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Self-Perceived Cooking Skills in Emerging Adulthood Predict Better Dietary Behaviors and Intake 10 Years Later: A Longitudinal Study

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Abstract

Objective: To determine whether perceived cooking skills in emerging adulthood predicts better nutrition a decade later.

Methods: Data were collected as part of the Project Eating and Activity in Teens and Young Adults longitudinal study. Participants reported on adequacy of cooking skills in 2002–2003 (age 18–23 years) and subsequently reported on nutrition-related outcomes in 2015–2016 (age 30–35 years) ($n = 1,158$). Separate regression models were used to examine associations between cooking skills at age 18–23 years and each subsequent outcome.

Results: One fourth of participants described their cooking skills as very adequate at 18–23 years, with no statistically significant differences by sociodemographic characteristics. Reports of very adequate cooking skills at age 18–23 years predicted better nutrition-related outcomes 10 years later, such as more frequent preparation of meals including vegetables ($P < .001$) and less frequent fast food consumption ($P < .001$).

Conclusions and Implications: Developing adequate cooking skills by emerging adulthood may have long-term benefits for nutrition over a decade later. Ongoing and new interventions to enhance cooking skills during adolescence and emerging adulthood are warranted but require strong evaluation designs that observe young people over a number of years.

Keywords

cooking; eating; longitudinal; nutrition

INTRODUCTION

An emerging body of evidence suggests that developing cooking and food preparation skills is important for nutritional well-being. Involvement in cooking has been associated with

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healthier diets and eating behaviors among adults¹ and adolescents.^{2–5} Moreover, involvement in meal preparation during the adolescent transition to young adulthood has been associated with better nutrition indicators later in life.⁶ Yet the practice of home cooking is declining⁷ and there are growing concerns that the skill of cooking may be lost in future generations.⁸ Previously, these skills were transmitted intergenerationally or through formal school curriculum.^{8,9} However, recent surveys found that few adolescents and adults reported that they learned to cook from school.^{10,11}

Over the past decade, numerous interventions were designed with the aim of developing cooking skills and confidence among children and adolescents¹² as well as adults.¹³ Many of these programs reported short-term benefits, particularly with participant confidence in cooking, knowledge of cooking techniques, and attitudes toward eating new foods, including vegetables.^{12,13} Robustly measuring the long-term impact of these types of programs remains challenging. In short, it is unknown whether developing cooking skills and confidence early in life makes a meaningful difference to nutrition and healthy eating throughout adulthood. Thus, by drawing on longitudinal data, the current study aimed to address this gap by determining whether adequate cooking skill perceptions in emerging adulthood were associated with better eating behaviors and weight status a decade later.

METHODS

Study Design and Population

Data were collected as part of the population-based Project Eating and Activity in Teens and Young Adults (EAT) longitudinal study of weight-related behaviors, weight status, and factors associated with these outcomes among young people. For the original assessment (EAT-I) in 1998–1999, adolescents enrolled at 31 public middle schools and senior high schools in the Minneapolis–St Paul metropolitan area of Minnesota completed surveys and anthropometric measures in school classrooms.^{14,15} Follow-up assessments were conducted using a combination of mailed and online surveys in 2003–2004 (EAT-II) and 2015–2016 (EAT-IV) to examine changes in the weight-related outcomes of the original participants as they progressed through emerging adulthood and entered their third decade of life.^{16–18}

Approximately 22.6% of the original study population was lost to follow-up at EAT-II, primarily owing to missing contact information at EAT-I (n = 411) and no address found at follow-up (n = 591). At EAT-IV, survey invitations were sent only to participants who had responded to at least 1 previous follow-up survey (EAT-II or EAT-III) and for whom current contact information was available (n = 2,770). Among those who could be contacted, the response rate at EAT-II was 68.5%, and at EAT-IV the response rate was 66.1%. To capture the unique and dynamic life changes between early and later adulthood, the current analysis includes only the 1,158 participants who responded at both of these waves and were in the emerging adult life stage (age 18–23 years) at EAT-II (2002–2003).

The University of Minnesota's Institutional Review Board Human Subjects Committee approved all protocols used in Project EAT at each time point. Parental consent and written assent from participants was obtained in 1998–1999. For Projects EAT-II and EAT-IV,

participants were mailed a consent form with their paper survey or reviewed a consent form as part of the online survey.

