sources of stress were derived from a 27-item questionnaire by means of a factor analysis. The three Stress scales and their contribution to the total amount of variance on the stress questionnaire are: 1) Stress: Unable to Relax, Depressed, 57%; 2) Stress: Inferiority, Lack of Self-Confidence, 12%; 3) Stress: Lack of Direction, 10%. Male and female responses to the Stress scales, items regarding diet behavior and weight control (Diet scale), compulsive eating (Eat scale), fear of failure (Failure scale), and a Hostility scale were examined for statistically significant relationships. Compulsive eating was correlated positively with each of the Stress scales; the Diet scale also was related significantly to each Stress scale, but less strongly. The women students exhibited the above relationships significantly more than the male subjects. A multiple regression analysis which evaluated the power of the Stress scales, in combination, to predict scores on the Eat scale resulted in a multiple 'r' of 0.26 with Stress: Inferiority, Lack of Self-Confidence, as the most powerful predictor. This particular subscale was correlated strongly ($p<0.005$) for the female subjects. Four variables on the Hostility scale (Indirect Hostility, Irritability, Resentment, Guilt) were correlated positively and significantly with the Eat scale. The multiple regression analysis, which tested the power of the Hostility variables, in combination, to predict scores on the Eat scale, yielded a multiple 'r' of 0.19, with Indirect Hostility as the most powerful predictor. Kagan and Squires (34) concluded that individual compulsive eating behaviors were pervasive among the 423 male and female university students surveyed, and suggested the need for a campus-based intervention in both the management of stress and its resultant modification of eating habits.

Dietary studies. Dietary quality. In a nationwide survey (45) a food preference questionnaire was administered to approximately 50,000 university students. Respondents were instructed to indicate whether they Liked, Did Not Know, or Disliked 207 food items in 10 food classes. The data were expressed as a percentage of the total response for that food. All foods were then ranked in terms of percent Liked, Disliked and Did Not Know and median and percentile groupings were formed within each item preference category and food class. The percentages of the 1968 Recommended Dietary Allowances (RDAs) (46) for vitamin A, ascorbic acid, calcium and iron, which were provided by one serving of each food item, were calculated. This procedure facilitated examination of the indicated food preferences with regards to these nutrients. The survey results indicated that low dietary intake of vitamin A could result if food preferences of college students were the sole determinant of food intake. Two-thirds of the 19 food items, which supplied 30% or greater of the RDA for vitamin A, were among the most disliked foods. One food item, orange juice, met 90% of the RDA for ascorbic acid; in contrast, 14 of the 24 foods, which contributed 30% or more of the RDA for vitamin C, were below the median in food preference for their respective classes. Sex differences were evident, however, which revealed that women liked vegetable sources of both ascorbic acid and vitamin A, e.g., asparagus, broccoli, carrots, squash, significantly more than men. The single richest iron source, liver, was among the least liked foods, but other less potent sources of the mineral were accepted, e.g., roast beef, french fries, scrambled eggs. These food preference data supported the estimate of about 6 mg of iron per 1000 kilocalories in the typical United States' diet (46). Thus, women would have a difficult time meeting their RDA for this nutrient. These investigators observed that despite the greater need for iron by the women subjects there was apparently no correspondingly greater preference for iron-containing foods. Milk and milk products were the most liked food sources of calcium, with an estimated 50% of the RDA supplied by these foods. In general, vegetable sources of calcium were not well liked.

Ostrom and Labuza (47) collected seven-day food records from 375 University of Minnesota students for the purpose of determining trends in deficient and excessive nutrient intakes. Mean daily intakes, by sex, were expressed as percentages of the 1968 RDAs (46). The data showed that students were consuming, on the average, over 100% of the RDA for protein, calcium, phosphorus, riboflavin, niacin, and ascorbic acid; and from 90-100% of the RDA for calories, vitamin A, and thiamin. A high degree of variability, however, was observed in parts of the data. Two-thirds of the total sample and 40% of the female sample were below 60% of the RDA for vitamin A. Nine out of 10 women were consuming less than 80% of the RDA for iron. These findings tended to support the trends observed in the nationwide survey (45). The investigators did not discuss the relative magnitude of nutrient excesses compared with the RDAs, even though this was one of their research objectives. Nutrient excesses are a desirable focus when viewed from the perspective that malnutrition encompasses over- as well as undernutrition.

Nutrient intakes of Canadian university women were examined by O'Leary and Lee (48) through the use of seven-day food records. Nutrient contributions from dietary supplements were included in the analysis. In contrast to low intakes of vitamin A which were reported by Ostrom and Labuza (47), these data showed that a modest proportion (around 10%) of their subjects consumed less than 100% of the 1964 Canadian Dietary Standards (CDS) (49). Ascorbic acid intakes were adequate with all respondents obtaining 100% of the CDS. A noticeable finding was that the caloric intake of over 33% of the sample was less than two-thirds of the CDS for energy. The low energy intakes were associated with 50% of the low calcium and 90% of the low iron intakes, suggesting that some of the subjects were placing their calcium and iron status in jeopardy by consuming low energy diets.

Cornell undergraduate women provided seven-day food records for nutrient analysis in a study conducted by Jakobovits et al. (50). Mean daily nutrient intakes were computed and expressed as percentages of the 1974 RDAs (51). Mean ascorbic acid intake was in excess of 200% of the RDA, with mean intakes of vitamin A, calcium, protein, riboflavin, thiamin and niacin all 100% or greater of their respective RDAs. A high degree of variance was evident in the ranges of intakes of most nutrients, which indicated consistently low intakes for some women. Energy intake was again an issue; 65% of respondents consumed less than 100% of the RDA for energy. A considerable proportion (over 40%) of the women had iron intakes less than two-thirds of the RDA, which reaffirmed this mineral as a problem nutrient. A dietary adequacy score was computed by assigning one point for each of the nine nutrients in excess of two-thirds of the RDA. Forty percent of the women had a perfect score of nine, and less than 15% scored below seven. The investigators concluded that, in general, nutrient intakes of the women in their sample were good, but a small proportion might have been consuming diets of poor nutritional quality. It was suggested that the low energy intakes may have been related to a sedentary lifestyle, which was hypothesized to exist within this group, but data concerning activity levels in the university population were not available.

Gottschalk et al. (52) examined three-day food records provided by University of Guelph men and women. Nutrient supplements were included in the computation of mean daily intakes. The percentage of total energy intake supplied by fat (36.7%) was similar to that observed by O'Leary and Lee (38-40%) (48). In agreement with the findings in other studies (48,50), 80% of the women and 60% of the men had inadequate energy intakes. As shown in previous research (48), 90% of the women's low intakes of iron were linked to low energy intakes. Calcium, vitamin A, thiamin, riboflavin, and niacin intakes were below the 1975 CDS (53) for 19-58% of the university women, and a significant number of the men (41-59%) also reported low intakes of vitamin A and thiamin. Several students reported "abnormal" dietary habits during the survey period attributable to midterm pressures. The researchers suggested that a sedentary lifestyle in conjunction with dieting concerns related to body image may have contributed to the low energy intakes.

Analysis of 24-hour recall data, which were collected from university students by Khan and Lipke (54) showed that both men and women consumed, on the average, over 100% of the 1980 RDA (9) for ascorbic acid, thiamin, riboflavin, niacin, vitamin A, calcium and protein. Mean iron intakes for women ranged from 68.6 to 71.1%. Mean energy intakes for both men and women, 96.0 and 89.1% respectively, appeared to be adequate, but the ranges of intakes were not reported. Three-way analyses of variance were computed to investigate daily nutrient intakes of students in relation to sex, major (nutrition or non-nutrition), and meal pattern (meals or snacks). Energy, protein, calcium, riboflavin and niacin intakes of men were higher ($p<0.01$) than those reported by women. Thiamin intakes for male students also were higher ($p<0.05$) than those of female students. Intakes of iron, vitamin A, and ascorbic acid by both sexes were comparable.

Meal-skipping patterns. Frequency of food intake is investigated often in dietary studies. In 1975 O'Leary and Lee (48) found that among students living in university residence the most frequently skipped meal was breakfast (37%), while only 10% of lunches and 9% of suppers were missed. Two years later, Jakobovits et al. (50) reported a similar pattern of breakfast- and supper-skipping among college students, but a marked increase in the number of noon meals missed; 32% of 195 women surveyed reported skipping lunch from three to five times a week. No correlation was found between meal-skipping and snacking behavior, which suggested that their food consumption patterns varied greatly.

Sex differences in the percentages of breakfasts missed by college students were reported by Gottschalk et al. (52). Men, with and without meal contracts, missed 49% and 18%, respectively, of this meal, compared to 31% and 12%, respectively, for women. Khan and Lipke (54) reported nonsignificant differences between University of Illinois men and women with regard to the number of noon and evening meals skipped; sex differences in the number of breakfasts missed were not reported. One-fourth of their mixed sample missed breakfast, 12% missed lunch, and 4% skipped dinner.

These data suggest that meal-skipping patterns among college students are highly variable, and that there may be sex differences in the magnitude and pattern of meals skipped. It remains unclear as to how altered meal patterns relate to the quality of diets of this age group.

Snacking behavior. Studies (48,54,55) have indicated that snacking has supplemented and/or replaced meal patterns for a sizeable portion of university students. The impact of this trend warrants attention because poor food habits during this stage of life can result in serious consequences that may be further aggravated by physical stress and emotional problems.

A study conducted in the mid 1960s (55) indicated some undesirable patterns in the kinds of snacks consumed by college students. Soft drinks, candy and hamburgers were consumed at a higher rate, whereas milk and cheese intakes declined markedly on campus compared to retrospective food intakes reported while at home. O'Leary and Lee (48) observed that the nutrient profile of snacks consumed by their sample of Canadian college students was one of low nutrient/high caloric density. Eighteen to 29% of the total daily caloric intake was supplied by snacks, whereas those same foods contributed only 10% of the student's daily needs for vitamin A and ascorbic acid. In contrast, 16 to 21% of their calcium requirement was obtained from snack items.

Snacks accounted for 34 to 51% of the total caloric intake of a group of college students who participated in an investigation by Gottschalk et al. (52). Contrary to the observations of O'Leary and Lee (48), these researchers found that, in most cases, snacks contributed significantly to the nutrient content of the diet. For example, snacks consumed by university males represented 56% of their total daily intakes of vitamin A and 47% of ascorbic acid.

Snacking rates of Cornell university women, expressed on a per-subject, per-day basis, were: 0.45 morning, 0.84 afternoon, and 1.54 evening (50). Forty-seven percent of these women reported snacking primarily in the evening. Foods that were eaten most frequently as snacks included: coffee, tea, fruit and fruit juices, milk, bread and bread products, candy, cookies, sweets, and alcoholic beverages.

The impact of selected snack items on the nutritive value of the diet was not assessed.

Snacking and its contribution to nutrient intakes was the focus of a 1982 study conducted by Khan and Lipke (54). A significant difference was found between the mean number of times a day male subjects ate (4.10) compared to women (4.02). A majority of students reported consuming beverages as snacks, with carbonated drinks being the most common. Morning snacks consumed, in addition to beverages and in order of magnitude, were candies, gum, fruits, vegetables, breads, cereals, and sandwiches. Soft drinks, candies and gum appeared at the top of the afternoon list of snack items, followed by salted snack items, fruits, vegetables, and cookies. Salted snack items were consumed during the evening hours by the majority of the 250 students who provided data, followed by fruits, vegetables, sandwiches, candies, and gum. The contribution of snacks toward meeting the 1980 RDAs (9) for key nutrients was as follows: 1) protein, 13.4-24.1%; 2) ascorbic acid, 13.5-29.0%; 3) vitamin A, 3.5-19.7%; 4) iron, 11.3-34.8%; and 5) calcium, 9.9-20.2%. These contributions to the total dietary intakes of calcium and iron were especially important for the college women; percentages of the RDAs met by mealtime intakes of calcium and iron ranged from 69.9 to 87.6% and 54.8 to 59.8%, respectively. Without snacks, all subjects would have consumed diets supplying less than desired energy levels.

The results of a recent study (56) of snack and beverage preferences of university students indicated that the readily available food items (salted snacks, candy, carbonated beverages, etc.) were not the most preferred. One hundred eighty-six students indicated that fruit drinks, not soft drinks, were the most preferred beverage, followed by milk and iced tea. Fresh fruits were the most desired food item, along with sandwiches, natural food packs, bakery items, ice cream items, chips, candy bars, and dried fruits--listed in order of desirability. These results were significant because Slochower et al. (18) found that availability was a determining factor with regards to stress-related food intake. The nutritional quality of available food items thus becomes an issue when investigating the relationship of stress-related food intake to quality of diet consumed.

# METHODS

## Approval and consent

The study was conducted in a university in a medium-sized midwestern city. Data were collected during class time on men and women enrolled in physical education or English composition classes. Approval for the study was obtained from the university committee on research involving human subjects (Appendix B).

A letter that described the study and a consent form (Appendix B) were distributed to the students by the researcher, who also collected the completed forms. To ensure anonymity, a three-digit identification (ID) number was assigned to each student who agreed to participate.

## Stressful Life Event (SLE) measurement

The potential for stress in the students' lives was measured using the College Schedule of Recent Experience (CSRE) instrument (14). The instrument consists of 47 items which college students have identified as causing adjustment in their lives and that may elicit a stress response (Appendix C). Students were asked to report the number of times (0-4) during the last year that they experienced each of the SLEs on the CSRE. The questionnaire required about ten minutes to complete.

The validity of the instrument was reported by Marx et al. (15), who used a one-way analysis of variance to compare three levels of SLE categories to self-reported stress associated with social life, family life, and school work. Mean stress scores related to family life and school work were statistically different across the three SLE categories. As the CSRE score increased, mean family and school stress scores also increased.

In the present study, the reliability of the CSRE was determined by administering the questionnaire in a test-retest design at a two-week interval to 20 students, who were enrolled in an upper-level nutrition course. The correlation coefficient computed for total number of Life Change Units (LCUs) between tests was positively related ($p<0.0001$) with an 'r' = 0.80. This result was in agreement with the reliability measurement ($r=0.78$) of a similar instrument administered to a comparable population under similar experimental conditions and design (57).

Dietary evaluation

A quantifiable food frequency instrument was used to assess each student's pattern of dietary intake during the last year (Appendix D). This instrument is comprised of 90 food groups, which are actually aggregates of specific food items. The food groups are arranged in the following food categories: milk or milk drinks; cheese or cottage cheese; other dairy products; meat; poultry; fish; shellfish; cereals; breads or pasta; vegetables; fruit; miscellaneous foods; nuts and snacks; candies or sweet desserts; non-alcoholic beverages; alcoholic beverages. Students were asked to indicate the frequency (0-9) per time period (day, week, month, year) that they consumed the food groups. This instrument also included questions concerning sex, age, student classification, residence status, meal patterns, height/weight data, diet behavior, supplement usage, and activity levels. About 20 minutes were required to complete the questionnaire.

The food frequency data were quantified with a computer program that assigns serving sizes, based on the age and sex of the subject, to the food frequency responses. Serving size weights were derived from data obtained in the second National Health and Nutrition Examination Survey (NHANES II) (58). The weight of an item in a food group is proportional to the reported use (frequency and/or quantity). Each food group also has a weighted "nutrient profile" based on the amount (in grams) NHANES II subjects consumed of each food item in that group.[1] Computed nutrient intakes are expressed on a daily basis for a composite day's dietary intake. Daily intakes were then expressed as percentages of the 1980 RDAs (9) by means of a computerized nutrient analysis program, based on the age, sex, and activity level of respondents. The following energy expenditure values (9) were utilized in the nutrient analysis program to compute an individualized energy RDA based on the respondents' reported number of hours spent in each of the activity levels during a 24-hour period.

| activity level | rate, women | rate, men |
|---|---|---|
| | kcal per minute | kcal per minute |
| level 1; sleeping, reclining | 1.00 | 1.10 |
| level 2; very light | 1.60 | 1.90 |
| level 3; light | 2.95 | 3.70 |
| level 4; moderate | 4.95 | 6.20 |
| level 5, heavy | 8.00 | 9.75 |

[1] Personal communication from John Stanton, Chair of Food Marketing Research, Academy of Food Marketing, St. Joseph University, Philadelphia, PA.

Stanton investigated the validity of the food frequency instrument by utilizing data from each of the 20,319 individuals in NHANES II and "simulating" their completion of the instrument.[1] The estimated food frequency intake values were then used to predict the actual values reported in NHANES II; separate regression models were built for each nutrient "to control for systematic variation and improve the predictive power of the system." The multiple regression coefficients were regarded as a measure of "convergent validity." The $R^2$s obtained were:

| | | | | | |
|---|---|---|---|---|---|
| calories | 0.956 | vitamin A | 0.726 | iron | 0.761 |
| protein | 0.940 | ascorbic acid | 0.791 | calcium | 0.950 |
| fat | 0.873 | thiamin | 0.590 | phosphorus | 0.745 |
| saturated fat | 0.867 | riboflavin | 0.820 | potassium | 0.914 |
| cholesterol | 0.923 | niacin | 0.845 | sodium | 0.793 |
| carbohydrate | 0.947 | | | | |

In the present study, the validity of the food frequency instrument was examined by computing correlation coefficients to compare the average energy and nutrient content of three-day food records with that of a composite day of food frequency data. Dietary data were collected from 20 students who were enrolled in an upper-level nutrition course (Appendix E). The average intakes of energy, protein, ascorbic acid, vitamin A, thiamin, riboflavin, niacin, calcium, phosphorus, and iron were calculated for the three-day period and for the composite day of food frequency data and expressed as percentages of the 1980 RDAs (9) for their appropriate age groups. Intakes of sodium, saturated fat, and cholesterol also were determined.

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[1] Ibid.

Percentages of the RDAs for iron and phosphorus were positively correlated ($p<0.05$) and those for energy, riboflavin, and calcium were correlated at $p<0.10$. A possible explanation for the relatively low degree of linear correlation found may be explained by the fact that the weighted nutrient profiles are not age-specific,[1] allowing for error in the estimation of dietary intake data, i.e., specific nutrients, from a subpopulation which may exhibit atypical eating patterns in comparison to the general populace.

The reliability of the food frequency instrument was tested in the present study by administering the questionnaire to 20 students, who were enrolled in an upper level nutrition course, in a test-retest design at a two week interval. The percentages of the 1980 RDAs (9) for energy and 9 nutrients (protein, ascorbic acid, vitamin A, thiamin, riboflavin, niacin, calcium, phosphorus and iron) and intakes of sodium, saturated fat, and cholesterol were correlated positively ($p<0.05$) on the two tests.

Data analysis

Demographic information. Frequency distributions of the demographic data were compiled. Mean body mass indexes (BMI) for men and women participants were calculated from self-reported height/weight data and assuming medium body frame according to the following formula (59):

$$\text{BMI} = \text{Weight (kg)}/\text{Height}^2\text{ (m)}$$

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[1] Ibid.

Minimum BMI criteria for obesity was utilized to classify the students as obese or non-obese (59).

The hours spent in the five activity levels were rounded to whole numbers prior to data processing. An estimate of the time the student was involved in non-sedentary activity was made by averaging the hours in levels 3-5 and expressing those hours as a percentage of the 24-hour period. Means and standard errors of the activity levels were computed, by sex, and sex differences were determined using the Student's t-test (60).

Meal skipping frequencies were converted to number of times per week prior to data analysis. Means and standard errors of the number of meals skipped per week were computed, by sex, and sex differences were determined using the Student's t-test (60).

College Schedule of Recent Experience (CSRE). Standard statistical coding procedures (61) were followed to assign variable names to the CSRE events. Event frequencies (0-4) were designated CSREX, where 'X' indicated the event number as it appeared on the instrument (Appendix C). A weighted response was constructed by multiplying the event frequency by the event value (Appendix A) and expressing it as a percentage of the total SLE score or total Life Change Units (LCUs). The weighted events were designated by their event number followed by a 'W', e.g., CSRE8W. Total LCUs were computed by summing all CSRE event frequencies multiplied by their respective values. A total frequency score also was calculated by summing frequency responses to the 47 CSRE events. Frequency distributions, means, and standard errors were computed, by sex, for CSRE frequency responses, weighted responses, total LCUs, and total frequency scores. The Student's t-test (60) was used to determine significant sex differences in the variables.

Ranges of total LCUs, by sex, were established by designating scores that were within one standard deviation of the class mean as moderate change, and those that were one standard deviation above and below the mean as high and low change, respectively. A chi-square analysis (60) was used to determine significant sex differences in the distribution of LCUs.

Food frequency. A recognition file was utilized to transform dietary data into a form that was compatible with the statistical program. Means and standard errors were computed, by sex, for the students' intake of energy and 12 nutrients (protein, ascorbic acid, vitamin A, thiamin, riboflavin, niacin, calcium, phosphorus, iron, sodium, saturated fat, and cholesterol) for the composite day of food frequency data. Means and standard errors also were computed for percentages of the 1980 RDAs (9) for energy and all of the nutrients (except sodium, saturated fat, and cholesterol), as well as for the percentages of carbohydrate, protein, and fat in the composite days' energy intakes.

Mean adequacy ratios (MARs). Mean adequacy ratios (MARs) (62) were calculated to evaluate overall dietary quality of the composite day of food frequency data. MAR values were generated by totaling nutrient adequacy ratios (NARs) for energy and 9 nutrients (protein, ascorbic acid, vitamin A, thiamin, riboflavin, niacin, calcium, phosphorus, iron) and computing a mean value. Nutrient adequacy ratio

(NAR) refers to the percentage of the RDA for a single nutrient. All NAR values greater than 100 percent were truncated to 100 to prevent intakes in excess of the RDA for one nutrient compensating for inadequacies of others. The MAR values were calculated according to the following equation:

$$MAR = \sum_{i=1}^{k} \chi_i \quad \text{where } \chi_i = \begin{cases} NAR & \text{if } NAR \leq 100 \\ 100 & \text{if } NAR > 100 \end{cases}$$

Two MAR values, one with and one without energy, were calculated. The MAR values were grouped into three ranges as follows:

90-100
80-<90
<80

A MAR less than 80 was used as a starting point for establishing ranges of the MAR values because, according to Guthrie (63) if the RDA is set two standard deviations (assumed to be ±30% for most biological parameters) above the mean to cover the needs of essentially all individuals within that group, then an average intake of 77% (100/130) of the RDA would meet the needs of the group. In this study, the 77% was rounded to 80%. Means and standard errors were computed, by sex, for the MAR values, and sex differences in the values were determined using the Student's t-test (60).

Interrelationships among the variables. Linear relationships among selected demographic variables were computed, by sex, utilizing Pearson's product-moment correlation coefficients (60). Variables included in these analyses included: student classification;

responsibility for selection or preparation of meals; residence status; meal patterns; diet behavior; supplement usage; BMI; non-sedentary activity level; CSRE variables: CSRE8; CSRE8W; total LCUs; total frequency score; percentages of the 1980 RDAs (9) for energy and the aforementioned nine nutrients; nutrient intakes of sodium, saturated fat, and cholesterol; and MARs.

Regression models for both women and men participants were computed to determine the ability of weighted CSRE events in combination with total LCUs to predict MAR values. Independent variables entered the models, in a stepwise fashion (61), at $p<0.50$ and remained in the models at $p<0.15$.

## RESULTS AND DISCUSSION

### Characteristics of the university students

The student sample was comprised of 36% women and 64% men (Table 3), which compared with the university undergraduate sex distribution of 44% females and 56% males. The majority of the students were freshmen, in their teens, and none were more than 22 years of age. More women than men indicated that they lived on campus, probably because the university encourages new women students to live in organized housing facilities. Approximately three-fourths of both sexes indicated that they were not responsible for the selection or preparation of their meals.

The calculated Body Mass Indexes for the women and men indicated that only 3% of both sexes were obese (Table 3). These data, however, must be interpreted with caution, because height and weight were self-reported and a medium-frame size was assumed in the calculations. Litchfield (64) found that many of her subjects provided inaccurate self-reported weight data, with as much as a ten pound variance. More males (39%) than females (22%) reported that their weight had increased over the last year, which may suggest that some men were still experiencing a physiological growth spurt. Decreased and/or fluctuation in body weight during the last 12 months was reported by more women (58%) than men (33%). Dieting and binge-eating behavior, which have been reported to be prevalent among college women (33-35), may have accounted for the reported weight changes of the women.

Table 3. Characteristics of the university students

| characteristic | response category | percent of sample | |
|---|---|---|---|
| | | women (N = 75) | men (N = 132) |
| sex | women | 36 | |
| | men | | 64 |
| age, years | 18 | 55 | 42 |
| | 19 | 28 | 44 |
| | 20-22 | 17 | 14 |
| class | freshman | 84 | 87 |
| | other | 16 | 13 |
| residence | on campus | 77 | 46 |
| | off campus | 23 | 54 |
| responsible for selection or preparation of meals | no | 76 | 77 |
| | yes | 24 | 23 |
| dieting | no | 88 | 96 |
| | yes | 12 | 4 |
| weight change (over last 12 months) | increased | 22 | 39 |
| | decreased | 16 | 10 |
| | fluctuated | 42 | 23 |
| | no change | 20 | 28 |
| BMI* | obese | 3 | 3 |
| | non-obese | 97 | 97 |
| vitamin or mineral use | none | 47 | 61 |
| | regular | 25 | 20 |
| | irregular | 28 | 19 |
| health status (self-reported) | excellent | 17 | 20 |
| | very good | 53 | 54 |
| | good | 25 | 24 |
| | fair | 4 | 2 |
| | poor | 1 | 0 |

*Body Mass Index (BMI) was calculated from self-reported height/weight data; BMI = weight (kg)/height$^2$ (m). Obesity was determined from this ratio utilizing minimum BMI criteria for obesity (59) with the assumption of a medium frame size for all subjects.

