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REPUBLIC OF TURKEY

HACETTEPE UNIVERSITY

GRADUATE SCHOOL OF HEALTH SCIENCES

DEVELOPMENT OF A NEW SCALE TO MEASURE CULINARY ACCULTURATION OF IMMIGRANTS WHO ARE LIVING IN TURKEY: VALIDITY AND RELIABILITY ASSESSMENT

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Program of Nutrition and Dietetics

DOCTOR OF PHILOSOPHY THESIS

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This thesis study has been approved and accepted as a PhD dissertation in **"Nutrition and Dietetics Program "** by the assesment committee, whose members are listed below, on 19[th]December 2018.

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YAYIMLAMA VE FİKRİ MÜLKİYET HAKLARI BEYANI

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** Tez **danışmanının** önerisi ve **enstitü anabilim dalının** uygun görüşü üzerine **enstitü** veya **fakülte yönetim kurulu** tarafından karar verilir.*

ETHICAL DECLARATION

In this thesis study, I declare that all the information and documents have been obtained in the base of the academic rules and all audio-visual and written information and results have been presented according to the rules of scientific ethics. I did not do any distortion in data set. In case of using other works, related studies have been fully cited in accordance with the scientific standards. I also declare that my thesis study is original except cited references. It was produced by myself in consultation with supervisor Assoc. Prof. Aylin Ayaz and written according to the rules of thesis writing of Hacettepe University Institute of Health Sciences.

Z. Begüm Kalyoncu, MSc

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To my parents, my brother, extended family, and close friends for their unconditional love and constant support throughout my PhD journey…

ABSTRACT

Kalyoncu, ZB. Development of A New Scale to Measure Culinary Acculturation of Immigrants Who Are Living in Turkey: Validity and Reliability Assessment. Hacettepe University, Graduate School of Health Sciences, Nutrition and Dietetics Program, Doctor of Philosophy Thesis, Ankara, 2018. The effect of immigration on diet and health should be captured with dietary intake, but also through assessing culturally based culinary exposures. Therefore, a visual instrument, Culinary Acculturation Assessment Inventory (CAAI) was developed to assess culinary acculturation and determined its validity and reliability for first generation immigrants. Turkey was used as a case study to evaluate culinary acculturation of immigrants to Turkish Cuisine. Standard scale development methods were employed with 256 participants (55% women) of 64% immigrants from 53 countries and 36% people from Turkey. The final version of CAAI included 19 items across one dietary pattern and three culinary patterns as a result of principal component analyses. Dietary and culinary pattern z-scores were compared between immigrants and the referent population from Turkey. Factor loads of dietary pattern ranged between 0.388 and 0.686 with an alpha of 0.729, while the factor loads of culinary patterns ranged between 0.480 and 0.860 with an alpha of 0.732. The CAAI scores of immigrants were positively correlated with language proficiency (r=0.295, p<0.001). When immigrant participants were divided into five regions as Slavic (n:32), Western (n:47), Asian (n:31), Sub-Saharan (n:22), and Mediterranean (n:30). Slavic immigrants had the highest level of culinary acculturation. Since this instrument could capture culinary acculturation of diverse group of immigrants who are living in the same host country, it has the potential to progress dietary acculturation research towards culinary acculturation.

Key Words: Inventory development, culinary acculturation, validity and reliability, first-generation immigrants

ÖZET

Kalyoncu, ZB. Türkiye'de Yaşayan Göçmenlerin Türk Mutfağına Uyumlarını Saptamaya Yönelik Yeni Bir Ölçek Geliştirme: Geçerlik ve Güvenirlik Çalışması. Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü, Beslenme ve Diyetetik Programı Doktora Tezi, Ankara, 2018. Bu çalışmada göçün beslenme ve sağlık üzerine olan etkilerini anlamak için göçmenlerin göç ettikleri ülkelerin mutfağının kültürel etmenlerine olan uyumunun belirlenmesi amaçlanmıştır. Türkiye'de yaşayan birinci nesil göçmenlerin mutfak uyumlarını belirlemeye yönelik görsel bir ölçek geliştirilmiş; geçerlik ve güvenirlik çalışması yapılmıştır. Mutfak Kültürel Etkileşimini Değerlendirme Ölçeği, özgün adıyla "Culinary Acculturation Assessment Inventory (CAAI)" için standart ölçek geliştirme metodolojisi uygulanmıştır. Çalışmaya dahil edilen 256 katılımcının (% 55 kadın) %64'ünü 53 farklı ülkeden gelen göçmenler ve %36'sını da Türkiye'den bir referans popülasyon oluşturmuştur. CAAI'nin son versiyonunda temel bileşenler analizleri yardımıyla 19 maddeden oluşan beslenme ve mutfak davranışlarıyla ilgili iki boyut bulunmuş ve bu boyutlar için z-skor değerleri hesaplanmıştır. Geçerlik ve güvenirliği yapılan çalışmada beslenme boyutunda faktör yükleri 0,388 ve 0,686 arasında ve alfa değeri 0,729; mutfak boyutundaki faktör yükleri de 0,480 ve 0,860 arasında ve alfa değeri 0,732 olarak bulunmuştur. Göçmenlerin CAAI'ye göre aldıkları skorlar Türkçe dil hakimiyeti değerleri ile pozitif korelasyon göstermektedir (r=0,295, p<0,001). Göçmen katılımcılar bölgesel olarak Slav ülkeleri (n:32), Batı ülkeleri (n:47), Asya ülkeleri (n:31), Sahra-altı Afrika ülkeleri (n:22) ve Akdeniz ülkeleri (n:30) olarak beş gruba ayrıldığında mutfak kültürel etkileşimi en yüksek olan göçmenlerin Slav ülkelerinden gelenler olduğu bulunmuştur. Göç edilen ülkenin mutfağına dair maruziyetlerin bir ülkede yaşayan tüm göçmen grupları üzerindeki etkilerini belirleyebilen bu ölçeğin mutfak uyum çalışmalarına katkıda bulunacağı düşünülmektedir.

Anahtar Kelimeler: Ölçek geliştirme, mutfak kültürel etkileşimi, geçerlik-güvenirlik, ilk nesil göçmen

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SYMBOLS AND ABBREVIATIONS

ANCOVA	Analysis of co-variance
ANOVA	Analysis of variance
ARSMA	Acculturation Rating Scale for Mexican Americans
ASASFA	A Short Acculturation Scale for Filipino Americans
BMI	Body mass index
CAAI	Culinary Acculturation Assessment Inventory
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
CI	Confidence Interval
df	degrees of freedom
EFA	Exploratory factor analysis
FFQ	Food frequency questionnaire
ICC	Intraclass correlation coefficient
IQR	Interquartile Range
KMO	Kaiser Meyer Olkin
MLR	Multiple Linear Regression
N/A	Not applicable
NFI	Normal Fit Index
NHANES	National Health and Nutrition Examination Survey
OR	Odds Ratio
PCA	Principal Component Analysis
PCFA	Partial confirmatory factor analysis
RMSEA	Root Mean Square Error of Approximation
SASH	Short Acculturation Scale for Hispanics
SD	Standard Deviation
SES	Socioeconomic status

SL-ASIA	The Suinn-Lew Asian Self-Identity Acculturation Scale
T2DM	Type 2 Diabetes Mellitus
TLI	Tucker-Lewis Index
US	United States
WHO	World Health Organization

FIGURES

TABLES

1. INTRODUCTION

1.1. Theoretical Approach

The number of international migrants worldwide has been increasing rapidly, reaching 258 million in 2017, up from 220 million in 2010 and 173 million in 2000 (1). Both voluntary and non-voluntary immigration, which results in a dramatic shift in people's environmental and life-style factors, is anticipated to continue to increase globally (2). Acculturation related dietary changes modify health risks in less than a generation by either creating unique health problems for immigrants or lowering those risks if people adopt a healthier diet (3). Unfortunately, evidence mostly points out to health disparities for many immigrant populations when compared with both the general population of the immigrated country as well as the populations of emigrated countries with prolonged residency (4). Therefore dynamic effects of immigration on nutrition and health transition should be assessed as a public health priority to inform prevention strategies for this potentially vulnerable group for diet-related disparities (5, 6). Understanding the process of dietary acculturation, which is the mechanism by which immigrants adopt the dietary practices of the host country, for each country is essential for creating effective nutrition and health related policies for immigrant populations (3, 5).

Since the early 2000s, food frequency questionnaires (FFQs), 24-hour dietary recalls, and short screeners on food and beverage consumptions have been seen as adequate to capture dietary acculturation (7, 8). However, while these tools capture dietary intake, they do not capture the culturally based culinary habits such as food preparation style, meal schedule, ergonomics of eating, and meal structure; all of which have both physiological and behavioral impacts on dietary intake (9-11). Therefore, the scope of measuring the effects of the new culinary environment on health should be enlarged to measuring "culinary acculturation" that incorporates dietary acculturation as a sub-domain in addition to culturally based food habits (3). Failure to adequately capture the extent of culinary behaviors within differing groups of social class, gender, minority vs. majority groups, immigrants vs. local people would hinder progress towards combatting social inequalities that arise from diet-related disparities (4, 12). Distinct from speaking the language of a host country or

adapting to new societal norms, culinary behaviors are partially practiced privately among individuals (e.g. eating while sitting on the floor or holding women primarily responsible for food preparation), thus detailed research into these behaviors could shed light into everyday practices that influence health (13).

Despite dietary acculturation assessment lacking the comprehensiveness of culinary acculturation, even its current assessment of immigration-related nutrition and health related changes is also far from optimum. Several studies that measured the dietary acculturation on immigrants' health have had shortcomings in terms of using non-validated scales or relying solely on proxy measures, assessing short term food and beverage intake (e.g. consumption for the previous month), asking about the presence of limited number of food items in the household, determining dietary acculturation to Western diet without specifying the culinary cultures in North America, and using untailored FFQs for immigrants or employing single 24 hour dietary recalls (7, 14-17). Furthermore, lack of standardized country-specific assessment tools creates difficulty in comparing the effect of dietary acculturation even among the same immigrant groups that immigrate to same countries (7, 8, 18).

As a case study, Turkey was selected due to its current diverse immigrant populations including asylum seekers, refuges; as well as expats, international students or people that move to Turkey after retirement (19). Turkey, historically a country at the crossroads of global migration has become a big hub of immigrants to a degree that from 2010 to 2018, Turkey's population increased by 9.6 % from 73.722.988 to 80.810.525 people; whereas the registered immigrant population increased by 1927% from 190.531 to 3.862.600 (20, 21). Since the health status of immigrants has become an important public health issue in Turkey, a critical public health objective should be to capture the culinary acculturation of different immigrants to Turkish cuisine.

1.2. Aims and Hypotheses

The primary aim of this study was to first quantify Turkish cuisine in a visual scale format, and then assess the constructed inventory's validity and reliability among first-generation immigrants and a reference population from Turkey. This instrument was

designed to carry the dietary acculturation research forward by incorporating traditionally under-studied culinary exposures with the purpose of seasoning nutritional epidemiology with more culinary tools and at the same time making culinary research heartier with more robust measurement tools. Consequently, the secondary aim of this study was to assess the level of culinary acculturation of first-generation immigrants in the study sample and compare the results with one another along with a reference population from Turkey. For the secondary aim, the following research questions were examined:

(1) Does culinary acculturation level differ between Turkish and immigrants' participants who have high vs. low acculturation? H_0 = Turkish and immigrant participants' culinary acculturation levels to Turkish cuisine do not differ H_a = Turkish participants' culinary acculturation levels to Turkish cuisine are significantly higher than highly acculturated immigrant participants and highly acculturated immigrant participants' culinary acculturation levels are significantly higher than low acculturated immigrant participants

(2) Does culinary acculturation level differ between different country category participants? H_0 = There is no significant difference between differing regions in terms of culinary acculturation to Turkish cuisine; H_a = There is a significant difference between differing regions in terms of culinary acculturation to Turkish cuisine;

(3) Are culinary acculturation scores of immigrants and their body mass index (BMI) associated? H_0 = Culinary acculturation scores of immigrants are not associated with BMI levels of immigrants. H_a = Immigrant participants with higher culinary acculturation to Turkish cuisine are more likely to have higher BMI levels

For the exploratory aim, the ranking of culinary acculturation to Turkish cuisine in between different country categories were created based on geographical and/or cultural similarities.

