

Impact of Cooking Support Software for Handheld Game Console on the Cooking Behavior of University Students

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Abstract. Japan is now faced with the emerging problems of unhealthy eating habits and poor nutrition in older adolescents and young adults (e.g., university students). To solve these problems, nutritional balance should be encouraged, and one way to do this is to promote the preparation and consumption of home-cooked meals. However, cooking often requires advanced skills, and as a result, only a small percentage of students cook for themselves. In this research, university students used cooking support software for Nintendo DS, a handheld game console; we found that consciousness about cooking and cooking behavior changed through the use of this software. Furthermore, we examined how the software can be improved to provide students who live alone with nutrition management support.

Keywords: cooking behavior, handheld game console, navigation, healthcare

1. Introduction

Recently in Japan, a trend toward unhealthy eating habits has emerged in older adolescents and young adults (e.g., university students), raising health concerns. For example, a sizable percentage of young adults in their 20s skip breakfast (Fig. 1) [1]. Learning to cook for one's self is important for health, as well as for food and nutrition education. However, cooking is a complex creative activity that requires advanced knowledge; to cook daily, one needs a certain amount of skill. Moreover, there are many people who think that it is troublesome to consider the dish in consideration of foods or nutritional balance even if he likes as for cooking itself [2]. Accordingly, there has recently been growth in the use of multimedia technology to support cooking through the digitization of teaching materials [3-5]. In particular, because the diffusion of handheld game consoles is high among young people, such a platform is expected to be effective for providing cooking supporting to improve their cooking skills. In this research, university students used cooking support software developed for the Nintendo DS, we explored differences in cooking behavior with and without use of the software, and we verified the validity of this approach. Moreover, we considered ways to promote cooking among university students who live alone.

2. Method

Shaberu! DS Oryōri Navi (literally, "Dishes of the World Talk! DS Cooking Navigator"; released in North America as *Personal Trainer Cooking* [6]) was used as cooking support software. An image of a Nintendo DS running the software is shown in Fig. 2. This software not only displays cooking procedures as text and images, but also provides audio instructions and responds to voice commands from the user. The user can provide voice commands such as "continue" (proceed to the next step), "repeat" (repeat the instruction), and "go back" (return to the previous step), and thus can operate the software while cooking. Furthermore, this software has a recommendation function that suggests dishes according to user-input conditions such as ingredients, cuisine type, calorie content, and ease of preparation. Moreover, the user can keep a record of dishes cooked.

The participants were 13 students in the School of Comprehensive Rehabilitation at Osaka Prefecture University. We first collected data on their cooking behavior without cooking support software. Over a two week period, the participants kept a log of meals, the contents of what they cooked, and the time required for cooking. Next, we provided the participants with the cooking support software and a Nintendo DS, if necessary; the participants kept a log of their software use over four weeks in addition to logging meals, the contents of what they cooked, and the time required for cooking. In a preliminary questionnaire, we gathered data about the participants' living arrangement (i.e., living alone or living with family), frequency of cooking, and Nintendo DS ownership. Furthermore, in a follow-up questionnaire conducted after the main experiment, we examined changes in the participants' consciousness about cooking and in their cooking behavior.

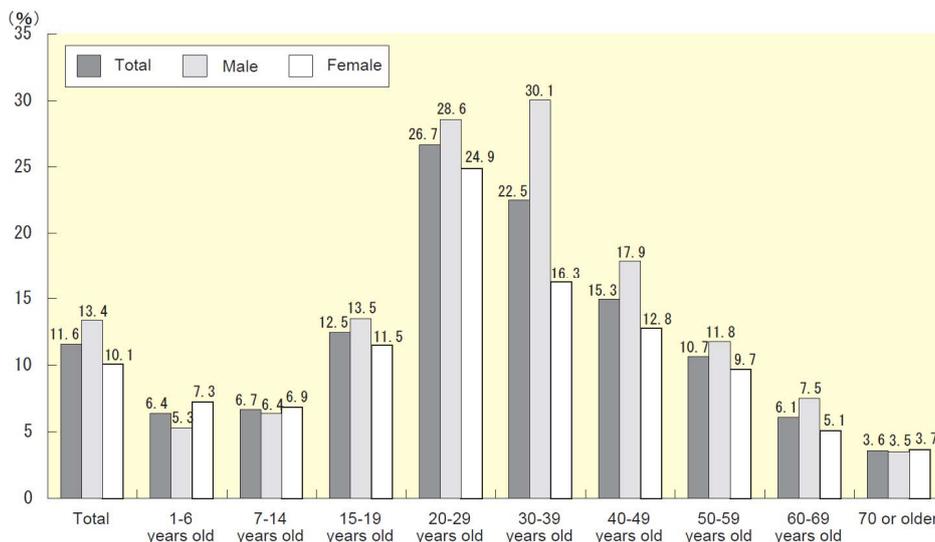


Fig. 1: Percentage of people who skip breakfast (cited from [1]).