Survey Development

The Project EAT survey was tailored at each assessment wave to reflect age-appropriate topics and areas of evolving interest. Perceived adequacy of cooking skills was assessed in emerging adulthood (age 18–23 years) and several other food preparation and meal behaviors were assessed in later adulthood (age 30–35 years). The item on adequacy of cooking skills was adapted from a 10-state survey of young adult food habits¹⁹ and was pretested along with other new survey items in focus groups with 20 young adults before they were added to the Project EAT-II survey. Similarly, for EAT-IV, 2 focus groups were conducted to pretest an initial draft of the survey with a community-based sample of 35 young adults. For pretesting at both waves, young adults individually completed a draft version of the survey and then provided oral feedback as a group on the content of the survey, the wording of items, and the response options provided for each item.^{20,21}

Psychometric properties of measures are reported when available based on data collected for EAT-IV. Scale psychometric properties were examined in the full sample of responders to the EAT-IV survey and estimates of item test-retest reliability were determined in a subgroup of 103 participants who completed the EAT-IV survey twice within 1–4 weeks. All test-retest correlations had P values $< .001$.

The independent variable of perceived adequacy of cooking skills was assessed by asking *How adequate are your cooking skills?* Participants could reply with 4 options: *very adequate*, *adequate*, *inadequate*, or *very inadequate*. The *very inadequate* and *inadequate* groups were combined for analyses because of the smaller numbers in those groups.

Frequency of having prepared a meal with vegetables was assessed by asking *During the past month, how often have you prepared a meal that included vegetables?* Participants could select 1 of 6 options ranging in frequency from *never* to *most days of the week* (test-retest $r = .84$). Based on the distribution, responses were dichotomized to represent *most days of the week* and *a few times a week or less*. Whether participants were usually involved in household food preparation was assessed by asking participants to select who was involved, from a list of their family members. Participants who replied *me* were considered a usual food preparer (test-retest agreement for selecting self = 91%).

Family meals, fast food for family meals, and barriers to food preparation were assessed among participants who reported being a parent to 1 children at the time of the EAT-IV survey. Frequency of family meals was assessed by asking *During the past 7 days, how many times did all or most of the people living in your household eat a meal together?* with 6 responses ranging from *never* to *7 times* (test-retest $r = .64$). Responses were dichotomized at *7 times* or less to create 2 groups of similar sizes. Fast food for family meals was assessed by asking *During the past week, how many times was a family meal purchased from a fast-food restaurant and eaten together at the restaurant or at home?* with 4 responses ranging from *never* to *3 times* (test-retest $r = .54$). Responses were dichotomized at *1 time* to capture weekly purchases. Barriers to food preparation were assessed with a 5-item scale asking about having time and energy for meal preparation, meal planning, and

feeding children *right*. The scale was adapted from Storfer-Isser and Musher-Eizenman²² and was found to have good internal consistency and reliability (Cronbach $\alpha = .74$; test-retest $r = .73$) in the EAT sample. Possible scores ranged from 5 to 25, with higher scores indicating greater barriers to food preparation.

Fast-food restaurant frequency was assessed with the item *In the past week, how often did you eat something from a fast-food restaurant?* with 6 response options ranging from *never* to *>7 times*. Responses were dichotomized at *1–2 times* or more often to create 2 groups of similar size (test-retest $r = .54$).

Daily servings of fruit, vegetables, whole grains, and sugar-sweetened beverages were assessed using a semiquantitative food-frequency questionnaire that was administered at the same time as the Project EAT-IV survey.²³ A daily serving was defined as the equivalent of 0.5 cup of fruits and vegetables and 16 g of whole grains. For sugar-sweetened beverages, a serving was defined as the equivalent of 1 glass, bottle, or can. Previous studies examined and reported on the reliability and validity of intake estimates.^{24,25} Responses to the food-frequency questionnaire were excluded if participants reported a biologically implausible level of total energy intake (<500 or >5,000 kcal/d) or left 20 items blank.²⁶ Daily servings of fruits, vegetables, whole grains, and sugar-sweetened soda were assessed at EAT-II following the same method as described previously, but with the youth version of the same food-frequency questionnaire.²⁷

Weight status of overweight (body mass index [BMI], 25–29.9) or obesity (BMI ≥ 30) was determined by self-reported height and weight. In a validation study among a subsample of 127 Project EAT-III young adult participants, the correlation between measured and self-reported BMI values was $r = .95$.²⁸

Unhealthy food at home was assessed with a 3-item scale developed for the Project EAT surveys. Participants were asked to report on the frequency of home availability of potato chips or salty snacks, chocolate or other candy, and soda (test-retest reliability $r = .70$, $.66$, and $.72$, respectively). Healthy food at home was assessed with a 5-item scale developed for the Project EAT surveys. Participants reported on the frequency of home availability of fruits and vegetables and whole-wheat bread and on the frequency of fruits, vegetables, and milk being served at meals (test-retest reliability all $>.68$).

