

Citation:

Byrd-Bredbenner C, Abbot JM, Wheatley V, Schaffner D, Bruhn C, Blalock L. Risky eating behaviors of young adults—implications for food safety education. *J Am Diet Assoc*. Mar 2008; 108(3): 549-552.

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Study Design:

Cross-sectional study

Class:

D - [Click here](#) for explanation of classification scheme.

Research Design and Implementation Rating:

NEUTRAL: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

To assess risky eating behaviors among young adults enrolled in higher education.

Inclusion Criteria:

All students that were part of a College or University in the US who had:

- A program approved by the American Dietetic Association and the American Psychological Association
- A college or school of human ecology
- Professors subscribed to electronic mailing list in the subjects of psychology, nutrition or biology.

Exclusion Criteria:

Subjects were excluded if there were:

- Non-students
- Were not part of a US university or college
- Were older than 26 years.

Description of Study Protocol:**Recruitment**

- Invitations were sent to various colleges across the US via e-mail to recruit students in their introductory courses to complete an online food safety survey

- Recruitment was also performed by professors willing to ask their students to participate in the online survey.

Design

Cross-sectional correlational study design.

Statistical Analysis

- Statistical Program for the social sciences (version 14.0, 2006, SPSS Inc, Chicago, IL)
- Measures of central tendency and dispersion were conducted to describe the study participants and mean risky eating score
- Spearman's coefficient for nonparametric correlations was calculated to determine relationships among risky eating score, self-efficacy and stage of change because these measures were not normally distributed
- Stage of change scores were limited to integer values between one and five, thus analysis of variance was used to test for a linear trend with risky eating score scores
- Backward stepwise regression with exclusion criterion set at F less than 25 was used to identify demographic characteristics and scores that were associated with risky eating behavior. This high F-value was chosen because of the large size of the survey sample and to focus on the strongest predictors of risky eating score.

Data Collection Summary:

Timing of Measurements

The survey was administered between January and October, 2005.

Measured Variables

- Consumption of risky foods and behavior towards their preparation (six safe foods, 20 risky foods and seven risky behaviors). Scale zero to 27
- Safe food-handling self-efficacy (24 items, one to five scale)
- Personal belief on food poisoning as a threat (one to five scale)
- Individual behavioral stage of change related to food safety (one to five scale)
- Food safety knowledge (zero to 89)
- Basic demographics: age, gender, race or ethnicity, college education status, major
- Prior and type of exposure to food safety information
- Number of meals prepared weekly (zero to 10 or greater than 10)
- Prior illness related to food poisoning
- Completion of food safety certification courses
- Completion of college level courses in nutrition, microbiology or food science (number of courses).

Description of Actual Data Sample:

- *Initial N*: 4,343 (female: 65%, male: 35%)
- *Attrition (final N)*: None reported
- *Mean age*: 19.92±1.67 years
- *Ethnicity*: Data collected, but not reported
- *Other relevant demographics*: None reported
- *Location*:
 - Data collected from 21 colleges and universities located in 17 states
 - Data analysis performed at Rutgers University, New Brunswick, NJ 08901.

Summary of Results:

Key Findings:

- Mean risky eating score (5.1±3.6) indicated that young adults consumed risky foods.
- Male respondents consumed more risky foods compared with female respondents, respectively ($p < 0.0001$).
- White participants engaged in significantly more risky eating behaviors than nonwhite participants ($P < 0.001$).
- Students had strong feelings of food safety self-efficacy (4.1±0.6), were between the contemplation and preparation stage-of-change (2.7±1.2), believed food poisoning was somewhat of a threat (3.1±0.8) and had modest food safety knowledge.
- As stage of change (movement to higher stages) and self-efficacy increased, risky eating score decreased; those who believed food poisoning was a personal threat tended to eat fewer risky foods.
- Regression models indicated that the strongest predictor of risky eating was self-efficacy score followed by stage of change. These variables, together with sex and race, explained about 10% of the variance in risky eating score.
- Although food safety knowledge correlated weakly with risky eating score, it did not significantly predict it.
- Young adults in this study had strong feelings of self-efficacy, were between the contemplation and preparation stage, were somewhat positive that food poisoning was a personal threat, and had modest knowledge levels.
- The college students surveyed reported consuming some "risky foods" including:
 - homemade raw cookie dough containing raw eggs (53%);
 - fried eggs with runny or soft yolks (33%);
 - sushi (29%);
 - raw sprouts (29%),
 - raw oysters, clams, or mussels (11%); and
 - hamburgers cooked rare (7%).