The percentage frequency distributions for self-reported health status were similar for both sexes: 95% of the women and 98% of the men assessed their health as good to excellent (Table 3). The use of vitamin or mineral supplements by women and men in this study was similar to that reported in other studies. Jakobovits et al. (50) observed that 23% of the college women in their study took a multi-vitamin with iron supplement on a regular basis, compared with 25% of the women in the present study. Twenty-eight percent of the combined male-female freshman sample surveyed by McCarthy and Sabry (65) reported taking a vitamin supplement. In this study, vitamin and/or mineral supplement usage was somewhat higher for women than for men.

Meal skipping patterns. The mean numbers of meals missed per week by the students in this study are listed in Table 4. Breakfast was the most frequently skipped meal, by both sexes, followed by lunch and dinner. Women omitted all meals more often than men, and the sex differences were significantly for lunches and dinners ($p \leq 0.01$ and $p \leq 0.05$, respectively). Other studies (48, 52, 54, 55, 66), also, have shown that breakfast is frequently skipped by women and men in this age group. Gottschalk et al. (52) reported that 49% of the respondents in their study missed breakfast routinely. Likewise, O'Leary and Lee (48) found that breakfast was the most frequently missed meal by university women during a seven-day study period. In a 1977 survey of Cornell women, which was conducted by Jakobovits et al. (50), breakfast was never omitted by 47%, missed only once or twice per week by 34%, and missed three or more times weekly by 19%.

The pattern of skipping lunch to a greater extent than the evening meal also has been reported (50).

Table 4. Means and standard errors of means for self-reported number of meals skipped per week by university students

| | women (N = 75) | men (N = 132) |
|---|---|---|
| | mean ± SE | mean ± SE |
| breakfast | 4.18 ± 0.30 | 3.52 ± 0.21 |
| lunch | 1.46 ± 0.19 | 0.80 ± 0.11** |
| dinner | 0.89 ± 0.15 | 0.51 ± 0.09* |

*$p \leq 0.05$, **$p \leq 0.01$: Student's t-test.

<u>Activity levels</u>. Students' typical level of activity during the last year was investigated to provide energy expenditure data for the computerized calculation of energy requirements and to examine the relationship between activity levels and levels of life stress. The mean self-reported activity levels for the women and men in the present study are provided in Table 5. The mean number of hours spent in very light activity (level 2) was higher ($p \leq 0.01$) for women than for men. It may be that women, as a group, spent more time in the sedentary activity of studying than men. In this study women held jobs with greater frequency as compared to men while in school ($p \leq 0.05$, Table 9), and it is possible that their employment consisted of desk jobs that required little physical activity. Clerical-type positions are known to be held more often by women (67), and such jobs are in abundance on university campuses. Baecke et al.

Table 5. Means and standard errors of means for self-reported activity levels† of university students

| activity levels‡ | women (N = 75) | men (N = 132) |
| --- | --- | --- |
| | mean ± SE | mean ± SE |
| level 1<br>sleeping, reclining | 9.1 ± 0.26 | 8.8 ± 0.18 |
| level 2 - very light<br>standing, desk jobs | 9.4 ± 0.36 | 8.0 ± 0.30** |
| level 3 - light<br>walking, light work | 3.4 ± 0.26 | 3.4 ± 0.17 |
| level 4 - moderate<br>biking, dancing | 1.4 ± 0.13 | 2.2 ± 0.15*** |
| level 5 - heavy<br>swimming, basketball | 0.7 ± 0.10 | 1.6 ± 0.13*** |
| non-sedentary activity# | 4.8 ± 0.30 | 5.7 ± 0.22* |

†Number of hours in an average day spent in levels based upon preceding 12-month activity pattern.

‡Durnin, J.V.G.A. and Passmore, P.: Energy, Work and Leisure. London: Heinemann Educational Books, 1967.

#Non-sedentary activity = no. of hours spent in levels 3-5 expressed as % of total 24-hour period.

*$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$: Student's t-test.

(68) reported that a factor-derived group of activities related to work occupied a greater portion ($p \leq 0.001$) of their young adult women's time than the time spent by men.

Mean scores for moderate and heavy activities (levels 4 and 5, Table 5) were much higher ($p \leq 0.001$) for men than for women in this study. These results contributed to the finding that university men spent more of their time ($p \leq 0.05$) in non-sedentary activity as compared to university women (Table 5). In a recent Gallup poll, sex, age, and education were identified as the most important factors related to the incidence of jogging (68). This vigorous activity peaked between 18 and 24 years of age, and was most prevalent among males, especially those who were attending or who had attended college. Baecke et al. (67) also found that men spent more time ($p \leq 0.001$) in a group of activities related to sports than women of comparable age.

Again, it should be emphasized that the activity levels of the women and men in this study were self-reported, and therefore the data must be interpreted cautiously. Self-assessment of physical activity, however, has been shown to parallel scores of actual activity reasonably well (70). Because caloric intake has become a major issue in dietary studies involving college-age students (48,50,52,54), it is important to assess activity levels so that caloric requirements can be determined as accurately as possible.

College Schedule of Recent Experience (CSRE)

Frequency responses. Percentage frequency distributions of the students' responses to CSRE events are listed in Table 6 (Appendix F).

The distribution of male responses to CSRE8, change in eating habits, was comparable to the response pattern reported by Greenberg (13) in his pooled sample of male and female students. The frequency distribution of female responses to CSRE8 in this study, however, appeared to be skewed upward, indicating that they experienced a change in eating habits with greater frequency than male subjects, and also more than the men and women in Greenberg's sample.

CSRE events experienced by 50% or more of the students in the present study and in Greenberg's investigation (13) are compared in Table 7. A greater percentage of KSU subjects than Greenberg's reported entering college and changing to a new school. The difference can be attributed probably to the greater proportion of freshmen students in this sample (86%) compared to Greenberg's (63%) study. The CSRE events experienced by 50% or greater of the subjects in both studies were similar. KSU students, however, experienced certain events, e.g., change in sleeping and eating habits, change in type and amount of recreation, and revision of personal habits with greater frequency than Greenberg's subjects. Two CSRE events, held a job while in school and took a trip or vacation, were experienced by fewer participants in this study than in Greenberg's. Differences in age and economic status of the subjects may have accounted for this finding. Six CSRE events, including change in financial status and change in the use of alcohol, were experienced by over 50% of KSU students in contrast to less than half of Greenberg's respondents. Unfortunately, the CSRE instrument does not measure the direction of change.

The rank order of 13 CSRE events experienced one or more times

Table 7. A comparison of College Schedule of Recent Experience (CSRE)* events reported by fifty percent or greater† of sampled students

| CSRE event | Kansas State University (N = 207) | University of Maryland‡ (N = 308) |
|---|---|---|
| | % | % |
| entered college | 96 | 87 |
| held job while in school | 55 | 69 |
| change in sleeping habits | 84 | 60 |
| change in eating habits | 80 | 61 |
| revision of personal habits | 81 | 60 |
| outstanding personal achievement | 70 | 74 |
| change in financial state | 70 | - |
| change in residence/living conditions | 93 | 51 |
| change in church activities | 51 | - |
| change in type/amount of recreation | 78 | 61 |
| change in use of alcohol | 52 | - |
| change in social activities | 81 | 58 |
| change in school activities | 63 | - |
| change in independence/responsibility | 86 | 66 |
| took trip/vacation | 62 | 72 |
| change to new school | 77 | 61 |
| change in dating habits | 60 | - |
| change in self-concept awareness | 50 | - |

*Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

†Blanks indicate CSRE event was not experienced by 50% or greater of Maryland sample.

‡Greenberg, J.S.: A study of stressors in the college student population. Health Education 12:8, 1981.

during the year by women and men in this study is listed in Table 8. Twelve of the 13 events were experienced by both sexes. An almost identical rank ordering of event frequencies for older men and women was reported by Levenson et al. (72), who obtained a high correlation coefficient ($r = 0.91$) for mean event frequencies between male and female subjects. Many of the events experienced by both sexes in this study were health-related, e.g., change in eating and sleeping habits, change in type or amount of recreation, and revision of personal habits. Hubble et al. (17) made the same observation in their study at Kansas State University almost 20 years ago. The sex differences (Table 8), change in dating habits for women and guilty of minor law violations for men, were similar to sex differences reported by Webb et al. (73), who found female subjects experienced greater numbers of personal events as compared to men, whereas male subjects experienced more involvements with the law as compared to women.

In this study, there were significant sex differences in four unweighted and three weighted frequency responses to CSRE events (Table 9). Women reported holding a job while in school, change in eating habits and marital engagement more often than men, and men reported more minor law violations than women. In addition, weighted responses for change in type/amount of recreation and change in use of alcohol were greater for men than women.

Total Life Change Units (LCUs) and total frequency of CSRE events. Because of problems in the design and reporting of stressful life events (SLE) studies, researchers who use SLE-type instruments

Table 8. Rank order of College Schedule of Recent Experience (CSRE)* events experienced one or more times during the last year

| women (N = 75) | | men (N = 132) | |
|---|---|---|---|
| CSRE event | mean ± SE | CSRE event | mean ± SE |
| CSRE8 change in eating habits | 2.09 ± 0.16 | CSRE6 change in sleeping habits | 1.85 ± 0.12 |
| CSRE6 change in sleeping habits | 2.05 ± 0.16 | CSRE40 change in independence/ responsibility | 1.75 ± 0.12 |
| CSRE40 change in independence/ responsibility | 1.84 ± 0.16 | CSRE8 change in eating habits | 1.62 ± 0.12 |
| CSRE38 change in social activities | 1.68 ± 0.15 | CSRE33 change in type/amount of recreation | 1.55 ± 0.12 |
| CSRE10 revision of personal habits | 1.52 ± 0.14 | CSRE13 outstanding personal achievement | 1.54 ± 0.12 |
| CSRE13 outstanding personal achievement | 1.51 ± 0.18 | CSRE38 change in social activities | 1.40 ± 0.10 |
| CSRE33 change in type/amount of recreation | 1.35 ± 0.14 | CSRE10 revision of personal habits | 1.34 ± 0.10 |
| CSRE19 change in financial state | 1.25 ± 0.14 | CSRE21 change in residence/living conditions | 1.20 ± 0.07 |
| CSRE21 change in residence/living conditions | 1.25 ± 0.08 | CSRE41 trip or vacation | 1.17 ± 0.11 |
| CSRE41 trip or vacation | 1.24 ± 0.14 | CSRE19 change in financial state | 1.14 ± 0.10 |
| CSRE39 change in school activities | 1.23 ± 0.14 | CSRE39 change in social activities | 1.06 ± 0.11 |
| CSRE44 change in dating habits | 1.15 ± 0.14 | CSRE1 entered college | 1.05 ± 0.04 |
| CSRE1 entered college | 1.13 ± 0.05 | CSRE12 guilty of minor law violations | 1.00 ± 0.11 |

*Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

Table 9. Student's t-test results for mean sex differences on the College Schedule of Recent Experience (CSRE)†

| CSRE variable | women (N = 75) mean ± SE | men (N = 132) mean ± SE |
|---|---|---|
| frequency responses‡ | | |
| CSRE4 held job while in school | 0.973 ± 0.111 | 0.667 ± 0.073* |
| CSRE8 change in eating habits | 2.093 ± 0.157 | 1.621 ± 0.125* |
| CSRE12 guilty of minor law violations | 0.493 ± 0.105 | 1.000 ± 0.109** |
| CSRE42 marital engagement | 0.160 ± 0.047 | 0.045 ± 0.026* |
| weighted responses as a % of total LCUs# | | |
| CSRE4W held job while in school | 0.033 ± 0.004 | 0.023 ± 0.003* |
| CSRE8W change in eating habits | 0.046 ± 0.003 | 0.035 ± 0.002** |
| CSRE12W guilty of minor law violations | 0.008 ± 0.002 | 0.019 ± 0.002** |
| CSRE33W change in type/amount of recreation | 0.036 ± 0.003 | 0.044 ± 0.003¶ |
| CSRE37W change in use of alcohol | 0.022 ± 0.003 | 0.030 ± 0.003¶ |
| CSRE42W marital engagement | 0.007 ± 0.002 | 0.003 ± 0.002¶ |

†Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

‡Frequency responses (0-4) to number of times during previous year CSRE events were experienced.

#Weighted response = frequency response × event value expressed as a % of total Life Change Units (LCUs). Total LCUs = sum of frequency responses × respective event values for all CSRE events.

¶$p \leq 0.10$, *$p \leq 0.05$, **$p \leq 0.01$: Student's t-test.

in the tradition of Holmes and Rahe (25) advocate the calculation of a sum of frequency responses for all SLEs, as well as a sum of frequency responses, multiplied by respective event values (Appendix A) (71,74, 75). The latter sum is referred to as total Life Change Units (LCUs). The mean total frequency responses and standard errors in our study were 32.61 ± 1.75 and 30.98 ± 1.45, for women and men, respectively. The mean total LCUs and their standard errors were 1404 ± 77.56 and 1326 ± 65.54 for women and men. Individual LCU scores, by sex, are tabulated in Tables 10 and 11 (Appendix G). There were no significant sex differences in total LCUs or total CSRE event frequencies, however, both totals tended to be higher for women than for men. A similar tendency was reported by Anderson (14) and Bruns and Geist (76). The correlation coefficients between the two scoring methods for both women and men in our study were 0.99, which is slightly higher than the 0.94 reported by Zimmerman (77). The total LCU score was used in further statistical analyses in our study, because it was considered to be a more appropriate measure of life event stress than the total frequency score.

The mean numbers of LCUs for women (1404) and men (1326) in our study were higher than other reported values. Mean scores for women and men students in Dubord's study (78) in 1972 were 929 and 927, respectively. Marx et al. (15) reported an average LCU score of 891, with a range of values from 42 to 3890, for a college student population. A 1984 study by Marron and Kayson (79) indicated that freshman students had much higher scores (1127) than seniors (747). The tendency toward a decrease in the number of life events experienced by upper classmen has been noted by other researchers (14,80).

The frequency distributions of LCU ranges, by sex, are listed in Table 12. Chi-square analysis indicated that the distribution of LCUs in the three ranges did not differ significantly for female and male students in our study ($\chi^2 = 5.46$, $p \leq 0.05$).

Table 12. Frequency distribution of total Life Change Units (LCUs) for university students

| ranges* | women (N = 75) | men (N = 132) |
|---|---|---|
| | % | % |
| low change | 5 | 11 |
| moderate change | 76 | 80 |
| high change | 19 | 9 |

*Ranges were calculated by designating those LCUs within one standard deviation of the class mean as moderate change; those one standard deviation below and above were designated "low" and "high change," respectively.

A number of factors may have influenced the LCUs reported in our study. Regional differences in both the pattern and magnitude of SLEs experienced by various populations have been reported (81). It is possible that rural adolescents experience greater amounts of adjustment associated with their college experience as compared to their urban counterparts. It is also conceivable that the time of data collection (prior to final examinations) may have heightened the students' introspectiveness, resulting in an increased number of life events recalled. Such an effect was described by Hansell and Mechanic (82).

Dietary evaluation of university students from food frequency questionnaire

Energy and nutrient intakes. The mean daily intakes of energy and 13 nutrients of the 18 to 22 year-old women and men in this study are listed in Table 13. Without exception, mean intake for males exceeded those of females, reflecting the males' greater physiological requirements for most nutrients during this developmental stage (83). Block et al. (84) also used a food frequency questionnaire, which was quantified using the NHANES II database (58), to collect dietary data from 25 to 35 year-old women and men. The energy and nutrients intakes of our subjects were higher than those reported by Block et al. (84). The greater nutrient needs of 18 to 22 year-olds compared to those of 25 to 35 year-olds (9) may have accounted for the difference in intakes.

The mean daily energy intake of 2288 kcal from the food frequency data of women in our study was higher than the energy intakes from food records of college women in other studies. Jakobovits et al. (50) and Polley et al. (85), found intakes of 1930 kcal from seven-day food records and 1733 kcal from four-day food records, respectively. Food frequency data have been found to over-estimate energy and nutrient intakes compared to other methods of dietary assessment (86-88). There is some debate, however, as to whether food frequency data overestimate, or other instruments under-estimate energy and nutrient intakes (86). Food intake patterns of college students, e.g. snacking behavior and meal-skipping, may contribute to the magnitude of error in estimating their energy and

Table 13. Means and standard errors of means for a composite day's energy and nutrient intakes of university students from food frequency data

| | women (N = 75) | | | men (N = 132) | | |
|---|---|---|---|---|---|---|
| | mean | ± | SE | mean | ± | SE |
| energy, kcal | 2288 | ± | 109.6 | 3581 | ± | 111.8 |
| protein, gm | 91.1 | ± | 3.89 | 142.7 | ± | 5.13 |
| fat, gm | 91.1 | ± | 4.29 | 148.6 | ± | 5.04 |
| saturated, gm | 33.4 | ± | 1.58 | 56.8 | ± | 2.06 |
| cholesterol, mg | 319 | ± | 14.8 | 596 | ± | 29.4 |
| vitamin A, I.U. | 8089 | ± | 558.2 | 9996 | ± | 396.6 |
| ascorbic acid, mg | 153.4 | ± | 10.75 | 208.8 | ± | 9.93 |
| thiamin, mg | 1.58 | ± | 0.08 | 2.38 | ± | 0.08 |
| riboflavin, mg | 2.34 | ± | 0.13 | 3.88 | ± | 0.16 |
| niacin, N.E.* | 21.8 | ± | 1.68 | 34.4 | ± | 1.09 |
| calcium, mg | 1154 | ± | 72.2 | 1838 | ± | 95.9 |
| phosphorus, mg | 1709 | ± | 83.4 | 2721 | ± | 105.0 |
| iron, mg | 14.90 | ± | 0.79 | 22.31 | ± | 0.72 |
| sodium, mg† | 3682 | ± | 154.4 | 4992 | ± | 147.2 |

*Niacin Equivalents do not account for amounts obtained through the conversion of tryptophan to niacin.

†Values represent sodium content of food, not discretionary use of salt.

nutrient intakes. Willett and Stampfer (89) acknowledged that any method of assessing caloric intake may either over- or underestimate intake.

Variance associated with energy intakes of the women and men in our study was similar (Table 13). This finding is in contrast to that reported by Sorensen et al. (86), who found that older females consistently showed more variation than males in their estimates of energy intake.

The mean daily intakes of ascorbic acid, 153.4 mg, and vitamin A, 8089 I.U., for the women in our study (Table 13) were intermediate to those reported for women in similar studies. Polley et al. (85) reported intakes of 235.0 mg of ascorbic acid and 8334 I.U. of vitamin A, whereas Jakobovits et al. (50) observed intakes of 124.0 mg and 6835 I.U., respectively, of those vitamins. A high degree of variation in ascorbic acid and vitamin A intakes has been reported (86,88, 90). It remains unclear how factors such as age, sex, season, and socioeconomic status affect the intakes of these two vitamins, which are believed to exert a protective influence against certain diseases (91-96).

Women's mean daily intakes of thiamin, riboflavin, and niacin in the present study (Table 13) also were in between those reported by Jakobovits et al. (50) and Polley et al. (85). Thus, the mean intakes calculated from food frequency data were comparable to those calculated from food records.

The mean daily intake of calcium by our female students was 1154 mg (Table 13), which was much higher than the intakes reported for college women by Jakobovits et al. (50) and Polley et al. (85), 862 mg and 846 mg, respectively. Mullen et al. (97) found that their bisexual college sample consistently overestimated the frequency with which they consumed milk. The high intake observed in our study may be a function of the food frequency instrument we used, or the women in our study may be consuming more milk and milk products as a result of the much publicized role of calcium intake in the development of osteoporosis. Their 14.9 mg mean daily intake of iron (Table 13) was very close to that reported by Polley et al. (85), 14.4 mg, for their women subjects.

Mean daily intakes of cholesterol for the women and men in our study were 319 mg and 596 mg, respectively; sodium intakes were 3682 mg for women and 4992 mg for men (Table 13). There were no reported intakes of these dietary components by college students for comparison. Sorenson et al. (86), who used a quantified food frequency instrument in the dietary assessment of an older population, reported cholesterol and sodium intakes of 334.9 mg and 2611.0 mg, respectively.

Percentages of the 1980 Recommended Dietary Allowances. The Recommended Dietary Allowances (RDAs) have been utilized as a standard for evaluating dietary survey data. Until recently, it was emphasized that the recommended intakes were applicable only to groups and not to individuals. The 1985 Recommended Dietary Allowances Committee, however, conceded that the standards may be applied to individuals within groups "as long as it can be assured that typical intake is compared with the RDAs" (63). It has been asserted that an advantage of the food frequency method for assessing dietary intake is that it measures typical food intake patterns over time as opposed to other procedures that measure intake over shorter time periods (87,88). The 1980 RDAs (9) for college-age men and women are tabulated in Table 14. Means and standard errors, by sex, of the percentages of the 1980 RDAs for energy and nine nutrients that were consumed by women and men in this study are listed in Table 15. Their individual dietary intakes and percentages of the 1980 RDAs are presented in Tables 16 and 17 in Appendix H.

The mean percentages of the RDAs for energy that were consumed by the women and men in our study were 84% and 93%, respectively (Table 15). These values were somewhat lower than those reported by other investigators. Jakobovits et al. (50) found that upper class university women met an average of 92% of their RDA for energy, whereas Ostrom and Labuza (47) reported energy intakes of 96% and 98% of their RDAs for women and men, respectively. Based on 24-hour recall data, Khan and Lipke (54) found that college women met 89% and men 96% of their energy RDAs. Differences in the dietary data collection methods and the editions of the RDAs that were used as standards may explain some of the variation in energy intakes. Jakobovits et al. (50) used the 1974 RDA (51) as a standard and the 1968 (46) and 1980 RDAs (9), respectively, were used by Ostrum and Labuza (47) and Khan and Lipke (54). The exact energy value from the range of values in the 1980 RDAs used by Khan and Lipke was not reported. These differences highlight the need for standardization

Table 14. Recommended Dietary Allowances* for university-age students

| | women | | men | |
|---|---|---|---|---|
| | 15-18 years | 19-22 years | 15-18 years | 19-22 years |
| energy, kcal | 2100 | 2100 | 2800 | 2900 |
| protein, gm | 46 | 44 | 56 | 56 |
| fat-soluble vitamins | | | | |
| vitamin A, I.U. | 4000 | 4000 | 5000 | 5000 |
| water-soluble vitamins | | | | |
| ascorbic acid, mg | 60 | 60 | 60 | 60 |
| thiamin, mg | 1.1 | 1.1 | 1.4 | 1.5 |
| riboflavin, mg | 1.3 | 1.3 | 1.7 | 1.7 |
| niacin, N.E. | 14 | 14 | 18 | 19 |
| minerals | | | | |
| calcium, mg | 1200 | 800 | 1200 | 800 |
| phosphorus, mg | 1200 | 800 | 1200 | 800 |
| iron, mg | 18 | 18 | 18 | 10 |

*Food and Nutrition Board: Recommended Dietary Allowances. 9th rev. ed., National Academy of Sciences, Washington, D.C., 1980.

Table 15. Means and standard errors of means for percentages of the Recommended Dietary Allowances* for a composite day's energy and nutrient intakes of university students from food frequency data

| | women (N = 75) | | | men (N = 132) | | |
|---|---|---|---|---|---|---|
| | mean | ± | SE | mean | ± | SE |
| energy, kcal† | 84 | ± | 4.0 | 93 | ± | 5.1 |
| protein, gm | 198.1 | ± | 8.72 | 254.6 | ± | 9.16 |
| vitamin A, I.U. | 197 | ± | 14.8 | 200 | ± | 8.0 |
| ascorbic acid, mg | 254.5 | ± | 18.07 | 347.5 | ± | 16.60 |
| thiamin, mg | 141.61 | ± | 7.63 | 164.25 | ± | 5.54 |
| riboflavin, mg | 177.37 | ± | 10.01 | 228.03 | ± | 9.66 |
| niacin, N.E.‡ | 152.8 | ± | 7.70 | 185.9 | ± | 5.95 |
| calcium, mg | 116 | ± | 7.8 | 194 | ± | 10.9 |
| phosphorus, mg | 171 | ± | 4.0 | 287 | ± | 12.0 |
| iron, mg | 82.29 | ± | 4.72 | 176.25 | ± | 7.00 |

*Food and Nutrition Board: Recommended Dietary Allowances. 9th rev. ed., National Academy of Sciences, Washington, D.C., 1980.

†Individual activity patterns were used to determine energy RDAs utilizing mean energy expenditure values per activity level as reported by Durnin and Passmore (9).

‡Niacin Equivalents do not account for amounts obtained through the conversion of tryptophan to niacin.

of dietary data collection procedures and analyses if meaningful and valid comparisons are to be made.

In our study, the computerized calculation of the energy RDA was based not only on age and sex, but also on self-reported activity levels. It is possible that some of our subjects overestimated their activity levels, which resulted in an elevated energy RDA to which their energy intake was compared. It is also possible that some of the students were expending more energy than they were consuming. Low energy intakes in this population have been reported by other researchers (48,50,52,54). Approximately one-fourth of both sexes in our study consumed less than two-thirds of their energy RDA during the last year, suggesting that some of the students may be restricting their energy intakes below healthy levels. Consolazio (98) advised that insufficient energy intake could cause considerable stress on the adolescent that might not be detected readily. Continued energy restriction during adolescence may not permit the individual to reach his or her maximum growth potential.

