

## EatNTrack Malaysia Mobile Application Food Calories Tracker - A Conceptual Paper

\*Maisarah Mohd Saleh<sup>1\*</sup>, Siti Aishah Abd Rahman<sup>1</sup>, Ainamardia Nazarudin<sup>2</sup>, Nurul Ain Abu Kasim<sup>3</sup>,  
and Fatin Aqilah Abdul Razak<sup>1</sup>

<sup>1</sup>Faculty of Sports Science and Recreation,  
Universiti Teknologi MARA Pahang, Jengka Campus  
26400 Bandar Tun Abdul Razak Jengka,  
Pahang MALAYSIA

<sup>2</sup>Faculty of Civil Engineering,  
Universiti Teknologi MARA Pahang, Jengka Campus  
26400 Bandar Tun Abdul Razak Jengka,  
Pahang MALAYSIA

<sup>3</sup>Faculty of Sports Science and Recreation,  
Universiti Teknologi MARA Cawangan Negeri Sembilan, Kampus Seremban  
70300 Seremban 3,  
Negeri Sembilan MALAYSIA

\*Corresponding author's email: sarahms@uitm.edu.my

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### ABSTRACT

Diet and nutrition apps are among the most popular health and fitness apps used by an increasing number of mobile device users. Undeniably, health and nutrition are some of the valuable aspects of life. With the introduction of mobile computing, health knowledge became much easier to understand due to its mobility and usability. A vast range of smartphone apps is emerging for tracking health and food. However, the existing mobile applications in Malaysia are lacking some important features. To address this limitation, the present mobile application responds by attempting to design and develop a Malaysian mobile nutrition application known as EatNTrack. EatNTrack is a mobile nutrition application that provides crucial features such as the ability to capture the food especially Malaysian foods, scanning food barcode, set the goal and calories of the day, a reminder for the user to capture the food, monthly progress of user, and integration with a wearable device. The needs of these features will give insight into many aspects of a user's eating habits. The more specific and accurate users with reporting, the more accurate their information will be. The aim of the study was to establish an innovative mobile-based dietary awareness tool that could be used to monitor target users' food intake.

**Keywords:** *nutrition, mobile application, food calories, track calories, health*

## 1.0 INTRODUCTION

Obesity is a medical condition in which excessive accumulation of body fat, usually caused by the consumption of more calories than the body can use. The National Health and Morbidity Survey (NHMS) 2019 finding reported that 50.1 % of adults in Malaysia were obese. In Southeast Asia, Malaysia has the highest rate of obesity among adults at 15.6%, led by Brunei (14.1%), Thailand (10.0%) and Indonesia (6.9%) (Ministry of Health Malaysia, 2019). Obesity is nothing new and has reached epidemic proportions globally. Many of this rise may be attributed to low-cost and poorly nutritious food processing combined with a higher intake of limited foods (Smith et al. 2020). The rising prevalence of obesity and its correlation with cardiovascular disease, various types of diabetes, cardiovascular diseases, cancer, and other chronic illnesses have driven us to find successful means of promoting good eating and management of weight. These dietary pattern changes are linked with many other serious illnesses, such as asthma, heart disease, stroke, high cholesterol, and diabetes, as well as obesity (Bricarello et al., 2018).

Applications to healthy nutrition and lifestyle can offer a fast and easy way to spread nutrition and diet information to the public. These applications also support personalised information for such populations (e.g., overweight, cancer patients, the risk group for heart disease) (Elbert et al., 2016; Okumus et al., 2018). The number of health and wellness applications has grown exponentially (Allman-Farinelli & Gemming, 2017; Schoeppe et al., 2017). Studies show that diet and weight-loss applications are the most common health applications (Franco et al., 2016). Several applications are available on major mobile platforms such as iPhone, Samsung, Nokia and Blackberry for dieting, fitness, and weight management. Feedback, goals of balanced living and healthy cooking, decision-making on food or food self-surveillance of resources and nutrients, weight monitoring, and social reinforcement preparation and improvement are common strategies.