Author Conclusion:

- Despite the importance of food safety, young adults, particularly white men, engage in risky eating behaviors
- Current safe food-handling practices, food safety self-efficacy and stage of change all help explain risk for engaging in risky eating practices
- The high self-efficacy and belief that food poisoning is a personal risk reported by this population suggests that they are willing to take the issue of food safety seriously; however, being between the contemplation and preparation stage of change and having modest food safety knowledge highlights a need to provide not only general food safety education, but encouragement and skill development to translate this education into behavior.

Reviewer Comments:

Authors mentioned that they asked interested professors to recruit students in their general education courses—perhaps could have been enough grounds to raise potential conflict of interest. But, the authors reported they have filed an application to their respective IRB office and have an approved protocol by the time they performed the survey.

- *Stepwise regression was used but no R2 and its significance representing the fitness of the model was reported*
- *Participant ethnicity was mentioned to be part of the demographic items but it was not reported. Risky food behavior is a relative term related to the type of foods consumed and the individual's culture.*

Related to the Quality Rating Checklist

- *4.1 There was no method of handling withdrawals. Was there an item within the online survey that allowed subjects that signed the consent form to stop at any time and, if so, what was that response rate?*
- *4.2 In the same line as before, there is no description of those who started, but not finished the survey*
- *7.6 Related to the ethnicity, no report on the actual classification of the surveyed races or ethnicities in this survey. Unclear if these were measured: Marital status, number of children living with you. Although the number of these individuals in college is reduced, this information was not reported*
- *8.7 Power calculations for non-significant effects or type 2, if conducted, were not reported.*

Research Design and Implementation Criteria Checklist: Primary Research

Relevance Questions

1.	Would implementing the studied intervention or procedure (if found successful) result in improved outcomes for the patients/clients/population group? (Not Applicable for some epidemiological studies)	N/A
2.	Did the authors study an outcome (dependent variable) or topic that the patients/clients/population group would care about?	Yes
3.	Is the focus of the intervention or procedure (independent variable) or topic of study a common issue of concern to nutrition or dietetics practice?	Yes
4.	Is the intervention or procedure feasible? (NA for some epidemiological studies)	N/A

Validity Questions

1.	Was the research question clearly stated?	Yes
1.1.	Was (were) the specific intervention(s) or procedure(s) [independent variable(s)] identified?	N/A
1.2.	Was (were) the outcome(s) [dependent variable(s)] clearly indicated?	N/A
1.3.	Were the target population and setting specified?	Yes
2.	Was the selection of study subjects/patients free from bias?	Yes

2.1.	Were inclusion/exclusion criteria specified (e.g., risk, point in disease progression, diagnostic or prognosis criteria), and with sufficient detail and without omitting criteria critical to the study?	Yes
2.2.	Were criteria applied equally to all study groups?	N/A
2.3.	Were health, demographics, and other characteristics of subjects described?	Yes
2.4.	Were the subjects/patients a representative sample of the relevant population?	Yes
3.	Were study groups comparable?	N/A
3.1.	Was the method of assigning subjects/patients to groups described and unbiased? (Method of randomization identified if RCT)	N/A
3.2.	Were distribution of disease status, prognostic factors, and other factors (e.g., demographics) similar across study groups at baseline?	N/A
3.3.	Were concurrent controls used? (Concurrent preferred over historical controls.)	N/A
3.4.	If cohort study or cross-sectional study, were groups comparable on important confounding factors and/or were preexisting differences accounted for by using appropriate adjustments in statistical analysis?	N/A
3.5.	If case control or cross-sectional study, were potential confounding factors comparable for cases and controls? (If case series or trial with subjects serving as own control, this criterion is not applicable. Criterion may not be applicable in some cross-sectional studies.)	N/A
3.6.	If diagnostic test, was there an independent blind comparison with an appropriate reference standard (e.g., "gold standard")?	N/A
4.	Was method of handling withdrawals described?	No
4.1.	Were follow-up methods described and the same for all groups?	N/A
4.2.	Was the number, characteristics of withdrawals (i.e., dropouts, lost to follow up, attrition rate) and/or response rate (cross-sectional studies) described for each group? (Follow up goal for a strong study is 80%.)	No
4.3.	Were all enrolled subjects/patients (in the original sample) accounted for?	N/A
4.4.	Were reasons for withdrawals similar across groups?	N/A
4.5.	If diagnostic test, was decision to perform reference test not dependent on results of test under study?	N/A
5.	Was blinding used to prevent introduction of bias?	N/A