The covariates age, sex, race/ethnicity, and socioeconomic status (SES) were determined by self-report on the EAT-I survey. Socioeconomic status (SES) was primarily based on adolescent reports of parental educational level, but also included reports of family eligibility of public assistance and parental employment level during the Project EAT-I survey.¹⁵ Household educational attainment was based on report of the highest level of education that the participant or his or her spouse or partner had completed at the time of response to the EAT-IV survey.

Analysis

All data were analyzed using the SURVEY procedures in the SAS software package (version 9.3, SAS, Cary, NC, 2011) to account for the weighting of the dataset. The analyses were

weighted to correct for nonresponse by participants and approximately reflects the original population-based cohort. Prevalence estimates were derived using bivariate analyses to examine the simple association between the variables of interest (eg, to describe the relationship between sociodemographic variables and perceived cooking skills). Multiple regression models were conducted to determine the relationship between perceived cooking skills at age 18–23 years and food preparation behaviors, nutrition and weight indicators, and aspects of the home food environment at age 30–35 years. All analyses controlled for age, sex, ethnicity, SES at EAT-I, and educational attainment at EAT-IV. A separate set of regression models was generated to control for the dependent variable as measured in EAT-II if the measure was available (fast-food restaurant frequency; consumption of fruits, vegetables, sugar-sweetened beverages, and whole grains; body size; and availability of healthy and unhealthy food at home). Associations were considered to be statistically significant at $P < .05$ or where 95% confidence levels were nonoverlapping.

RESULTS

Most participants perceived their cooking skills to be adequate at age 18–23 years (Table 1). Approximately one quarter of adults reported their cooking skills to be very adequate, and 56% to be adequate. There were no differences in perceived cooking skills by sex, race or ethnicity, SES (measured at EAT-I) or educational attainment (measured at EAT-IV), or age.

Perceived adequacy of cooking skills in emerging adulthood (age 18–23 years) predicted multiple indicators of nutrition outcomes later in adulthood (age 30–35 years) (Table 2). Specifically, reporting very adequate cooking skills in emerging adulthood was associated with greater odds of preparing a meal with vegetables most days (odds ratio = 3.5; confidence interval, 2.1–5.9) and identifying as a usual food preparer (odds ratio = 2.6; confidence interval, 1.4–4.7) later in adulthood. Similarly, adequate cooking skills in emerging adulthood predicted eating 3 servings/d vegetables ($P < .001$) and less frequent consumption of fast food ($P < .001$) later in adulthood. Among participants with children (when participants were aged 30–35 years), perceived cooking skills during early adulthood predicted more frequent family meals ($P = .02$), less frequent fast food for family meals ($P < .001$), and fewer food preparation barriers ($P < .001$) a decade later. No other statistically significant relationships between cooking skills and nutrition outcomes were observed.

When analyses were repeated to include available measures of the dependent variables (fast-food restaurant frequency; consumption of fruits, vegetables, whole grains, and soda; weight status; and home availability of healthy or unhealthy foods) when participants were aged 18–23 years, the results were unaffected.

DISCUSSION

The aim of the current study was to determine whether reporting adequate cooking skills as a young adult was associated with multiple indicators of healthful nutrition a decade later. The study found that the perception of adequate cooking skills in emerging adulthood predicted food preparation behaviors and healthier eating behaviors more than a decade later.

In the current study, one quarter of emerging adults perceived their cooking skills to be very adequate. The measure of adequacy of cooking skills was self-reported and open to interpretation. In a qualitative study, Wolfson et al²⁹ found that people defined cooking by a broad range of activities, from cooking from scratch to preparing anything at home. Nonetheless, perceived adequacy of cooking skills indicates a marker of self-efficacy regarding cooking and the current findings suggest that this alone may have an enduring impact on diet quality.