Although advertisers and businesses can generate sales in an increasingly growing environment, these technologies often face a range of significant challenges. Due to the overwhelming number of lifestyle applications currently available in combination with the rapid development of relevant technologies and functionality, consumers have to pick the app that better satisfies their particular needs and priorities with scant usability and efficiency knowledge in advance (Jake-Schoffman et al., 2017). In addition, the lack of consumer interest in Fitness and Lifestyle applications remains a great concern for advertisers and brands, amid tremendous technical and design advances (Toro-Ramos et al., 2017). Most lifestyle and fitness technologies are not able to hold consumers long-term (Brandt et al., 2018). On the other hand, healthcare providers work in a highly competitive environment and are unsure about the activities and objectives that multiple customers have for a healthier way of life, which are encouraging their present and aspiring actions or desire to participate and maintain major behavioural improvements.

A better understanding of these variables to meet the needs of customers and ensure continuing success in lifestyle and fitness app markets is necessary to strengthen an established definition, design, and functionality. For instance, the existing Malaysia nutrition application was solely focused on 70+ Malaysian food and users have to manually type the food searching. Some of the features that the existing Malaysia app is lacking are food capturing, scanning of food barcodes, reminders for users to start tracking their food intake and the goal of the user in maintaining their health and fitness. Thus, all these features are crucial as people of all age is so conscious about their fitness and more importantly their health. In this setting, the smartphone devices ignite, support, and motivate people to follow a fitness routine regime.

The paper aimed to develop a concept of an innovative mobile-based tool (EatNTrack) for dietary intake awareness utilized to keep track of the food consumption of target users based on existing Malaysian mobile applications. This mobile application is specifically designed for Malaysians as it improves the existing mobile application available in Malaysia..

## 2.0 MATERIAL AND METHOD

In this section, we present the proposed concept EatNTrack app. In the following section, the features of the EatNTrack app methodology are explained. EatNTrack offers better features such as food capturing image, food barcode scanner, goal setting, food capture reminder and user's progression. This will allow the user to track and plan their nutrition goals in more specific and yet understand their intake better. In

comparing with MyNutriDiari2, an apps developed by the Minister of Health Malaysia, it offers a different aspect of nutrition goals which are Body Mass Index calculator, a diary to monitor daily calorie intake, calorie intake and deficit, water intake and weight monitor.

## 2.1 APP DESIGN AND FEATURES

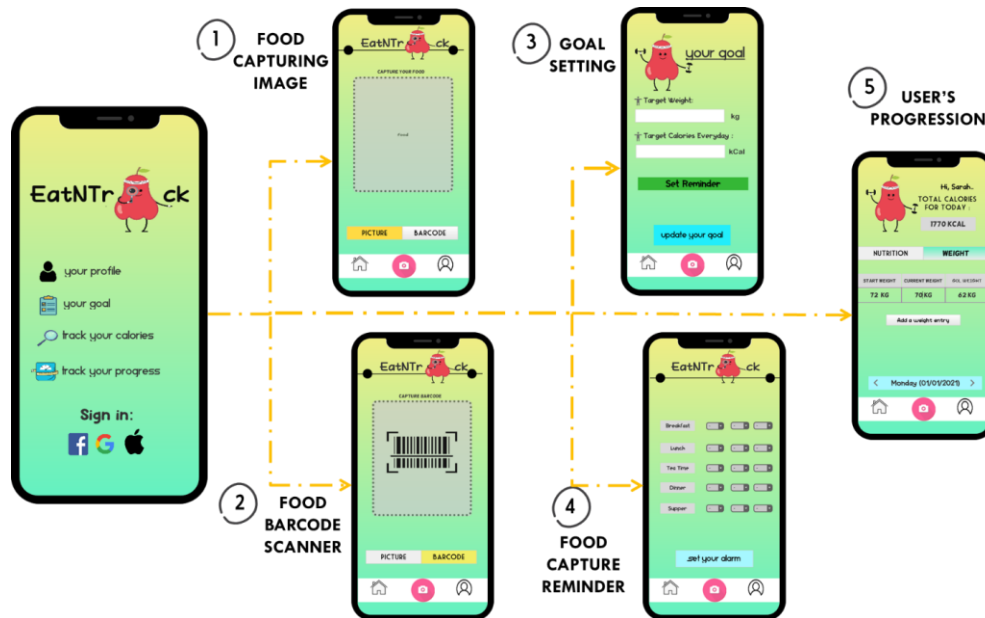


Figure 2.0: Features available in EatNTrack mobile application

### 2.1.1 Food Capturing and Scanning Food Barcode

EatNTrack allows the user to capture the food especially Malaysian food to identify the number of calories and amount of macro and microminerals in the food. Apart from that, another feature in this app is the ability to scan supermarket barcodes to get nutritional information that helps users make smart choices while grocery shopping, and the tracking of macronutrients such as carbohydrates, protein, and fat.