2. GENERAL OVERVIEW

2.1. International Immigration

Migration is the geographical relocation of people between specified boundaries for socio-economic, political, and environmental reasons (21). It could take place domestically or internationally and both forms of immigration are reported to be on the rise (1). To give a comparison, if 2017 international migrant population of 258 million people were to make up their own country, it would have been the fifth most populous country after China, India, United States, and Indonesia (1, 22). In terms of international immigration, a main distinction could be made in terms of voluntary and non-voluntary migration to be able to contextualize the various possible risk patterns and exposures of different migrant groups (23).

Voluntary international migrants are called *immigrants* and their immigration purposes could be education, family reunification, search or requirement of jobs, post-retirement settlement, etc. that would grant them an upgraded pursuit of a better life quality (23). According to the United Nations, an international immigrant needs to stay in the new country for at least a year to be called an immigrant (22). On the other hand, conflicts, wars, deteriorating political environments as well as human rights violations such as genital mutilation could force people into becoming an *asylum seeker* in another country (21, 22). Asylum seekers apply for being a *refugee* and could remain in the host country until a decision is made for them to be either accepted to the country that granted them temporary asylum or arranged to be resettled to a third country or denied a refugee status (21, 22, 24). Refugees are civilians who have not committed war crimes and have the same rights of a legal resident (22). Therefore, upon completion of naturalization requirements they can become nationals of the host country that they reside (22, 25). There could also be *irregular migrants* who stay or work in other countries without a legal immigration authorization or legal documents (22). The final group of immigrants are classified as *illegal immigrants* and the term is restricted for people that were smuggled or trafficked illegally (22). The phenomenon of international migration not only alters the population dynamics of the origin and host countries, but also it is associated with socioeconomic, lifestyle, environmental, and health related changes among all groups of migrants.

Although most immigrants are relatively healthier to be strong enough to be able to migrate to another country, they often experience stressors throughout the migration process due to decreased level of social support, perceived discrimination and allostatic stress load (26-28). Regardless of their immigration status all foreign-born individuals could be considered as vulnerable groups with a variable degree since they have shown to have limited access to health resources due to factors ranging from unawareness about the specifics of national health system of the host country, lack of language skills to limited financial capabilities (29, 30). Therefore, immigrant populations might have different needs compared to the citizens of the host countries (31). If immigrant populations are perceived as contributors to the cultural richness and welfare of their host countries, their special characteristics should be monitored to understand their immigration process to ameliorate their experiences and health (32, 33).

As opposed to the perspective of cost-intensive migrants in potential ill-health that could drain the limited resources of the host country (34, 35), research on immigration and health should develop a more impartial approach that highlights the health priorities that result from the interaction between immigrants and the host culture (36).

2.2. Immigration and Acculturation

After immigration, the process of foreign-born individuals to adapt and/or adopt the attitudes, customs, values, and behaviors of the host culture with prolonged contact is defined as acculturation (37). Therefore, acculturation is a necessary process for the immigrants to better function in the new societies that they are trying to incorporate themselves into (38).

Immigration results in voluntary and imposed changes among the interacting immigrants and the host society that could affect physical and psychological well-being of individuals (37, 39). In theory although the process of acculturation creates changes both in immigrant and host culture, in practice acculturation results in greater and faster changes in the immigrating group compared to the host culture (40, 41).

For characterizing the acculturation process of immigrants, theorists are mainly divided into two camps in terms of conceptualizing this construct as either

unidimensional or bidimensional. The unidimensional camp argues that the framework lies along a single direction of acculturation that goes from an orientation of their origin culture towards the host culture for immigrants (42), the bidirectional framework stipulates that immigrants acculturate towards host culture, yet without losing their origin culture (35, 42-44). The pre-immigration context of voluntary vs. forced immigration have differing ramifications on the adaptation process of immigrants vs. refugees or asylum seekers. For voluntary migrants, as the contrast level between host and origin countries in terms of income, geography, culture, and urbanization increases, acculturation becomes slower and more difficult (3-5, 45). Therefore, the context of immigration should be highlighted in research studies that focus on immigrants.

The two theoretical perspectives of unidimensional and bidimensional understanding affect the empirical measures employed in research studies. Measuring acculturation from a unidimensional approach could be done with capturing language acquisition, interpersonal relationships, age at immigration, length of stay, proportion of life spent in the new country, generational status, etc. to assess the exposure of immigrants with the host culture. On the other hand, the bidimensional framework uses scales and indices that could identify four distinct acculturation strategies of assimilation, separation, integration, and marginalization as conceptualized by Berry and Sam (46). However, despite the differences in the theoretical understanding of both measures, they were shown to be highly correlated with one another in terms of capturing acculturation (39).

Measuring acculturation allows researchers to examine the notion of "immigrant health paradox", which is the notion of healthier first-generation immigrants (compared to origin and host populations) when these immigrants developing worse health-related outcomes as they acculturate with prolonged residence in the high-income host countries and this condition is referred as the healthy migrant effect (5).

When immigrants move from a low or middle to a high-income country, they have mostly been shown to adopt high risk health behaviors such as having energy-dense dietary patterns, being sedentary as well as increased tobacco use, alcohol

consumption that are associated with chronic diseases ranging from cardiovascular diseases to asthma and allergies (35, 47, 48).

One important aspect that determines the health of an immigrant is her nutrition status, which is affected by dietary and culinary modifications that become unavoidable after migration due to changing life styles, lack of traditional ingredients and convenience of adopting new ingredients and cooking styles (13, 49). Despite its significance, the relationship between nutrition and immigration as a social determinant of health is understudied especially in countries that have relatively recently become immigrant destinations. Since nutrition could be perceived as one of the cheapest forms of healthcare, elucidating possible diet related disparities for immigrant populations is important for combatting them (4).

2.3. Immigration, Diet Related Disparities, and Dietary Acculturation

Nutrition and diet are among the key underlying reasons of health disparities (4). When there is a significant difference in health-related risks in certain sub-populations compared to the dominant population due to immigration status, gender, disability, sexual orientation, having low-income or low education, etc., these groups carry an unequal burden of disease risk (50). Among the factors contributing to this health inequity is the discrepancy in nutritional status of differing sub-populations that are referred as diet related disparities (4). The diet related disparities could be more salient for immigrants because of the altered context of food consumption.

Since all humans need to eat in order to survive, this basic need has created cultures around this act beyond providing nutrients (13, 49, 51). Differing culinary traditions became part of people's identities. The sense of identity is a flexible social construct and immigration could enforce changes in the sense of identity in many ways, among which dietary acculturation is one of them (52).

Dietary acculturation is a complex process for immigrants to adopt the dietary patterns of the immigrated country with the changing environment (3, 5). There are a couple of models that explain how the process of dietary acculturation occurs. Satia proposed a preliminary model of dietary acculturation that is influenced by the dynamic relationship between socioeconomic, demographic, and cultural factors of the

immigrants coupled with an exposure to host culture that result in changes in psychosocial and environmental factors, taste preferences, food procurement, and food preparation (45) (Figure 2.1)
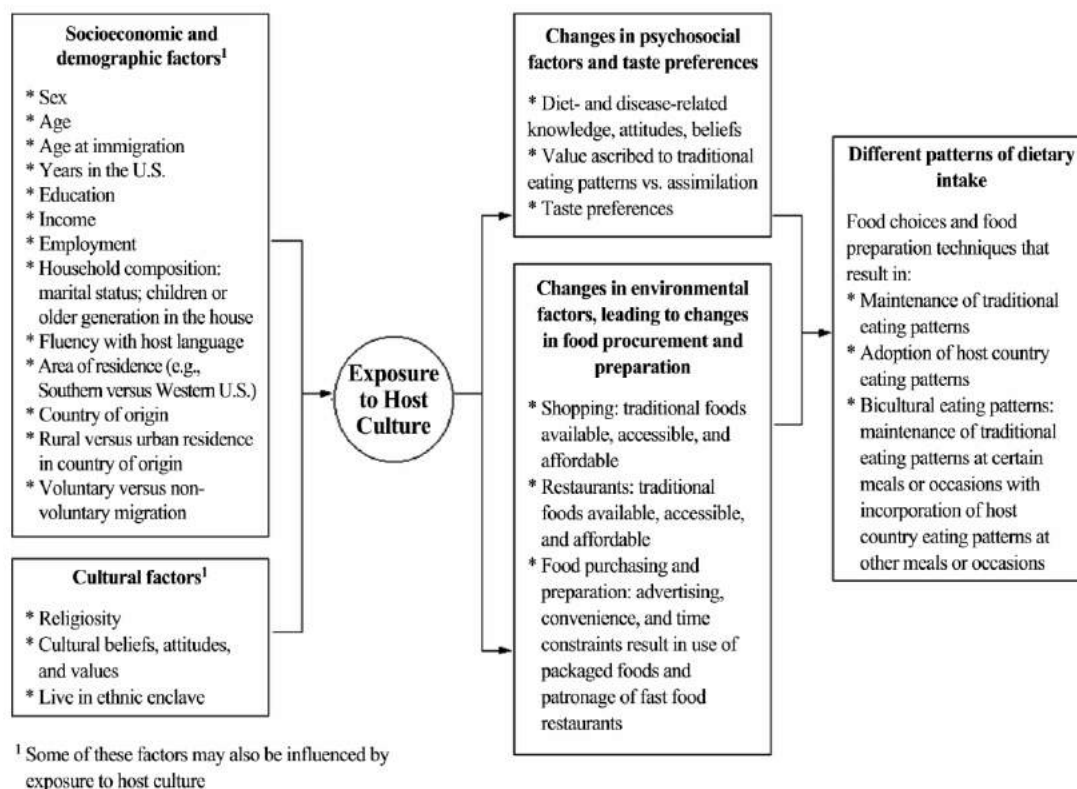
Figure 2.1. Satia's proposed model of dietary acculturation for racial/ethnic and rural-urban migrant groups (45)

Another famous cultural food habit grouping model is called Core and Complementary Foods Model (Figure 2.2) (13, 49).
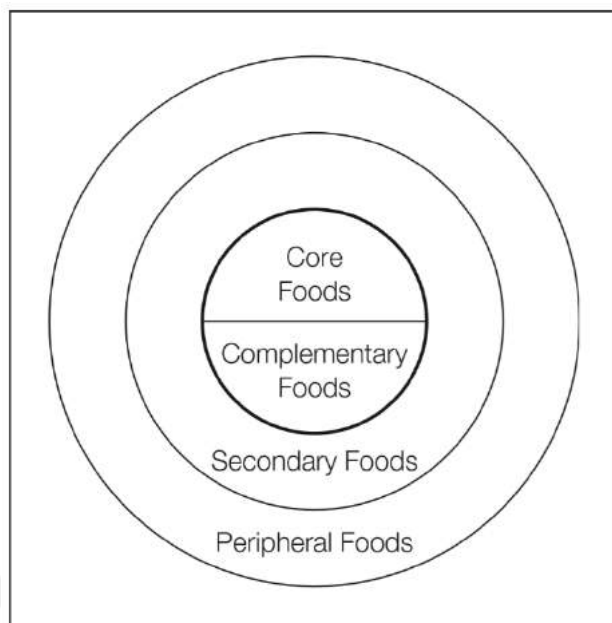
Figure 2.2 The core and complementary foods model (13, 49)

In this model foods are grouped according to their consumption frequencies. Core foods indicate the most commonly consumed staples for each culinary culture such as bread, rice, potato, cassava, plantains, etc. (13, 49). Secondary foods are the ones that are consumed once or a couple of times per week such as beef, chicken, specific fruits or vegetables. Peripheral foods are the ones that are consumed quite infrequently, and these foods do not have to belong to the person's culture per se, as they generally indicate a personal rather than a cultural group preference (13, 49). Kocturk also has a model that is quite similar to the model mentioned above, however she prefers to categorize the food into staple, complementary, and accessory foods (53, 54). In both models, complementary or secondary foods are used to enhance the palatability of the core foods or staples that have a neutral taste and high amount of carbohydrates. According to Kocturk's model dietary patterns revolve around the culture-specific staple foods, which have a strong cultural significance and therefore could be more difficult to change for the first generation immigrants (53, 54).