The mean percentages of the RDAs for protein that were consumed by our students (Table 15) were higher than other reported values. The women in our study averaged 198% of their RDA for protein compared to a range of intakes from 139% to 164% of their respective RDAs in other studies (47,50,54). The men consumed, on the average, 255% of their protein RDA, which was much higher than the 168% reported by Ostrum and Labuza (47) and the 184% observed by Khan and Lipke (54). The high protein intakes observed in our study were not the result of a few extreme values. Ninety-two percent of the women and 98% of the men reported consuming more than 100% of their RDA for this macronutrient. It has been stated that a diet, which provides no more than the RDA for protein, would be unacceptable to most people in industrialized societies, and that animal products naturally high in protein are important contributors of essential trace nutrients (9). A high protein intake may be advantageous for this population. Scrimshaw (99) reported that university men excreted greater amounts of urinary nitrogen during examinations than during a baseline period, indicating that protein catabolism was elevated during this stressful time. Mitchell (5), however, found that a high protein diet was a conditioning factor that enhanced the production of corticotrophic hormones by the anterior pituitary gland during the stress response, and that animals maintained on a low protein diet did not manifest either hypertension or nephrosclerosis as did animals that consumed high amounts of protein.

The mean percentages of the RDA for ascorbic acid that were consumed by both women (254%) and men (348%) in the present study were very high (Table 15). High intakes of this nutrient have been noted, elsewhere. College-age women reportedly consumed from 158% to 276% of their respective RDA for vitamin C in other studies (47,50,54). The mean percentage of the RDA for ascorbic acid (348%) consumed by the men in our study was much higher than intakes observed by Khan and Lipke (54), (171%), or by Ostrum and Labuza (47), (212%). As with protein, the high mean percentages of the RDA for ascorbic acid were the result of an upward skew of the distribution of individual intakes. It has been acknowledged that under conditions of acute emotional or environmental stress the requirement for vitamin C increases, indicating that high intakes may be advantageous in the university population.

The average percentages of the RDA for vitamin A that were consumed by the women and men in our study were similar, 197% and 200%, respectively (Table 15). Reported mean percentage intakes for college women have ranged from 94% to 171% (47,50,54) and 96% to 107% for men (47,54). The food frequency method that we used to assess dietary intakes may have contributed to the high values. Sorenson et al. (86) observed that vitamin A intakes were higher from food frequency and diet history data than from 24-hour recalls or food records. The high intakes reported by the students in our study may indicate a desirable contemporary trend in eating behavior. Einstein and Hornstein (45) found that vitamin A was a problem nutrient for university students based on food preference data. Low intakes of this vitamin may be cause for concern; it has been suggested that this nutrient functions in the immunological responses, and may exhibit some anticarcinogenic activity (91,92,94-96).

The mean percentages of the RDAs for the B-complex vitamins that were consumed by our subjects were consistently higher than those reported by other investigators. Thiamin intakes of 142% of the RDA by the women in our study and 164% by the men compared with ranges of 93% to 112% and 99% to 108% for men and women, respectively, in other studies (47,50,54). Our women students consumed 177% and men students 228% of their RDAs for riboflavin compared with ranges of 113% to 134% for women and 138% to 143% for men reported by other researchers (47,50,54). The mean percentages of the RDAs for niacin, excluding tryptophan conversion, that the women and men in our study consumed were 153% and 186%, respectively. Reported values in similar studies (47,50,54) ranged from 113% to 131% for women to 117% to 139% for men. As noted previously, the food frequency method overestimates energy and nutrient intakes when compared to other methods of assessment, i.e. food records and 24-hour recalls (86-88). Thiamin, however, had a somewhat low multiple correlation coefficient associated with its predictive ability (0.590) as a result of the convergent test of instrument validity that was conducted by Stanton (see Methods section, p. 34). It is not possible to determine whether the increased variability associated with thiamin's predictive power may result in under- or overestimation of the intake of this nutrient.

The mean percentages of the RDAs for calcium and iron that were consumed by the students in our sample (Table 15) support the conclusion that it is possible to classify individuals in ranges or categories of dietary intake accurately by using a food frequency instrument (87). As reported in similar studies (47,50,54), intakes of both calcium and iron, expressed as percentages of their RDAs, were low for a sizeable proportion of the women in our study. Although, as a group, they met 116% of their RDA for calcium and 82% of their RDA for iron (Table 15), approximately one-third of them reported intakes of less than two-thirds of the RDAs for both minerals. Intakes by college women in other studies have ranged from 85% to 110% of the RDA for calcium and 56% to 69% for iron (47,50,54).

The men students in our sample consumed 194% of their RDA for calcium and 176% of their RDA for iron (Table 15). Logue and Smith (100) reported that females indicated a lower preference for milk than males. This food preference impacts on calcium intake. The lower RDA for iron for men in this age group, compared to that for women, increases their likelihood of meeting their need for this micronutrient. Phosphorus intakes of the men and women in our study, 171% and 287% of their RDAs (Table 15), respectively, were similar to those reported by Ostrum and Labuza (152% for men and 235% for women) (47).

Mean Adequacy Ratios. Mean Adequacy Ratios (MARs) (62) were computed to assess the overall quality of the students' diets in this study. Mean MAR values for university women and men, computed with and without energy, are listed in Table 18. Their individual MARs are presented in Tables 16 and 17 in Appendix H. The MAR values, with and without energy, for men were higher ($p \leq 0.001$) than those for women. The MAR values for both sexes were higher ($p \leq 0.001$) when the RDA for energy was not included in the computation. Using 80% as the dividing point between satisfactory and unsatisfactory diets in this method of assessing dietary quality, it appeared that, as a group these students were consuming nutritionally adequate diets. Jakobovits et al. (50) reported similar findings for a group of Cornell undergraduate women.

The percentages of our students in selected ranges of MARs are presented in Table 19. A greater ($p \leq 0.01$) number of men than women had MAR values, with and without energy, of 80% or above.

Table 18. Means and standard errors* for Mean Adequacy Ratios (MARs)† of university students from food frequency data

| | women (N = 75) | men (N = 132) |
|---|---|---|
| | mean ± SE | mean ± SE |
| MAR (with energy) | 90.9 ± 1.05 | 96.5 ± 0.58 |
| MAR (without energy) | 92.6 ± 1.00 | 98.1 ± 0.51 |

*All values are significantly different at $p \leq 0.001$: Student's t-test.

†MARs were calculated by averaging individual percentages of the 1980 Recommended Dietary Allowances for nine nutrients (protein, vitamin A, ascorbic acid, thiamin, riboflavin, niacin, calcium, phosphorus, iron), with and without energy, with values >100 truncated.

Although over 80% of the women had MAR values of 80 or greater, MAR values, with and without energy, for 16% and 12%, respectively, were below 80% compared to 1.5% for men.

Table 19. Percentages of university students in selected ranges of Mean Adequacy Ratios (MARs)*

| | women (N = 75) | | | men (N = 132) | | |
|---|---|---|---|---|---|---|
| | <80 | 80-<90 | 90-100 | <80 | 80-<90 | 90-100 |
| MAR (with energy) | 16.0 | 10.7 | 73.3 | 1.5 | 8.3 | 90.2** |
| MAR (without energy) | 12.0 | 12.0 | 76.0 | 1.5 | 3.8 | 94.7** |

*MARs were calculated by averaging individual percentages of the 1980 Recommended Dietary Allowances for nine nutrients (protein, vitamin A, ascorbic acid, thiamin, riboflavin, niacin, calcium, phosphorus, iron), with and without energy, with values >100 truncated.

**$p \leq 0.01$: Chi-square.

Intercorrelations among CSRE variables, quality of dietary nutrient intakes, meal patterns, and reported alcohol consumption

<u>Correlations among CSRE variables and percentages of the 1980 RDAs for energy, ascorbic acid, vitamin A, and iron</u>. Both CSRE8, the frequency response to change in eating habits, and the total Life Change Units (LCU) scores for the women in our study were correlated positively ($p \leq 0.01$) with their calculated energy intakes expressed as percentages of the RDA (Table 20), but no such relationship was observed for the men. It has been reported that female subjects increase their food intake under stress more frequently than male subjects (21,34-36). The LCU scores for the women in our study were somewhat higher than those for the men (see Results, p. 51). Assuming that their greater number of stressful life events resulted in a physiological stress response, it is possible that opioid-induced ingestive behaviors influenced the relationship between energy intake and total LCUs. Evidence exists suggesting that endogenously-produced opioid peptides may be released during the stress response (101), that may influence appetite regulation secondarily by stimulating a hyperphagic response (102,103). Because male subjects did not demonstrate increased energy intake in conjunction with their total LCUs (Table 20), it may be that gender differences in psychoneuroendocrinological responses exist (29,32). Alternatively, Kagan and Squires (34) speculated that women are behaviorally conditioned to use food as a narcotic in response to anxiety.

The positive correlation ($p \leq 0.01$) between the intakes of ascorbic acid, expressed as a percentage of the RDA, and both CSRE8

Table 20. Intercorrelations among College Schedule of Recent Experience (CSRE)† variables, Mean Adequacy Ratios (MARs),‡ percentages of the 1980 Recommended Dietary Allowances (RDAs),# nutrient intakes, and reported alcohol consumption for university women (N = 75) and men (N = 132)

| variable | CSRE8 | CSRE8W | total LCUs | MAR (with energy) | MAR (without energy) | energy | ascorbic acid | vitamin A | iron | sodium (mg) | saturated fat (gm) | choles-terol (mg) | alcohol (gm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CSRE8¶ | | | | | | | | | | | | | |
| women | | | | | | | | | | | | | |
| men | | | | | | | | | | | | | |
| CSRE8W ‖ | | | | | | | | | | | | | |
| women | 0.70*** | | | | | | | | | | | | |
| men | 0.84*** | | | | | | | | | | | | |
| total LCUs†† | | | | | | | | | | | | | |
| women | 0.58*** | -0.10 | | | | | | | | | | | |
| men | 0.51*** | 0.11 | | | | | | | | | | | |
| MAR--with energy | | | | | | | | | | | | | |
| women | 0.11 | -0.11 | 0.26* | | | | | | | | | | |
| men | -0.07 | -0.17* | 0.12 | | | | | | | | | | |
| MAR--without energy | | | | | | | | | | | | | |
| women | 0.08 | -0.13 | 0.22 | 0.99*** | | | | | | | | | |
| men | -0.09 | -0.21* | 0.11 | 0.97*** | | | | | | | | | |
| energy | | | | | | | | | | | | | |
| women | 0.29** | 0.07 | 0.35** | 0.60*** | 0.51*** | | | | | | | | |
| men | -0.02 | -0.05 | 0.06 | 0.58*** | 0.41*** | | | | | | | | |
| ascorbic acid | | | | | | | | | | | | | |
| women | 0.30** | 0.09 | 0.32** | 0.58*** | 0.57*** | 0.46*** | | | | | | | |
| men | 0.03 | -0.04 | 0.04 | 0.38*** | 0.34*** | 0.37*** | | | | | | | |
| vitamin A | | | | | | | | | | | | | |
| women | 0.25* | -0.04 | 0.39*** | 0.55*** | 0.55*** | 0.41*** | 0.73*** | | | | | | |
| men | 0.05 | -0.05 | 0.20* | 0.44*** | 0.39*** | 0.43*** | 0.59*** | | | | | | |
| iron | | | | | | | | | | | | | |
| women | 0.23* | -0.07 | 0.41*** | 0.69*** | 0.65*** | 0.81*** | 0.64*** | 0.66*** | | | | | |
| men | 0.07 | -0.01 | 0.18* | 0.45*** | 0.38*** | 0.50*** | 0.37*** | 0.60*** | | | | | |
| sodium (mg) | | | | | | | | | | | | | |
| women | 0.19 | -0.08 | 0.38*** | 0.63*** | 0.58*** | 0.38*** | 0.55*** | 0.50*** | 0.48*** | | | | |
| men | 0.06 | 0.02 | 0.14 | 0.52*** | 0.44*** | 0.51*** | 0.30*** | 0.39*** | 0.38*** | | | | |
| saturated fat (gm) | | | | | | | | | | | | | |
| women | 0.20 | -0.06 | 0.35*** | 0.57*** | 0.50*** | 0.88*** | 0.44*** | 0.39*** | 0.77*** | 0.48*** | | | |
| men | 0.06 | 0.04 | 0.08 | 0.49*** | 0.38*** | 0.68*** | 0.36*** | 0.58*** | 0.58*** | 0.41*** | | | |
| cholesterol (mg) | | | | | | | | | | | | | |
| women | 0.15 | -0.18 | 0.44*** | 0.55*** | 0.50*** | 0.72*** | 0.35*** | 0.43*** | 0.64*** | 0.42*** | 0.78*** | | |
| men | 0.12 | 0.07 | 0.16 | 0.36*** | 0.29*** | 0.42*** | 0.24** | 0.54*** | 0.52*** | 0.43*** | 0.73*** | | |
| alcohol (gm) | | | | | | | | | | | | | |
| women | 0.17 | -0.02 | 0.31** | 0.07 | 0.02 | 0.30** | 0.15 | -0.04 | 0.17 | 0.12 | 0.25* | 0.25* | |
| men | 0.10 | 0.12 | 0.05 | 0.12 | 0.11 | 0.16 | 0.03 | 0.05 | 0.05 | 0.13 | 0.22* | 0.19* | |

†Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972).

‡MARs were calculated by averaging percentages of the 1980 Recommended Dietary Allowances for nine nutrients (protein, ascorbic acid, vitamin A, thiamin, riboflavin, niacin, calcium, phosphorus, iron), with and without energy, with values >100 truncated.

#Food and Nutrition Board: Recommended Dietary Allowances. 9th rev. ed., National Academy of Sciences, Washington, D.C., 1980.

¶CSRE8 = frequency response (0-4) to "change in eating habits."

‖CSRE8W = frequency response to "change in eating habits" × event value expressed as a percentage of total Life Change Units (LCUs).

††Total Life Change Units (LCUs) = sum of frequency responses × respective event values for all CSRE events.

*$p \leq 0.05$, **$p \leq 0.01$, ***$p \leq 0.001$; Pearson product-moment correlation coefficients.

and total LCUs for women may be a desirable association (Table 20). Kallner (104) suggested that increased intakes of this vitamin resulted in an optimized stress response, that is, increased excretion of adrenaline, and that individuals on higher intakes may react with greater preparedness than those on lower intakes. Watson and Leonard (94) proposed that vitamin C exhibits cancer preventing properties through its function as a nitrite scavenger. Physical, physiological, emotional, and environmental stresses lower plasma ascorbate levels. The 1980 RDA committee (9) recognized acute emotional and environmental stresses as conditions which require ascorbic acid supplementation to maintain normal plasma levels. In contrast to the total female sample in our study, there was a negative correlation ($p \leq 0.05$) between ascorbic acid intakes and the amount of life stress experienced by women with MARs less than 80 percent (Table 21).

The correlation between the percentages of the RDA for vitamin A ingested and total LCU scores was positive for both women ($p \leq 0.001$) and men ($p \leq 0.05$) in our study (Table 20). Numerous researchers have reported a negative association between vitamin A intake and cancer incidence, presumably through the vitamin's role in regulating and/or stimulating immune function (91,92,94,95). This proposed role makes adequate vitamin A intake especially important for a subpopulation experiencing significant exposure to stressors. The stress response has been demonstrated to depress immune function, perhaps through the involution of the thymus gland (3).

There was a positive relationship between iron intakes and total

Table 21. Intercorrelations among total Life Change Units (LCUs), reported alcohol consumption, dietary intakes of ascorbic acid and vitamin A,† and meal-skipping patterns‡ for university women (N = 9) with MARs# less than 80

| variables | total LCUs¶ | alcohol (gm)‖ |
|---|---|---|
| ascorbic acid | -0.57* | -0.66* |
| vitamin A | -0.27 | -0.80** |
| lunch | 0.26 | 0.68* |
| dinner | 0.25 | 0.84** |

†Percentages of the 1980 Recommended Dietary Allowances.

‡Reported number of times per week meal was skipped.

#Mean Adequacy Ratios (MARs) were calculated by averaging percentages of the 1980 Recommended Dietary Allowances for nine nutrients (protein, ascorbic acid, vitamin A, thiamin, riboflavin, niacin, calcium, phosphorus, iron), with and without energy, with values >100 truncated.

¶Total LCUs are obtained by summing all College Schedule of Recent Experience (14) events multiplied by their respective LCU values.

‖Represents grams of alcoholic beverages consumed.

*$p \leq 0.05$, **$p \leq 0.01$: Pearson product-moment correlation coefficients.

LCUs for the women ($p \leq 0.001$) and men ($p \leq 0.05$) in our study (Table 20). Bereza (105) reported that dietary intakes of iron were 14.8% greater among adult Russians engaged in occupations involving mental and emotional stress than among those employed in less stressful work. It has been noted that a characteristic repercussion of the stress response involves the involution of the spleen (3), an organ that functions in the reutilization of heme iron. This change may indicate that the need for dietary iron is increased in individuals experiencing chronic exposure to stress, and it may have a special implication for college-age women whose intakes of dietary iron have been reported to be low (47,48,50,52,54).

Correlations among CSRE variables and MARs. A positive relationship ($p \leq 0.05$) was observed between total LCUs and the Mean Adequacy Ratio (MAR) including energy, for the women in our study (Table 20). The magnitude of the correlations between the intakes of energy, ascorbic acid, vitamin A, and iron and total LCU scores contributed to this finding. The fact that a significant relationship between overall dietary quality and the level of life stress emerged only when energy intake was included in the calculation of the MAR, underscores the assertion made by Willett and Stamfer (89) that energy intake deserves careful scrutiny in nutrition studies.

There was a negative correlation ($p \leq 0.05$) between CSRE8W, the weighted frequency response to change in eating habits expressed as a percentage of total LCUs, and MARs with and without energy for the men in our study (Table 20). This indicates that their diet quality scores decreased as changes in eating habits increased as a proportion of total life stress.

Correlations among total LCU scores and dietary intakes of sodium, saturated fat, and cholesterol. Positive correlations ($p \leq 0.001$) were found between the total LCU scores for the women in our study and their reported intakes of sodium, saturated fat, and cholesterol (Table 20). No similar relationships existed for the men (Table 20). Kuta et al. (106) demonstrated that mice exposed to food deprivation and immobilization stressors experienced a stress-related increase in salt intake mediated by endogenous opioids. Marks-Kaufman and Kanarek (107) observed that laboratory rats given morphine, an opiate analgesic drug, selectively increased their fat intake during a six-hour feeding period, resulting in an overall increase in fat intake as compared to their intakes of either protein or carbohydrate.

Because of the hypothesized relationship between sodium intake and idiopathic hypertension (9,22,59,108), increased intakes of this mineral may be undesirable. The stress response also has been implicated in the etiology of high blood pressure (108). An increased intake of saturated fat and cholesterol that may result in elevated blood lipids is not compatible with the current dietary recommendations to lower the incidence of cardiovascular disease (22, 24,109). Adverse changes in blood lipid profiles have been reported in college-age students following exposure to perceived stressors (30).

Correlations among CSRE variables, MARs, and meal patterns. Intercorrelations among CSRE variables, MARs, and meal patterns are shown in Table 22. There were positive correlations between CSRE8, frequency response to change in eating habits, and the number of times per week that the men in our study skipped breakfast ($p \leq 0.05$), lunch ($p \leq 0.01$), and dinner ($p \leq 0.05$). The CSRE8W variable also was related positively ($p \leq 0.01$) to the number of breakfasts they skipped per week. Both MAR scores, with and without energy, for men were correlated negatively with the CSRE8W variable ($p \leq 0.05$), as were their MAR scores and the number of times per week that they missed breakfast, lunch, and dinner ($p \leq 0.01$).

The reason for the absence of significant relationships among CSRE variables, MARs, and meal patterns for the women in our study is unclear (Table 22). The women reported that they skipped lunch ($p \leq 0.01$) and dinner ($p \leq 0.05$) more often than the men and with somewhat higher variability (Table 4). Perhaps the variability associated with possible erratic food intake of the women prevented detection of significant relationships among the variables. Nelson (110) reported that adolescent females tended to eat more frequently than males. Increased snacking behavior among the women in our study may have affected the number of meals that they skipped. Jakobovits et al. (50), however, reported that meal skipping patterns of their female university subjects were not correlated with their snacking behavior. The fact that the women's responses to CSRE8 were correlated positively with increased intakes of energy, ascorbic acid, vitamin A and iron (Table 20), suggests that they were making

Table 22. Intercorrelations among College Schedule of Recent Experience (CSRE)† variables, Mean Adequacy Ratios (MARs),‡ meal-skipping patterns,# and reported alcohol consumption for university women (N = 75) and men (N = 132)

| variable | CSRE8 | CSRE8W | MAR (with energy) | MAR (without energy) | breakfaat | lunch | dinner | alcohol (gm) |
|---|---|---|---|---|---|---|---|---|
| CSRE8¶ | | | | | | | | |
| women | | | | | | | | |
| men | | | | | | | | |
| CSRE8W ‖ | | | | | | | | |
| women | 0.70*** | | | | | | | |
| men | 0.84*** | | | | | | | |
| MAR--with energy | | | | | | | | |
| women | 0.11 | -0.11 | | | | | | |
| men | -0.07 | -0.17* | | | | | | |
| MAR--without energy | | | | | | | | |
| women | 0.08 | -0.13 | 0.99*** | | | | | |
| men | -0.09 | -0.21* | 0.97*** | | | | | |
| breakfaat | | | | | | | | |
| women | -0.13 | -0.06 | -0.18 | -0.16 | | | | |
| men | 0.19* | 0.23** | -0.23** | -0.24** | | | | |
| lunch | | | | | | | | |
| women | 0.18 | 0.11 | 0.03 | 0.05 | 0.07 | | | |
| men | 0.23** | 0.16 | -0.26** | -0.23** | 0.27** | | | |
| dinner | | | | | | | | |
| women | 0.08 | 0.04 | 0.09 | 0.12 | 0.02 | 0.66*** | | |
| men | 0.21* | 0.13 | -0.28** | -0.24** | 0.34*** | 0.48*** | | |
| alcohol (gm)†† | | | | | | | | |
| women | 0.17 | -0.02 | 0.07 | 0.02 | -0.01 | 0.29** | 0.22* | |
| men | 0.10 | 0.12 | 0.12 | 0.11 | 0.30*** | 0.02 | 0.21* | |

†Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972).

‡MARs were calculated by averaging percentagea of the 1980 Recommended Dietary Allowances (for nine nutrients (protein, ascorbic acid, vitamin A, thiamin, riboflavin, niacin, calcium, phosphorus, iron), with and without energy, with values >100 truncated.

#Reported number of times per week meal waa skipped.

¶CSRE8 = frequency response (0-4) to "change in eating habits."

‖CSRE8W = frequency response to "change in eating habits" × event value expressed as a percentage of total Life Change Units (LCUs).

††Represents grams of alcoholic beverages consumed.

*p ≤ 0.05, **p ≤ 0.01, ***p ≤ 0.001: Pearson product-moment correlation coefficients.

desirable food choices in conjunction with reported changes in eating habits. It has been reported that adolescent females are better informed consumers with regard to food selection than adolescent males (110).

Correlations among reported alcohol consumption, meal patterns, percentages of the RDAs for energy, ascorbic acid, and vitamin A, and total LCU scores. Positive relationships between meals skipped and alcohol consumption were observed for both women and men in our study. In the total female sample there was a positive relationship between the number of lunches ($p \leq 0.01$) and dinners ($p \leq 0.05$) skipped and their reported intake of alcoholic beverages (Table 20). The same was true for the women with MARs less than 80%, except that the significance levels for the two meals were reversed (Table 21). Reported alcohol intake by the men was related positively to the number of breakfasts ($p \leq 0.001$) and dinners ($p \leq 0.05$) that they missed (Table 22).

Because of the relatively high energy density of alcohol, the ingestion of alcoholic beverages may increase energy intake considerably (59). The calculated energy intakes, expressed as percentages of the RDA, for the women in this study were correlated positively ($p \leq 0.01$) with their self-reported consumption of alcoholic beverages (Table 20), suggesting that the empty calories derived from those beverages may have contributed substantially to their energy needs. Negative correlations were observed between the intakes of ascorbic acid ($p \leq 0.05$) and vitamin A ($p \leq 0.01$) and the grams of alcoholic beverages consumed by the subsample of women with

MAR values less than 80% (Table 21). Because alcohol consumption has been linked to a variety of oral cancers (6,22), and both ascorbic acid and vitamin A are believed to possess anti-carcinogenic properties (91-96) the women in this subsample of our population may be placing their health status in jeopardy.

There was a positive correlation ($p \leq 0.01$) between women's total LCU scores and their reported alcohol consumption (Table 20). No relationship existed between male values for these variables. Nash and Maickel (111) reported that unpredictable exposure to stressful stimuli induced an alcohol consummatory behavior in rats. The present finding may suggest yet another sexually differentiated response pattern in association with increased levels of life stress.