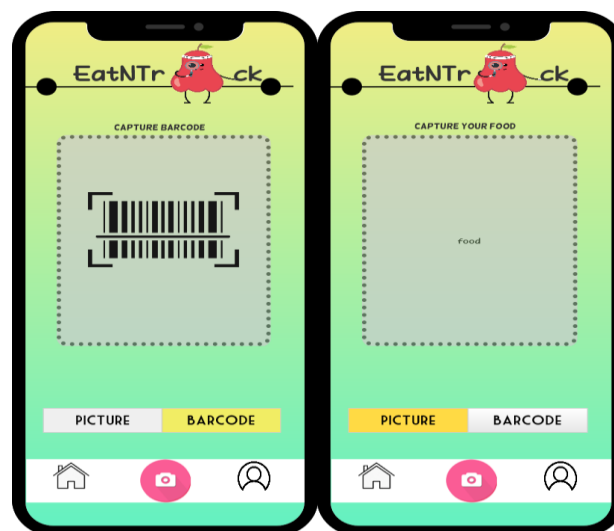


Figure 2.1: Interface of food capture and food barcode scanner

### 2.1.2 Reminder For A Week / Month To Capture The Food

The EatNTrack app can set up reminders to notify you whenever it is time to capture your meal before indulging it. This reminder works weekly or monthly depending on your setup.

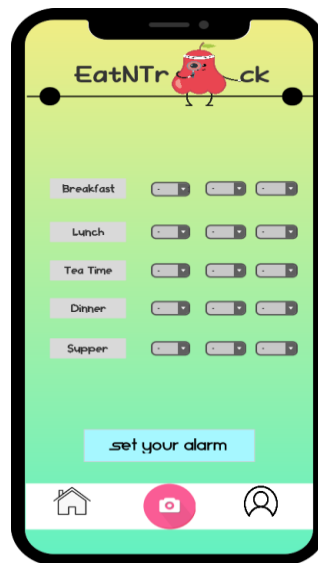


Figure 2.2: Interface of food capture reminder

### 2.1.3 User's Profile To Set the Goal and Count the Calories of the Day

EatNTrack records based on your weight, height, age, and goals and calculates the recommended daily calorie intake. It also includes a well-designed food journal and exercise log in providing a personalised calorie intake recommendation. It also shows your remaining recommended intake and the number of calories you burned while exercising. Each user has a goal that can be set on the app as well. With this feature, they can get a clear understanding of how close they are towards achieving their goal. In addition, through in-home interface, this app provides information on the number of calories left after the user eats breakfast, lunch and dinner.

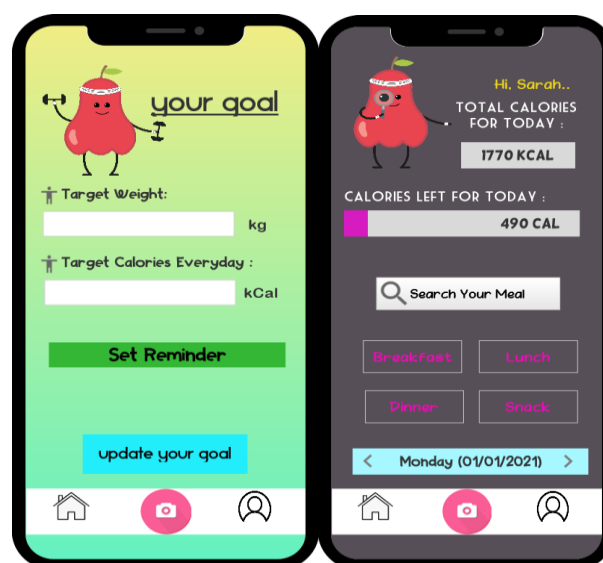


Figure 2.3: Interface of setting user's goal and home

#### 2.1.4. Monthly Tracking and Progression of User's Food Intake

EatNTrack provides a monthly summary view that shows the total calorie consumption for each day and the total average for each month. This feature may be convenient for tracking your overall progress. The most positive thing about this tracking is that it gives the ability to visually track the progression over time and see if any changes are made (positive or negative) that eventually affect health. This information will provide clarity to the users regarding the steps they need to walk and the food they need to eat to achieve their set goals.