Although the effect of immigration on diet has been captured in intercultural nutrition studies since 1980s, the results have not shown a consistent pattern with time.

In the United States, Latino individuals come from over 20 countries from Latin America and Caribbean, and their acculturation was associated with poor diet quality and overweight with an increased risk for Type 2 Diabetes Mellitus (T2DM) (55).

Data analysis from National Health and Nutrition Examination Survey (NHANES) from 1999 to 2009 demonstrated that successive generations of Mexican origin children were found to have poorer diet quality compared to prior generations if they come from lower SES (38).

Another childhood disadvantage was shown for second generation Mexican-origin 2 to 5-year-old children in US. They had higher average BMI and obesity levels compared to non-Hispanic white children of the same age group, especially for the boys compared to girls (56).

Poorer diet quality and higher rates of overweight and obesity was also shown for second generation Thailand/Laos-born Hmong children aged 9-18 years in US with higher levels of dietary acculturation (57).

In a study that measured the relationship between acculturation and Latino fathers' feeding-related parenting strategies; acculturation was shown to be related to undesired practices of controlling and disciplining strategies that impact the healthy eating negatively (58).

Furthermore, in a study that examined the relationship between length of residence and nutritional status of Vietnamese wives that immigrated to Korea, a positive relationship was found between the length of residence and central obesity (59). However, when 1999-2008 NHANES data was analyzed for Latino sub-populations in US, lower levels of acculturation was found to be associated with food insecurity and smoking (60). In another case-control study that was conducted among Latinas in an urban setting in US, food insecure participants were 3.3 times more likely to have T2DM, 2.45 times more likely to have higher waist circumference, and 3.75 times more likely have physical inactivity (61). In addition, lower level of acculturation was associated with vitamin D deficiency among East Asian immigrant women living in Sydney, Australia (62).

Although Puerto Rico is a United States territory and its citizens are considered American, the island has a very different culture, language, and has been denied the status of an official state, therefore Puerto Ricans' acculturation to US has been captured in different studies as well. In a cohort of acculturating Puerto Rican adults living in Boston, US food insecurity was related to faster cognitive decline (63). When their acculturation was assessed with psychological orientation, higher income earning Puerto Ricans were found to have better diet quality (64).

Overall, acculturation contributes to diet-related disparities at differing levels. However, the role of acculturation in immigrants' dietary behaviors remain to be inconsistent due to discrepancies in acculturation constructs employed in studies as well as lack of valid and reliable measures. Therefore, these comparisons among differing immigrant groups and/or the host population are difficult to interpret and generalize for this dynamic and multidimensional process (4, 55).

2.4. Dietary Acculturation and Its Current Assessment

In order to better understand the current assessment of the construct of dietary acculturation, three databases of Pubmed, CINAHL, and CAB were searched simultaneously from inception till September 29, 2017 using the master algorithm with the following key words and MESH terms: acculturation, dietary acculturation, food acculturation, nutrition survey, nutritional status, feeding behavior, cooking, cooking and eating utensils, immigrants, culinary, cuisine, eating, food preference, food availability, food habit, food frequency, food selection, food choice, food pattern, food access, food adaptation, integration, assimilation, emigration, adaptation, mealtime, and food environment. After excluding the duplicates, 3418 articles were reviewed and only seven articles have used special dietary acculturation instruments (Table 2.1.). The rest of the studies were consistent with Satia's paper that found common approaches such as using single item measures of acculturation in general, acculturation scales, and dietary intake assessments. Most commonly used food-based assessments were done by using FFQs, 24-hour dietary recalls, food diary, mixed methodology that incorporated two of the food intake assessment methods, and certain dietary behaviors related to fat and fiber intake.

In general proxy measures of acculturation were used as single or multiple item measures and the most commonly used ones were generation status, language proficiency, length of stay. Majority of the studies were reported on Latino, Asian, and African populations that had immigrated to Western countries.

The acculturation scales in the reviewed studies were developed and used for specific groups of immigrants such as Chinese, Filipino, Hispanics, South Asians, Korean. Japanese, etc. Those scales included questions on language proficiency, the language preferred in different settings such as media sources, social relationships, generation status, geographical history, years of stay, age at immigration, etc. The acculturation scale items were used to create composite scores with dichotomous interpretations of high vs. low acculturation with median split method or the scores were analyzed continuously or based on tertiles with categorical levels of acculturation. Among the most commonly used acculturation scales are Acculturation Rating Scale for Mexican Americans (ARSMA) 1 and 2, A Short Acculturation Scale for Hispanics (SASH), A Short Acculturation Scale for Filipino Americans (ASASFA), The Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA), Cuellar's scale, Vancouver Index of Acculturation, Acculturation Scale for South East Asians (42). To explain some of these scales, ARSMA 1 and ARSMA 2 measures Mexican Americans' acculturation in five levels, namely as very Mexican, Mexican-oriented bicultural, true bicultural, Anglo-oriented bicultural, and very Anglicized (65). SASH has also two versions like ARSMA, the first version has 12 items whereas the second version has 4 items that measure acculturation of Hispanics with 5-point bipolar scale with a cut-off point of 2.99 (high acculturation for points above this, and low acculturation for points below this) (66). ASASFA measures first-generation Filipino Americans acculturation in a unidirectional manner (67). SL-ASIA measures Asian Americans acculturation and it was modeled after ARSMA (68).

Most of the food-based assessments on immigrants were done with either standard FFQs or with tailored versions of them for the specific origin countries or regions. Simple FFQs, semi-quantitative FFQs, and FFQs with portion size alternatives were used in those studies (53, 69, 70). The immigrant studies that used 24-hour dietary recall methodology were conducted with one to three administrations among which the first one was done in person, and the rest being through phone interviews (71, 72).

Photo assisted portion size estimation was commonly used in the initial 24-hour dietary recall and the following recalls were done with a timeframe of one to three weeks in between each interview. The studies that used mixed methodologies combined food diary with a single 24-hour dietary recall and a short FFQ with a single 24-hour dietary recall (73, 74).

The seven studies that used special dietary acculturation instruments mostly captured food and beverage consumption of the origin and host countries, however most of them used non-validated questions (Table 2.1)

Table 2.1. Summary of findings of dietary acculturation assessment methodologies.

Author	Study Design	Sample	Dietary Acculturation Scale Content	Response Options and Scoring Information	Validity and Reliability Assessment
Satia et al., 2001 (7)	Cross-sectional study design	Random sampling of 244 Chinese-American and Chinese-Canadian women	Combination of Chinese Dietary Acculturation Scale (5-item) and Western Dietary Acculturation Scale (10-item). Items were found from the results of qualitative research studies.	Respondents were asked whether these foods are currently in their household for all the 15 questions (yes or no response options). Response options were coded as 0 and 1. A mean summary score for each scale was calculated with the non-missing items and the resulting inventory scores were divided into tertiles of high, intermediate and low	Validity → fair to good internal consistency Reliability → Cronbach alpha was 0.55 for the Chinese scale and 0.72 for the Western scale
Park et al., 2003 (75)	Cross-sectional study design	Convenience sample of 225 Korean American mothers who are living in California, US	Two-part questionnaire: First part → 7 adapted questions from unidimensional acculturation measures Second part → questions about the dietary habits of the family, such as the frequency of weekly meals eaten at home and outside from home, consumption and preparation frequency of Korean foods, preparation of kimchi specifically, and 4 favorite foods of the family. Separately, mothers were also asked about 5 favorite dishes of the family in general and 5 favorite dishes they prepare for special occasions and guests.	Open ended and multiple response options. No final scoring was used, correlations were chi-square tables were used to interpret results	Validity → Acculturation questions were tested for internal validity Reliability → (Cronbach α≥0.7) and used to divide subjects by acculturation stage.
Oyster and Yung, 2010 (76)	Cross-sectional study design	300 Chinese immigrants who are attending free cardiovascular risk screening at a New York City community health center	Combination of Chinese Dietary Acculturation Scale (5-item) and Western Dietary Acculturation Scale (10-item). Items were found from the results of qualitative research studies.	Respondents were asked whether these foods are currently in their household for all the 15 questions (yes or no response options). Response options were coded as 0 and 1. A mean summary score for each scale was calculated with the non-missing items and the resulting inventory scores were divided into tertiles of high, intermediate and low	Previously validated by Satia et al. (7) Reliability → Cronbach alpha was 0.747 for the Western and 0.338 for the Chinese scale.

Table 2.1. (cont'd). Summary of findings of dietary acculturation assessment methodologies.

Author	Study Design	Sample	Dietary Acculturation Scale Content	Response Options and Scoring Information	Validity and Reliability Assessment
Lesser et al., 2014 (8)	Cross-sectional study design	207 South Asian immigrants from Canada (this was a sub-study of the Multi-Cultural Community Health Assessment Trial (M-CHAT) (77)	Questions were asked on nutrition knowledge and awareness, and the perceived changes in dietary patterns and food preparation since immigration	All the questions had 5-point Likert-scale response options, with frequency results shown in three categories as either, decreased change/less often/harder (combined responses of 1 and 2), no change (response 3) or 'increased change/more often/easier (combined responses of 4 and 5).	Validity and reliability were not assessed.
Van Hook et al., 2015 (78)	Secondary analysis of repeated cross-sectional NHANES from 1999/00 till 2009/10 NHANES (publicly available data)	27,365 adults aged 20–84 years, both Americans and immigrants were included in the analysis	'Food Similarity Index'' (FSI) – an index created by the 24 hour dietary recall data of NHANES	24 hour dietary recall data, so the responses came from open ended questions	FSI had face validity → positively correlated with common American food consumption and negatively correlated with Hispanic and Asian food consumption. Also, FSI was correlated with the duration of U.S. residence and generational status among all racial/ethnic groups among Hispanics. FSI was also negatively correlated with the Healthy Eating Index 2010. Reliability → Not assessed
Vargas and Jurado, 2015 (79)	Cross-sectional study design	210 first-generation immigrants and convenience sample was used	Dietary Acculturation Questionnaire for Filipino Americans (DAQFA), which has 15 items on food and dietary behaviors. DAQFA measures Filipino and western dietary acculturation.	The response options of DAQFA are either yes or no based on the participants' dietary practices in the past month. A higher score in the Filipino section is indicative of Filipino eating pattern maintenance and a higher score for Western foods indicates acculturation to Western pattern	Validated previously Reliability for this study → Cronbach's alpha was found to be 0.74.

Table 2.1. (cont'd). Summary of findings of dietary acculturation assessment methodologies.