Multiple regression analyses of the effect of stressful life events on the quality of diets of university students

The results of the stepwise analyses of the predictive ability of College Schedule of Recent Experience (CSRE) variables to account for the variance associated with diet quality scores are reported in Tables 23 and 24. The multiple correlation coefficient, $R^2$, associated with the model selected in the final step of each regression analysis is reported. The $R^2$ values for the regression equations, which predict the Mean Adequacy Ratios (MARs) with and without energy, for the women in our study were 0.401 and 0.486, respectively (Table 23). In contrast, the $R^2$ values for the men were 0.218 and 0.219, respectively (Table 24). The $R^2$ values indicated that the CSRE variables accounted for 40% or greater of

Table 23. Regression analysis* of the relationships of College Schedule of Recent Experience (CSRE)+ variables to diet quality of university women (N = 75) from food frequency data

| CSRE variable‡ | MAR# (with energy) | | | | MAR (without energy) | | | |
|---|---|---|---|---|---|---|---|---|
| | $\hat{B}_i$ | SE | P¶ | order‖ | $\hat{B}_i$ | SE | P | order |
| total LCUs‡ | 0.005 | 0.001 | 0.0001 | 6 | 0.004 | 0.001 | 0.0020 | 7 |
| CSRE4W held job while in school | 57.91 | 28.46 | 0.0459 | 3 | | | | |
| CSRE13W outstanding personal achievement | 37.89 | 20.54 | 0.0696 | 2 | | | | |
| CSRE20W gained new family member | 78.44 | 40.42 | 0.0566 | 8 | 75.04 | 35.31 | 0.0374 | 6 |
| CSRE28W change in number of arguments with spouse | | | | | 51.23 | 32.68 | 0.1219 | 12 |
| CSRE30W spouse began/ceased work | 306.92 | 140.51 | 0.0325 | 9 | 259.76 | 126.52 | 0.0442 | 5 |
| CSRE10W revision of personal habits | | | | | -62.81 | 30.18 | 0.0414 | 11 |
| CSRE12W guilty of minor law violations | | | | | -134.42 | 51.31 | 0.0110 | 8 |
| CSRE14W experienced a pregnancy | | | | | -114.69 | 53.95 | 0.0374 | 1 |
| CSRE16W sexual difficulties | -137.63 | 40.28 | 0.0011 | 5 | -178.70 | 36.96 | 0.0001 | 2 |
| CSRE18W change in number of family gatherings | -95.96 | 52.54 | 0.0723 | 12 | -164.42 | 45.60 | 0.0006 | 4 |
| CSRE34W change in use of drugs | -69.04 | 33.59 | 0.0438 | 11 | -89.42 | 34.22 | 0.0112 | 10 |
| $R^2$ | 0.401 | | | | 0.486 | | | |
| mean square error | 56.04 | | | | 44.37 | | | |

*The model reported is the exploratory regression model of which independent CSRE variables entered at $p < 0.50$ and stayed at $p < 0.15$. Blanks indicate CSRE variable did not meet significance level for staying in the model.

+Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

‡CSRE variables were weighted by multiplying their reported frequency of occurrence (0–4) by their respective Life Change Unit (LCU) values; this product was then expressed as a % of the respondent's total LCU score. Total LCUs are obtained by summing all CSRE event frequencies multiplied by their respective LCU values.

#Mean Adequacy Ratios (MARs) were calculated by averaging percentages of the 1980 Recommended Dietary Allowances for nine nutrients (protein, vitamin A, ascorbic acid, thiamin, riboflavin, niacin, calcium, phosphorus, iron), with and without energy, with values >100 truncated.

¶P = prob > F.

‖Step in which CSRE variables entered model in a stepwise regression analysis.

Table 24. Regression analysis* of the relationships of College Schedule of Recent Experience (CSRE)+ variables to diet quality of university men (N = 132) from food frequency data

| CSRE variable‡ | MAR# (with energy) | | | | MAR (without energy) | | | |
|---|---|---|---|---|---|---|---|---|
| | $\hat{B}_i$ | SE | P¶ | order‖ | $\hat{B}_i$ | SE | P | order |
| total LCUs‡ | 0.002 | 0.001 | 0.0077 | 7 | | | | |
| CSRE7W death of close family member | 44.56 | 17.53 | 0.0123 | 2 | 34.56 | 15.63 | 0.0298 | 2 |
| CSRE21W change in residence/living conditions | 25.65 | 16.74 | 0.1281 | 10 | | | | |
| CSRE29W change in responsibilities at work | | | | | 40.77 | 23.10 | 0.0800 | 6 |
| CSRE40W change in independence/responsibility | 24.54 | 11.62 | 0.0367 | 8 | 24.27 | 10.19 | 0.0187 | 4 |
| CSRE4W held job while in school | | | | | -31.39 | 15.49 | 0.0449 | 5 |
| CSRE8W change in eating habits | -41.30 | 18.51 | 0.0274 | 4 | -38.73 | 16.41 | 0.0198 | 3 |
| CSRE9W change in field of study | | | | | -28.17 | 17.43 | 0.1086 | 7 |
| CSRE10W revision of personal habits | -45.54 | 15.02 | 0.0030 | 1 | -46.43 | 13.59 | 0.0009 | 1 |
| CSRE18W change in number of family gatherings | -41.45 | 25.11 | 0.1013 | 5 | | | | |
| CSRE32W marital separation | -151.72 | 69.30 | 0.0305 | 6 | | | | |
| $R^2$ | 0.218 | | | | 0.219 | | | |
| mean square error | 36.37 | | | | 28.60 | | | |

*The model reported is the exploratory regression model of which independent CSRE variables entered at p < 0.50 and stayed at p < 0.15. Blanks indicate CSRE variable did not meet significance level for staying in the model.

+Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

‡CSRE variables were weighted by multiplying their reported frequency of occurrence (0-4) by their respective Life Change Unit (LCU) values; this product was then expressed as a % of the respondent's total LCU score. Total LCUs are obtained by summing all CSRE event frequencies multiplied by their respective LCU values.

#Mean Adequacy Ratios (MARs) were calculated by averaging percentages of the 1980 Recommended Dietary Allowances for nine nutrients (protein, vitamin A, ascorbic acid, thiamin, riboflavin, niacin, calcium, phosphorus, iron), with and without energy, with values >100 truncated.

¶P = prob > F.

‖Step in which CSRE variables entered model in a stepwise regression analysis.

the variation in MAR scores for women but only 22% for men.

The beta weights associated with significant predictors that had a chance to be included in the model are reported along with their significance levels (Table 23 and 24). A significant beta weight indicates that the corresponding CSRE variable as a significant predictor of diet quality, that is, the variable accounted for some of the variance in diet quality that was not accounted for by the other variables present in the regression model. Total Life Change Units (LCUs) were positive indicators of the women's MARs with and without energy ($p \leq 0.0001$ and $p \leq 0.0020$, respectively) (Table 23). Other positive indicators ($p \leq 0.05$) included a set of CSRE events suggestive of mature life roles, for example, held job while in school, gained new family member, and spouse began/ceased work (Table 23). Negative predictors ($p \leq 0.05$) of women's MAR without energy were revision of personal habits, guilty of minor law violations, experienced a pregnancy, sexual difficulties, change in number of family gatherings, and change in use of drugs (Table 23). It has been reported that sexuality issues increased stress among adolescent women (76), and that life stress levels increased with elevated drug use (76). A change in the number of family gatherings may indicate a decrease in social support, which has been reported to ameliorate the impact of stressful life experiences (112-114).

Total LCUs were also a positive predictor ($p \leq 0.0077$) of men's MAR with energy (Table 24). In addition, two CSRE events involving responsibility, that is, change in responsibilities at work and change in independence/responsibility were positive predictors

($p \leq 0.05$) of the men's diet quality scores. In contrast to the finding for the women, negative beta weight ($p \leq 0.05$) was associated with the CSRE variable, held job while in school, and the men's MAR without energy (Table 24). The CSRE variable involving a change in eating habits, CSRE8W, also was a negative predictor ($p \leq 0.05$) of both MAR values for men. The strongest overall negative predictor of MARs with and without energy ($p \leq 0.0030$ and $0.0009$, respectively) was CSRE10W, revision of personal habits.

# SUMMARY

Psychosocial epidemiological researchers have conceptualized stress as the need to adapt to stressful life events (SLEs). Numerous researchers have observed that university students experience significant exposure to potential stressors, one of which may be a change in eating habits. The physiological stress response is contingent on a number of conditioning factors, which may include nutritional status. The stress-illness relationship is attracting the attention of researchers. Because stress has been found to influence appetite and eating behaviors, and because stress and dietary quality have been found to be associated independently with various disease processes, the relationships between stress levels and the quality of diets of university students were investigated.

The College Schedule of Recent Experience (CSRE) instrument was used to investigate the number of SLEs experienced by 75 female and 132 male university students. A quantifiable food frequency questionnaire was administered to assess their dietary intakes and meal patterns, and each student estimated his/her activity level. Dietary data were analyzed for energy and nine nutrients and expressed as percentages of the Recommended Dietary Allowances (RDAs). Mean Adequacy Ratios (MARs), with and without energy, were calculated to assess dietary quality. Sex differences and relationships among all variables were analyzed statistically.

Total stress scores on the CSRE for the women and men did not differ significantly, although the women indicated a greater

frequency response to change in eating habits. Males reportedly spent more time in non-sedentary activity than females. All meals were omitted more frequently by the women than by the men. Average energy intakes for both sexes and iron intakes for females were less than their RDAs. More women than men had MAR values less than 80%.

The men's meal-skipping patterns were correlated positively with their frequency responses to change in eating habits and negatively with their MARs. Total stress scores for women were related positively to their intakes of energy, ascorbic acid, sodium, saturated fat, cholesterol, and alcoholic beverages, as well as to their MARs with energy. For both sexes total stress scores were correlated positively with their vitamin A and iron intakes. Stepwise regression analyses indicated that CSRE variables predicted women's MAR values with approximately twice the predictive ability as compared to men's MARs. Sex-specific CSRE events emerged as predictors of dietary quality.

The results of this study suggest differential responses to stress levels on the basis of sex. SLEs influenced women's dietary quality to a greater extent as compared to men, with desirable as well as undesirable dietary patterns emerging. Further investigation examining the interrelationships among stress levels, dietary quality and health status may clarify the degree to which dietary quality mediates the stress-illness relationship.

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Sincere gratitude is expressed to my entire family for their support throughout my education, and their patience and flexibility extended to me during the duration of this project.

# APPENDICES

# APPENDIX A

Life Change Unit (LCU) values on the College Schedule of Recent Experience (CSRE) listed in descending order

Table 1. Life Change Unit (LCU) values* on the College Schedule of Recent Experience (CSRE)† listed in descending order

| life event | LCU value |
|---|---|
| death of spouse | 87 |
| married | 77 |
| death of family member | 77 |
| divorced | 76 |
| marital separation | 74 |
| death of close friend | 68 |
| pregnant or fathered a pregnancy | 68 |
| experienced personal injury/illness | 65 |
| fired from work | 62 |
| broken steady relationship | 60 |
| sexual difficulties | 58 |
| marital reconciliation with mate | 58 |
| change in self-concept/awareness | 57 |
| change in health/behavior of family member | 56 |
| marital engagement | 54 |
| change in financial state | 53 |
| change in use of drugs | 52 |
| took mortgage/loan <$10,000 | 52 |
| entered college | 50 |
| gained new family member | 50 |
| conflict with/change in values | 50 |
| change in line of work | 50 |
| change in number of arguments with spouse | 50 |
| change to new school | 50 |
| change in independence/responsibility | 49 |
| change in responsibilities at work | 47 |
| change in use of alcohol | 46 |
| revision of personal habits | 45 |
| trouble with school administration | 44 |
| held job while in school | 43 |

Table 1. Life Change Unit (LCU) values* on the College Schedule of Recent Experience (CSRE)† listed in descending order (cont)

| life event | LCU value |
|---|---|
| change in social activities | 43 |
| change in working hours/conditions | 42 |
| trouble with in-laws | 42 |
| change in residence/living conditions | 42 |
| change in dating habits | 41 |
| spouse began/ceased work outside home | 41 |
| change in field of study | 41 |
| outstanding personal achievement | 40 |
| trouble with boss | 38 |
| change in school activities | 38 |
| change in type/amount of recreation | 37 |
| change in church activities | 36 |
| change in sleeping habits | 34 |
| took trip/vacation | 33 |
| change in eating habits | 30 |
| change in number of family get-togethers | 26 |
| guilty of minor law violations | 22 |

*LCU values were obtained by consensus from the responses of 284 college students at North Dakota State University; these units are said to represent the amount of adjustment required by an individual as the result of experiencing the particular life event.

†Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

# APPENDIX B

Approval and consent

KANSAS STATE UNIVERSITY

Graduate School

Research and Sponsored Programs
Fairchild Hall
Manhattan, Kansas 66506
913-532-6195

TO: Dr. Kathleen Newell
Foods and Nutrition
Justin Hall

Proposal Number: 494

FROM: Robert P. Lowman, Chair
Committee on Research Involving Human Subjects

DATE: November 22, 1985

RE: Committee Review of Your Proposal Titled Stress as a Factor in the Quality of Diets of Kansas College Students

The Committee on Research Involving Human Subjects has reviewed and approved the proposal identified above and has determined that:

- [X] There is no more than minimal risk to subjects.
- [ ] There is greater than minimal risk to subjects.

This approval applies to this project only and only under the conditions and procedures described in the application. Any change in the protocol or conditions described in the proposal will require separate approval. This approval may be followed by a periodic review of the project and examination of records related to the project. Individual identification of human subjects in any publication is an "invasion of privacy" and requires a separately executed "informed consent."

Prior to involving human subjects, properly executed informed consent must be obtained from each subject or an authorized representative, and such forms must be retained on file for a minimum of three years after termination of the project. Each research subject must be furnished with a copy of the informed consent document for his or her personal records. Your informed consent statement, as approved by the Committee, is attached to this memorandum.

Any unanticipated problems involving risk to human subjects or others must be reported immediately to the Director of the Student Health Center and the Chairperson of the Committee on Research Involving Human Subjects.

KSU
KANSAS STATE UNIVERSITY

**Department of Foods and Nutrition**

Justin Hall
Manhattan, Kansas 66506
913-532-5508

APPROVED

NOV 2 2 1985

Committee on Research
Involving Human Subjects
Kansas State University

Dear Student:

University students have been found to experience significant amounts of stress attributable to the numerous adjustments required of them. This study has been designed to gain a better understanding of the relationship of stress to quality of the diet.

All students enrolled in Concepts of Physical Education (PE 101) are being asked to participate. Each student will be asked to complete a questionnaire concerning life events that may elicit a stress response; this should require about 10 minutes. In addition, each student will be asked to complete a food frequency questionnaire, requiring about 20 minutes to complete.

Risks to the student will be minimal and all information will be kept confidential with responses and data identified by number only. We hope that all students will take part in the study; however, participation is voluntary. The student may refuse to participate or discontinue participation at any time with no penalty or loss of benefits to which the student is otherwise entitled.

Data from this study will hopefully provide greater understanding of how stress may be related to diet quality. This understanding could then be utilized by those professionals who conduct stress management/intervention instruction.

Please indicate your willingness to take part in the study on the form below. You may retain the second copy (attached) for your file. If you have any questions regarding the research, please contact Dr. Kathleen Newell (913-532-5508). Thank you for your cooperation.

Sincerely,

Margaret Mall
Margaret Mall
Graduate Student, KSU

Kathleen Newell
Kathleen Newell
Professor
Dept. of Foods & Nutrition, KSU

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

STUDENT CONSENT

I have read the description of the research study and:
(please sign your name after one sentence)

I will take part in this study. ______________________ __________
(signature of student) (date)

I will not take part in this study. ______________________ __________
(signature of student) (date)

Thank you.

# APPENDIX C

## College Schedule of Recent Experience (CSRE)

KANSAS STATE UNIVERSITY DEPARTMENT OF FOODS & NUTRITION ID#________

COLLEGE SCHEDULE OF RECENT EXPERIENCE:

Below is a list of 47 events which college students have identified as causing adjustment in their lives. This adjustment may elicit a stress response in an individual. In order to examine the relationship between stress and diet quality, we would like for you to complete this questionnaire. All answers will be kept confidential. You are not required to answer all questions, however the data will be invalid unless all questions are answered.

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

Directions: In the space provided at the left of each item indicate the NUMBER OF TIMES (0,1,2,3,4+) during the LAST YEAR (12 month period) that you:

_____ 1. entered college.
_____ 2. married.
_____ 3. had trouble with your boss; either a lot more or a lot less.
_____ 4. held a job while attending school.
_____ 5. experienced the death of a spouse.
_____ 6. experienced a major change in sleeping habits (sleeping a lot more or less, change in part of day when asleep, etc.
_____ 7. experienced the death of a close family member.
_____ 8. experienced a major change in eating habits (a lot more or less food intake, or very different meal hours or surroundings).
_____ 9. made a change in or choice of a major field of study.
_____ 10. had a revision of your personal habits (friends, dress, manners, associations).
_____ 11. experienced the death of a close friend.
_____ 12. have been found guilty of minor violations of the law (traffic tickets, jaywalking, etc.).
_____ 13. have had an outstanding personal achievement.
_____ 14. experienced pregnancy or fathered a pregnancy.
_____ 15. had a major change in the health or behavior of a family member.
_____ 16. had sexual difficulties.
_____ 17. had trouble with in-laws.
_____ 18. had a major change in the number of family get-togethers (a lot more or less).
_____ 19. had a major change in financial state (a lot worse off or a lot better off than usual).
_____ 20. gained a new family member (through birth, adoption, older person moving in, etc.).
_____ 21. changed your residence or living conditions.
_____ 22. had a major conflict in or change in values.
_____ 23. had a major change in church activities (a lot more or less than usual).
_____ 24. had a marital reconciliation with your mate.
_____ 25. were fired from work.
_____ 26. were divorced.
_____ 27. changed to a different line of work.
_____ 28. had a major change in the number of arguments with spouse (either a lot more or less than usual).
_____ 29. had a major change in responsibilities at work (promotion, demotion etc.).
_____ 30. had your spouse begin or cease work outside the home.
_____ 31. had a major change in working hours or conditions.
_____ 32. had a marital separation from your mate.
_____ 33. had a major change in usual type and/or amount of recreation.
_____ 34. had a major change in the use of drugs (a lot more or less).
_____ 35. took a mortgage or loan less than $10,000 (such as purchase of a car, TV, school loan, etc.).
_____ 36. had a major personal injury or illness.
_____ 37. had a major change in the use of alcohol (a lot more or less).
_____ 38. had a major change in social activities.
_____ 39. had a major change in the amount of participation in school activities.
_____ 40. had a major change in the amount of independence and responsibility (for example: managing time, money, etc.).
_____ 41. took a trip or vacation.
_____ 42. were engaged to be married.
_____ 43. changed to a new school.
_____ 44. changed dating habits.
_____ 45. had trouble with school administration (instructors, advisors, class scheduling, etc.).
_____ 46. broke or had broken a marital engagement or a steady relationship.
_____ 47. had a major change in self-concept or self-awareness.

# APPENDIX D

Quantifiable food frequency instrument

ID# ___________

KANSAS STATE UNIVERSITY DEPARTMENT OF FOODS & NUTRITION

FOOD INTAKE QUESTIONNAIRE:

This food intake questionnaire has been designed with the purpose of collecting data regarding your pattern of food intake during the LAST YEAR (12 month period). These data will be analyzed to determine what, if any, relationships exist between your stress score and the quality of your diet. Please complete Section I and II below as accurately as possible.

## I. GENERAL INFORMATION ABOUT YOU AND YOUR FOOD HABITS

1. What is your age? _______ 2. What is your student classification? ()Freshman ()Sophomore ()Junior ()Senior
3. Are you male or female? ()male ()female If female, are you: ()pregnant ()lactating
4. What is your weight?______ 5. What is your height?_______
6. Has your weight changed in the last 12 months? a.()increased b.()decreased c.()both a & b d.()no change
7. Are you on a special diet? ()no ()yes If yes, is it: ()reducing ()therapeutic
8. Are you responsible for the selection and preparation of most of your meals? ()no ()yes
9. Do you live on or off campus? ()on ()off If off, check appropriate status: ()apartment, house ()sorority, fraternity ()Jardine ()with parents, family
10. Do you take a vitamin or mineral pill? ()no ()yes, regularly ()yes, irregularly
11. Which vitamin or mineral pill do you take? ()multiple vitamins with iron or other minerals ()multiple vitamins ()iron ()calcium ()vitamin A ()vitamin B-complex ()vitamin C ()vitamin E ()other

| | Never | # of times | | | | | | | | | Per Time Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | day | week | month | year |
| 12. How often do you skip breakfast? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 13. How often do you skip lunch? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 14. How often do you skip dinner? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |

15. What is your general state of health? ()excellent ()very good ()good ()fair ()poor
16. Activity level (Based on the LAST YEAR): The purpose of this section is to get a rough approximation of how many calories you expend in an average day. Below, you will see that all activities are divided into 5 categories or "levels". For each level fill in the TOTAL NUMBER OF HOURS A DAY that you think you spend in an activity comparable to the examples supplied below. All 5 levels should add up to 24 hours.

| | | # of hours |
|---|---|---|
| LEVEL 1 | (sleeping, reclining) | _______ |
| LEVEL 2 | (most desk jobs, typing, standing, driving a car, etc.) | _______ |
| LEVEL 3 | (walking, volleyball, washing windows, carpentry work, etc.) | _______ |
| LEVEL 4 | (fast walk, weeding & hoeing, tennis, skiing, biking, etc.) | _______ |
| LEVEL 5 | (lap swimming, basketball, jogging, etc.) | _______ |
| | | 24 hrs. |

## II. HOW OFTEN DO YOU EAT OR DRINK THE FOLLOWING FOODS?

Please tell us how often you eat or drink the foods listed below.
To answer each question:
a) Circle the number that tells how often you eat the food.
b) Circle the letter that tells if you eat the food every day, week, month or year.

For example: If you drink skim milk for breakfast and before going to bed almost every day, circle 2 (for number of times) and D (for the time period). If you never drink skim milk circle 0.

1. MILK OR MILK DRINKS
(including hot chocolate, milk shakes, chocolate milk drinks)

| | Never | Number of times | | | | | | | | | Per Time Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | day | week | month | year |
| Skim Milk or skim milk drinks (including reconstituted dry milk) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| low-fat or low-fat milk drinks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| whole milk or whole milk drinks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |

| | Never | Number of Times | | | | | | | | | Per Time Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **2. CHEESE OR COTTAGE CHEESE** | | | | | | | | | | | | | | |
| cottage cheese or ricotta cheese | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| other cheeses such as American, Swiss, Cheddar, or Mozzarella | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| **3. OTHER DAIRY PRODUCTS** | | | | | | | | | | | | | | |
| Yogurt | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Pudding | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Ice Cream | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Sour Cream or Cream Cheese | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Butter or Margarine | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Eggs | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| **4. MEAT** | | | | | | | | | | | | | | |
| Hamburger | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Hot dogs or Sausage | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Luncheon meats (bologna, salami, or chicken/turkey roll) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Beef or steak | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Pork or ham | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Bacon | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Liver | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Other meats (veal, lamb, or venison) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| **5. POULTRY** (chicken, turkey, or duck) | | | | | | | | | | | | | | |
| Fried poultry | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Baked or broiled poultry | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| **6. FISH** (other than shellfish) | | | | | | | | | | | | | | |
| Canned fish (tuna, salmon, or sardines) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Fried fish | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Baked, broiled, or cooked fish | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| **7. SHELLFISH** (shrimp, crab, or oysters) | | | | | | | | | | | | | | |
| Raw shellfish | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Fried shellfish | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Baked, broiled, or cooked shellfish | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| **8. CEREALS, BREADS OR PASTA** | | | | | | | | | | | | | | |
| Cooked breakfast cereals | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Ready-to-eat breakfast cereals | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Waffles (waffles, pancakes, or french toast) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Breads, rolls, muffins, and biscuits | | | | | | | | | | | | | | |
| white or whole grain | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |

| | Never | Number of Times | | | | | | | | | Per Time Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Other Starches—Rice, potatoes or pasta | | | | | | | | | | | | | | |
| Rice | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Pasta, macaroni, noodles or tortilla | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Fried potatoes | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Boiled or baked potatoes | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 9. VEGETABLES (canned, fresh or frozen, excluding juices) | | | | | | | | | | | | | | |
| Yams or sweet potatoes | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Corn | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Brussel sprouts or cabbage | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Squash, zucchini, or eggplant | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Cauliflower | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Broccoli | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Carrots | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Tomatoes | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Olives | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Lettuce | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Spinach or other greens | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Green peas | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Green or yellow beans | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Dry Beans, peas, or lentils | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Soybeans or soybean products such as tofu or textured vegetable protein | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Other vegetables such as mushrooms, peppers, turnips, or beets | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 10. FRUIT (fresh, frozen or canned but not juice) | | | | | | | | | | | | | | |
| Citrus fruits | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Apples or pears | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Peaches or plums | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Cherries or Berries | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Bananas | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Melons | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Raisins or other dried fruit | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Mixed fruits or other fruits (such as fruit cocktail, grapes, pineapple, or nectarines) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 11. Miscellaneous Foods | | | | | | | | | | | | | | |
| Peanut butter | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Jams and jellies | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Pancake syrup | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Sugar or honey added to food | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Pizza | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |

| | Never | Number of Times | | | | | | | | | Per Time Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Soups such as broth, consume, or bouillon | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Other soups | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Meat gravies | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| White or cheese sauces | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Tomato sauce or Ketchup | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Mayonnaise | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Low-cal salad dressing | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Regular salad dressing | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Mustard - condiments | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 12. NUTS AND SNACKS | | | | | | | | | | | | | | |
| Nuts | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Crackers | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Potato chips or corn chips | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Other snacks such as popcorn or pretzels | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 13. CANDIES OR SWEET DESSERTS | | | | | | | | | | | | | | |
| candies | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Other sweets such as cookies, cakes, pies, donuts, danish, or pastries | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| cake icing | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| chocolate syrup | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| sherbert | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| 14. NON-ALCOHOLIC BEVERAGES | | | | | | | | | | | | | | |
| Fruit or vegetable juices | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Fruit drinks (such as lemonade or Hawaiian Punch) | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Low-cal carbonated soft drinks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Regular carbonated soft drinks | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Beverage mixes | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Coffee or tea | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Instant coffee or tea with sweetner | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| coffee or tea with sugar added | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |

Do you usually add:
non-dairy creamers [ ] yes [ ] no
milk or cream [ ] yes [ ] no

| | Never | Number of Times | | | | | | | | | Per Time Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15. ALCOHOLIC BEVERAGES | | | | | | | | | | | | | | |
| Beer | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Wine | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |
| Liquor or liqueur | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | D | W | M | Y |