Figure 2.4: Interface of user's progression

#### 2.1.5 Integration with Wearable Devices

The number of people using fitness trackers is growing rapidly. Statistica claims that in 2020, 60% of Malaysian consumers owned a fitness band and 56% of them connected it with fitness apps. EatNTrack aims to develop a platform that easily connects with third-party devices such as iOS health or android health in the user's smartwatch and enables conveniences like monitoring heart rate, distance covered by walking, cycling, swimming, and running.

### 3.0 RESULT AND DISCUSSION

Currently, the global downloads of mobile applications for health and fitness apps are increasing (Pellegrini et al., 2015). The awareness regarding health and wellness among communities has increased exponentially during the COVID-19 pandemic. These concepts of application have shown the successful use of fitness and health apps in managing various health conditions such as diabetes and other non-communicable diseases (NCDs) (Denison et al., 2013; Payne et al., 2015). With the EatNTrack app, users are guided on how to eat properly by tracking calories and controlling eating habits, providing tips on the nutritional value of foods and record meal and calorie intake.

The choice of an app is made specifically by the users since apps are being developed in different countries. The serving sizes and nutritional guidelines vary from country to country. The EatNTrack app is based on national guidelines and is culturally relevant for the Malaysian community. The EatNTrack app contains features allowing the user to estimate their calories by simply capturing an image of the meal. Each food/beverage item matching is based on nutrient content and quantity, using the Malaysian Food Composition Database (MyFCD).

According to Statistica (2018), the average utilisation frequency of a mobile application is highest in millennials aged 18-34. Statistica (2021) also reported that as of January 2020, about 81 percent of the Malaysian population were active social media users and these speaking imprecisely in contributing towards eating habits. Yong (2020) mentioned that a large number of millennials have developed a social media ritual of capturing a photo of their food prior to eating it. Yong also highlighted that although occasional food hunts with friends may seem harmless, however, a sense of caution is needed about how much influence social media has on our dietary intake. In response to this statement, it will be sensible to target these populations as the majority of the audience is using the EatNTrack mobile application. The innovation of the EatNTrack app is one of the potential nutrition apps which are user-friendly and based on national dietary guidelines and Malaysian food culture.

Previous research narrated the importance of user engagement for the achievement of healthy lifestyle goals and ultimately determined the success of the apps in the marketplace (Dinner et al., 2015; Laing et al., 2014). Therefore, it is presupposing that mobile apps have to be designed as such to sufficiently motivate users to continue using the apps. We postulated by improvising the available application in Malaysia based on food calorie and physical activity tracker, EatNTrack will respond well in this technology savvy era especially among Malaysian millennials. EatNTrack has a user-friendly mode in tracking food calories by the means of scanning and image capturing of any particular food of interest at hand. Furthermore, EatNTrack will provide more user engagement among Malaysians, as it benefits its users with the relevancy of usage by focusing on local Malaysian cuisines and delicacies.

Commonly retrospective approaches for assessing food intake included 24-h recalls, and food frequency questionnaires (Penn et al., 2010). Due to the complexities in assessing food consumption, sizes, and portions, the field of dietary assessment has looked to technology to assist in measuring food intakes (Ngo et al., 2009). According to Banerjee et al. (2020), most participants were confused with portion sizes or difficulties of manual entry as major limits for usage of the apps. The innovation of the EatNTrack app to use cameras provides easier ways to estimate calories through features such as photo capture of food. It does not require manual entry and can automatically track food contents and calories. Wearable cameras have been shown to enhance dietary assessment of food and beverage consumption (Gemming et al., 2013).

Another important feature to be emphasized in EatNTrack is its ability in sending push notifications on a daily basis especially if the user is taking additional calories beyond their daily requirement per day. The feature is important as Stawarz et al. (2015) found that push notifications are a useful tool to keep people engaged.