5.1.	In intervention study, were subjects, clinicians/practitioners, and investigators blinded to treatment group, as appropriate?	N/A
5.2.	Were data collectors blinded for outcomes assessment? (If outcome is measured using an objective test, such as a lab value, this criterion is assumed to be met.)	N/A
5.3.	In cohort study or cross-sectional study, were measurements of outcomes and risk factors blinded?	Yes
5.4.	In case control study, was case definition explicit and case ascertainment not influenced by exposure status?	N/A
5.5.	In diagnostic study, were test results blinded to patient history and other test results?	N/A
6.	Were intervention/therapeutic regimens/exposure factor or procedure and any comparison(s) described in detail? Were intervening factors described?	N/A
6.1.	In RCT or other intervention trial, were protocols described for all regimens studied?	N/A
6.2.	In observational study, were interventions, study settings, and clinicians/provider described?	N/A
6.3.	Was the intensity and duration of the intervention or exposure factor sufficient to produce a meaningful effect?	N/A
6.4.	Was the amount of exposure and, if relevant, subject/patient compliance measured?	N/A
6.5.	Were co-interventions (e.g., ancillary treatments, other therapies) described?	N/A
6.6.	Were extra or unplanned treatments described?	N/A
6.7.	Was the information for 6.4, 6.5, and 6.6 assessed the same way for all groups?	N/A
6.8.	In diagnostic study, were details of test administration and replication sufficient?	N/A
7.	Were outcomes clearly defined and the measurements valid and reliable?	Yes
7.1.	Were primary and secondary endpoints described and relevant to the question?	N/A
7.2.	Were nutrition measures appropriate to question and outcomes of concern?	Yes
7.3.	Was the period of follow-up long enough for important outcome(s) to occur?	N/A
7.4.	Were the observations and measurements based on standard, valid, and reliable data collection instruments/tests/procedures?	Yes
7.5.	Was the measurement of effect at an appropriate level of precision?	N/A
7.6.	Were other factors accounted for (measured) that could affect outcomes?	No

7.7.	Were the measurements conducted consistently across groups?	N/A
8.	Was the statistical analysis appropriate for the study design and type of outcome indicators?	Yes
8.1.	Were statistical analyses adequately described and the results reported appropriately?	Yes
8.2.	Were correct statistical tests used and assumptions of test not violated?	Yes
8.3.	Were statistics reported with levels of significance and/or confidence intervals?	Yes
8.4.	Was "intent to treat" analysis of outcomes done (and as appropriate, was there an analysis of outcomes for those maximally exposed or a dose-response analysis)?	N/A
8.5.	Were adequate adjustments made for effects of confounding factors that might have affected the outcomes (e.g., multivariate analyses)?	N/A
8.6.	Was clinical significance as well as statistical significance reported?	Yes
8.7.	If negative findings, was a power calculation reported to address type 2 error?	No
9.	Are conclusions supported by results with biases and limitations taken into consideration?	Yes
9.1.	Is there a discussion of findings?	Yes
9.2.	Are biases and study limitations identified and discussed?	Yes
10.	Is bias due to study's funding or sponsorship unlikely?	Yes
10.1.	Were sources of funding and investigators' affiliations described?	Yes
10.2.	Was the study free from apparent conflict of interest?	Yes