APPENDIX E

Individual percentages of the 1980 RDAs and MARs (including and excluding energy) for university students (N = 20) from food frequency data

Table 2. Individual percentages of the 1980 RDAs* and MARs† (including and excluding energy) for university students (N = 20) from 3-day food records and food frequency data

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 307‡ | 67 | 324.6 | 177 | 248.0 | 134.4 | 114.6 | 106.9 | 89 | 183 | 162.6 | 95.6 | 98.8 |
| 307A# | 16 | 41.8 | 33 | 45.6 | 27.0 | 46.0 | 53.3 | 56 | 71 | 41.5 | 43.1 | 46.1 |
| 307B# | 15 | 35.7 | 36 | 86.9 | 27.2 | 39.3 | 25.5 | 46 | 61 | 30.7 | 40.3 | 43.1 |
| 342 | 57 | 173.2 | 437 | 302.8 | 155.0 | 176.2 | 147.4 | 153 | 206 | 96.0 | 95.3 | 99.6 |
| 342A | 47 | 143.0 | 249 | 273.8 | 153.7 | 158.5 | 155.8 | 117 | 165 | 81.6 | 92.2 | 98.0 |
| 342B | 55 | 155.9 | 284 | 285.3 | 172.2 | 192.1 | 172.7 | 141 | 185 | 83.4 | 93.8 | 98.2 |
| 371 | 88 | 396.5 | 661 | 147.5 | 169.2 | 293.8 | 180.8 | 156 | 142 | 105.1 | 98.8 | 100.0 |
| 371A | 105 | 201.0 | 166 | 203.6 | 174.3 | 221.9 | 169.6 | 172 | 212 | 91.3 | 99.1 | 99.0 |
| 371B | 85 | 175.2 | 183 | 139.3 | 141.9 | 213.0 | 136.1 | 166 | 196 | 76.6 | 96.2 | 97.4 |
| 372 | 71 | 322.8 | 82 | 230.1 | 81.2 | 139.3 | 99.4 | 135 | 162 | 69.2 | 90.3 | 92.4 |
| 372A | 88 | 211.9 | 184 | 232.3 | 132.8 | 187.2 | 162.3 | 165 | 215 | 83.6 | 97.2 | 98.2 |
| 372B | 77 | 243.3 | 208 | 265.8 | 128.2 | 208.1 | 144.0 | 188 | 235 | 77.2 | 95.4 | 97.5 |
| 373 | 56 | 154.9 | 174 | 165.1 | 73.0 | 112.4 | 74.7 | 134 | 164 | 44.0 | 84.8 | 88.0 |
| 373A | 53 | 155.6 | 158 | 281.9 | 116.9 | 140.5 | 109.4 | 129 | 162 | 54.7 | 90.8 | 95.0 |
| 373B | 68 | 193.3 | 201 | 307.1 | 137.5 | 172.5 | 147.1 | 140 | 189 | 74.2 | 94.2 | 97.1 |
| 374 | 69 | 283.0 | 79 | 329.1 | 172.1 | 150.7 | 177.1 | 148 | 259 | 251.3 | 94.8 | 97.7 |
| 374A | 113 | 243.0 | 309 | 448.9 | 179.5 | 253.1 | 238.4 | 200 | 324 | 252.0 | 100.0 | 100.0 |
| 374B | 83 | 230.9 | 258 | 429.2 | 156.7 | 209.2 | 199.3 | 193 | 293 | 207.9 | 98.3 | 100.0 |
| 375 | 96 | 325.2 | 514 | 312.2 | 187.8 | 232.9 | 256.6 | 149 | 293 | 119.0 | 99.6 | 100.0 |
| 375A | 79 | 234.3 | 369 | 201.8 | 167.1 | 279.9 | 176.8 | 236 | 262 | 89.3 | 96.8 | 98.1 |
| 375B | 68 | 182.1 | 279 | 238.0 | 144.8 | 179.8 | 163.8 | 127 | 180 | 84.5 | 95.2 | 98.3 |
| 376 | 89 | 149.1 | 278 | 249.1 | 129.7 | 152.1 | 114.5 | 113 | 148 | 64.3 | 95.3 | 96.0 |
| 376A | 115 | 228.5 | 243 | 294.7 | 188.9 | 308.3 | 171.6 | 253 | 304 | 90.5 | 99.0 | 98.9 |
| 376B | 88 | 195.5 | 230 | 232.9 | 166.1 | 258.7 | 151.3 | 216 | 238 | 84.6 | 97.3 | 98.3 |
| 377 | 50 | 172.6 | 590 | 34.8 | 144.2 | 141.1 | 119.9 | 182 | 198 | 153.2 | 88.5 | 92.8 |
| 377A | 74 | 270.7 | 154 | 88.7 | 215.8 | 219.5 | 161.9 | 229 | 322 | 193.1 | 96.3 | 98.7 |
| 377B | 63 | 251.7 | 134 | 90.8 | 222.9 | 171.6 | 170.8 | 164 | 275 | 222.7 | 95.4 | 99.0 |
| 378 | 67 | 172.4 | 95 | 182.6 | 163.9 | 121.9 | 149.2 | 43 | 132 | 77.1 | 88.2 | 90.6 |
| 378A | 79 | 209.6 | 202 | 583.0 | 162.7 | 162.0 | 159.2 | 102 | 264 | 84.7 | 96.4 | 98.3 |
| 378B | 47 | 108.1 | 97 | 111.8 | 89.0 | 101.2 | 89.2 | 61 | 109 | 45.2 | 82.8 | 86.8 |
| 379 | 52 | 105.8 | 135 | 163.7 | 222.7 | 187.9 | 184.7 | 76 | 123 | 116.6 | 92.8 | 97.3 |
| 379A | 48 | 125.2 | 130 | 191.6 | 103.8 | 118.6 | 111.0 | 74 | 113 | 62.3 | 88.4 | 92.9 |
| 379B | 46 | 117.3 | 105 | 212.4 | 99.4 | 111.9 | 103.0 | 80 | 114 | 58.1 | 88.4 | 93.1 |
| 380 | 87 | 366.7 | 95 | 56.5 | 147.7 | 181.2 | 138.5 | 215 | 178 | 78.5 | 91.7 | 92.2 |
| 380A | 56 | 160.1 | 92 | 138.1 | 87.8 | 131.5 | 101.3 | 131 | 159 | 46.8 | 88.3 | 91.8 |
| 380B | 17 | 148.7 | 110 | 167.8 | 95.2 | 111.9 | 109.8 | 82 | 132 | 55.4 | 85.0 | 92.5 |

Table 2. Individual percentages of the 1980 RDAs* and MARs† (including and excluding energy) for university students (N = 20) from 3-day food records and food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 381 | 78 | 287.5 | 149 | 89.8 | 141.8 | 174.5 | 161.4 | 157 | 187 | 108.9 | 96.8 | 98.9 |
| 381A | 36 | 126.6 | 124 | 193.8 | 102.5 | 131.1 | 111.4 | 85 | 149 | 59.1 | 88.0 | 93.8 |
| 381B | 45 | 120.5 | 95 | 182.8 | 81.9 | 115.0 | 94.6 | 84 | 139 | 49.7 | 85.0 | 89.5 |
| 382 | 68 | 172.1 | 46 | 144.4 | 72.4 | 70.1 | 91.7 | 75 | 115 | 47.5 | 77.1 | 78.1 |
| 382A | 77 | 194.6 | 186 | 250.5 | 124.4 | 138.5 | 143.7 | 151 | 199 | 76.7 | 95.4 | 97.4 |
| 382B | 108 | 244.6 | 153 | 246.6 | 150.5 | 152.5 | 185.4 | 128 | 212 | 98.9 | 99.9 | 99.9 |
| 383 | 55 | 138.1 | 175 | 417.7 | 111.1 | 130.8 | 96.6 | 103 | 107 | 71.2 | 92.3 | 96.4 |
| 383A | 61 | 168.3 | 178 | 169.7 | 114.6 | 145.4 | 124.0 | 127 | 170 | 65.2 | 92.6 | 96.1 |
| 383B | 51 | 135.5 | 131 | 166.7 | 88.6 | 120.0 | 93.3 | 101 | 141 | 54.9 | 88.8 | 93.0 |
| 384 | 46 | 215.3 | 84 | 111.5 | 91.4 | 109.5 | 100.7 | 99 | 86 | 75.9 | 88.2 | 92.9 |
| 384A | 54 | 159.7 | 113 | 204.2 | 100.4 | 118.9 | 99.0 | 100 | 144 | 51.8 | 90.5 | 94.5 |
| 384B | 40 | 137.9 | 86 | 150.1 | 83.1 | 86.3 | 97.2 | 74 | 117 | 46.4 | 81.3 | 85.9 |
| 400 | 63 | 178.2 | 94 | 159.4 | 60.1 | 73.8 | 89.7 | 47 | 92 | 39.6 | 75.9 | 77.4 |
| 400A | 89 | 189.1 | 252 | 251.2 | 154.3 | 179.0 | 192.5 | 126 | 189 | 93.7 | 98.3 | 99.3 |
| 400B | 78 | 140.2 | 187 | 220.8 | 121.7 | 143.3 | 141.9 | 93 | 142 | 67.1 | 93.8 | 95.6 |
| 401 | 38 | 120.6 | 26 | 2.9 | 49.6 | 58.9 | 39.5 | 71 | 53 | 30.7 | 47.0 | 48.0 |
| 401A | 47 | 93.7 | 129 | 328.2 | 97.8 | 117.5 | 89.0 | 95 | 113 | 47.7 | 87.0 | 91.5 |
| 401B | 58 | 147.6 | 177 | 304.3 | 105.5 | 133.7 | 116.7 | 92 | 150 | 59.6 | 91.0 | 94.6 |
| 402 | 113 | 231.5 | 466 | 256.9 | 108.7 | 165.4 | 89.7 | 146 | 204 | 73.3 | 96.3 | 95.9 |
| 402A | 83 | 203.0 | 246 | 417.3 | 173.5 | 193.1 | 169.5 | 148 | 213 | 101.0 | 98.3 | 100.0 |
| 402B | 68 | 186.5 | 223 | 222.3 | 138.7 | 160.8 | 157.5 | 115 | 177 | 89.1 | 95.7 | 98.8 |
| 405 | 67 | 271.7 | 182 | 244.5 | 142.5 | 147.2 | 132.2 | 107 | 151 | 70.2 | 93.7 | 96.7 |
| 405A | 83 | 198.5 | 216 | 281.4 | 135.3 | 144.5 | 149.7 | 107 | 172 | 91.3 | 97.4 | 99.0 |
| 405B | 67 | 163.1 | 206 | 256.3 | 109.2 | 129.0 | 109.8 | 103 | 152 | 73.3 | 94.0 | 97.0 |

*Food and Nutrition Board: Recommended Dietary Allowances. 9th rev. ed., National Academy of Sciences, Washington, D.C., 1980.

†Mean Adequacy Ratios were calculated by averaging individual % RDAs for the tabled nutrients, including and excluding energy, with values >100 truncated.

‡Averaged values over 3-day period recorded.

#Composite day's intake from food frequency data obtained twice at 2-week interval.

# APPENDIX F

Percentage frequency distributions of student responses to College Schedule of Recent Experience (CSRE)

Table 6. Percentage frequency distribution of student responses* to College Schedule of Recent Experience (CSRE)†

| CSRE event | women (N = 75) response | | | | | men (N = 132) response | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 4 |
| entered college | 1 | 87 | 11 | 0 | 1 | 5 | 87 | 5 | 2 | 1 |
| married | 99 | 1 | 0 | 0 | 0 | 99 | 1 | 0 | 0 | 0 |
| trouble with boss | 65 | 24 | 3 | 1 | 7 | 61 | 17 | 12 | 2 | 8 |
| held job while in school | 35 | 44 | 12 | 8 | 1 | 51 | 35 | 10 | 3 | 1 |
| death of spouse | 100 | 0 | 0 | 0 | 0 | 98 | 2 | 0 | 0 | 0 |
| change in sleeping habits | 14 | 30 | 17 | 15 | 24 | 17 | 33 | 19 | 8 | 23 |
| death of family member | 76 | 20 | 3 | 1 | 0 | 80 | 19 | 1 | 0 | 0 |
| change in eating habits | 8 | 36 | 21 | 8 | 27 | 26 | 30 | 17 | 8 | 19 |
| change in field of study | 45 | 37 | 11 | 4 | 3 | 54 | 34 | 8 | 3 | 1 |
| revision of personal habits | 15 | 51 | 15 | 8 | 12 | 21 | 46 | 17 | 11 | 5 |
| death of close friend | 85 | 12 | 0 | 2 | 1 | 82 | 14 | 3 | 0 | 1 |
| guilty of minor law violations | 69 | 20 | 4 | 5 | 2 | 51 | 19 | 12 | 13 | 5 |
| outstanding personal achievement | 36 | 25 | 11 | 8 | 20 | 26 | 34 | 14 | 10 | 16 |
| pregnant or fathered a pregnancy | 99 | 1 | 0 | 0 | 0 | 98 | 1 | 0 | 0 | 1 |
| change in health/behavior of family member | 8 | 19 | 9 | 3 | 1 | 71 | 24 | 3 | 1 | 1 |
| sexual difficulties | 83 | 9 | 7 | 0 | 1 | 83 | 8 | 4 | 0 | 5 |
| trouble with in-laws | 95 | 1 | 3 | 1 | 0 | 88 | 5 | 5 | 0 | 2 |
| change in number of family get-togethers | 56 | 27 | 11 | 1 | 5 | 55 | 30 | 7 | 3 | 5 |

Table 6. Percentage frequency distribution of student responses* to College Schedule of Recent Experience (CSRE)† (cont)

| CSRE event | women (N = 75) response | | | | | men (N = 132) response | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 4 |
| change in financial state | 28 | 46 | 9 | 8 | 9 | 31 | 46 | 10 | 4 | 9 |
| gained new family member | 81 | 16 | 1 | 0 | 1 | 86 | 12 | 1 | 0 | 1 |
| change in residence/living conditions | 5 | 72 | 17 | 3 | 3 | 7 | 76 | 7 | 7 | 3 |
| conflict with/change in values | 49 | 35 | 12 | 0 | 4 | 58 | 29 | 7 | 3 | 3 |
| change in church activities | 51 | 40 | 7 | 1 | 1 | 49 | 36 | 8 | 1 | 6 |
| marital reconciliation with mate | 97 | 0 | 0 | 3 | 0 | 94 | 2 | 1 | 2 | 1 |
| fired from work | 100 | 0 | 0 | 0 | 0 | 98 | 1 | 1 | 0 | 0 |
| divorced | 100 | 0 | 0 | 0 | 0 | 99 | 1 | 0 | 0 | 0 |
| change in line of work | 75 | 21 | 1 | 0 | 3 | 68 | 22 | 4 | 4 | 2 |
| change in number of arguments with spouse | 88 | 5 | 3 | 0 | 4 | 89 | 4 | 2 | 1 | 4 |
| change in responsibilities at work | 69 | 19 | 7 | 0 | 5 | 78 | 14 | 4 | 1 | 3 |
| spouse began/ceased work outside home | 97 | 2 | 1 | 0 | 0 | 99 | 0 | 0 | 0 | 1 |
| change in working hours/conditions | 49 | 32 | 12 | 4 | 3 | 56 | 28 | 11 | 1 | 4 |
| marital separation | 99 | 1 | 0 | 0 | 0 | 98 | 1 | 0 | 1 | 0 |
| change in type/amount of recreation | 24 | 43 | 17 | 7 | 9 | 20 | 42 | 15 | 8 | 15 |
| change in use of drugs | 88 | 7 | 3 | 0 | 2 | 85 | 9 | 3 | 2 | 1 |
| took mortgage/loan <$10,000 | 76 | 17 | 5 | 2 | 0 | 72 | 20 | 5 | 2 | 1 |
| experienced personal injury/illness | 84 | 13 | 3 | 0 | 0 | 83 | 12 | 3 | 2 | 0 |

Table 6. Percentage frequency distribution of student responses* to College Schedule of Recent Experience (CSRE)† (cont)

| CSRE event | women (N = 75) response | | | | | men (N = 132) response | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 0 | 1 | 2 | 3 | 4 |
| change in use of alcohol | 55 | 29 | 6 | 5 | 5 | 45 | 36 | 7 | 5 | 7 |
| change in social activities | 19 | 37 | 16 | 13 | 15 | 20 | 50 | 11 | 8 | 11 |
| change in school activities | 29 | 40 | 16 | 8 | 7 | 41 | 35 | 8 | 9 | 7 |
| change in independence/responsibility | 9 | 48 | 15 | 5 | 23 | 16 | 39 | 15 | 13 | 17 |
| took trip/vacation | 36 | 25 | 23 | 11 | 5 | 39 | 28 | 18 | 8 | 7 |
| marital engagement | 85 | 13 | 2 | 0 | 0 | 97 | 2 | 0 | 1 | 0 |
| changed to new school | 17 | 80 | 1 | 2 | 0 | 26 | 70 | 3 | 0 | 1 |
| changed dating habits | 37 | 33 | 16 | 4 | 10 | 41 | 39 | 8 | 5 | 7 |
| trouble with school administration | 56 | 25 | 10 | 5 | 4 | 64 | 25 | 5 | 3 | 3 |
| broken steady relationship | 67 | 29 | 3 | 0 | 1 | 76 | 16 | 5 | 2 | 1 |
| change in self-concept/awareness | 51 | 27 | 12 | 2 | 8 | 49 | 35 | 10 | 3 | 3 |

*Number of times (0-4) during the last year event was experienced.

†Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

## APPENDIX G

Individual total Life Change Units (LCUs) for university women (N = 75) and men (N = 132) from College Schedule of Recent Experience (CSRE)

Table 10. Individual total Life Change Units (LCUs)* for university women (N = 75) from College Schedule of Recent Experience (CSRE)†

| ID number | LCUs | ID number | LCUs | ID number | LCUs | ID number | LCUs |
|---|---|---|---|---|---|---|---|
| 3 | 2189 | 111 | 980 | 195 | 948 | 336 | 2568 |
| 9 | 942 | 115 | 815 | 197 | 2025 | 338 | 825 |
| 11 | 1487 | 116 | 818 | 198 | 1110 | 341 | 960 |
| 12 | 1263 | 117 | 768 | 199 | 632 | 343 | 1254 |
| 15 | 1147 | 118 | 1786 | 200 | 1162 | 344 | 790 |
| 16 | 761 | 119 | 2366 | 203 | 1120 | 346 | 2264 |
| 22 | 475 | 127 | 1346 | 304 | 939 | 347 | 1846 |
| 37 | 736 | 130 | 2128 | 305 | 1645 | 350 | 3594 |
| 40 | 1142 | 131 | 1882 | 308 | 1349 | 351 | 2379 |
| 41 | 1489 | 132 | 871 | 309 | 1263 | 352 | 1049 |
| 48 | 2495 | 133 | 962 | 310 | 1445 | 353 | 759 |
| 51 | 579 | 134 | 831 | 314 | 827 | 391 | 1028 |
| 62 | 2344 | 136 | 788 | 315 | 1377 | 398 | 2179 |
| 66 | 1067 | 149 | 1062 | 321 | 1575 | 400 | 1368 |
| 68 | 967 | 177 | 660 | 322 | 2613 | 401 | 1657 |
| 83 | 1838 | 184 | 1111 | 323 | 967 | 408 | 3168 |
| 99 | 1514 | 190 | 964 | 325 | 1525 | 417 | 1746 |
| 101 | 1608 | 191 | 1873 | 326 | 2239 | 420 | 611 |
| 103 | 610 | 192 | 929 | 327 | 2966 | | |

*LCUs = sum of frequency responses × respective event values for all CSRE events.

†Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

Table 11. Individual total Life Change Units (LCUs)* for university men (N = 132) from College Schedule of Recent Experience (CSRE)†

| ID number | LCUs | ID number | LCUs | ID number | LCUs | ID number | LCUs |
|---|---|---|---|---|---|---|---|
| 1 | 1705 | 63 | 1672 | 141 | 1212 | 333 | 1486 |
| 2 | 971 | 64 | 1574 | 143 | 1662 | 335 | 2104 |
| 4 | 1072 | 65 | 548 | 153 | 3683 | 339 | 760 |
| 5 | 1036 | 71 | 191 | 154 | 862 | 340 | 1364 |
| 7 | 1805 | 75 | 1140 | 155 | 396 | 342 | 1265 |
| 8 | 1476 | 77 | 1872 | 161 | 535 | 345 | 425 |
| 17 | 867 | 78 | 1870 | 162 | 1548 | 348 | 1011 |
| 20 | 1003 | 79 | 1640 | 163 | 869 | 356 | 2780 |
| 23 | 1408 | 80 | 1889 | 164 | 1299 | 357 | 1064 |
| 24 | 1140 | 81 | 1506 | 165 | 431 | 387 | 1889 |
| 25 | 578 | 82 | 1272 | 166 | 2951 | 388 | 1842 |
| 26 | 1227 | 84 | 1403 | 172 | 1387 | 389 | 1139 |
| 27 | 4907 | 85 | 534 | 173 | 822 | 390 | 683 |
| 28 | 1328 | 86 | 506 | 175 | 2849 | 392 | 716 |
| 29 | 1170 | 91 | 1678 | 176 | 2248 | 393 | 1516 |
| 30 | 1285 | 92 | 1011 | 181 | 1671 | 394 | 1062 |
| 31 | 1503 | 93 | 737 | 183 | 931 | 397 | 1475 |
| 32 | 985 | 94 | 737 | 185 | 1189 | 399 | 1754 |
| 33 | 1249 | 95 | 1614 | 188 | 2038 | 402 | 758 |
| 34 | 728 | 96 | 1778 | 189 | 1058 | 403 | 1402 |
| 35 | 1647 | 98 | 5135 | 193 | 1680 | 404 | 836 |
| 36 | 1097 | 102 | 912 | 194 | 855 | 405 | 1864 |
| 38 | 644 | 106 | 677 | 204 | 2437 | 406 | 1727 |
| 42 | 2340 | 107 | 633 | 205 | 558 | 407 | 1570 |
| 43 | 324 | 110 | 688 | 306 | 1176 | 411 | 1648 |
| 46 | 1926 | 113 | 1346 | 311 | 1521 | 412 | 1569 |
| 47 | 1185 | 114 | 1078 | 313 | 1440 | 414 | 742 |
| 49 | 1012 | 121 | 657 | 316 | 426 | 416 | 1218 |
| 52 | 1278 | 122 | 1193 | 317 | 1162 | 418 | 765 |
| 53 | 1483 | 129 | 730 | 318 | 1120 | 419 | 614 |
| 57 | 1236 | 138 | 760 | 320 | 3339 | 421 | 591 |
| 59 | 1483 | 139 | 400 | 328 | 873 | 423 | 1264 |
| 61 | 1315 | 140 | 1109 | 330 | 2153 | 424 | 899 |

*LCUs = sum of frequency responses × respective event values for all CSRE events.

†Anderson, G.E.: College Schedule of Recent Experience. M.S. Thesis, North Dakota State University, 1972. (As modified by Marx, M.B. and Bowers, F.R., University of Kentucky College of Medicine, 1972.)