Fig. 2: Image of cooking support software on Nintendo DS (*Shaberu! DS Oryōri Navi*).

3. Results and Discussions

We compared the time required to prepare a meal between the cases with and without cooking support software (Fig. 3). The cooking time with software use was 17.2 ± 2.8 min, a significantly higher value than

that in the case without software support (Wilcoxon signed-rank test: $p < 0.05$). Moreover, in the follow-up questionnaire, responses such as “I started wanting to make various dishes” and “Now I’ll try to cook when possible” indicate consciousness about cooking was raised (Fig. 4). In the questionnaire item assessing the participant opinion of the cooking support software, the response “I liked the function that showed which dishes I could make from a set of ingredient” suggests better consciousness about cooking. From these results, the longer cooking times that accompanied the use of the software can be attributed to improved consciousness about cooking; the cooking support software was effective in promoting better cooking behavior from the viewpoint of improving cooking the content (ingredients, nutrition, etc.) of the dishes cooked).

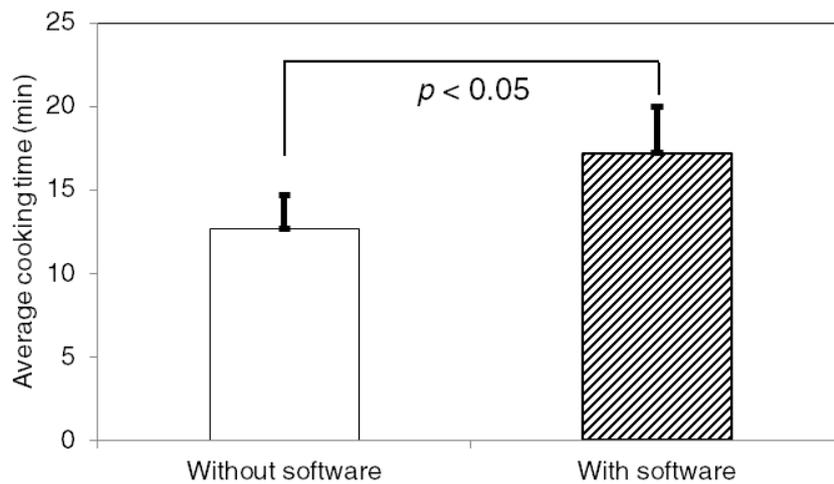


Fig. 3: Difference in time spent cooking between cases with and without cooking support software (mean and standard deviation).