EatNTrack app focuses on diet and nutrition for Malaysian food. The innovation of the EatNTrack app provides crucial features such as the ability to estimate calories by capturing the food image. Users can monitor, set goals, and plan their diet, by having the information on the measurement of the calories, macronutrients and fluid intake and calculation of fluid, macronutrients and calories needed. The EatNTrack app is able to become a platform for the delivery of health communication interventions. Easier ways to estimate calories by capturing images will increase the motivation among users to become alert about their food consumption. Users are able to control their weight by helping users monitor their diets and nutrition.

To corroborate the establishment of the EatNTrack application, we had colluded with an industrial company. Unimed Sdn Bhd is a pharmaceutical company focused on importing, marketing and distributing generic pharmaceutical finished products, nutraceutical, medical devices, herbal and nutritional supplementation finished goods. Unimed Sdn Bhd joined forces by assisting the usage of the EatNTrack mobile application through their hospital clientele. The commentary and response that will be gathered from these populations will be taken into consideration for EatNTrack's further refinement.

#### **4.0 CONCLUSION**

The present mobile application of EatNTrack is aimed to address the rising prevalence of obesity by providing a unique user-friendly innovation approach of hassle-free goal setting and calories measurement through food photo capture. Innovation such as push notifications in the present proposed apps of EatNTrack will be a beneficial tool in sending notifications upon exceeded daily intake. It is

being well established that the global downloads of a mobile application for health and fitness apps are increasing. However, EatNTrack acknowledges user engagement particularly among Malaysians, through its innovation of apps that focuses on featuring Malaysian local delights on food calories measurement, along with its friendly trait of usage in integrating with any wearable devices. On a related note, collaboration with an industrial company such as Unimed Sdn Bhd will be another added insight in predicting EatNTrack trend of usage and marketability among Malaysian users. In a nutshell, the innovation of EatNTrack can be beneficial in this scenario by promoting better choices in daily food intake thus acting as one of the trusted nutritional apps that is focused on Malaysian local delights, and designed in accordance with national dietary guidelines.

## REFERENCES

- Allman-Farinelli, M., & Gemming, L. (2017). Technology interventions to manage food intake: where are we now? *Current Diabetes Reports*, 17(11), 1-8
- Astrup, A., & Brand-Miller, J. (2012) Diet composition and obesity. *The Lancet*. 379:1100.
- Banerjee, P., Mendu, V. V. R., Korrapati, D., & Gavaravarapu, S. M. (2020). Calorie counting smartphone apps: Effectiveness in nutritional awareness, lifestyle modification and weight management among young Indian adults. *Health Informatics Journal*, 26(2), 816-828.
- Bleich, S., Cutler, D., Murray, C., Adams, A. (2008) Why is the developed world obese? *Annual Review of Public Health*. 29:273–95.
- Brandt, C. J., Sogaard, G. I., Clemensen, J., Søndergaard, J., & Nielsen, J. B. (2018). Determinants of successful eHealth coaching for consumer lifestyle changes: qualitative interview study among health care professionals. *Journal of Medical Internet Research*, 20(7), e237.
- Bricarello, L. P., Poltronieri, F., Fernandes, R., Retondario, A., de Moraes Trindade, E. B. S., & de Vasconcelos, F. de A. G. (2018). Effects of the dietary approach to stop hypertension (DASH) diet on blood pressure, overweight and obesity in adolescents: a systematic review. *Clinical Nutrition ESPEN*, 28, 1–11.
- Dennison, L., Morrison, L., Conway, G., & Yardley, L. (2013). Opportunities and challenges for smartphone applications in supporting health behavior change: a qualitative study. *Journal of Medical Internet Research*, 15(4), e86.
- Dinner, I. M., Van Heerde, H. J., & Neslin, S. (2015). Creating customer engagement via mobile apps: How app usage drives purchase behavior. *Tuck School of Business Working Paper*, 2669817.
- Elbert, S. P., Dijkstra, A., & Oenema, A. (2016). A mobile phone app intervention targeting fruit and vegetable consumption: the efficacy of textual and auditory tailored health information tested in a randomized controlled trial. *Journal of Medical Internet Research*, 18(6), e147.
- Franco, R. Z., Fallaize, R., Lovegrove, J. A., & Hwang, F. (2016). Popular nutrition-related mobile apps: a feature assessment. *JMIR MHealth and UHealth*, 4(3), e85.
- Gemming, L., Doherty, A., Kelly, P., Utter, J., & Mhurchu, C. N. (2013). Feasibility of a SenseCam-assisted 24-h recall to reduce under-reporting of energy intake. *European Journal of Clinical Nutrition*, 67(10), 1095-1099.
- Jake-Schoffman, D. E., Silfee, V. J., Waring, M. E., Boudreaux, E. D., Sadasivam, R. S., Mullen, S. P., Carey, J. L., Hayes, R. B., Ding, E. Y., & Bennett, G. G. (2017). Methods for evaluating the content, usability, and efficacy of commercial mobile health apps. *JMIR MHealth and UHealth*, 5(12), e190.
- Laing, B. Y., Mangione, C. M., Tseng, C.-H., Leng, M., Vaisberg, E., Mahida, M., Bholat, M., Glazier, E., Morisky, D. E., & Bell, D. S. (2014). Effectiveness of a smartphone application for weight loss compared with usual care in overweight primary care patients: a randomized, controlled trial. *Annals of Internal Medicine*, 161(10\_Supplement), S5–S12.
- Ministry of Health Malaysia. (2019). *The National Health and Morbidity Survey 2019. Non Communicable Diseases: Risk Factors and Other Health Problems*. Institute of Public Health. Ministry of Health Malaysia.