# APPENDIX H

Individual dietary intakes, percentages of the 1980 RDAs, and MARs (including and excluding energy) for university women (N = 75) and men (N = 132) from food frequency data

Table 16. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university women (N = 75) from food frequency data

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 003 | | | | | | | | | | | | |
| intake | 2141 | 94.3 | 7220 | 124.4 | 1.72 | 1.58 | 24.28 | 616 | 1395 | 16.02 | 92.8 | 93.4 |
| % RDA | 88 | 205.0 | 180 | 207.3 | 156.7 | 121.6 | 173.4 | 51 | 116 | 88.9 | | |
| 009 | | | | | | | | | | | | |
| intake | 1670 | 46.3 | 3943 | 178.9 | 1.01 | 1.08 | 13.11 | 475 | 966 | 8.74 | 85.2 | 86.1 |
| % RDA | 77 | 105.3 | 98 | 298.1 | 92.4 | 83.0 | 93.6 | 59 | 121 | 48.5 | | |
| 011 | | | | | | | | | | | | |
| intake | 1850 | 63.6 | 9222 | 164.6 | 1.76 | 2.17 | 21.63 | 868 | 1216 | 15.98 | 97.5 | 98.8 |
| % RDA | 86 | 144.6 | 230 | 274.2 | 160.3 | 167.5 | 154.5 | 108 | 152 | 88.8 | | |
| 012 | | | | | | | | | | | | |
| intake | 1774 | 77.8 | 4106 | 79.8 | 1.09 | 1.25 | 20.01 | 511 | 1153 | 13.49 | 91.4 | 92.7 |
| % RDA | 79 | 176.8 | 103 | 132.9 | 99.7 | 96.2 | 143.6 | 64 | 144 | 74.9 | | |
| 015 | | | | | | | | | | | | |
| intake | 1336 | 63.4 | 3023 | 51.4 | 1.17 | 1.07 | 13.89 | 514 | 927 | 9.06 | 77.6 | 79.2 |
| % RDA | 64 | 137.7 | 76 | 85.5 | 106.8 | 82.4 | 99.2 | 43 | 77 | 50.3 | | |
| 016 | | | | | | | | | | | | |
| intake | 1835 | 76.6 | 3629 | 121.5 | 1.03 | 1.54 | 16.80 | 803 | 1424 | 10.89 | 91.1 | 93.9 |
| % RDA | 66 | 174.1 | 91 | 202.4 | 93.7 | 118.7 | 120.0 | 100 | 178 | 60.5 | | |
| 022 | | | | | | | | | | | | |
| intake | 1837 | 72.6 | 5864 | 66.5 | 1.00 | 1.47 | 18.35 | 611 | 1226 | 10.57 | 71.0 | 70.1 |
| % RDA | 79 | 113.4 | 59 | 66.5 | 61.3 | 81.6 | 96.6 | 51 | 102 | 15.5 | | |
| 037 | | | | | | | | | | | | |
| intake | 2621 | 107.5 | 13435 | 172.2 | 2.07 | 2.69 | 23.99 | 1401 | 1845 | 17.84 | 99.3 | 99.9 |
| % RDA | 94 | 244.2 | 336 | 286.9 | 188.2 | 206.8 | 171.3 | 175 | 230 | 99.1 | | |
| 040 | | | | | | | | | | | | |
| intake | 2196 | 78.6 | 11257 | 217.3 | 1.66 | 2.73 | 21.74 | 1332 | 1927 | 15.15 | 96.4 | 98.2 |
| % RDA | 80 | 170.7 | 281 | 362.2 | 151.5 | 210.5 | 155.3 | 111 | 161 | 84.1 | | |
| 041 | | | | | | | | | | | | |
| intake | 2503 | 94.0 | 6753 | 185.5 | 1.58 | 1.77 | 21.87 | 633 | 1509 | 15.32 | 90.8 | 93.1 |
| % RDA | 70 | 167.7 | 135 | 309.1 | 113.1 | 104.5 | 121.5 | 53 | 126 | 85.1 | | |
| 048 | | | | | | | | | | | | |
| intake | 3530 | 158.5 | 13601 | 212.8 | 2.83 | 3.63 | 42.38 | 1401 | 2504 | 28.70 | 100.0 | 100.0 |
| % RDA | 145 | 344.6 | 340 | 354.6 | 257.6 | 279.8 | 302.7 | 117 | 209 | 159.4 | | |

Table 16. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university women (N = 75) from food frequency data (cont)

| ID number | energy | protein | vit A | aacorbic acid | thiamin | riboflavin | niacin | calcium | phosphorua | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 051 | | | | | | | | | | | | |
| intake | 2339 | 86.3 | 9488 | 132.1 | 1.38 | 1.45 | 21.54 | 564 | 1442 | 16.49 | 91.6 | 93.2 |
| % RDA | 77 | 187.6 | 237 | 220.1 | 126.2 | 112.0 | 153.8 | 47 | 120 | 91.6 | | |
| 062 | | | | | | | | | | | | |
| intake | 1524 | 66.9 | 8449 | 83.4 | 0.89 | 1.96 | 11.39 | 1112 | 1302 | 8.83 | 87.2 | 89.3 |
| % RDA | 68 | 145.4 | 211 | 139.0 | 81.2 | 150.7 | 81.3 | 93 | 108 | 49.0 | | |
| 066 | | | | | | | | | | | | |
| intake | 2209 | 103.2 | 8799 | 126.7 | 1.78 | 2.94 | 23.52 | 1342 | 1825 | 15.63 | 95.7 | 98.5 |
| % RDA | 70 | 224.4 | 220 | 211.2 | 161.9 | 226.2 | 168.0 | 112 | 152 | 86.8 | | |
| 068 | | | | | | | | | | | | |
| intake | 2329 | 90.2 | 6052 | 143.6 | 1.72 | 2.65 | 20.09 | 1362 | 1866 | 12.96 | 94.1 | 96.9 |
| % RDA | 69 | 205.0 | 151 | 239.3 | 156.7 | 203.8 | 143.5 | 170 | 233 | 72.0 | | |
| 083 | | | | | | | | | | | | |
| intake | 2420 | 85.0 | 6623 | 90.0 | 1.77 | 2.02 | 27.84 | 651 | 1360 | 20.29 | 94.7 | 94.9 |
| % RDA | 93 | 184.8 | 166 | 150.0 | 161.2 | 155.7 | 198.8 | 54 | 113 | 112.7 | | |
| 099 | | | | | | | | | | | | |
| intake | 3544 | 124.0 | 14163 | 451.2 | 3.03 | 4.36 | 35.08 | 2136 | 3014 | 22.50 | 100.0 | 100.0 |
| % RDA | 100 | 221.3 | 283 | 752.0 | 216.9 | 256.9 | 194.9 | 178 | 251 | 125.0 | | |
| 101 | | | | | | | | | | | | |
| intake | 2438 | 87.9 | 8123 | 79.4 | 1.36 | 1.61 | 23.81 | 536 | 1257 | 17.56 | 93.8 | 94.7 |
| % RDA | 85 | 157.0 | 162 | 132.3 | 90.6 | 95.2 | 125.3 | 67 | 157 | 99.5 | | |
| 103 | | | | | | | | | | | | |
| intake | 1037 | 44.6 | 2815 | 74.1 | 0.55 | 1.22 | 7.67 | 742 | 939 | 4.89 | 67.4 | 70.4 |
| % RDA | 41 | 96.8 | 70 | 123.4 | 50.4 | 94.0 | 54.8 | 62 | 78 | 27.2 | | |
| 111 | | | | | | | | | | | | |
| intake | 1004 | 42.9 | 7950 | 183.2 | 0.85 | 1.13 | 11.98 | 502 | 791 | 8.41 | 78.0 | 83.9 |
| % RDA | 25 | 97.4 | 199 | 305.2 | 77.3 | 86.8 | 85.6 | 63 | 99 | 46.7 | | |
| 115 | | | | | | | | | | | | |
| intake | 2281 | 86.2 | 5893 | 69.3 | 1.11 | 2.13 | 19.54 | 1054 | 1594 | 10.97 | 94.0 | 94.3 |
| % RDA | 92 | 187.3 | 147 | 115.4 | 101.6 | 164.3 | 139.5 | 88 | 133 | 60.9 | | |
| 116 | | | | | | | | | | | | |
| intake | 2511 | 66.6 | 6219 | 84.2 | 1.94 | 2.04 | 23.11 | 607 | 1190 | 15.60 | 93.6 | 92.9 |
| % RDA | 119 | 144.8 | 155 | 140.3 | 176.4 | 157.6 | 165.1 | 50 | 99 | 86.6 | | |

Table 16. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university women (N = 75) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 117 | | | | | | | | | | | | |
| intake | 2323 | 92.5 | 7186 | 208.6 | 1.65 | 1.80 | 22.72 | 829 | 1607 | 16.35 | 93.1 | 95.5 |
| % RDA | 71 | 201.1 | 180 | 347.6 | 150.0 | 138.9 | 162.3 | 69 | 134 | 90.8 | | |
| 118 | | | | | | | | | | | | |
| intake | 1803 | 83.9 | 3993 | 75.1 | 1.26 | 1.71 | 19.95 | 758 | 1282 | 12.68 | 91.4 | 92.6 |
| % RDA | 81 | 182.3 | 99 | 125.1 | 114.6 | 132.0 | 142.5 | 63 | 107 | 70.4 | | |
| 119 | | | | | | | | | | | | |
| intake | 2660 | 98.9 | 8005 | 217.9 | 1.64 | 2.25 | 25.54 | 1022 | 1764 | 16.89 | 97.8 | 97.7 |
| % RDA | 99 | 215.0 | 200 | 363.1 | 149.2 | 173.2 | 182.4 | 85 | 147 | 93.8 | | |
| 127 | | | | | | | | | | | | |
| intake | 2529 | 131.9 | 8170 | 260.7 | 1.57 | 3.77 | 19.26 | 2183 | 2761 | 13.49 | 93.5 | 97.2 |
| % RDA | 60 | 286.6 | 204 | 434.5 | 143.1 | 290.0 | 137.6 | 182 | 230 | 74.9 | | |
| 130 | | | | | | | | | | | | |
| intake | 1960 | 66.7 | 8244 | 172.5 | 1.65 | 1.61 | 23.72 | 462 | 1017 | 17.49 | 90.4 | 91.1 |
| % RDA | 84 | 145.0 | 206 | 287.5 | 150.7 | 124.1 | 169.4 | 38 | 85 | 97.1 | | |
| 131 | | | | | | | | | | | | |
| intake | 1598 | 63.1 | 1982 | 27.9 | 0.69 | 1.28 | 12.53 | 645 | 1058 | 7.44 | 74.9 | 74.3 |
| % RDA | 80 | 143.3 | 50 | 46.5 | 63.0 | 98.7 | 89.5 | 80 | 132 | 41.3 | | |
| 132 | | | | | | | | | | | | |
| intake | 2452 | 102.7 | 7718 | 102.0 | 1.75 | 4.14 | 20.98 | 2352 | 2397 | 12.72 | 96.2 | 96.7 |
| % RDA | 91 | 233.3 | 193 | 169.9 | 159.8 | 318.4 | 149.8 | 294 | 300 | 70.6 | | |
| 133 | | | | | | | | | | | | |
| intake | 2941 | 99.1 | 5838 | 146.6 | 2.13 | 3.37 | 22.93 | 1879 | 2109 | 14.86 | 98.2 | 98.1 |
| % RDA | 145 | 215.5 | 146 | 244.3 | 194.2 | 259.5 | 163.8 | 156 | 176 | 82.5 | | |
| 134 | | | | | | | | | | | | |
| intake | 1423 | 56.1 | 5318 | 104.6 | 1.02 | 1.12 | 13.72 | 483 | 875 | 9.70 | 79.9 | 82.7 |
| % RDA | 55 | 121.9 | 133 | 174.2 | 92.7 | 86.3 | 98.0 | 40 | 73 | 53.9 | | |
| 136 | | | | | | | | | | | | |
| intake | 1082 | 31.1 | 5066 | 88.8 | 0.83 | 1.09 | 9.66 | 509 | 660 | 7.78 | 68.3 | 70.8 |
| % RDA | 46 | 67.5 | 127 | 148.0 | 76.1 | 84.1 | 69.0 | 42 | 55 | 43.2 | | |
| 149 | | | | | | | | | | | | |
| intake | 1325 | 53.4 | 5975 | 144.9 | 1.08 | 1.46 | 15.04 | 791 | 1081 | 9.75 | 90.4 | 94.6 |
| % RDA | 52 | 121.4 | 145 | 241.5 | 98.3 | 112.9 | 107.4 | 99 | 135 | 54.1 | | |

Table 16. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university women (N = 75) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 177 | | | | | | | | | | | | |
| intake | 1651 | 75.6 | 3482 | 78.6 | 0.89 | 1.13 | 14.95 | 473 | 1012 | 10.73 | 83.3 | 86.1 |
| % RDA | 58 | 171.7 | 87 | 130.9 | 81.2 | 87.6 | 106.8 | 59 | 126 | 59.6 | | |
| 184 | | | | | | | | | | | | |
| intake | 1199 | 35.5 | 3992 | 100.4 | 0.58 | 0.87 | 7.73 | 480 | 987 | 5.49 | 69.5 | 71.8 |
| % RDA | 49 | 80.7 | 100 | 167.4 | 52.6 | 67.3 | 55.2 | 60 | 123 | 30.5 | | |
| 190 | | | | | | | | | | | | |
| intake | 3205 | 137.9 | 9186 | 107.0 | 2.29 | 3.67 | 33.25 | 1673 | 2300 | 22.81 | 100.0 | 100.0 |
| % RDA | 145 | 299.8 | 230 | 178.3 | 208.7 | 282.6 | 237.5 | 139 | 192 | 126.7 | | |
| 191 | | | | | | | | | | | | |
| intake | 3052 | 88.0 | 4392 | 210.4 | 1.93 | 1.99 | 28.04 | 911 | 1977 | 16.21 | 95.4 | 96.2 |
| % RDA | 88 | 191.2 | 110 | 350.7 | 176.2 | 153.5 | 200.3 | 76 | 165 | 90.0 | | |
| 192 | | | | | | | | | | | | |
| intake | 2056 | 82.4 | 9208 | 191.9 | 1.45 | 1.53 | 22.71 | 724 | 1280 | 15.81 | 95.3 | 97.6 |
| % RDA | 74 | 187.3 | 230 | 319.8 | 131.7 | 117.7 | 162.2 | 90 | 160 | 87.8 | | |
| 195 | | | | | | | | | | | | |
| intake | 2282 | 70.2 | 4469 | 88.2 | 1.18 | 1.78 | 15.21 | 827 | 1292 | 12.85 | 96.9 | 96.8 |
| % RDA | 98 | 159.4 | 112 | 147.0 | 107.9 | 137.4 | 108.6 | 103 | 161 | 71.3 | | |
| 197 | | | | | | | | | | | | |
| intake | 1898 | 89.8 | 13308 | 209.0 | 1.51 | 2.96 | 18.82 | 1626 | 2012 | 12.41 | 93.8 | 96.5 |
| % RDA | 69 | 204.0 | 333 | 348.2 | 138.0 | 227.9 | 134.4 | 203 | 251 | 68.9 | | |
| 198 | | | | | | | | | | | | |
| intake | 2086 | 107.9 | 4964 | 45.6 | 1.32 | 2.60 | 16.92 | 1647 | 2016 | 10.77 | 89.9 | 92.9 |
| % RDA | 63 | 234.5 | 124 | 75.9 | 120.5 | 200.2 | 120.8 | 137 | 168 | 59.8 | | |
| 199 | | | | | | | | | | | | |
| intake | 1766 | 83.8 | 4764 | 76.7 | 1.13 | 2.93 | 13.95 | 1720 | 1836 | 8.43 | 91.3 | 94.0 |
| % RDA | 66 | 190.4 | 119 | 127.8 | 102.6 | 225.8 | 99.6 | 215 | 230 | 46.8 | | |
| 200 | | | | | | | | | | | | |
| intake | 1729 | 49.6 | 3164 | 118.8 | 0.79 | 1.15 | 14.79 | 526 | 1247 | 8.55 | 80.6 | 81.3 |
| % RDA | 75 | 107.9 | 79 | 197.9 | 71.9 | 89.0 | 105.6 | 44 | 104 | 47.5 | | |
| 203 | | | | | | | | | | | | |
| intake | 2372 | 89.9 | 4878 | 70.6 | 1.55 | 2.78 | 20.19 | 1428 | 1803 | 12.08 | 95.2 | 96.3 |
| % RDA | 85 | 203.8 | 122 | 117.6 | 141.4 | 214.5 | 144.2 | 178 | 225 | 67.1 | | |

Table 16. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university women (N = 75) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 304 | | | | | | | | | | | | |
| intake | 2458 | 101.2 | 7812 | 105.1 | 1.55 | 2.46 | 22.83 | 1231 | 1756 | 15.58 | 98.5 | 98.5 |
| % RDA | 98 | 229.9 | 195 | 175.1 | 141.4 | 189.7 | 163.1 | 154 | 220 | 86.5 | | |
| 305 | | | | | | | | | | | | |
| intake | 2557 | 131.3 | 27976 | 378.1 | 2.16 | 3.10 | 30.62 | 1793 | 2325 | 21.67 | 100.0 | 100.0 |
| % RDA | 102 | 285.5 | 699 | 630.1 | 196.5 | 239.1 | 218.7 | 149 | 194 | 120.3 | | |
| 308 | | | | | | | | | | | | |
| intake | 1800 | 87.0 | 9955 | 143.1 | 1.19 | 1.63 | 19.30 | 805 | 1306 | 13.32 | 94.5 | 97.1 |
| % RDA | 71 | 197.8 | 249 | 238.5 | 108.1 | 125.8 | 137.8 | 101 | 163 | 74.0 | | |
| 309 | | | | | | | | | | | | |
| intake | 1467 | 64.7 | 4603 | 61.1 | 0.85 | 1.01 | 16.43 | 367 | 902 | 9.77 | 75.5 | 79.5 |
| % RDA | 40 | 140.6 | 115 | 101.7 | 77.4 | 78.2 | 117.4 | 30 | 75 | 54.2 | | |
| 310 | | | | | | | | | | | | |
| intake | 1624 | 50.7 | 1246 | 28.8 | 1.13 | 1.25 | 15.08 | 503 | 1066 | 6.53 | 72.6 | 74.9 |
| % RDA | 52 | 115.3 | 31 | 48.0 | 103.0 | 96.1 | 107.7 | 63 | 133 | 36.2 | | |
| 314 | | | | | | | | | | | | |
| intake | 1378 | 58.3 | 3565 | 88.2 | 1.13 | 1.35 | 16.18 | 552 | 917 | 10.65 | 81.9 | 85.6 |
| % RDA | 48 | 126.7 | 89 | 147.0 | 103.4 | 104.3 | 115.6 | 46 | 76 | 59.1 | | |
| 315 | | | | | | | | | | | | |
| intake | 2336 | 70.1 | 4844 | 194.5 | 1.49 | 1.77 | 17.89 | 819 | 1627 | 12.35 | 93.7 | 93.0 |
| % RDA | 103 | 152.3 | 121 | 324.1 | 136.1 | 136.8 | 127.7 | 68 | 136 | 68.6 | | |
| 321 | | | | | | | | | | | | |
| intake | 3003 | 102.8 | 7114 | 336.3 | 1.95 | 3.12 | 19.73 | 1538 | 1953 | 15.97 | 97.6 | 98.7 |
| % RDA | 87 | 223.5 | 178 | 560.4 | 177.3 | 240.5 | 140.9 | 128 | 163 | 88.7 | | |
| 322 | | | | | | | | | | | | |
| intake | 1987 | 100.1 | 8463 | 83.4 | 1.36 | 3.03 | 16.14 | 1784 | 2018 | 12.50 | 96.2 | 96.6 |
| % RDA | 93 | 227.4 | 212 | 139.0 | 124.1 | 233.4 | 115.2 | 223 | 252 | 69.4 | | |
| 323 | | | | | | | | | | | | |
| intake | 1043 | 44.9 | 3620 | 51.8 | 0.66 | 1.27 | 9.30 | 721 | 853 | 6.55 | 77.0 | 80.8 |
| % RDA | 42 | 102.0 | 90 | 86.3 | 60.2 | 97.7 | 66.4 | 90 | 107 | 36.4 | | |
| 325 | | | | | | | | | | | | |
| intake | 2194 | 94.4 | 7543 | 212.5 | 1.92 | 3.11 | 22.05 | 1688 | 1971 | 14.99 | 97.2 | 98.1 |
| % RDA | 89 | 205.2 | 188 | 354.2 | 175.2 | 239.6 | 157.5 | 141 | 164 | 83.3 | | |

Table 16. Individual dietary intakes, percentagea of the 1980 RDAs*, and MARs† (including and excluding energy) for university women (N = 75) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 326 | | | | | | | | | | | | |
| intake | 3104 | 130.6 | 16972 | 279.6 | 2.46 | 4.33 | 24.55 | 2526 | 2790 | 20.35 | 100.0 | 100.0 |
| % RDA | 104 | 283.9 | 424 | 465.9 | 223.9 | 333.7 | 175.3 | 210 | 232 | 113.0 | | |
| 327 | | | | | | | | | | | | |
| intake | 3495 | 136.4 | 32110 | 491.0 | 2.47 | 3.36 | 35.63 | 2023 | 2584 | 31.58 | 100.0 | 100.0 |
| % RDA | 109 | 296.4 | 803 | 818.3 | 225.3 | 259.0 | 254.5 | 168 | 215 | 175.4 | | |
| 336 | | | | | | | | | | | | |
| intake | 2171 | 89.6 | 9968 | 54.0 | 1.32 | 1.96 | 20.43 | 930 | 1468 | 14.92 | 67.3 | 69.6 |
| % RDA | 47 | 95.3 | 66 | 45.0 | 66.3 | 93.3 | 97.3 | 58 | 92 | 12.6 | | |
| 338 | | | | | | | | | | | | |
| intake | 1747 | 75.3 | 7306 | 159.4 | 1.40 | 2.21 | 15.36 | 1246 | 1471 | 13.05 | 92.3 | 96.9 |
| % RDA | 50 | 163.7 | 183 | 265.6 | 127.9 | 170.4 | 109.7 | 104 | 122 | 72.5 | | |
| 341 | | | | | | | | | | | | |
| intake | 2179 | 89.4 | 12993 | 153.4 | 1.59 | 2.36 | 19.98 | 1236 | 1698 | 14.21 | 93.7 | 97.7 |
| % RDA | 58 | 194.2 | 325 | 255.6 | 144.9 | 182.2 | 142.7 | 103 | 141 | 78.9 | | |
| 343 | | | | | | | | | | | | |
| intake | 4915 | 186.4 | 8951 | 258.3 | 2.19 | 2.31 | 46.48 | 895 | 2736 | 27.80 | 100.0 | 100.0 |
| % RDA | 169 | 423.5 | 224 | 430.5 | 199.2 | 177.6 | 331.9 | 112 | 342 | 154.4 | | |
| 344 | | | | | | | | | | | | |
| intake | 2092 | 98.1 | 5846 | 170.8 | 1.85 | 2.69 | 19.78 | 1314 | 1783 | 15.22 | 97.5 | 98.3 |
| % RDA | 90 | 213.2 | 146 | 284.6 | 168.9 | 207.3 | 141.2 | 110 | 148 | 84.5 | | |
| 346 | | | | | | | | | | | | |
| intake | 2643 | 134.7 | 13127 | 203.0 | 2.22 | 3.92 | 28.83 | 1910 | 2431 | 20.42 | 97.4 | 100.0 |
| % RDA | 74 | 202.7 | 328 | 338.3 | 202.5 | 302.0 | 205.9 | 159 | 202 | 113.4 | | |
| 347 | | | | | | | | | | | | |
| intake | 1510 | 70.9 | 3763 | 28.5 | 0.86 | 1.34 | 14.21 | 721 | 1089 | 8.11 | 81.0 | 83.8 |
| % RDA | 55 | 161.0 | 94 | 47.4 | 78.2 | 103.6 | 101.5 | 90 | 136 | 45.0 | | |
| 350 | | | | | | | | | | | | |
| intake | 4381 | 149.7 | 7606 | 220.6 | 2.52 | 3.33 | 36.80 | 1620 | 2680 | 24.45 | 100.0 | 100.0 |
| % RDA | 148 | 340.2 | 190 | 367.6 | 229.2 | 256.6 | 262.8 | 202 | 335 | 135.8 | | |
| 351 | | | | | | | | | | | | |
| intake | 7047 | 212.6 | 19414 | 334.5 | 5.38 | 7.36 | 67.01 | 2938 | 4843 | 50.53 | 100.0 | 100.0 |
| % RDA | 269 | 462.2 | 485 | 557.4 | 489.3 | 556.1 | 478.6 | 245 | 403 | 280.7 | | |

Table 16. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university women (N = 75) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 352 | | | | | | | | | | | | |
| intake | 2695 | 127.7 | 9477 | 114.4 | 2.07 | 4.11 | 32.32 | 2312 | 2872 | 15.32 | 95.7 | 98.3 |
| % RDA | 72 | 290.3 | 237 | 190.5 | 188.5 | 316.6 | 230.8 | 289 | 359 | 85.1 | | |
| 353 | | | | | | | | | | | | |
| intake | 2019 | 96.8 | 7974 | 169.1 | 1.50 | 2.83 | 21.45 | 1482 | 1864 | 14.43 | 97.2 | 97.8 |
| % RDA | 92 | 219.9 | 199 | 281.7 | 136.5 | 217.9 | 153.2 | 185 | 233 | 80.1 | | |
| 391 | | | | | | | | | | | | |
| intake | 1610 | 77.3 | 9169 | 135.8 | 1.11 | 1.80 | 16.69 | 877 | 1461 | 13.73 | 90.4 | 94.4 |
| % RDA | 54 | 168.0 | 229 | 226.3 | 101.1 | 138.5 | 119.2 | 73 | 122 | 76.3 | | |
| 398 | | | | | | | | | | | | |
| intake | 2152 | 100.6 | 14945 | 114.1 | 1.36 | 2.28 | 21.11 | 1165 | 1538 | 17.38 | 96.5 | 99.3 |
| % RDA | 72 | 218.7 | 374 | 190.1 | 123.7 | 175.3 | 150.8 | 97 | 128 | 96.5 | | |
| 400 | | | | | | | | | | | | |
| intake | 4471 | 157.0 | 9402 | 262.8 | 3.44 | 4.90 | 38.20 | 3017 | 3661 | 26.29 | 100.0 | 100.0 |
| % RDA | 111 | 356.9 | 235 | 437.9 | 312.7 | 376.9 | 272.9 | 377 | 458 | 146.1 | | |
| 401 | | | | | | | | | | | | |
| intake | 1562 | 74.8 | 7160 | 105.7 | 1.09 | 2.32 | 13.01 | 1367 | 1619 | 8.47 | 89.4 | 93.3 |
| % RDA | 54 | 170.0 | 179 | 176.1 | 99.5 | 179.0 | 92.9 | 171 | 202 | 47.0 | | |
| 408 | | | | | | | | | | | | |
| intake | 2917 | 112.4 | 8383 | 158.6 | 1.57 | 2.11 | 28.76 | 1037 | 2037 | 16.88 | 99.0 | 99.3 |
| % RDA | 97 | 255.4 | 210 | 264.3 | 143.1 | 162.4 | 205.4 | 130 | 255 | 93.7 | | |
| 417 | | | | | | | | | | | | |
| intake | 3001 | 126.8 | 9377 | 311.4 | 2.21 | 3.49 | 29.21 | 1732 | 2635 | 19.39 | 100.0 | 100.0 |
| % RDA | 128 | 275.6 | 234 | 519.0 | 201.2 | 268.6 | 208.6 | 144 | 220 | 107.7 | | |
| 420 | | | | | | | | | | | | |
| intake | 1687 | 73.8 | 6268 | 160.5 | 1.65 | 2.04 | 23.00 | 657 | 1176 | 14.10 | 93.4 | 95.6 |
| % RDA | 73 | 167.8 | 157 | 267.5 | 150.0 | 157.3 | 164.6 | 82 | 147 | 78.3 | | |

*Food and Nutrition Board: Recommended Dietary Allowances. 9th rev. ed., National Academy of Sciences, Washington, D.C., 1980.