Author	Study Design	Sample	Dietary Acculturation Scale Content	Response Options and Scoring Information	Validity and Reliability Assessment
Venkatesh et al., 2017 (80, 81)	cross-sectional web-based survey	153 Asian Indian-American adults	Asian Indian Dietary Acculturation Measure (AIDAM) - 50 items. The items measured eight underlying themes that may influence dietary acculturation behaviors: 1-Social network (9 items); 2- Health and nutrition (8 items); 3- Media (2 items); 4- Taste preferences (12 items); 5- Restaurants (3 items); 6- Food preparation practices (10 items); 7- Food purchasing (3 items); 8- Religious and cultural beliefs (3 items).	All the questions had 5-point Likert-scale response options (1 = strongly agree…5 = strongly disagree). Dietary acculturation is measured with traditional Asian Indian dietary practices at one end and western/non-Indian practices on the other. The responses for all the items are added and divided by the number of items to get a final score ranging from 1 to 5, where 1 indicates Asian Indian dietary practices and 5 is indicative of non-Indian dietary practices.	Validity → content validity with dieticians + prior validity; convergent validity with NI-FFQ (r=.265) and divergent validity with AI-FFQ (r=-.432) Reliability → Rasch model analysis, all 50 items of AIDAM had reliability of 0.88

2.5. Moving Beyond Dietary Acculturation: Culinary Acculturation

Since solely measuring food and beverage intake might lead to misclassification problems, capturing culinary acculturation would provide a more detailed and accurate assessment. To elucidate this concept with examples, immigrants who are acculturating to a new culinary culture with later meals might experience shifts in their leptin, ghrelin, insulin, and glucagon secretion patterns that affect satiety, anthropometric outcomes, and adipose tissue functions due to changes in temporal eating patterns and disrupted circadian system (82-84). Plus, later dinners might shorten the digestion time before sleeping, so conditions such as reflux or lower sleep quality could be seen (85). Another understudied concept in migration studies is the changing commensality patterns. Commensality is eating together with others, which is an important social dimension of eating and food environment (86, 87). Eating alone has consistently been associated with increased nutritional risk, higher likelihood of having metabolic syndrome and abdominal obesity, especially among men (88, 89). Therefore, intercultural nutrition studies should also capture commensality. Furthermore, assessment of cooking is very important that a distinction should be made between immigrants that consume the food and beverages of the host country when given or purchased versus preparing these food and beverages themselves (13, 49). Moreover, a factor such as ergonomics of eating (e.g. eating while sitting on a high chair vs. low chair or on the floor) could alter stomach constriction that might affect the rate of gastric emptying and satiety (90, 91). Therefore, moving from a country where meals are consumed on carpeted floors to a country where meals are consumed while sitting on a high chair could change the ergonomics of eating, and altered posture might affect gastric emptying and the satiety rate. Considering all the factors above, advancing from measuring dietary acculturation to culinary acculturation would enable us to better quantify the immigration-related culinary exposures on health-related outcomes (Figure 2.3).
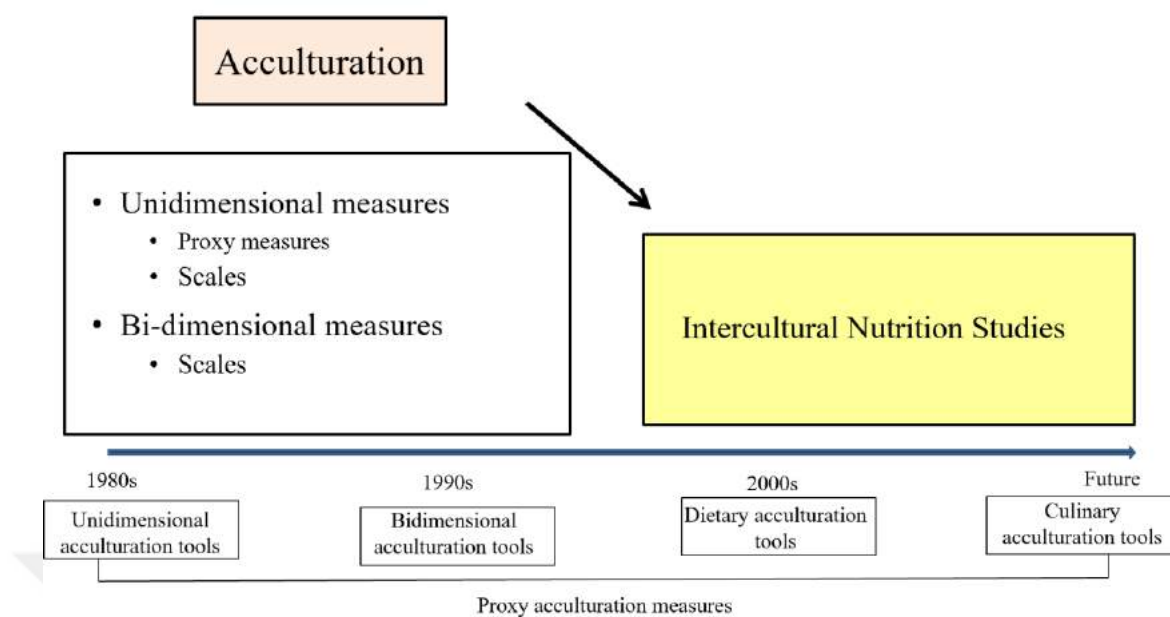
Figure 2.3 Transition of acculturation measurement for intercultural nutrition studies.

To illustrate this concept visually (Figure 2.4), if a culinary acculturation measurement tool were to be a Swiss army knife, the most used aspect of the tool, much like the knife section in the below model, would be dietary intake. But, just like a Swiss army knife would be incomplete without the other sections, measuring culinary acculturation would be incomplete without capturing the culinary exposures of food preparation, social consumption factors, meal schedule, and ergonomics of eating.
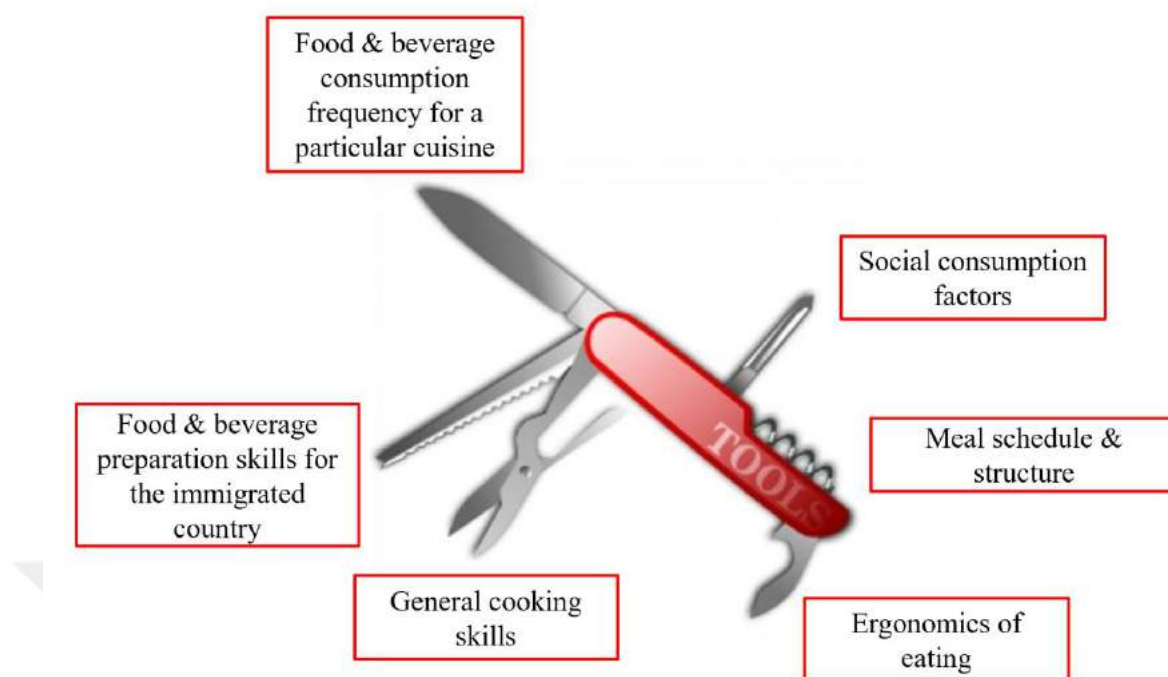
Figure 2.4. Defining culinary acculturation on an American swiss army knife model.

2.6. Turkey and International Immigration

Turkey is increasingly becoming attractive for immigrants coming mostly from countries that have cultural and geographical proximity especially if they have been exposed to active conflicts or poverty (92). Additionally, Turkey has lenient visa policies with multitude of bilateral agreements with many different countries, relatively straightforward process of property ownership for foreigners as well as providing government funded scholarships for international students (92, 93). Therefore, all those factors contribute to the rising number of immigrants in Turkey.

The phenomenon of more than 4 million Syrian refugees that Turkey has been hosting is familiar to researchers, journalists, and the lay public not only in Turkey, but also internationally. However, knowledge gap remains for the condition of "non-refugee" immigrants that come to Turkey in pursuit of a better education, employment, investment opportunities as well as intercultural marriage, family reunion or post-

retirement settlement. Even less well-known is the acculturation process of these immigrants to the new culinary environment.

Since immigrants are becoming an integral part of country demographics, the process of acculturation needs to be understood from all aspects. Therefore, Turkey was selected as a case study for this thesis research.

2.7. An Overview of Culinary Culture of Turkey

The history and the everchanging geography that Turks lived, migrated, and settled have defined the constantly evolving Turkish cuisine (94). During more than 4000-year history of Turkish people, they first lived in Central Asia, then they moved westward and established different settlements, states, and empires among Asia, Middle East, Europe, and North Africa (95).

After a long period of nomadic lifestyle that began in Central Asia, Turkish people based themselves in Anatolia in the early 11th century where they first established the Anatolian Seljuk State till the founding of Ottoman Empire in 1299 (95). Ottoman Empire ruled for 624 years among three continents until the foundation of Turkish Republic that allowed for the citizens to self-rule and determine their own faith thanks to democracy for the first time (95).

Parallel to that, the reflection of the history and geography manifests itself in Turkish cuisine and Halici divides the culinary periods of Turkish cuisine as Central Asian, Anatolian Seljuk, Ottoman Empire, and Republic eras (51, 96) (Figure 2.4). To follow that historical order, initially the food culture was centered around the necessities of the nomadic culture, in which basic dairy products, meat, and simple versions of doughs and basic version of bread-like staples were consumed (51).

The Eurasian steppe region between China and eastern Europe hosted numerous different groups of pastoral nomads for the last 3000 years (97). Various forms of fermented dairy product consumption were central to nomadic foodways that even the sedentary societies have adopted the terminology of fermented food products from the

steppe world, such as yogurt and ayran (98). Nomads also consumed meat from the herds that they raised, but since limited number of animals provided milk, excessive meat consumption has never been the case in nomads' diets till they established permanent settlement (97). Some other sources of meat were hunting, which was done as part of military training (97). Throughout nomadic life, limited number of slaughtered animals were used efficiently as sources of meat and fat (97). Especially sheep's tail and adipose tissue fat were rendered into oil and used in boiled dishes (97). Since the amount of fat was limited, frying was uncommon for nomads as opposed to settled people of China, and boiling was the most common method of cooking (97). Boiling food with water not only increased the liquid intake of people that were living in barren steppe environment, but also helped to extend the limited sources of meat (99). Despite the collective culture of nomadic life, there was a distinction between rich and poor (97). However, everybody shared food altogether as social status lied both in sharing food with others as much as having it (97).

Then, as people transition to a more settled life, they started enriching their diet with more meat, agricultural varieties of wheat, vegetables, fruits as well as being influenced by the cultures that have been established in Anatolia (51, 100). Despite Turkish people coming from Central Asia, due to their nomadic culture's assimilation to Western Asia, bread became the main staple (97). The dominance of bread as the main staple continued during the permanent settlement era of Anatolian Seljuks and it accompanied stew type of warm meals such as *kalye, borani, sogurme*, and more stew-like kebabs (100). The popularity of kebab consumption increased as Turkish people came into contact with Abbasid (Arabs) and Safavid (Persians) culinary cultures (94, 101, 102).