[http://www.iku.gov.my/images/IKU/Document/REPORT/NHMS2019/Report\\_NHMS2019-NCD\\_v2.pdf](http://www.iku.gov.my/images/IKU/Document/REPORT/NHMS2019/Report_NHMS2019-NCD_v2.pdf)

- Okumus, B., Ali, F., Bilgihan, A., & Ozturk, A. B. (2018). Psychological factors influencing customers' acceptance of smartphone diet apps when ordering food at restaurants. *International Journal of Hospitality Management*, 72, 67–77.
- Payne, H. E., Lister, C., West, J. H., & Bernhardt, J. M. (2015). Behavioral functionality of mobile apps in health interventions: a systematic review of the literature. *JMIR mHealth and uHealth*, 3(1), e20.
- Pellegrini, C. A., Pfammatter, A. F., Conroy, D. E., & Spring, B. (2015). Smartphone applications to support weight loss: current perspectives. *Advanced Health Care Technologies*, 1, 13.
- Penn, L., Boeing, H., Boushey, C. J., Dragsted, L. O., Kaput, J., Scalbert, A., ... & Mathers, J. C. (2010). Assessment of dietary intake: NuGO symposium report. *Genes & Nutrition*, 5(3), 205-213.
- Schoeppe, S., Alley, S., Rebar, A. L., Hayman, M., Bray, N. A., Van Lippevelde, W., Gnam, J.-P., Bachert, P., Direito, A., & Vandelanotte, C. (2017). Apps to improve diet, physical activity and sedentary behaviour in children and adolescents: a review of quality, features and behaviour change techniques. *International Journal of Behavioral Nutrition and Physical Activity*, 14(1), 1-10.
- Smith, C. J., Perfetti, T. A., Hayes, A. W., & Berry, S. C. (2020). Obesity as a Source of Endogenous Compounds Associated with Chronic Disease: A Review. *Toxicological Sciences*, 175(2), 149–155.
- Statista (2018). Average daily usage frequency of using an app per day according to mobile device users in the United States as of April 2018, by age group. Retrieved 28/1/2021 from <https://www.statista.com/statistics/243856/daily-app-use-by-us-mobile-app-users/>
- Statista (2021). Active social media users as a percentage of the total population in Malaysia from 2016 to 2020. Retrieved 28/1/2021 from <https://www.statista.com/statistics/883712/malaysia-social-media-penetration>
- Stawarz, K., Cox, A. L., & Blandford, A. (2015). Beyond self-tracking and reminders: designing smartphone apps that support habit formation. Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems, 2653–2662.
- Toro-Ramos, T., Lee, D.-H., Kim, Y., Michaelides, A., Oh, T. J., Kim, K. M., Jang, H. C., & Lim, S. (2017). Effectiveness of a smartphone application for the management of metabolic syndrome components focusing on weight loss: a preliminary study. *Metabolic Syndrome and Related Disorders*, 15(9), 465–473.
- Yong, J. Y., Tong, E. M., & Liu, J. C. (2020). When the camera eats first: Exploring how meal-time cell phone photography affects eating behaviours. *Appetite*, 154, 104787.