Reporting adequate cooking skills at age 18–23 years was associated with usual involvement in meal preparation, having frequent family meals, greater vegetable consumption, and lower consumption of fast food later in life. Findings were consistent with a growing body of literature that suggests learning to cook is associated with better dietary behaviors. In a review of cooking studies among adults, McGowan et al³⁰ found that cooking skills were associated with better dietary behaviors in observational studies, but findings from intervention studies were limited by the few studies and small sample sizes. For example, a Scottish cooking intervention (n = 113) in a high-deprivation area resulted in a small but positive effect on cooking confidence and food choices.³¹

It is hypothesized that developing cooking skills leads to better dietary behaviors through greater involvement in cooking. Numerous studies demonstrated that involvement in home cooking and food preparation is associated with better dietary indicators for adults, in cross-sectional studies^{1–3,32} and longitudinal studies.⁶ That said, a study of Australian adults³³ reported only small differences in diet quality for people involved in food preparation, compared with those who were not. Moreover, in a previous cross-sectional analysis of the EAT-II dataset, there were no associations between cooking skills and dietary quality.³ It is possible that the impact of developing cooking skills early in life may not be apparent until later adulthood when individuals have more opportunity and responsibility for meal preparation. The current study found no relationships between perceived cooking skills and later weight status, home food availability, or soda, fruit, or whole-grain consumption. This likely reflects the numerous influences on weight status and food choices, and that consumption of foods such as soda, fruits, and whole grains typically does not require cooking.

Strengths of the current study include the large, population-based sample size and timeliness of the data. The longitudinal nature of the data, over a long period, adds novelty to this type of research. In addition, the range of food preparation behaviors and diet indicators is valuable. However, there are limitations worth considering when interpreting the findings presented here. First, the data were collected among a cohort of participants who lived in the midwestern region of the US during their adolescence. As such, they may not reflect the greater diversity of the American or international populations. Second, the measure of adequacy of cooking skills was not specific enough to identify the attributes and resources that people need to be able to prepare their own healthy meals. Finally, both the cooking abilities measure and the nutrition-related outcomes were self-reported. As such, it is possible that shared method variance may explain some of these findings, because participants who report their cooking abilities positively may also report their nutrition-related outcomes positively.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Opportunities to develop adequate cooking skills by young adulthood may result in long-term benefits for nutritional well-being, particularly with regard to cooking and eating behaviors. It is striking that simply identifying having adequate cooking skills by emerging adulthood can significantly predict involvement in food preparation and healthier eating over the next decade. Families, health and nutrition professionals, educators, community agencies, and funders can continue to invest in home economics and cooking education despite challenges in evaluating the long-term effects of these programs. Opportunities to develop cooking skills may be particularly important for adolescents and young adults as they develop more autonomy and live independently. Findings presented here provide evidence to justify the implementation of interventions during adolescence and emerging adulthood to enhance cooking skills, with strong evaluation designs that observe young people over a number of years.

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Table 1.Perceived Adequacy of Cooking Skills at Age 18–23 y, by Sociodemographic Characteristics of Participants^a

Characteristics	Perceived adequacy of Cooking skills								
	Very inadequate, inadequate			Adequate			Very adequate		
	n	% or Mean ^b	CI ^c	n	% or Mean ^b	CI ^c	n	% or Mean ^b	CI ^c
Total	211	19.1	16.1–22.1	656	56.0	52.4–59.7	275	24.9	21.7–28.0
Sex									
Male	92	20.1	15.3–24.8	269	56.3	50.6–62.3	117	23.6	18.9–28.3
Female	119	18.1	14.5–21.7	387	55.7	51.1–60.3	158	26.2	22.1–30.3
Race/ ethnicity									
White	166	20	16.7–22.4	508	57	53.6–60.7	199	23	20.2–26.4
Non-white	44	19	12.6–24.5	145	55	47.3–61.7	75	27%	20.8–33.1
SES (measured at Project EAT-I)									
Low	21	19.2	9.6–28.8	63	53.3	42.1–64.4	30	27.5	17.8–37.3
Low–middle	36	20.2	13.4–27.1	96	53.2	44.1–62.4	41	26.5	18.2–34.9
Middle	44	19.0	12.5–25.6	148	57.4	49.7–65.0	64	23.6	17.5–29.7
High–middle	76	18.9	14.7–23.1	222	58.5	53.0–64.0	84	22.6	17.9–27.2
High	32	15.6	10.4–20.8	124	57.5	50.4–64.5	55	27.0	20.6–33.4
Educational attainment (measured at Project EAT-IV)									
High school graduate or equivalent	26	20.6	11.7–29.6	84	60.2	49.9–70.5	31	19.2	11.4–26.9
Some university	46	16.8	10.7–22.8	143	53.2	45.5–60.9	68	30.0	22.9–37.1
Four-year university degree	87	19.7	15.6–23.9	256	57.0	51.5–62.4	100	23.3	18.6–28.0
Graduate or professional degree	51	18.7	13.3–24.2	170	56.4	49.7–63.2	74	24.8	19.3–30.4
Age, y (mean)	211	20.5	20.3–20.6	656.0	20.4	20.3–20.5	275.0	20.4	20.3–20.5