During the Seljuk Era, according to Rumi's writings Dervish convent doctrines and customs contributed to the culinary culture (103). This was mainly due to the privileged status and the governmental endorsements of the Dervish convents not only in the Anatolian Seljuk Era, but also in Ottoman Empire (103). The novice Dervish trainings started in the kitchen with preparing the foods that were complementing the Dervish rituals and the notion of "cooking" was considered to be the spiritual

equivalent of maturation and evolution (103). Culinary culture of Dervish convents attributed special meanings to each food group as they believed the foods represented elements of human life such as soups represented water, meat and vegetables earth, *pilav* and *borek* fire, and egg dishes represented different generations. Overall, the culinary legacy of convents enabled the mix of Central Asian nomadic foodways with Arabic and Farsi food influence that came through geography and Muslim culture (103). It was again these convents where Turkish coffee and Noah's pudding (*asure*) became integral parts of Turkish culinary culture for many years to come (103). According to Rumi's writings, the cuisine had already incorporated a significant amount of vegetables and legumes, which were agricultural products of the Middle East (97).

Despite bread being the main staple for all the periods of Turkish cuisine, rice and/or bulgur had never lost its culinary importance and they could be considered as the second most dominant staples in the cuisine finding their way either served as a dish themselves in the form of *pilavs* or at the least being part of soups, casseroles, dolma varieties, and even in desserts like *zerde* and rice pudding (51, 100, 104).

Later, as Ottoman Empire enlarged its rule, a sophisticated palatial eating culture started to evolve and incorporated culinary elements from former Byzantine Empire, Rumelia (the Ottoman territory, which was in Europe), North Africa, and the Middle East (51, 94). Although the golden age of culinary innovations that were commonplace in the palace and the elites of the sultanate that lived in special mansions called "*konak*"s, the subjects of the empire, who were referred as "*teba*" by the Sultan (i.e. the citizens of Ottoman Empire that were paying taxes depending on their religion and income) had a much more modest culinary culture compared to the palace and the rich minority that lived around Istanbul (105). In Ottoman Empire, a breakfast meal was added to the two common meals of light midday snack, "*kusluk*", and dinner that were consumed during the nomadic and Anatolian Seljuk Era according to 17th century travel writer Evliya Celebi (51). The ergonomics of eating while sitting on a high chair and table did not emerge until Mahmud II and until that time everyone ate on the floor

from low tables (*sofra*), which were slightly heightened large round trays with spoons and hand (51, 94).

Throughout Ottoman Empire, majority of the food ingredients were regulated by the government (106). Especially price and weight of bread were strictly controlled (107). The same applied for meat that was mostly imported from the European regions of Ottoman Empire, but after the Ottoman-Austrian war defeat and the loss of territory, meat became expensive to import and the government had to stop regulating the meat prices strictly (106). Hence, meat prices went up, which decreased meat consumption. This paved the path for increased consumption and innovations of different types of dolmas and plant-based vegetable dishes that were cooked with olive oil (106). Before 18th century, olive oil was mostly used for cooking by non-Muslim Ottomans when Muslim Ottomans were using it to mostly light their oil-lamps (94, 106). After the second half of 18th century, vegetables from America such as tomato, green pepper, potato, green bean, etc. started to appear in Ottoman kitchens (94). In fact, tomato became a fundamental ingredient as it was included in any dish along with onions (94, 108). Soups continued to be the main dish of all income strata of society, from palaces to soup kitchens (*imarets*) in Ottoman Empire due to their nutritiousness and affordability both for breakfast as well as dinner meals (94, 105). Although *boreks* and dough-based foods were not consumed as frequently as soups, both savory and sweet pastries were diligently refined and continued to retain an integral place in the cuisine (94, 107, 108).

Starting with the Tanzimat Period from 1839, a modernization period brought Western influences on the culinary culture and the high-income circles started incorporating bechamel sauce, mayonnaise, Western desserts, etc. to their foods (51, 104).

Then, during the Republic Era, the culinary culture that differed between the palace and the so-called "subjects" of the sultan started to equate despite maintaining the local and ethnic differences of differing regions (51). Moreover, the national industrial production of food ingredients and savvy agricultural policies made the country self-

sufficient. Current Turkish cuisine consists of numerous varieties of breads, salads, soups, casseroles of red and white meat, vegetable, legume, and egg dishes, fish, *koftes, dolmas, mezes, pilavs, pasta* and *manti* varieties, *boreks, pides*, and deserts that are milk, dough, fruit, vegetable, and grain based (109). These varieties are a mix of traditional culinary legacies coming from central Asia as well as western countries' cuisines (109).

In Turkey, Traditionally, domestic culinary legacies passed from mother to daughter or from mother-in-law to daughter-in-law (110) and the eating out culture was mostly practiced for food items that were hard to cook at home such as doner or kebabs (51). After Turkish immigrants settled in Germany from 1960s, fast food restaurants that sold kebab and doner started to create an image of Turkish cuisine as equivalent to kebap and doner when in reality the variety of the cuisine included numerous regional dishes, desserts, beverages, food preparation and cooking techniques. Furthermore, it is also noteworthy to mention the effect of Turkey's 8th president Turgut Özal's economic policies that allowed global fast food chains to enter into Turkish market, which had an irreversible change in what people ate and established hamburgers, pizza, French fries, ketchup, coca cola etc. to be part of daily diet (51). Currently New Anatolian cuisine revival movement not only promotes regional ingredients and dishes from all around Turkey in restaurants, but also reminds the general public about the traditional flavors that are at the risk of being endangered for domestic consumption (111).

To conclude, the current cuisine of Turkey can be considered as a gestalt that incorporates Central Asian, Mediterranean, Eastern European, and many other minority (e.g. Kurdish, Armenian, Laz, Circassian) culinary legacies with its distinct foods, food preparation techniques, food consumption and meal structure patterns (96, 112, 113).
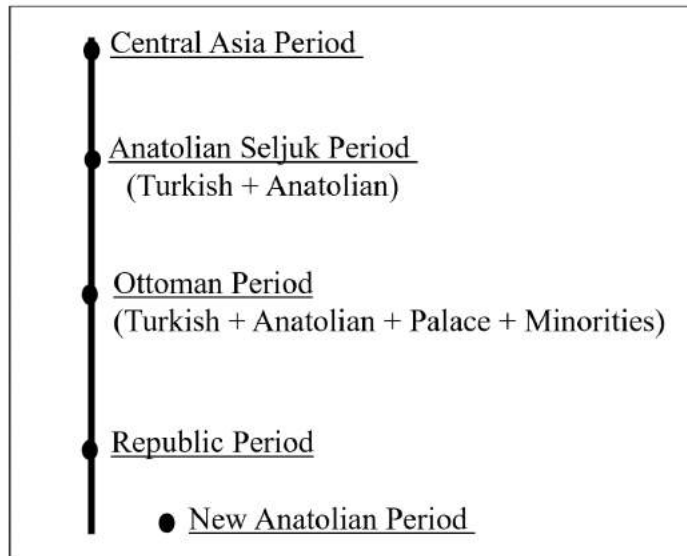
Figure 2.5. Historical Stages of Turkish Cuisine

3. STUDY DESIGN AND METHODS

3.1. Initial Development Process of Culinary Acculturation Assessment Inventory (CAAI)

The inventory development phase was carried out in two different stages: 1) inventory development; 2) validity and reliability assessment of the inventory among both first-generation immigrants and a reference population from Turkey (See Figure 3.1).

In order to conduct this research study, ethical permit was obtained from Hacettepe University's Non-interventional Clinical Researches Ethics Board (GO 16/527) **(Appendix 1)**. Informed written consent was obtained from all the participants. Further administrative approval from Özyegin University Scientific Research and Publication Ethics Board was obtained for conducting focus group studies **(Appendix 2)**.
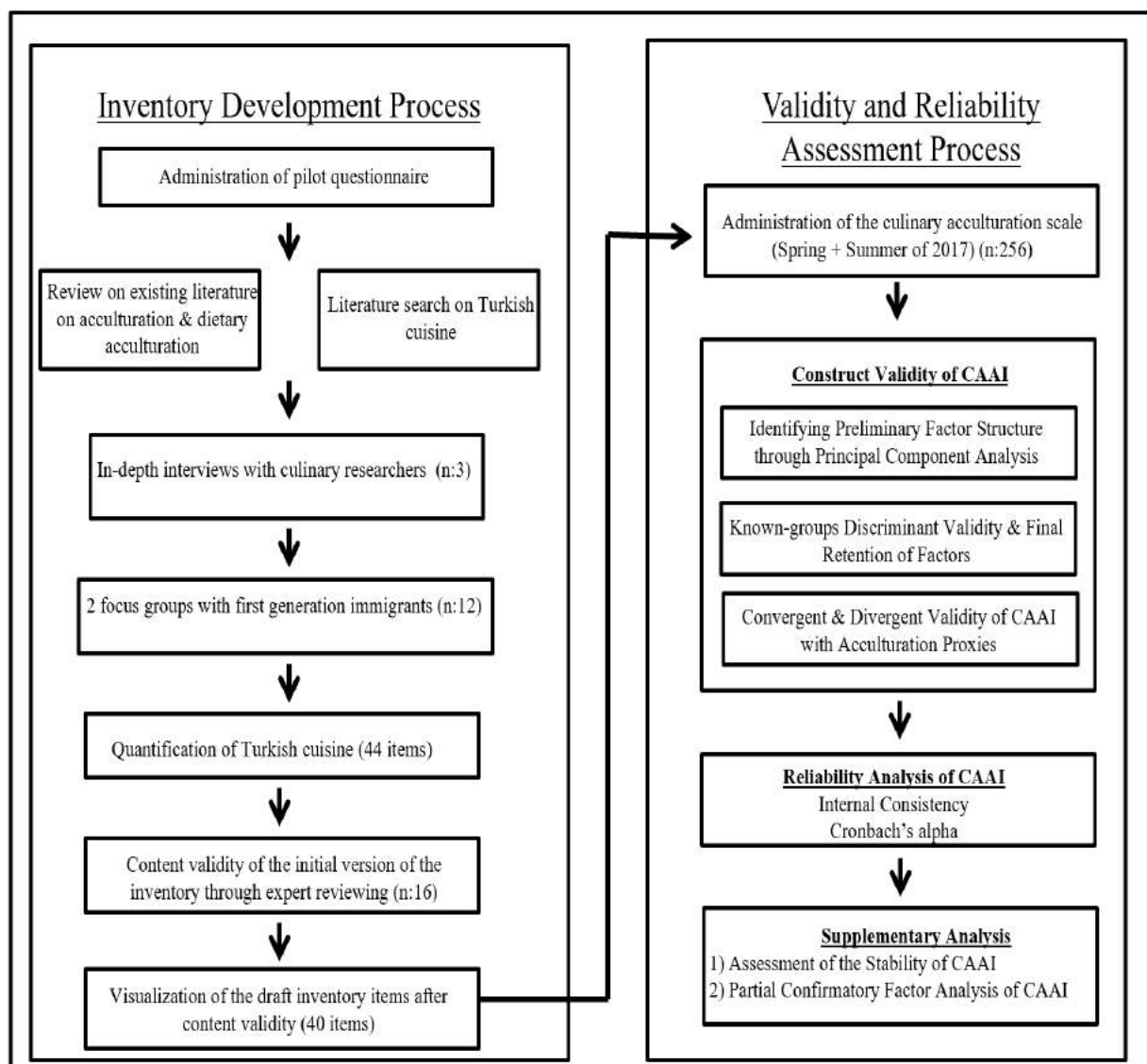
Figure 3.1 Flow diagram of inventory construction & validation processes for Culinary Acculturation Assessment Inventory – CAAI.