†Mean Adequacy Ratios were calculated by averaging individual % RDAs for the tabled nutrients, including and excluding energy, with values >100 truncated.

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 001 | | | | | | | | | | | | |
| intake | 3111 | 118.6 | 12284 | 317.3 | 2.77 | 3.56 | 39.29 | 1163 | 2400 | 22.35 | 97.3 | 99.7 |
| % RDA | 76 | 211.8 | 246 | 528.7 | 198.2 | 209.5 | 218.3 | 97 | 200 | 124.2 | | |
| 002 | | | | | | | | | | | | |
| intake | 5142 | 228.9 | 9794 | 192.7 | 3.04 | 7.26 | 35.01 | 4407 | 4564 | 22.64 | 100.0 | 100.0 |
| % RDA | 176 | 408.7 | 196 | 321.1 | 202.7 | 425.5 | 184.2 | 551 | 570 | 226.4 | | |
| 004 | | | | | | | | | | | | |
| intake | 5001 | 243.4 | 17407 | 198.8 | 3.40 | 8.07 | 42.38 | 4386 | 7865 | 27.15 | 100.0 | 100.0 |
| % RDA | 180 | 434.6 | 348 | 331.2 | 243.4 | 474.8 | 235.4 | 366 | 405 | 150.8 | | |
| 005 | | | | | | | | | | | | |
| intake | 2839 | 103.9 | 5028 | 199.8 | 1.78 | 2.07 | 28.64 | 672 | 1813 | 18.93 | 93.9 | 95.1 |
| % RDA | 83 | 185.5 | 101 | 332.9 | 127.4 | 121.7 | 159.1 | 56 | 151 | 105.1 | | |
| 007 | | | | | | | | | | | | |
| intake | 2481 | 92.9 | 9507 | 147.1 | 1.42 | 1.94 | 21.93 | 788 | 1477 | 15.19 | 97.8 | 99.3 |
| % RDA | 84 | 165.9 | 190 | 245.2 | 95.2 | 114.1 | 115.4 | 98 | 185 | 151.9 | | |
| 008 | | | | | | | | | | | | |
| intake | 3067 | 141.1 | 11432 | 114.9 | 2.75 | 4.96 | 28.50 | 2649 | 3074 | 22.24 | 95.2 | 100.0 |
| % RDA | 52 | 252.0 | 229 | 191.4 | 183.6 | 291.7 | 149.9 | 331 | 384 | 222.4 | | |
| 017 | | | | | | | | | | | | |
| intake | 4414 | 170.4 | 12059 | 169.3 | 3.19 | 5.20 | 39.53 | 3083 | 3596 | 28.94 | 100.0 | 100.0 |
| % RDA | 118 | 304.2 | 241 | 282.1 | 228.1 | 306.0 | 219.6 | 257 | 300 | 160.7 | | |
| 020 | | | | | | | | | | | | |
| intake | 4504 | 154.1 | 18939 | 335.4 | 3.84 | 5.58 | 48.60 | 2304 | 3191 | 36.21 | 100.0 | 100.0 |
| % RDA | 275 | 275.1 | 379 | 558.9 | 256.5 | 328.7 | 255.7 | 288 | 399 | 362.1 | | |
| 023 | | | | | | | | | | | | |
| intake | 4119 | 192.5 | 16206 | 309.0 | 2.70 | 5.01 | 44.28 | 2162 | 3556 | 23.78 | 100.0 | 100.0 |
| % RDA | 104 | 343.6 | 324 | 515.0 | 180.1 | 294.7 | 233.0 | 270 | 444 | 237.8 | | |
| 024 | | | | | | | | | | | | |
| intake | 2727 | 82.3 | 9371 | 252.8 | 1.95 | 2.10 | 18.98 | 1088 | 1453 | 15.69 | 98.2 | 100.0 |
| % RDA | 83 | 146.9 | 187 | 421.3 | 130.1 | 123.6 | 99.8 | 136 | 182 | 156.9 | | |
| 025 | | | | | | | | | | | | |
| intake | 4408 | 148.4 | 10728 | 586.7 | 2.36 | 5.14 | 25.80 | 2895 | 5606 | 18.47 | 100.0 | 100.0 |
| % RDA | 179 | 264.9 | 214 | 977.8 | 169.2 | 302.6 | 143.3 | 241 | 467 | 102.6 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 026 | | | | | | | | | | | | |
| intake | 4678 | 171.8 | 16828 | 311.6 | 2.65 | 3.74 | 38.22 | 1414 | 2946 | 30.02 | 98.4 | 100.0 |
| % RDA | 84 | 306.8 | 336 | 519.3 | 189.9 | 220.0 | 212.3 | 118 | 246 | 166.8 | | |
| 027 | | | | | | | | | | | | |
| intake | 4359 | 171.2 | 22074 | 103.5 | 3.18 | 4.48 | 40.48 | 1609 | 3128 | 38.79 | 99.9 | 100.0 |
| % RDA | 99 | 305.6 | 441 | 172.4 | 212.3 | 263.6 | 213.3 | 201 | 391 | 387.9 | | |
| 028 | | | | | | | | | | | | |
| intake | 2601 | 114.1 | 8038 | 171.8 | 2.10 | 2.71 | 37.65 | 547 | 1732 | 23.11 | 90.4 | 94.0 |
| % RDA | 58 | 203.7 | 161 | 286.3 | 150.5 | 159.5 | 209.2 | 46 | 144 | 128.3 | | |
| 029 | | | | | | | | | | | | |
| intake | 3686 | 183.0 | 5620 | 114.8 | 2.68 | 3.90 | 40.90 | 1674 | 2881 | 24.36 | 100.0 | 100.0 |
| % RDA | 137 | 326.7 | 112 | 191.3 | 191.6 | 229.5 | 227.2 | 140 | 240 | 135.3 | | |
| 030 | | | | | | | | | | | | |
| intake | 3712 | 163.6 | 5769 | 72.2 | 2.08 | 5.36 | 31.63 | 2992 | 3314 | 15.63 | 100.0 | 100.0 |
| % RDA | 114 | 292.2 | 115 | 120.3 | 138.8 | 315.2 | 166.4 | 374 | 414 | 156.3 | | |
| 031 | | | | | | | | | | | | |
| intake | 4821 | 177.0 | 7526 | 178.3 | 3.45 | 4.93 | 47.51 | 2385 | 3161 | 30.83 | 100.0 | 100.0 |
| % RDA | 149 | 316.1 | 150.5 | 297.1 | 230.5 | 290.0 | 250.0 | 298 | 395 | 308.3 | | |
| 032 | | | | | | | | | | | | |
| intake | 3779 | 168.3 | 10364 | 267.2 | 2.48 | 3.45 | 39.59 | 1682 | 3003 | 25.86 | 96.8 | 100.0 |
| % RDA | 68 | 300.5 | 207 | 445.3 | 177.2 | 203.2 | 219.9 | 140 | 250 | 143.6 | | |
| 033 | | | | | | | | | | | | |
| intake | 2341 | 61.8 | 9709 | 251.7 | 1.92 | 2.40 | 25.97 | 855 | 1670 | 16.88 | 96.9 | 100.0 |
| % RDA | 69 | 110.4 | 194 | 419.4 | 128.0 | 141.5 | 136.7 | 107 | 210 | 168.8 | | |
| 034 | | | | | | | | | | | | |
| intake | 3539 | 154.4 | 10462 | 239.8 | 2.84 | 5.20 | 28.50 | 2864 | 3483 | 24.80 | 100.0 | 100.0 |
| % RDA | 100 | 275.7 | 209 | 399.7 | 189.5 | 305.8 | 150.0 | 358 | 435 | 248.0 | | |
| 035 | | | | | | | | | | | | |
| intake | 5477 | 179.5 | 12922 | 429.2 | 3.30 | 5.29 | 46.73 | 2420 | 3839 | 29.72 | 100.0 | 100.0 |
| % RDA | 197 | 320.5 | 258 | 715.3 | 220.4 | 311.1 | 245.9 | 302 | 480 | 297.2 | | |
| 036 | | | | | | | | | | | | |
| intake | 3312 | 110.4 | 14870 | 231.8 | 2.52 | 3.25 | 38.67 | 1366 | 2150 | 25.08 | 100.0 | 100.0 |
| % RDA | 101 | 197.1 | 297 | 386.4 | 167.9 | 191.5 | 203.5 | 171 | 269 | 251.0 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 038 | | | | | | | | | | | | |
| intake | 5052 | 194.9 | 15401 | 194.2 | 3.00 | 6.32 | 31.67 | 3648 | 4009 | 26.66 | 100.0 | 100.0 |
| % RDA | 155 | 348.0 | 308 | 323.7 | 200.5 | 372.0 | 166.6 | 456 | 501 | 266.6 | | |
| 042 | | | | | | | | | | | | |
| intake | 2460 | 137.1 | 8596 | 106.8 | 1.71 | 3.81 | 22.72 | 1960 | 2517 | 16.07 | 97.4 | 98.8 |
| % RDA | 84 | 244.8 | 172 | 178.0 | 122.4 | 224.1 | 126.2 | 163 | 210 | 89.3 | | |
| 043 | | | | | | | | | | | | |
| intake | 3679 | 172.7 | 12543 | 226.5 | 2.39 | 4.43 | 35.01 | 2512 | 3355 | 21.09 | 100.0 | 100.0 |
| % RDA | 132 | 308.3 | 251 | 377.5 | 159.6 | 260.7 | 184.2 | 314 | 419 | 210.9 | | |
| 046 | | | | | | | | | | | | |
| intake | 3468 | 128.3 | 9281 | 157.0 | 2.57 | 4.07 | 33.37 | 1824 | 2460 | 22.96 | 97.9 | 100.0 |
| % RDA | 79 | 229.1 | 186 | 261.6 | 183.8 | 239.9 | 185.4 | 152 | 205 | 127.5 | | |
| 047 | | | | | | | | | | | | |
| intake | 3335 | 142.5 | 11171 | 273.5 | 2.76 | 3.58 | 40.93 | 1354 | 2278 | 25.56 | 99.6 | 100.0 |
| % RDA | 96 | 254.5 | 223 | 455.8 | 197.5 | 210.6 | 227.4 | 113 | 190 | 142.0 | | |
| 049 | | | | | | | | | | | | |
| intake | 3192 | 165.2 | 9810 | 196.1 | 2.28 | 3.24 | 44.81 | 1099 | 2336 | 27.49 | 95.6 | 99.0 |
| % RDA | 65 | 295.0 | 196 | 328.1 | 162.8 | 190.7 | 248.9 | 92 | 195 | 152.7 | | |
| 052 | | | | | | | | | | | | |
| intake | 6255 | 211.4 | 17471 | 384.6 | 5.18 | 10.00 | 66.02 | 4102 | 5992 | 39.36 | 100.0 | 100.0 |
| % RDA | 178 | 377.4 | 349 | 641.0 | 370.5 | 588.4 | 366.7 | 342 | 499 | 218.6 | | |
| 053 | | | | | | | | | | | | |
| intake | 2080 | 92.6 | 4757 | 164.2 | 1.30 | 2.29 | 21.62 | 1158 | 1778 | 12.30 | 93.1 | 98.0 |
| % RDA | 49 | 165.3 | 95 | 273.6 | 87.1 | 134.7 | 113.7 | 145 | 222 | 123.0 | | |
| 057 | | | | | | | | | | | | |
| intake | 2110 | 62.5 | 4371 | 140.0 | 1.40 | 1.17 | 18.86 | 394 | 983 | 12.45 | 86.9 | 88.7 |
| % RDA | 71 | 111.8 | 87.4 | 233.3 | 93.7 | 69.1 | 99.2 | 49.2 | 123 | 124.5 | | |
| 059 | | | | | | | | | | | | |
| intake | 2995 | 91.0 | 8692 | 210.0 | 2.47 | 3.06 | 32.63 | 1075 | 2356 | 25.02 | 99.7 | 100.0 |
| % RDA | 127 | 254.8 | 145 | 288.9 | 139.4 | 167.9 | 205.1 | 134 | 294 | 250.1 | | |
| 061 | | | | | | | | | | | | |
| intake | 3701 | 142.7 | 7274 | 173.4 | 2.09 | 2.85 | 38.97 | 1075 | 2356 | 25.02 | 100.0 | 100.0 |
| % RDA | 127 | 254.8 | 145 | 288.9 | 139.4 | 167.9 | 205.1 | 134 | 294 | 250.1 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 063 | | | | | | | | | | | | |
| intake | 2957 | 90.3 | 8082 | 225.5 | 1.59 | 2.25 | 24.29 | 961 | 2345 | 16.77 | 99.2 | 100.0 |
| % RDA | 92 | 161.2 | 162 | 375.8 | 106.1 | 132.5 | 127.8 | 120 | 293 | 167.7 | | |
| 064 | | | | | | | | | | | | |
| intake | 2660 | 116.8 | 5554 | 61.0 | 1.29 | 3.63 | 19.44 | 2110 | 2343 | 10.64 | 95.1 | 98.5 |
| % RDA | 64 | 208.5 | 111 | 101.6 | 86.3 | 213.7 | 102.3 | 264 | 293 | 106.4 | | |
| 065 | | | | | | | | | | | | |
| intake | 4068 | 133.1 | 8517 | 113.8 | 2.15 | 3.16 | 34.38 | 1553 | 2364 | 22.41 | 100.0 | 100.0 |
| % RDA | 130 | 237.6 | 170 | 189.7 | 143.8 | 186.3 | 180.9 | 194 | 295 | 224.1 | | |
| 071 | | | | | | | | | | | | |
| intake | 2418 | 85.1 | 12150 | 180.3 | 1.80 | 2.33 | 25.10 | 922 | 1511 | 19.00 | 94.1 | 97.4 |
| % RDA | 64 | 151.9 | 243 | 300.4 | 129.2 | 137.0 | 139.4 | 77 | 126 | 105.5 | | |
| 075 | | | | | | | | | | | | |
| intake | 5547 | 209.8 | 13462 | 189.8 | 3.16 | 7.59 | 40.35 | 4364 | 4772 | 22.23 | 100.0 | 100.0 |
| % RDA | 140 | 374.6 | 269 | 316.2 | 225.9 | 446.5 | 224.1 | 364 | 398 | 123.5 | | |
| 077 | | | | | | | | | | | | |
| intake | 3828 | 161.8 | 6277 | 119.7 | 1.84 | 4.18 | 34.87 | 2221 | 2987 | 18.18 | 97.3 | 100.0 |
| % RDA | 73 | 289.0 | 126 | 199.4 | 132.0 | 246.2 | 193.7 | 185 | 249 | 101.0 | | |
| 078 | | | | | | | | | | | | |
| intake | 4209 | 158.8 | 9246 | 153.8 | 2.35 | 3.58 | 37.06 | 1785 | 2812 | 22.26 | 100.0 | 100.0 |
| % RDA | 144 | 283.6 | 185 | 256.2 | 168.2 | 211.0 | 205.8 | 149 | 234 | 123.6 | | |
| 079 | | | | | | | | | | | | |
| intake | 4226 | 177.8 | 16095 | 237.0 | 2.70 | 5.50 | 37.05 | 2888 | 3437 | 25.87 | 99.7 | 100.0 |
| % RDA | 97 | 317.4 | 322 | 394.9 | 193.1 | 323.8 | 205.8 | 241 | 286 | 143.7 | | |
| 080 | | | | | | | | | | | | |
| intake | 6317 | 236.1 | 19341 | 452.4 | 4.57 | 6.21 | 65.15 | 2790 | 4506 | 41.47 | 100.0 | 100.0 |
| % RDA | 153 | 421.5 | 387 | 754.0 | 326.5 | 365.5 | 361.9 | 232 | 376 | 230.4 | | |
| 081 | | | | | | | | | | | | |
| intake | 5984 | 187.6 | 17415 | 829.8 | 4.40 | 4.40 | 61.25 | 1657 | 4371 | 42.10 | 99.6 | 100.0 |
| % RDA | 96 | 334.9 | 348 | 1382.9 | 314.2 | 258.8 | 340.3 | 138 | 364 | 233.9 | | |
| 082 | | | | | | | | | | | | |
| intake | 2724 | 120.8 | 7623 | 92.7 | 2.23 | 3.10 | 34.72 | 1105 | 1891 | 21.90 | 97.3 | 100.0 |
| % RDA | 73 | 215.6 | 152 | 154.5 | 148.9 | 182.3 | 182.7 | 138 | 236 | 219.0 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 084 | | | | | | | | | | | | |
| intake | 4593 | 188.2 | 16016 | 271.6 | 3.97 | 7.99 | 49.23 | 3858 | 4444 | 32.22 | 100.0 | 100.0 |
| % RDA | 113 | 336.1 | 320 | 452.6 | 265.1 | 470.0 | 259.1 | 482 | 555 | 322.2 | | |
| 085 | | | | | | | | | | | | |
| intake | 8875 | 443.6 | 28382 | 484.2 | 5.70 | 10.90 | 89.68 | 5345 | 7683 | 55.46 | 100.0 | 100.0 |
| % RDA | 150 | 792.1 | 568 | 806.9 | 380.4 | 641.3 | 472.0 | 668 | 960 | 554.6 | | |
| 086 | | | | | | | | | | | | |
| intake | 2232 | 99.4 | 6940 | 176.9 | 1.75 | 2.46 | 30.38 | 898 | 1685 | 17.71 | 98.1 | 100.0 |
| % RDA | 81 | 177.5 | 139 | 294.8 | 116.8 | 144.6 | 159.9 | 112 | 211 | 177.1 | | |
| 091 | | | | | | | | | | | | |
| intake | 3396 | 149.8 | 6749 | 201.4 | 2.03 | 3.09 | 34.95 | 1443 | 2667 | 20.34 | 97.4 | 100.0 |
| % RDA | 74 | 267.5 | 135 | 335.7 | 135.8 | 182.1 | 183.9 | 180 | 333 | 203.4 | | |
| 092 | | | | | | | | | | | | |
| intake | 4400 | 157.2 | 9819 | 228.6 | 2.86 | 5.11 | 43.78 | 2578 | 3480 | 24.13 | 100.0 | 100.0 |
| % RDA | 117 | 208.8 | 196 | 381.0 | 204.5 | 300.8 | 243.2 | 215 | 290 | 134.0 | | |
| 093 | | | | | | | | | | | | |
| intake | 6926 | 364.5 | 15795 | 214.4 | 4.07 | 7.86 | 64.45 | 3673 | 5483 | 44.54 | 100.0 | 100.0 |
| % RDA | 126 | 650.9 | 316 | 357.4 | 290.8 | 462.3 | 358.0 | 306 | 457 | 247.4 | | |
| 094 | | | | | | | | | | | | |
| intake | 2280 | 94.8 | 6906 | 186.5 | 1.74 | 3.15 | 21.32 | 1658 | 1908 | 13.49 | 94.9 | 97.2 |
| % RDA | 74 | 169.2 | 138 | 310.8 | 124.5 | 185.5 | 118.4 | 138 | 159 | 74.9 | | |
| 095 | | | | | | | | | | | | |
| intake | 2930 | 114.7 | 7692 | 133.4 | 1.53 | 2.65 | 24.97 | 1413 | 2131 | 15.76 | 95.4 | 100.0 |
| % RDA | 54 | 204.8 | 154 | 222.3 | 102.4 | 156.1 | 131.4 | 177 | 266 | 157.6 | | |
| 096 | | | | | | | | | | | | |
| intake | 4983 | 173.5 | 10818 | 176.9 | 3.02 | 6.10 | 44.19 | 3367 | 3858 | 25.29 | 100.0 | 100.0 |
| % RDA | 164 | 310.0 | 216 | 294.8 | 201.5 | 358.9 | 232.6 | 421 | 482 | 252.9 | | |
| 098 | | | | | | | | | | | | |
| intake | 3040 | 173.4 | 12035 | 126.8 | 2.82 | 4.14 | 46.42 | 1583 | 2699 | 27.94 | 99.5 | 100.0 |
| % RDA | 95 | 309.6 | 241 | 211.3 | 201.7 | 243.8 | 257.9 | 132 | 225 | 155.2 | | |
| 102 | | | | | | | | | | | | |
| intake | 5918 | 315.5 | 10023 | 142.7 | 3.05 | 4.92 | 66.92 | 1678 | 4132 | 48.63 | 99.9 | 100.0 |
| % RDA | 99 | 563.3 | 200 | 237.8 | 217.9 | 289.4 | 371.7 | 140 | 344 | 270.1 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 106 | | | | | | | | | | | | |
| intake | 5104 | 168.7 | 8400 | 176.3 | 1.86 | 5.33 | 43.65 | 2832 | 4225 | 17.26 | 100.0 | 100.0 |
| % RDA | 133 | 301.2 | 168 | 293.8 | 124.3 | 313.8 | 229.7 | 354 | 528 | 172.6 | | |
| 107 | | | | | | | | | | | | |
| intake | 1813 | 70.2 | 6790 | 239.5 | 1.27 | 1.73 | 16.85 | 846 | 1334 | 12.16 | 86.6 | 91.4 |
| % RDA | 43 | 125.3 | 136 | 399.1 | 91.0 | 101.8 | 93.6 | 70 | 111 | 67.5 | | |
| 110 | | | | | | | | | | | | |
| intake | 3861 | 104.3 | 15969 | 415.1 | 2.51 | 3.66 | 31.79 | 1610 | 2869 | 21.33 | 98.0 | 100.0 |
| % RDA | 80 | 186.2 | 319 | 691.7 | 167.7 | 215.6 | 167.3 | 201 | 359 | 213.3 | | |
| 113 | | | | | | | | | | | | |
| intake | 3697 | 130.8 | 9520 | 326.8 | 2.91 | 2.98 | 41.42 | 1040 | 2049 | 25.91 | 100.0 | 100.0 |
| % RDA | 126 | 233.5 | 170 | 544.6 | 194.4 | 175.7 | 218.0 | 130 | 256 | 259.1 | | |
| 114 | | | | | | | | | | | | |
| intake | 3631 | 125.8 | 8614 | 191.0 | 2.12 | 2.70 | 32.57 | 1159 | 2290 | 20.55 | 98.5 | 99.6 |
| % RDA | 89 | 224.6 | 172 | 318.4 | 151.5 | 158.7 | 180.9 | 96 | 191 | 114.1 | | |
| 121 | | | | | | | | | | | | |
| intake | 2975 | 120.8 | 7234 | 145.6 | 1.83 | 3.70 | 25.09 | 2050 | 2396 | 15.44 | 95.6 | 98.4 |
| % RDA | 70 | 215.8 | 145 | 242.6 | 130.9 | 217.8 | 193.3 | 171 | 200 | 85.8 | | |
| 122 | | | | | | | | | | | | |
| intake | 1722 | 68.8 | 4180 | 144.2 | 1.14 | 1.92 | 13.08 | 1060 | 1276 | 8.48 | 86.5 | 90.4 |
| % RDA | 52 | 122.8 | 84 | 240.2 | 76.2 | 113.4 | 68.8 | 132 | 160 | 84.8 | | |
| 129 | | | | | | | | | | | | |
| intake | 2975 | 89.2 | 5807 | 158.1 | 1.43 | 2.12 | 29.51 | 711 | 1834 | 15.58 | 98.3 | 98.3 |
| % RDA | 99 | 159.2 | 116 | 263.4 | 95.5 | 125.1 | 155.3 | 89 | 229 | 155.8 | | |
| 138 | | | | | | | | | | | | |
| intake | 1890 | 89.8 | 3215 | 74.0 | 1.04 | 1.65 | 19.36 | 773 | 1378 | 12.32 | 89.0 | 92.0 |
| % RDA | 63 | 160.3 | 64 | 123.3 | 69.7 | 97.2 | 101.9 | 96 | 172 | 123.2 | | |
| 139 | | | | | | | | | | | | |
| intake | 3442 | 142.5 | 12040 | 233.2 | 2.30 | 3.85 | 29.95 | 1921 | 2483 | 20.84 | 100.0 | 100.0 |
| % RDA | 132 | 254.5 | 241 | 388.5 | 153.4 | 226.6 | 157.6 | 240 | 310 | 208.4 | | |
| 140 | | | | | | | | | | | | |
| intake | 4783 | 182.3 | 11251 | 314.5 | 3.01 | 3.90 | 43.37 | 1686 | 2952 | 28.75 | 98.4 | 100.0 |
| % RDA | 84 | 325.5 | 255 | 524.1 | 200.6 | 229.3 | 228.2 | 211 | 369 | 287.5 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 141 | | | | | | | | | | | | |
| intake | 3882 | 106.9 | 7565 | 336.8 | 1.53 | 3.11 | 24.01 | 1595 | 3362 | 14.64 | 99.1 | 100.0 |
| % RDA | 91 | 190.8 | 151 | 561.3 | 102.3 | 183.1 | 126.3 | 199 | 420 | 146.4 | | |
| 143 | | | | | | | | | | | | |
| intake | 5462 | 193.5 | 12967 | 285.9 | 3.96 | 5.87 | 55.44 | 2821 | 4162 | 35.71 | 100.0 | 100.0 |
| % RDA | 136 | 345.5 | 259 | 476.4 | 282.8 | 345.5 | 308.0 | 235 | 347 | 198.4 | | |
| 153 | | | | | | | | | | | | |
| intake | 7652 | 336.9 | 20151 | 184.7 | 5.51 | 12.20 | 63.90 | 7326 | 7787 | 38.57 | 100.0 | 100.0 |
| % RDA | 157 | 601.6 | 403 | 307.8 | 367.9 | 717.7 | 336.3 | 916 | 973 | 385.6 | | |
| 154 | | | | | | | | | | | | |
| intake | 3446 | 129.4 | 8277 | 432.4 | 3.82 | 4.21 | 37.23 | 1560 | 2317 | 22.80 | 98.5 | 100.0 |
| % RDA | 85 | 231.1 | 165 | 720.7 | 254.7 | 247.7 | 195.9 | 195 | 290 | 228.0 | | |
| 155 | | | | | | | | | | | | |
| intake | 3234 | 117.8 | 6784 | 213.2 | 1.93 | 3.09 | 25.50 | 1544 | 2840 | 17.28 | 97.8 | 99.6 |
| % RDA | 82 | 210.3 | 136 | 355.3 | 137.8 | 181.7 | 141.6 | 129 | 237 | 96.0 | | |
| 161 | | | | | | | | | | | | |
| intake | 2963 | 114.6 | 7457 | 136.4 | 2.27 | 3.14 | 28.83 | 1469 | 2043 | 19.47 | 99.0 | 100.0 |
| % RDA | 90 | 204.7 | 149 | 227.2 | 151.5 | 185.0 | 151.7 | 184 | 255 | 194.7 | | |
| 162 | | | | | | | | | | | | |
| intake | 4193 | 181.8 | 9016 | 210.2 | 2.39 | 6.11 | 30.90 | 3651 | 3946 | 18.95 | 100.0 | 100.0 |
| % RDA | 102 | 324.5 | 180 | 350.3 | 170.7 | 359.5 | 171.7 | 304 | 329 | 105.2 | | |
| 163 | | | | | | | | | | | | |
| intake | 3464 | 147.3 | 7497 | 120.8 | 2.58 | 4.23 | 38.65 | 1726 | 2544 | 23.41 | 96.2 | 100.0 |
| % RDA | 62 | 263.0 | 150 | 201.3 | 172.2 | 248.9 | 203.4 | 216 | 318 | 234.1 | | |
| 164 | | | | | | | | | | | | |
| intake | 3506 | 156.2 | 9454 | 228.0 | 2.27 | 4.22 | 29.78 | 2350 | 2922 | 20.90 | 98.6 | 100.0 |
| % RDA | 86 | 279.5 | 189 | 279.9 | 151.8 | 248.7 | 156.7 | 294 | 365 | 209.0 | | |
| 165 | | | | | | | | | | | | |
| intake | 1980 | 91.0 | 6736 | 179.3 | 1.62 | 2.87 | 22.48 | 1508 | 1822 | 13.48 | 95.6 | 100.0 |
| % RDA | 56 | 162.5 | 135 | 298.7 | 108.5 | 169.0 | 118.3 | 188 | 228 | 134.8 | | |
| 166 | | | | | | | | | | | | |
| intake | 4489 | 189.6 | 10640 | 160.5 | 2.56 | 4.54 | 40.07 | 2200 | 3239 | 28.23 | 100.0 | 100.0 |
| % RDA | 128 | 338.6 | 213 | 267.4 | 171.0 | 267.0 | 210.8 | 275 | 405 | 282.3 | | |