CI indicates confidence interval; Project EAT, Project Eating and Activity in Teens and Young Adults; SES, Socioeconomic status.

^aParticipants include those who participated in the first, second, and fourth waves of the Project EAT survey and were in the emerging adult life stage (age 18–23 years) at EAT-II (2002–2003).^bUnadjusted percent or mean.^c95% confidence limit for the percentage or mean.

Table 2. Relationship Between Food Preparation Behaviors, Nutrition and Weight Indicators, and Home Environment at Age 30–35 y and Perceived Adequacy of Cooking Skills at Age 18–23 y

Nutrition-Related outcomes (Age 30–35 y)	Adequacy of cooking skills (Age 18–23 y)										
	Very inadequate, inadequate			Adequate			Very adequate			P	
n	% ^a	OR ^b	CI ^d	%	OR	CI	%	OR	CI		
Food preparation behaviors											
Prepared meal with vegetables, most days	909	36	Reference	–	48	1.8	1.2–2.8	62	3.5	2.1–5.9	<.001
Usual food preparer	1,016	63	Reference	–	74	2.0	1.2–3.3	79	2.6	1.4–4.7	.007
Nutrition and weight indicators											
Family meals, 7/wk ^e	614	26	Reference	–	42	2.1	1.2–3.6	41	2.1	1.1–3.9	.02
Fast food for family meals, 1 time ^e	613	82	Reference	–	85	1.2	0.6–2.3	69	0.5	0.2–0.9	<.001
Fast food, weekly	1,141	73	Reference	–	63	0.6	0.4–0.9	57	0.4	0.3–0.6	<.001
Fruit, 2 servings/d	1,142	34	Reference	–	34	1.1	0.7–1.7	35	1.2	0.8–2.0	.62
Vegetables, 3 servings/d	1,142	27	Reference	–	36	1.7	1.1–2.5	42	2.3	1.5–3.6	<.001
Whole grains, 3 servings/d	1,142	27	Reference	–	18	0.5	0.3–0.8	20	0.7	0.4–1.2	.05
Sugar-sweetened beverages, 1/d	1,142	16	Reference	–	17	1.0	0.6–1.7	20	1.3	0.7–2.3	.59
Overweight or obese	1,073	62	Reference	–	62	0.9	0.6–1.4	69	1.4	0.9–2.1	.18
Home environment											
Unhealthy food at home	1,123		LSMeans ^c	CI ^d		LSMeans	CI		LSMeans	CI	
			7.2	6.8–7.6		7.0	6.7–7.4		6.7	6.4–7.1	.07
Healthy food at home	1,127		13.6	13.0–14.2		14.3	13.8–14.8		14.3	13.7–14.8	.07
Barriers to food preparation ^e	407		12.5	11.5–13.6		11.8	11.1–12.4		10.4	9.7–11.2	<.001

CI indicates confidence interval; OR, odds ratio; EAT, Project Eating and Activity in Teens and Young Adults; LSMMeans, least squared means.

^aUnadjusted percentages.

^bAnalyses controlling for age, sex, race/ethnicity, and socioeconomic status (all measured at EAT-I) and educational attainment (measured at EAT-IV).

^cControlling for age, sex, race/ethnicity, and SES (all measured at EAT-I) and educational attainment (measured at EAT-IV).

^d95% confidence limit for odds ratio or means.

Items asked among only participants with children (54%).

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