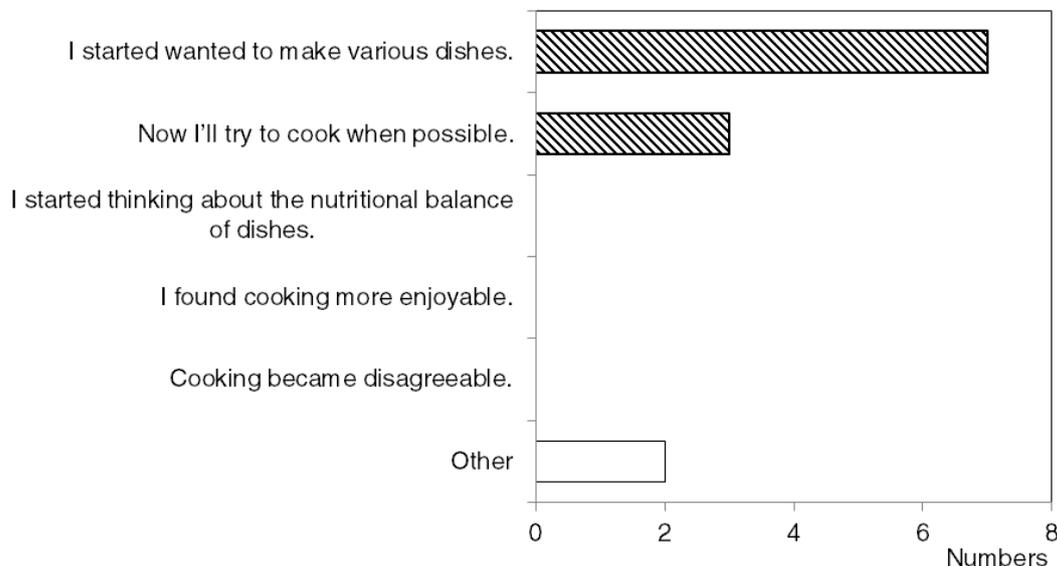


Fig. 4: Changes in cooking consciousness from using cooking support software.

Next, when we evaluated the number of times that the cooking support software was used, broken down by living arrangement (living alone vs. living with family) and by Nintendo DS ownership (Fig. 5). The students who used the software most frequently were those who did not have a Nintendo DS before the study and lived with their family. As a factor that their frequency in use was high, the pleasure by using DS for the first time can be considered. Our initial expectation was that students living alone would tend to have unhealthy eating habits and would need the most extensive cooking support; however, it became clear that they seldom used the software. We surmised that many of the recipes included in the software were designed

for families, which might explain why students living alone used the software less frequently. Thus, we examined all the recipes included in the software. In regard to software features, students living alone reported, “I would like recipes that can be prepared within 5 minutes,” and “I would like easy recipes with ready-to-use sauces.” These comments suggest that students living alone want recipes that are quick and easy, but we found that only 15 out of 200 included recipes met those criteria.

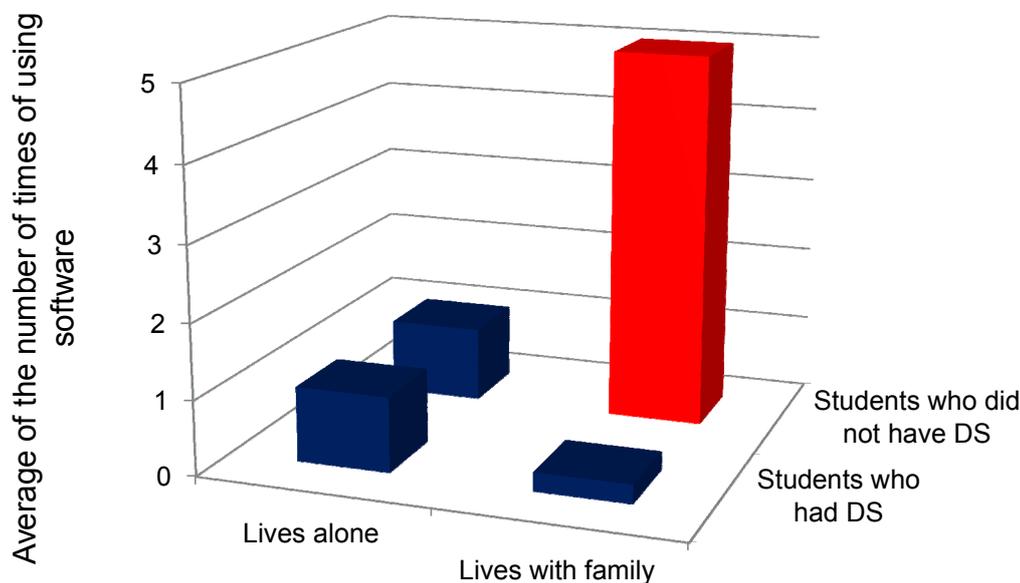


Fig. 5: Number of times using the software by living arrangement and Nintendo DS ownership.

4. Conclusion

In this paper, we showed that university students’ cooking time significantly increased when they used cooking support software on a handheld game console. This result suggests that the use of such software encourages cooking. However, in order to promote cooking among students who live alone, the software should include a greater number of quick and easy recipes.

A limitation of this study is the small number of participants, and thus a larger-scale investigation should be performed. Other topics for future investigation include how living environment and lifestyle affect cooking behavior. Smartphones have spread rapidly in recent years, making it easier to access recipes via the Internet. In fact, our questionnaire indicated that students are using smartphones to search for recipes. Therefore, we should also investigate the possibility of implementing cooking support software on smartphones in addition to handheld game consoles.

5. References

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