Table 17. Individual dietary intakes, percentagea of the 1980 RDAa*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 172 | | | | | | | | | | | | |
| intake | 3341 | 158.3 | 12028 | 163.9 | 2.11 | 4.44 | 25.13 | 2636 | 3219 | 19.30 | 95.4 | 100.0 |
| % RDA | 54 | 282.7 | 240 | 273.2 | 141.1 | 261.6 | 132.2 | 329 | 402 | 193.0 | | |
| 173 | | | | | | | | | | | | |
| intake | 4186 | 162.1 | 8444 | 126.1 | 2.47 | 3.81 | 30.48 | 2065 | 2769 | 22.81 | 100.0 | 100.0 |
| % RDA | 110 | 289.4 | 169 | 210.1 | 164.9 | 224.1 | 160.4 | 258 | 346 | 228.1 | | |
| 175 | | | | | | | | | | | | |
| intake | 3911 | 167.0 | 7602 | 281.9 | 2.35 | 3.29 | 41.88 | 1445 | 3063 | 24.44 | 97.9 | 100.0 |
| % RDA | 79 | 298.2 | 152 | 469.8 | 168.0 | 193.7 | 232.6 | 120 | 255 | 135.7 | | |
| 176 | | | | | | | | | | | | |
| intake | 3199 | 131.8 | 8164 | 299.5 | 2.43 | 4.17 | 32.86 | 1792 | 2473 | 21.88 | 96.1 | 100.0 |
| % RDA | 61 | 235.3 | 163 | 499.2 | 174.0 | 245.3 | 182.5 | 149 | 206 | 121.5 | | |
| 181 | | | | | | | | | | | | |
| intake | 4794 | 194.4 | 9430 | 224.8 | 2.94 | 5.40 | 42.80 | 2821 | 3981 | 25.07 | 100.0 | 100.0 |
| % RDA | 125 | 347.1 | 189 | 374.6 | 196.1 | 317.5 | 225.2 | 353 | 498 | 250.7 | | |
| 183 | | | | | | | | | | | | |
| intake | 3122 | 125.7 | 14274 | 242.2 | 2.62 | 2.71 | 38.10 | 927 | 1992 | 25.78 | 99.1 | 100.0 |
| % RDA | 91 | 224.5 | 285 | 403.6 | 175.2 | 159.5 | 200.5 | 116 | 249 | 257.8 | | |
| 185 | | | | | | | | | | | | |
| intake | 2578 | 83.0 | 7657 | 138.4 | 2.03 | 2.69 | 29.51 | 891 | 1460 | 20.21 | 92.7 | 97.1 |
| % RDA | 52 | 148.1 | 153 | 230.7 | 144.9 | 158.5 | 163.9 | 74 | 122 | 112.2 | | |
| 188 | | | | | | | | | | | | |
| intake | 4019 | 168.9 | 6670 | 270.0 | 2.48 | 3.70 | 36.67 | 1867 | 2824 | 24.27 | 100.0 | 100.0 |
| % RDA | 102 | 301.6 | 133 | 449.9 | 177.4 | 217.9 | 203.7 | 156 | 235 | 134.8 | | |
| 189 | | | | | | | | | | | | |
| intake | 2638 | 120.7 | 14861 | 196.7 | 1.72 | 4.12 | 23.10 | 2400 | 2684 | 12.79 | 93.2 | 96.8 |
| % RDA | 61 | 215.5 | 297 | 327.7 | 122.8 | 242.6 | 128.2 | 200 | 224 | 71.0 | | |
| 193 | | | | | | | | | | | | |
| intake | 5182 | 166.2 | 7526 | 270.2 | 2.69 | 3.04 | 43.60 | 1419 | 3105 | 27.85 | 100.0 | 100.0 |
| % RDA | 186 | 296.8 | 150 | 450.3 | 179.4 | 179.2 | 229.5 | 177 | 388 | 278.4 | | |
| 194 | | | | | | | | | | | | |
| intake | 2081 | 71.2 | 4451 | 88.6 | 1.19 | 1.64 | 17.18 | 736 | 1399 | 11.53 | 94.5 | 95.1 |
| % RDA | 89 | 161.8 | 111 | 147.7 | 108.4 | 126.1 | 122.7 | 92 | 175 | 64.0 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 204 | | | | | | | | | | | | |
| intake | 2877 | 126.9 | 8512 | 213.8 | 2.20 | 3.61 | 26.76 | 1546 | 2091 | 17.53 | 96.8 | 100.0 |
| % RDA | 68 | 226.6 | 170 | 356.2 | 147.2 | 212.4 | 140.8 | 193 | 261 | 175.3 | | |
| 205 | | | | | | | | | | | | |
| intake | 3542 | 139.0 | 7219 | 172.8 | 2.02 | 3.77 | 29.64 | 1874 | 2523 | 20.96 | 98.1 | 100.0 |
| % RDA | 81 | 248.2 | 144 | 287.9 | 134.9 | 222.0 | 156.0 | 234 | 315 | 209.6 | | |
| 306 | | | | | | | | | | | | |
| intake | 2216 | 114.2 | 6858 | 98.6 | 1.61 | 3.50 | 29.92 | 1906 | 2319 | 12.89 | 81.0 | 83.9 |
| % RDA | 55 | 150.2 | 62 | 98.5 | 84.8 | 159.3 | 90.9 | 119 | 145 | 18.9 | | |
| 311 | | | | | | | | | | | | |
| intake | 5404 | 181.6 | 21307 | 491.8 | 4.23 | 6.25 | 48.10 | 2961 | 4068 | 34.05 | 100.0 | 100.0 |
| % RDA | 118 | 324.2 | 426 | 819.7 | 302.7 | 367.9 | 267.2 | 247 | 339 | 189.1 | | |
| 313 | | | | | | | | | | | | |
| intake | 2415 | 83.2 | 6134 | 147.6 | 1.96 | 2.53 | 24.92 | 1002 | 1569 | 18.99 | 97.8 | 100.0 |
| % RDA | 78 | 148.5 | 123 | 246.0 | 131.0 | 149.1 | 131.1 | 125 | 196 | 189.9 | | |
| 316 | | | | | | | | | | | | |
| intake | 4284 | 154.2 | 7929 | 180.6 | 2.90 | 3.51 | 41.68 | 1511 | 2662 | 28.07 | 100.0 | 100.0 |
| % RDA | 107 | 275.3 | 158 | 301.0 | 207.3 | 206.6 | 231.5 | 126 | 222 | 155.9 | | |
| 317 | | | | | | | | | | | | |
| intake | 1568 | 58.3 | 6890 | 76.0 | 0.84 | 1.43 | 15.26 | 696 | 1070 | 8.62 | 83.2 | 88.2 |
| % RDA | 38 | 104.1 | 138 | 126.7 | 55.9 | 84.4 | 80.3 | 87 | 134 | 86.2 | | |
| 318 | | | | | | | | | | | | |
| intake | 2210 | 81.3 | 5682 | 108.9 | 1.35 | 1.91 | 26.79 | 901 | 1508 | 15.28 | 96.1 | 98.9 |
| % RDA | 71 | 145.1 | 114 | 181.4 | 90.0 | 112.7 | 141.0 | 113 | 188 | 152.8 | | |
| 320 | | | | | | | | | | | | |
| intake | 2651 | 89.8 | 7229 | 254.0 | 2.63 | 3.89 | 30.33 | 1599 | 2018 | 18.11 | 96.8 | 100.0 |
| % RDA | 68 | 160.3 | 144 | 423.4 | 188.2 | 229.0 | 168.5 | 133 | 169 | 100.6 | | |
| 328 | | | | | | | | | | | | |
| intake | 3153 | 98.0 | 5762 | 236.2 | 2.10 | 2.27 | 29.45 | 786 | 1985 | 20.52 | 93.7 | 96.2 |
| % RDA | 72 | 175.0 | 115 | 393.7 | 150.1 | 133.5 | 163.6 | 65 | 165 | 114.0 | | |
| 330 | | | | | | | | | | | | |
| intake | 2417 | 75.0 | 11333 | 216.5 | 1.30 | 2.09 | 25.22 | 753 | 1593 | 14.37 | 92.2 | 97.9 |
| % RDA | 41 | 133.9 | 227 | 360.8 | 87.0 | 123.2 | 132.7 | 94 | 199 | 143.7 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 333 | | | | | | | | | | | | |
| intake | 2353 | 129.1 | 16115 | 273.3 | 2.51 | 1.97 | 32.69 | 592 | 1597 | 27.31 | 91.5 | 97.1 |
| % RDA | 41 | 230.4 | 322 | 455.5 | 167.4 | 116.1 | 172.0 | 74 | 200 | 273.1 | | |
| 335 | | | | | | | | | | | | |
| intake | 4627 | 153.5 | 8465 | 199.9 | 2.76 | 4.06 | 47.39 | 1647 | 2948 | 27.27 | 99.5 | 100.0 |
| % RDA | 95 | 274.1 | 169 | 333.1 | 197.7 | 239.0 | 263.2 | 137 | 246 | 151.5 | | |
| 339 | | | | | | | | | | | | |
| intake | 2203 | 80.7 | 4972 | 91.9 | 1.41 | 2.46 | 19.47 | 1318 | 1596 | 13.04 | 94.5 | 99.3 |
| % RDA | 51 | 144.1 | 99 | 153.2 | 94.5 | 144.9 | 102.4 | 165 | 200 | 130.4 | | |
| 340 | | | | | | | | | | | | |
| intake | 3732 | 142.6 | 10227 | 215.9 | 2.65 | 3.99 | 34.98 | 1880 | 2484 | 22.30 | 100.0 | 100.0 |
| % RDA | 118 | 254.6 | 204 | 359.9 | 189.9 | 234.6 | 194.3 | 157 | 207 | 123.9 | | |
| 342 | | | | | | | | | | | | |
| intake | 3377 | 131.7 | 7401 | 210.6 | 2.01 | 3.77 | 29.77 | 2103 | 2621 | 18.03 | 100.0 | 100.0 |
| % RDA | 101 | 235.2 | 148 | 351.0 | 143.8 | 221.7 | 165.4 | 175 | 218 | 100.1 | | |
| 345 | | | | | | | | | | | | |
| intake | 3457 | 139.2 | 8505 | 128.1 | 2.07 | 3.52 | 35.01 | 1681 | 2439 | 20.59 | 100.0 | 100.0 |
| % RDA | 120 | 248.5 | 170 | 213.5 | 138.3 | 207.5 | 184.2 | 210 | 305 | 205.9 | | |
| 348 | | | | | | | | | | | | |
| intake | 3549 | 154.1 | 7594 | 154.5 | 2.61 | 4.84 | 31.44 | 2566 | 2919 | 20.22 | 99.1 | 100.0 |
| % RDA | 91 | 275.1 | 152 | 257.4 | 173.9 | 285.2 | 165.4 | 321 | 365 | 202.1 | | |
| 356 | | | | | | | | | | | | |
| intake | 4832 | 169.5 | 12932 | 332.4 | 3.70 | 4.29 | 51.96 | 1640 | 3003 | 33.03 | 98.3 | 100.0 |
| % RDA | 83 | 302.6 | 259 | 554.0 | 264.3 | 252.5 | 288.6 | 137 | 250 | 183.4 | | |
| 357 | | | | | | | | | | | | |
| intake | 2016 | 80.9 | 4882 | 139.2 | 1.25 | 1.94 | 19.92 | 890 | 1374 | 12.68 | 87.4 | 92.4 |
| % RDA | 43 | 144.4 | 98 | 231.9 | 89.2 | 114.5 | 110.7 | 74 | 114 | 70.4 | | |
| 387 | | | | | | | | | | | | |
| intake | 4364 | 195.6 | 9093 | 128.7 | 2.34 | 3.22 | 46.66 | 1381 | 2895 | 27.53 | 96.9 | 100.0 |
| % RDA | 69 | 349.3 | 182 | 214.4 | 156.0 | 189.7 | 245.6 | 172 | 362 | 275.3 | | |
| 388 | | | | | | | | | | | | |
| intake | 3226 | 105.0 | 6975 | 107.3 | 1.88 | 1.78 | 26.95 | 906 | 1733 | 19.04 | 100.0 | 100.0 |
| % RDA | 120 | 187.4 | 140 | 178.8 | 125.4 | 104.6 | 141.8 | 113 | 217 | 190.3 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 389 | | | | | | | | | | | | |
| intake | 915 | 47.5 | 1295 | 15.52 | 0.39 | 0.69 | 9.86 | 325 | 609 | 6.90 | 45.9 | 49.0 |
| % RDA | 19 | 84.8 | 26 | 25.8 | 26.1 | 40.5 | 51.9 | 41 | 76 | 69.0 | | |
| 390 | | | | | | | | | | | | |
| intake | 2683 | 112.4 | 7140 | 154.7 | 2.00 | 2.52 | 28.03 | 1127 | 1964 | 18.61 | 98.7 | 99.3 |
| % RDA | 93 | 200.6 | 143 | 257.7 | 143.4 | 148.7 | 155.7 | 94 | 164 | 103.4 | | |
| 392 | | | | | | | | | | | | |
| intake | 2608 | 112.2 | 8895 | 115.4 | 2.22 | 3.76 | 31.03 | 1776 | 2279 | 19.27 | 95.5 | 100.0 |
| % RDA | 55 | 200.4 | 178 | 192.2 | 158.8 | 221.3 | 172.3 | 148 | 198 | 107.0 | | |
| 393 | | | | | | | | | | | | |
| intake | 3598 | 188.0 | 8511 | 202.2 | 2.34 | 4.35 | 41.27 | 1750 | 2708 | 28.04 | 100.0 | 100.0 |
| % RDA | 142 | 335.6 | 170 | 336.9 | 167.6 | 256.3 | 229.3 | 146 | 226 | 155.7 | | |
| 394 | | | | | | | | | | | | |
| intake | 1212 | 51.4 | 2554 | 18.90 | 0.62 | 1.49 | 12.50 | 711 | 993 | 6.63 | 67.1 | 69.4 |
| % RDA | 47 | 91.7 | 51 | 31.4 | 41.4 | 87.9 | 65.8 | 89 | 124 | 66.3 | | |
| 397 | | | | | | | | | | | | |
| intake | 4115 | 147.8 | 9438 | 181.6 | 2.47 | 3.92 | 36.52 | 1851 | 2844 | 22.35 | 100.0 | 100.0 |
| % RDA | 106 | 263.8 | 189 | 302.6 | 164.7 | 230.5 | 192.2 | 231 | 356 | 223.5 | | |
| 399 | | | | | | | | | | | | |
| intake | 3100 | 108.9 | 5884 | 114.0 | 1.65 | 2.61 | 31.10 | 1161 | 2090 | 16.60 | 97.6 | 100.0 |
| % RDA | 76 | 194.4 | 118 | 190.0 | 110.4 | 153.5 | 163.7 | 145 | 261 | 166.0 | | |
| 402 | | | | | | | | | | | | |
| intake | 2275 | 95.4 | 4994 | 63.5 | 1.59 | 2.01 | 25.85 | 754 | 1441 | 15.10 | 88.9 | 94.1 |
| % RDA | 42 | 170.4 | 100 | 105.8 | 113.7 | 118.7 | 143.6 | 63 | 120 | 83.9 | | |
| 403 | | | | | | | | | | | | |
| intake | 3504 | 137.1 | 7722 | 203.8 | 2.29 | 3.65 | 31.89 | 1896 | 2609 | 19.12 | 99.5 | 100.0 |
| % RDA | 95 | 244.7 | 154 | 339.5 | 152.7 | 215.1 | 167.8 | 237 | 326 | 191.2 | | |
| 404 | | | | | | | | | | | | |
| intake | 2090 | 104.1 | 5710 | 69.1 | 1.39 | 2.53 | 20.97 | 1223 | 1747 | 12.71 | 98.0 | 99.2 |
| % RDA | 87 | 185.9 | 114 | 115.1 | 93.0 | 149.1 | 110.3 | 153 | 218 | 127.1 | | |
| 405 | | | | | | | | | | | | |
| intske | 3243 | 103.4 | 12215 | 368.6 | 1.99 | 2.05 | 29.37 | 829 | 1990 | 21.61 | 95.6 | 100.0 |
| % RDA | 56 | 184.6 | 244 | 614.2 | 132.6 | 121.0 | 154.5 | 104 | 249 | 216.1 | | |

Table 17. Individual dietary intakes, percentages of the 1980 RDAs*, and MARs† (including and excluding energy) for university men (N = 132) from food frequency data (cont)

| ID number | energy | protein | vit A | ascorbic acid | thiamin | riboflavin | niacin | calcium | phosphorus | iron | MAR (energy) | MAR (without energy) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kcal | gm | I.U. | mg | mg | mg | N.E. | mg | mg | mg | | |
| 406 | | | | | | | | | | | | |
| intake | 5751 | 261.8 | 18868 | 376.5 | 3.54 | 9.29 | 45.15 | 5560 | 5662 | 30.44 | 100.0 | 100.0 |
| % RDA | 110 | 467.5 | 377 | 627.5 | 252.8 | 546.8 | 250.8 | 463 | 472 | 169.1 | | |
| 407 | | | | | | | | | | | | |
| intake | 1910 | 70.7 | 4962 | 76.1 | 1.28 | 1.74 | 18.30 | 723 | 1207 | 12.45 | 88.5 | 91.1 |
| % RDA | 65 | 126.2 | 99 | 126.8 | 91.3 | 102.3 | 101.6 | 60 | 100 | 69.2 | | |
| 411 | | | | | | | | | | | | |
| intake | 3352 | 147.5 | 13135 | 409.5 | 2.52 | 2.18 | 41.44 | 716 | 2433 | 26.67 | 99.0 | 98.8 |
| % RDA | 135 | 263.3 | 263 | 682.5 | 168.3 | 128.2 | 218.1 | 90 | 304 | 266.7 | | |
| 412 | | | | | | | | | | | | |
| intake | 3733 | 177.6 | 20297 | 269.1 | 2.58 | 3.84 | 39.82 | 1684 | 2906 | 26.98 | 100.0 | 100.0 |
| % RDA | 106 | 371.2 | 406 | 448.4 | 184.7 | 226.2 | 221.2 | 140 | 242 | 149.8 | | |
| 414 | | | | | | | | | | | | |
| intake | 1806 | 79.1 | 3403 | 67.55 | 0.96 | 1.75 | 16.69 | 857 | 1305 | 10.37 | 80.2 | 84.3 |
| % RDA | 43 | 141.2 | 68 | 112.5 | 68.6 | 103.2 | 92.7 | 71 | 109 | 57.6 | | |
| 416 | | | | | | | | | | | | |
| intake | 2969 | 109.1 | 18932 | 236.8 | 1.80 | 3.70 | 24.06 | 2237 | 2358 | 18.16 | 95.8 | 100.0 |
| % RDA | 58 | 194.8 | 379 | 394.7 | 120.0 | 217.9 | 126.6 | 280 | 295 | 181.6 | | |
| 418 | | | | | | | | | | | | |
| intake | 2030 | 92.2 | 5680 | 74.6 | 1.03 | 1.65 | 21.80 | 607 | 1276 | 13.93 | 85.2 | 88.8 |
| % RDA | 53 | 164.6 | 114 | 124.2 | 73.5 | 97.5 | 121.1 | 51 | 106 | 77.4 | | |
| 419 | | | | | | | | | | | | |
| intake | 3360 | 111.5 | 9376 | 169.3 | 1.97 | 3.92 | 25.10 | 2204 | 2730 | 16.97 | 93.9 | 99.4 |
| % RDA | 44 | 199.0 | 188 | 282.1 | 141.1 | 230.6 | 139.4 | 184 | 227 | 94.3 | | |
| 421 | | | | | | | | | | | | |
| intake | 3612 | 140.4 | 15182 | 129.7 | 2.71 | 4.66 | 39.91 | 1807 | 2627 | 25.16 | 99.9 | 100.0 |
| % RDA | 99 | 250.7 | 304 | 216.2 | 194.0 | 274.3 | 221.7 | 150 | 219 | 139.8 | | |
| 423 | | | | | | | | | | | | |
| intake | 4739 | 202.8 | 11185 | 297.6 | 3.20 | 4.56 | 54.48 | 1576 | 2992 | 37.28 | 99.6 | 100.0 |
| % RDA | 96 | 362.1 | 224 | 495.9 | 213.4 | 268.1 | 286.7 | 197 | 374 | 372.8 | | |
| 424 | | | | | | | | | | | | |
| intake | 3411 | 114.1 | 11150 | 143.4 | 2.43 | 3.32 | 34.30 | 1231 | 2142 | 25.11 | 97.3 | 100.0 |
| % RDA | 73 | 203.8 | 223 | 239.0 | 162.2 | 195.4 | 180.5 | 154 | 268 | 251.1 | | |

*Food and Nutrition Board: Recommended Dietary Allowances. 9th rev. ed., National Academy of Sciences, Washington, D.C., 1980.

†Mean Adequacy Ratios were calculated by averaging individual % RDAs for the tabled nutrients, including and excluding energy, with values >100 truncated.

# STRESSFUL LIFE EVENTS AS A FACTOR IN THE DIETARY QUALITY OF UNIVERSITY STUDENTS

by

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B.S., Kansas State University, 1983

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ABSTRACT

Psychosocial epidemiologists have conceptualized stress as the need to adapt to stressful life events (SLEs). Researchers have observed that university students experience exposure to potential stressors, one of which may be a change in eating habits. The physiological stress response is contingent on conditioning factors, which may include nutritional status. The stress-illness relationship is attracting the attention of researchers. Because stress has been found to influence appetite and eating behaviors, and because stress and dietary quality have been found to be associated independently with various disease processes, the relationships between stress levels and the dietary quality of university students were investigated.

The College Schedule of Recent Experience (CSRE) instrument was used to investigate the number of SLEs experienced by 75 female and 132 male university students. A quantifiable food frequency questionnaire was administered to assess their dietary intakes, meal patterns, and activity levels. Dietary data were analyzed for energy and nine nutrients and expressed as percentages of the Recommended Dietary Allowances (RDAs). Mean Adequacy Ratios (MARs), with and without energy, were calculated to assess dietary quality. Sex differences and relationships among all variables were analyzed statistically.

Total stress scores on the CSRE for the women and men did not differ significantly, although the women indicated a greater frequency response to change in eating habits. Males reportedly

spent more time in non-sedentary activity than females. All meals were omitted more frequently by the women than by the men. Average energy intakes for both sexes and iron intakes for females were less than their RDAs. More women than men had MAR values less than 80%.

The men's meal-skipping patterns were correlated positively with their frequency responses to change in eating habits and negatively with their MARs. Total stress scores for women were correlated positively to their intakes of energy, ascorbic acid, sodium, saturated fat, cholesterol, and alcoholic beverages, as well as to their MARs with energy. For both sexes total stress scores were correlated positively with their vitamin A and iron intakes. Stepwise regression analyses indicated that CSRE variables predicted women's MAR values with approximately twice the predictive ability as compared to men's MARs.