3.1.1. Item Development

During the literature review process on dietary acculturation assessment and Turkish cuisine; one pilot questionnaire on Turkish cuisine was administered to voluntary participants of Ozyegin University's academic staff, administrative staff, and students (n:42). The pilot questionnaire inquired about topics such as favorite and disliked foods and beverages from Turkish cuisine, foods they consume for breakfast, lunch, dinner, etc. (**Appendix 3**). Then, 3 in-depth interviews were conducted with experts on Turkish cuisine, namely Dr. Nevin Halıcı, Ms. Pricilla Mary Işın, and Mr.

Musa Dağdeviren with the aim of quantifying and capturing the complexities of the country's cuisine. Secondly, immigrant participants were recruited through Ozyegin University's faculty and graduate students to participate in focus groups. Initially, a pilot focus group was conducted with 5 participants. Then, two formal focus groups containing six participants each were held on the same week. In total of 12 participants (4 women, 8 men) were from Spain, France, Belgium, Bosnia, Lebanon, China, South Korea, Nigeria, U.S., and Venezuela. Purposive sampling strategy was employed, and all the participants have lived in Turkey for a minimum of a year; and half of the participants were married to Turkish spouses. Participants were informed that the purpose of the focus group was to learn about their experiences with Turkish cuisine in order to get a better idea of how to quantify it.

Open-ended questions were used following Satia's dietary acculturation framework and Kocturk's model of dietary change (3, 53, 54, 114). Selected examples of the included questions included the following: *(1) 'Could you please describe your experience with Turkish cuisine?' (2) 'What defines Turkish cuisine for you?' (3) 'What are some core ingredients that are essential to Turkish cuisine?' (4) 'How has been your process of getting used to the cuisine?' (5) 'How would you describe Turkish cuisine to a person from your own country if you want to familiarize them?' (6) 'What were some idiosyncratical foods or drinks that were very different from your expectations? Have you gotten used to them after a certain time?'* The responses from the focus groups were recorded and transcribed.

Emerging themes from the focus groups about participants' experiences with Turkish cuisine were variety in terms of ingredients and dishes, conservatism of the cooking methods and meal schedule, particular order of foods served in meals, over-reliance on tomatoes for cooking, spiciness, consumption of bread as the main staple, olive oil as the dominating oil, and soup as a fundamental element of the daily Turkish diet. Focus group participants unanimously shared positive attitudes about the variety of Turkish cuisine, which is shown in the following statements:

"Turkish cuisine means variety. So, I really appreciate the different culinary elements coming from different regions. Every day of the year you can eat something that you haven't seen before."

"I am surprised with the variety of food that you have here. I have been living in Turkey for 4 years and still I can taste new stuff."

However, despite acknowledging variety, the participants of the focus groups were mostly surprised about the conservatism in Turkish cuisine in terms of food preparation methods and inflexibility of the recipe ingredients.

"Turkish people want to stick to what they know for preparing food and they don't want to change anything. It must be a certain way and no other. So many times, I tried to do something creative and tried to cook a food and share with my Turkish girlfriend and she is like 'No, no, no!'"

"I guess conservatism is one of my complaints about the Turkish food, it can only be is made one or two ways. Like, if it is taze fasulye (green beans), it is gonna be onion, tomato, olive oil, and maybe just a little bit sugar and everything will always be the same. You can never see taze fasulye with lemon or mushrooms."

"They put olive oil, onion and tomatoes and always cook the same way to cook the meat and vegetable."

"In the dining hall, I like mixing different mezes with the main course foods to set out some variety, but that would weird out the Turkish people. So, I don't do that if I'm sitting with Turkish people cuz I'm afraid that it'd be disgusting for their lunch. But you know little leeks in with the chicken stir fry would be delicious I think, or you can add spinach to the pasta"

The participants had opposing views about the spiciness level of foods depending on their home country's cuisine. Some participants found Turkish cuisine to be highly spicy when others found the spice level to be quite right, and others found it to be rather bland. Similarly, participants had mixed reactions to Turkish cuisine's over reliance of yogurt and tomatoes.

"I still can't get used to the sourness of yogurt with salty food! They have this brilliant Iskender kebab, but why must they ruin it with yogurt?"

"I think the diet in Turkey consist a lot of dairy, so I think for health again it is a choice and I do feel really good here."

"A lot of tomatoes and too many tomatoes! How can you have green beans with tomatoes c'mon for God's sake?"

"If we are eating mushrooms, then we would expect to taste the mushrooms not the tomato! If we are eating broccoli, I expect to taste the broccoli not the tomato! So, we are expecting something from the ingredient itself. But what you are getting is kind of tomato taste. If you like tomato you will love Turkish food."

Participants overwhelmingly mentioned the popularity of bread and soup in Turkish cuisine;

"Turkish food is bread dominated, instead of rice dominated. Here there is no rice anything. Just rice itself as a side dish."

"Always bread. Turkish people eat bread with everything!"

"Back home we have soup as well, but not like you because you have soup with every meal! In Turkey, in every restaurant, café you have soup."

"The way you eat soup in Asian cuisine is different. In Asian cuisine, it is like a main course, but in here you have soup first and then the main course."

Several participants described meal schedules to be very different in Turkey compared to the meal times in their home countries.

"Now here, lunch time could start as early as from 11 to 11:30 am. This is breakfast for me!"

"In my country lunch starts from 2 to 3 o'clock in the afternoon. So, for me it is little bit early in here."

Last, but not least an overarching theme that came up during the focus group discussions were how participants enjoyed the quality of vegetables and fruits in Turkey.

"I consider myself as a former meat lover who almost turned vegetarian in Turkey. Compared to Europe, I found vegetables and fruits to be much tastier in here. And meat tends to be too expensive here than in Europe, so I eat a lot of vegetables now."

"Vegetables and fruits are much more delicious in Turkey! If I was gonna describe something unique to people from my country, I would describe different fruits that I tasted here which are really great like quince, yeni dünya (persimmon), and those kind of things…"

Using the literature search, in-depth interviews, and transcript analysis, 44 items were identified related to Turkish cuisine, which were broadly categorized as main ingredients (staples, complementary and accessory foods) (53, 54, 114), common starters, main courses, side dishes, desserts, beverages, cooking and food preparation method, and food consumption characteristics.

3.2. Validity and Reliability Assessment of CAAI

3.2.1. General Information on Validity and Reliability & Their Assessment

Measurement is a crucial process of science with generalizable and systematic approaches, which are required to ensure the correct assignment of numbers to analysis units or to link "abstract concepts to empirical indicants" (115). Therefore, high quality measurement gathers information to have a greater understanding on the relationship between empirical findings and an underlying unobservable concept (115), such as acculturation or dietary acculturation or culinary acculturation. The concepts of reliability and validity are useful when determining the degree of which empirical finding represents the theoretical concept or model. The first required quality of a measurement tool is its reliability, which is the repeatability, or at least the consistency, of the results when repeated measures are taken with the same instrument (116). The second required quality of a measurement tool is its validity, which is present to the degree of measurement tool to measure what it was intended to measure and the extent of nonrandom error presence (115). For example, an inventory for culinary acculturation assessment would have high validity if it measures the culinary acculturation construct rather than some other phenomena. Both reliability and validity are a matter of degree of the results obtained from the assessment tool (117).

There are multiple types of validity and each type requires a different assessment approach (115, 116). The first type of validity is called content validity and it has a fundamental role in the development of the scales (116). Content validity of a

measurement tool is about the relevancy of the content to the phenomena that is under study (116). In order to achieve a high level of content validity and a proper specification of the outcome measure, researchers need to include all the relevant items through literature review, expert consultation, and possibly a pilot test (115). Secondly, criterion-related validity requires a comparison of the developed tool with either a gold-standard or a reference measure of the outcome variable under study (116). For example, the results of a short screener on celiac disease diagnosis could be compared to the results of intestinal biopsy findings to gauge the criterion-related validity of the newly developed celiac disease diagnosis screener. However, since not every outcome measure is related to an already existing gold-standard measurement tool, this type of validity may not apply to all assessment tools. Third type of validity is called construct validity and its usefulness to assess an instrument's validity makes it more indispensable compared to content validity and criterion-related validity (115). Construct validity logic is based on the premise that the theoretically relevant empirical measurements ought to have similar patterns of direction, consistency, and strength (115). A very useful way to assess construct validity is by employing factor analysis (such as principal component analysis, maximum likelihood, generalized least squares, etc.) (118). Factor analysis allows researchers to compile myriad of measurements into smaller number of factors, hence provides a way for data reduction by clustering underlying common factors (119). Two of the important subcategories of construct validity are convergent validity and discriminant validity that indicate the degree of relationship between similar or different measures compared with the construct that the scale aims to measure (115). For example, in order to provide evidence for convergent validity a researcher might expect similar results in similar groups or she can collect data from two similar scales or measures and expect a positive correlation between them. In contrast, for divergent validity, known-group differences could be used, or a negative correlation is expected between two measures that are opposing theoretically (120). Finally, reliability is assessed with different methods including test-retest, alternative-form, split-halves, and internal consistency (with Cronbach alpha coefficient) methods (115).

3.2.2. Content Validity Phase of Developing CAAI

After identifying 44 items related to Turkish cuisine, they were sent to 40 experts to be evaluated into three categories, namely (1) necessary, (2) useful, but inadequate, and (3) unnecessary. 16 experts (11 academics from departments of Nutrition and Dietetics, Gastronomy and Culinary Arts, and Tourism, 2 chefs, and 2 independent Turkish cuisine researchers) responded and reviewed the 44 items. The responses were used to calculate content validity ratio and content validity index (121). Based on expert feedback, 6 items were deleted, several questions were reworded, and 2 items were added to make the 40-item draft inventory, which was visualized with photographic images.

Since two dimensional drawings and photographic images are routinely used to capture dietary intake, a similar visualization methodology was employed for each item (122, 123). Depending on the item's comprehensiveness, each item was visualized with 1-9 photos, in order to make the statements more understandable for participants with limited Turkish or English language skills and for participants with low literacy levels. Photos were taken either by the researchers or downloaded from royalty-free image websites. If the item was about a single food or beverage (e.g. simit -Turkish bagel- or Turkish coffee) 1-3 photos were used. However, when the item was about a general food or beverage category or social consumption factors or food preparation characteristics specific to Turkey, 3-9 photos were used per item to make it more understandable (See Figure 3.2).

8) Consumption frequency of Turkish style brewed tea?

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

5) The frequency of cooking meals with the base of onion, tomato, and/or tomato (or red pepper) paste?

Tomato paste

Cooking with onions

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

Figure 3.2. Two sample items from CAAI

The first 30 items were about food and beverage consumption frequencies, and each item was transformed into 8 different frequency levels (i.e. every meal, once per day, two or three times per week, once per week, two or three times per month, once per month, once per year, and never). The final 10 items were on food preparation and

social consumption characteristics of Turkish cuisine and each item was transformed into 7 different frequency levels (i.e. once per day, two or three times per week, once per week, two or three times per month, once per month, two or three times per year, and never).

3.2.3. Construct Validity of CAAI

Participants for CAAI Construct Validity and Reliability Assessment

The 40-item draft visual inventory was administered to 256 participants (163 immigrants and 93 people from Turkey) that were found using snowball sampling methodology in Istanbul, Ankara, and Antalya between April and August 2017. Sample size was *a priori* defined as a minimum 5 participants per item (i.e. minimum 200 participants as the final draft scale had 40 items) as recommendations ranged from 2 to 20 participants per item, with an absolute minimum of 100 to 250 subjects (124). Inclusion criteria for immigrants were being voluntary adult immigrants, who have lived in Turkey for a minimum of one year. Due to similarities of their cuisines, immigrants from neighboring countries (i.e. Bulgaria, Greece, Cyprus, Georgia, Armenia, Iran, Iraq, and Syria) were excluded (96). Individuals who are following special diets due to metabolic or chronic conditions both for immigrant and native participants from Turkey were also excluded.

Full Survey Content of the Study

In addition to the draft visual instrument, participants also completed a questionnaire covering items such as nationality, sex, age, self-reported weight and height, education, household income, marital status, occupation, presence of disease, physical activity. Participants' body mass index (BMI) was calculated by dividing their weight in kilograms by the square of their height in meters (kg/m^2). For example, a person who weighs 55 kg with a height of 1.65 m would have a BMI of 20.2. The following BMI categories were used to define nutritional status that were defined by the World Health Organization (WHO);

Table 3.1. BMI categories of nutritional status according to WHO.

BMI	Nutritional Status
Below 18.5	Underweight
18.5 – 24.9	Normal weight
25 – 29.9	Pre-obesity
30 – 34.9	Obesity class I
35 – 39.9	Obesity class II
Above 40	Obesity class III

Different from Turkish participants, immigrant participants also completed two more survey sections. The first section had questions on immigration related information including duration of stay in Turkey, command of Turkish language, the preferred language of the news sources they use, presence of a Turkish person in their nuclear family or in their household, and property ownership in Turkey. The last section had questions that measured perceived changes in their weight, dietary patterns, and food preparation post-immigration that was developed by Rosenmoller et al. (18) **(Appendix 4)**. Participants' BMI before moving to Turkey were also calculated based on their self-reported weight before moving.

Identifying Preliminary Factor Structure

In order to measure construct validity, firstly exploratory factor analysis (EFA) was carried out with the aim of pattern identification. The suitability of the study data for EFA was evaluated by calculating the Kaiser–Meyer–Olkin (KMO) coefficient and Bartlett's test. For the data to be suitable for EFA, the KMO has to be higher than 0.60 and the chi square calculated in Bartlett's test has to be statistically significant (121, 125, 126). Items with a factor value of 0.30 or lower were excluded from the scale. Principal Component Analysis (PCA) was carried out in order to determine the factor structure of the scale. Varimax rotation with Kaiser's normalization technique was used in order to ease the interpretation of the factors. The number of factors was determined by eigen value from Kaiser's criteria. In addition, the eigen values were visualized using scree plots. Since the culinary acculturation scale had two parts (i.e. first part capturing dietary intake and the other culinary domains) with different response options, two separate EFAs were conducted to analyze the dietary intake vs. culinary components of CAAI.

Standardization of the Inventory

In order to make the two sub-sections of the inventory (namely dietary and culinary) more comparable and interpretable, z-score values were calculated for each measure of the CAAI with the basic z-score formula (121);

$$z = \frac{X - \bar{X}}{S} \qquad (3.1)$$

where z is the standardized z score, X stands for each value in data set, $\bar{X}$ stands for mean of all values in the data set, and S stands for the standard deviation of the sample. Resulting analyses were conducted using the summed-up z-score values of the sub-sections of the inventory.

Known-groups Discriminant Validity and Final Retention of Factors

To further validate CAAI, the known groups technique was used to compare the scores of the inventory between immigrant vs. a reference Turkish population by performing an analysis of covariance (ANCOVA) by accounting for any demographic variable that was significantly different between immigrants and Turkish people. Followingly, any factor that would not found to be significantly different between these two groups would be eliminated from the final version of the CAAI.

Convergent Validity of CAAI with Acculturation Proxies

As part of validation process, correlations between CAAI total scores and its individual factors with acculturation proxies were examined to determine if these measures were associated through non-parametric partial correlation while accounting for age and sex. The proxies used were; (i) length of stay, (ii) age at immigration, which was calculated by subtracting the length of stay from participants' age at the time of data collection, (iii) command of Turkish language, which was determined through the question of "How would you rate your Turkish speaking skills?" with response options of; 1) Fluent 2) Advanced 3) Intermediate 4) Beginner 5) I do not

speak Turkish at all, (iv) percentage of life spent in Turkey, which was calculated by dividing the number of years spent in Turkey by the age of the participant and then multiplying that number by 100. For example; if a participant was 25 years old at the time of the inventory administration and if she lived in Turkey for 4 years, then she would have spent 16% of her life in Turkey.

3.3. Reliability of CAAI

The reliability of CAAI was established by using internal consistency coefficient by Cronbach alpha. Internal consistency coefficients (Cronbach's alpha) were calculated separately for dietary intake and the culinary domain sub-sections of the final version of the culinary acculturation scale. Alpha values range between 0 and 1, ideally the values should be between 0.7 and 0.9. (Table 3.2) (121, 127).

Table 3.2. Reliability classification according to Cronbach alpha coefficients

Alpha Coefficient	Explanation
0.8 – 1.0	High reliability
0.6 – 0.79	Acceptable reliability
0.4 – 0.59	Low level of reliability
0.0 – 0.39	Not reliable

3.4. Supplementary Analyses of Validity and Reliability

3.4.1. Assessment of the Stability of CAAI

The stability of the scale was investigated in a sub-sample of 31 Turkish people through re-administering CAAI two to four weeks after the initial survey completion. The internal consistency coefficient (ICC) estimates were assessed with their 95% confidence intervals being calculated based on mean-rating, absolute-agreement, and 2-way mixed-effects model for the patterns of Basic, Contemporary Food Preparation, Traditional Food Preparation, and Meal Structure. Additionally, Wilcoxon test was

used to compare the test-retest groups by using the yearly median scores of each participant's responses for each item of the final CAAI.

3.4.2. Partial Confirmatory Factor Analysis of CAAI

A partial confirmatory factor analysis (PCFA) was performed to see whether a future confirmatory factor analysis would be empirically justifiable for further research. PCFA is also a data reduction technique like EFA and according to Gignac, it is a step between EFA and Confirmatory Factor Analysis (CFA) (128). PCFA supplements the results of EFA or PCA with more information on whether the resulting factors could be confirmed in a future CFA that would be conducted on a new sample of participants (128). PCFA was performed by estimating the unrestricted factor model solution and chi square values of residual correlation matrix via maximum likelihood estimation technique consistent with the process described by Gignac's paper with good model fit based on Root Mean Square Error of Approximation (RMSEA) $\leq 0.06 - 0.08$, Standardized Root Mean Residual (SRMR) ≤ 0.08; Normal Fit Index (NFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI) ≥ 0.95 (128, 129).

3.5. Culinary Acculturation Assessment of the Participants

In order to address the secondary research aim, the level of culinary acculturation of the first-generation immigrants was assessed in the study sample by using CAAI z-score values and then compare the results with the reference population sample from Turkey. The association between culinary acculturation to Turkish cuisine scores of CAAI and its individual sub-scales (i.e. dietary and culinary domains) and BMI was assessed with partial correlation while accounting for age and sex.

Then, the 162 first-generation immigrant participants from 53 different countries were categorized into five regions as Slavic (n:32), Western (n:47), Asian (n:31), Sub-Saharan (n:22), and Mediterranean (n:30). Differences between groups were assessed with Kruskal Wallis tests.

Next, perceived changes in diet and food preparation since immigration were assessed with the data gathered from the survey section that was based on Rosenmoller's questionnaire. This section's response options were based on a Likert scale of *Much less, Less, No change, More, and Much more*. To ease the data comprehensibility and interpretation, these response options were recoded and reduced into three categories of *More, No Change, and Less* and all the following data analyses were conducted with those three categories. The association between variables related to perceived diet & food preparation change and acculturation categories (i.e. tertile categories of the variable "percentage of life spent in Turkey") and Turkish language proficiency were analyzed with Chi-Square analyses. Since there were only three people that claimed to speak no Turkish at all, these three people were analyzed together with the beginner level Turkish speakers, which reduced the Turkish language proficiency into four categories of beginner, inter-mediate, advanced, and fluent. Then, the significant outcomes were analyzed with ordinal logistic regression analyses and documented with odds ratios (OR) and 95% confidence interval (CI). Ordinal logistic regression is used when the dependent variable has ordinal categories, and the linear regression assumptions are violated (130). Ordinal logistic models predict the odds of the dependent variable occurring by taking account into the ordering of the levels, hence without losing statistical power (130). All ordinal regression analyses were accounted for age, sex, education, and BMI. Finally, the associations of immigrant and Turkish participants were examined to quantify the characteristics of age, sex, dichotomous Turkishness (i.e. being an immigrant vs. being from Turkey), BMI, exercise, education, and marital status with multiple linear regression (Figure 3.3.).
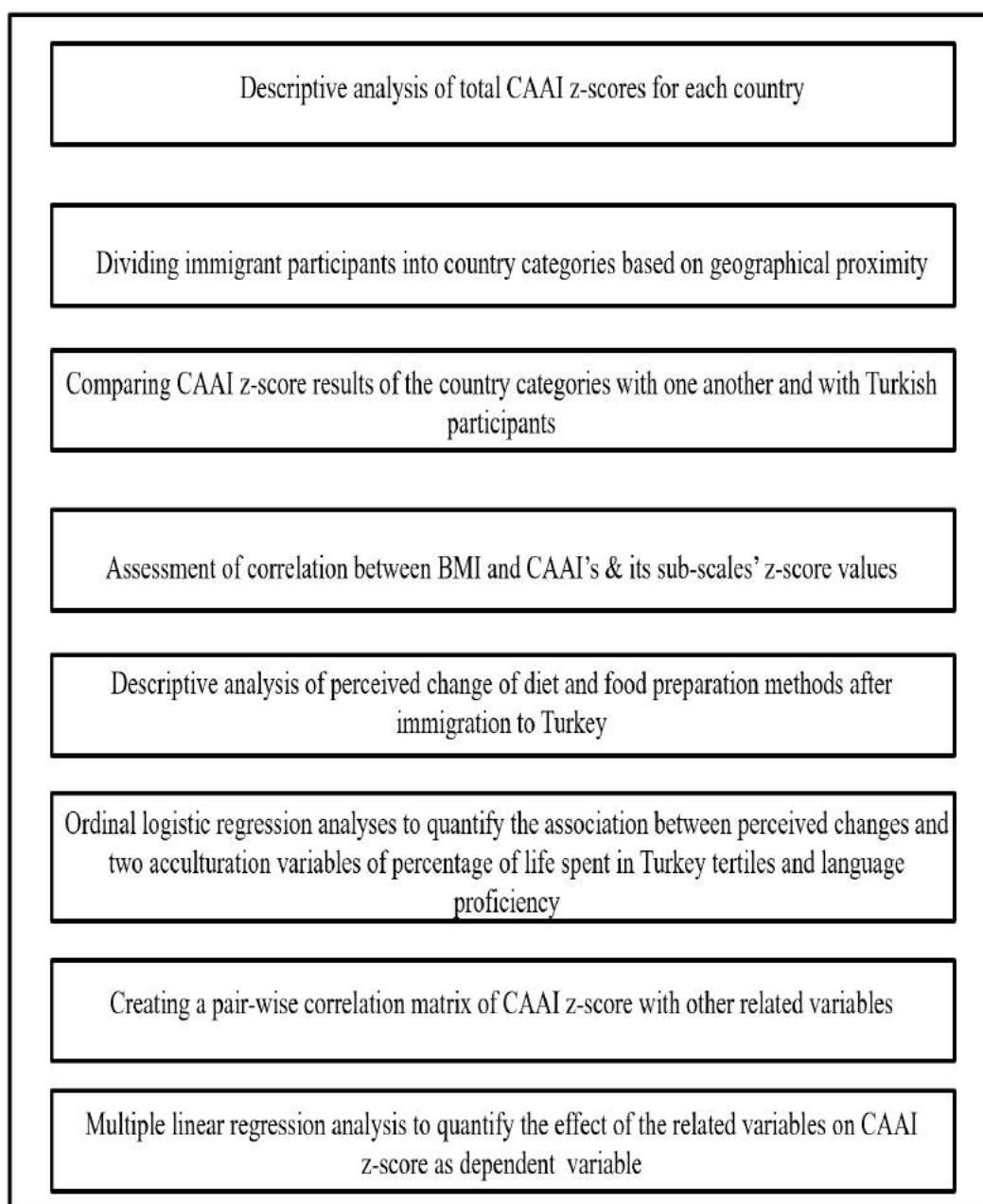
Figure 3.3. Flow diagram of culinary acculturation assessment analysis

3.6. Statistical Analyses and Data Handling

Means ± SD and median (IQR) were determined for continuous variables, and frequencies (%) for categorical variables. For the primary analysis, EFA (Varimax rotation) was used to determine the scale's construct validity. Individual total scores of each item were obtained by transforming the frequencies into monthly

corresponding values. For example, once per day became 30 times per month, once per week became 4 times per month and so on.

Cronbach's Alpha (α) was also calculated as an internal consistency estimate of the scale. Data were evaluated for capturing statistical differences using student's t-test and ANOVA for normally distributed continuous variables whereas Mann-Whitney U and Kruskal Wallis for continuous variables that were not distributed normally. Wilcoxon sign-rank test was used to capture differences between repeated measures of continuous variables, and Chi Square was used to capture differences between categorical variables. Ordinal logistic regression, MLR, and Pearson correlation matrix were created to quantify the association between multiple variables. In all the tests, a p-value of < 0.05 was used to assess significance. Data was analyzed with SPPS software version 21 (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, Version 21.0. IBM Corp: Armonk, NY, USA).

4. RESULTS

4.1. Validity and Reliability Assessment Results of CAAI

4.1.1. Participant Characteristics of the Final Inventory

A total of 256 participants (64% immigrants, 36% reference population from Turkey) completed the visual culinary acculturation inventory as well as demographic and perceived changes in dietary patterns and food preparation questionnaires. The visual culinary acculturation scale was completed within 10 to 12 minutes. In general, the participants were young to middle-aged with normal weight, highly educated, a little over half of them low-income, relatively healthy with close to even distribution of sex (See Table 4.1).

Participants from Turkey were slightly older than immigrants with 39.65 years compared with 34.15 years ($p < 0.05$). Immigrant participants were coming from 53 different countries and the countries were broadly categorized into Sub-Saharan, Slavic, Western, Mediterranean, and Asian regions of the world (See Table 4.2). They were relatively recent immigrants with approximately 6 years of mean residence and on average the immigrants had spent 17% of their lives in Turkey during the data collection phase of the study.

Table 4.1. Demographic characteristics validation study population

	Immigrants (n=162)	People from Turkey (n=94)	Total (n=256)	p-value
Age (years)[1]	34.15±10.7	39.65±13.3*	36.17 ±11.97	**0.001**
Sex[2]				
Female	86 (53.0)	55 (58.5)	141 (55.0)	0.436
Male	76 (47.0)	39 (41.5)	115 (45.0)	0.436
Education Total Year[1]	15.98±3.58	15.62 ±5.34	15.85±4.31	0.515
Employment Status				
Employed	115 (71.0)	61 (65.0)	176 (69.0)	0.330
Not employed	47 (29.0)	33 (35.0)	80 (31.0)	0.330
Income Level[2]				
Low	96 (59.3)	50 (53.2)	146 (57.0)	0.362
High	66 (40.7)	44 (46.8)	110 (43.0)	0.362
BMI[1] (kg/m^{2})	24.00±4.23	25.81±5.63	24.67±4.86	**0.004***
Underweight	8 (4.9)	2 (2.1)	10 (3.9)	0.074
Normal weight	97 (59.9)	43 (45.7)	140 (54.7)	
Pre-Obesity[2]	47 (29.0)	35 (37.2)	82 (32.0)	
Obesity Class 1[2]	6 (3.7)	7 (7.4)	13 (5.1)	
Obesity Class 2[2]	3 (1.9)	4 (4.3)	7 (2.7)	
Obesity Class 3[2]	1 (0.6)	3 (3.2)	4 (1.6)	
Regular Exercise[2]	3 (1.9)	8 (8.5)	11 (4.3)	**0.02***
Length of Residence[1]	6.26±6.83	N/A	N/A	N/A
Proportion of Life Spent in Turkey for Immigrants[1]	17.02±15.87	N/A	N/A	N/A
Command of Turkish[2]				
Fluent	39 (24.1)	N/A	N/A	N/A
Very good	30 (18.5)	N/A	N/A	N/A
Good	28 (17.3)	N/A	N/A	N/A
Poor	62 (38.3)	N/A	N/A	N/A
None	3 (1.9)	N/A	N/A	N/A

[1]: mean ± SD [2]: n (%), Categorical variables were analyzed with Chi Square and Continuous variables were analyzed by Student's T-Test * p<0.05, N/A: not applicable

Table 4.1. (cont'd). Demographic characteristics validation study population

	Immigrants (n=162)	People from Turkey (n=94)	Total (n=256)	p-value
News Resources' Language²				
Only Turkish	6 (3.7)	N/A	N/A	N/A
Turkish and other	59 (36.4)	N/A	N/A	N/A
Only other	97 (59.9)	N/A	N/A	N/A
Presence of Turkish Family Member (spouse or parent) ²	44 (27.2)	N/A	N/A	N/A
Property Ownership²	28 (17.3)	N/A	N/A	N/A

¹: mean ± SD ²: n (%), Categorical variables were analyzed with Chi Square and Continuous variables were analyzed by Student's T-Test * $p<0.05$, N/A: not applicable

Table 4.2. Geographical categories of the participants

Geographical Categories	Total	
	n	%
Western Countries (Western Europe + Americas + Australia + New Zealand) – United States (n: 12), England (n: 4), Mexico (n: 1), Peru (n: 4), Canada (n: 3), Australia (n: 2), Germany (n: 5), Brazil (n: 2), Ireland (n: 1), New Zealand (n:1), Romania (n: 1), Poland (n: 1), Colombia (n:4), Cuba (n: 1), Venezuela (n: 2), Argentina (n: 2), Netherlands (n: 1)	47	18.4
Mediterranean Countries (Southern Europe + Middle East + North Africa) – Spain (n: 1), France (n: 9), Portugal (n:1), Lebanon (n: 2), Afghanistan (n: 3), Yemen (n: 7), Egypt (n: 1), Saudi Arabia (n: 2), Algeria (n: 1), Bahrein (n: 1), Serbia (n: 1), Morocco (n: 1)	30	11.7
Sub Saharan African Countries – Niger (n: 1), Nigeria (n: 8), Sudan (n: 3), Mali (n: 1), Uganda (n: 3), Madagascar (n: 3), Burkina Faso (n: 1), South Africa (n: 1), Kameron (n: 1)	22	8.6
Asian Countries – Pakistan (n: 5), Turkmenistan (n: 11), China (n: 1), Philippines (n: 5), Tajikistan (n: 1) , Indonesia (n: 3), Kirgizstan (n: 2), Thailand (n: 3)	31	12.1
Slavic Countries – Moldova (n: 3), Azerbaijan (n: 2), Uzbekistan (n: 4), Russia (n: 12), Ukraine (n: 7), Kazakhstan (n: 3), Belarus (n:1)	32	12.5
People from Turkey who were either married to immigrants or have lived abroad	33	12.9
People from Turkey with low foreign culture exposure	61	23.8
Total Participants	**256**	**100**

4.1.2. Preliminary Factor Structure

Since the first 30 items and the final 10 items of the draft inventory had different response options, two separate EFAs were conducted. For the first EFA of 30 items, the sample size (n:256) provided 8.53 respondents per scale item, and for the last 10 items, the same sample size provided 25.6 respondents per item. KMO measure of sampling adequacy was found to be 0.689. As a result of first EFA, three items (seed, spice, and seasonal beverages consumption related items) of the initial 30-item section of the draft scale met elimination criteria due to low factor loadings (<0.30). A four-factor solution accounted for 36% of the variance. The four components had eigenvalues over 1.0; therefore, a four-factor solution was selected for factor stability and reliability. The factor structure and item-factor loadings are shown in Table 4.3.

Bartlett's test of sphericity was significant (Chi-Square = 1240.15, degrees of freedom (df) = 351, $p < 0.001$). Factor 1, named Basic Pattern, and contained 9 dietary items measuring the consumption of the fundamental food and beverages of Turkish cuisine. Factor 2 is called Meat-Heavy Pattern, and contained 5 items measuring the consumption of meat dishes and rice, which accompanies most of the meat dishes in Turkish cuisine (113). Factor 3 is called Starch-Heavy Pattern and contained 7 items of different types of deserts and confectionary. Finally, Factor 4 is called Accessory Foods Pattern, and contained 6 very common accessory foods that accompany meals consumed in Turkey (100).

Second EFA of the final 10 items on culinary domains yielded a three-factor solution, which accounted for 60% of the variance. Three components had eigenvalues over 1.0, and Bartlett's test of sphericity was significant (Chi-Square = 705.9, degrees of freedom (df) = 45, $p < 0.001$). KMO measure of sampling adequacy was found to be 0.742. The factor structure and item-factor loadings are shown in Table 4.4 for those final 10 items.

Table 4.3. The four-dimensional factor loads, Eigenvalues, and the percentage of variance explained after Varimax rotation of the food and beverage consumption section of the inventory (n=256)

Items	Factor 1	Factor 2	Factor 3	Factor 4
Basic Pattern				
1.Bread consumption	.527			
5.Soup consumption	.459			
7.Casserole consumption	.686			
11.Vegetarian olive oil dish consumption	.388			
15.Seasonal vegetable consumption	.401			
17.Breakfast consumption	.630			
19.Yogurt consumption	.492			
28.Tea consumption	.522			
29.Coffee consumption	.477			
Meat-heavy Pattern				
4.Rice consumption		.565		
6.Kebab consumption		.594		
8.Meatball consumption		.503		
9.Processed meat & deli meat consumption		.575		
10.Internal organ consumption		.490		
Starch-heavy Pattern				
2.Savory pastry consumption			.389	
21.Pastry dessert consumption			.702	
22.Milky dessert consumption			.547	
24.Halva consumption			.475	
25.Light dessert consumption			.477	
26.Fruit dessert consumption			.477	
27.Confectionary consumption			.515	
Accessory Foods Pattern				
3.Simit consumption				.409
12.Traditional salad consumption				.515
13.Pickle consumption				.478
14.Salad dressing consumption				.507
16.Seasonal fruit consumption				.414
23.Compote consumption				.555
Eigenvalue	3.902	2.351	1.919	1.569
Variance (%)	14.453	8.708	7.106	5.811

Factor 1, Basic Pattern; Factor 2, Meat-heavy Pattern; Factor 3, Starch-heavy Pattern; Factor 4, Accessory Foods Pattern

Table 4.4. The three-dimensional factor loads, Eigenvalues, and the percentage of variance explained after Varimax rotation of the complementary culinary domains section of the inventory (n=256)

Items	Factor 1	Factor 2	Factor 3
Contemporary Food & Beverage Preparation Pattern			
31.Preparation frequency of Turkish breakfast	.541		
33.Cooking frequency of Turkish dishes	.804		
34. Cooking frequency with oils and butter	.833		
35. Frequency of cooking onion & tomato based foods	.860		
Traditional Culinary Pattern			
32.Preparation frequency of Turkish beverages		.681	
36.Frequency of preparing traditional ingredients		.532	
40.Frequency of eating on the floor		.627	
Meal Structure Pattern			
37.Frequency of commensality			.480
38.Frequency of consuming regular meals			.776
39.Frequency of having three main meals per day			.795
Eigenvalue	3.219	1.615	1.161
Variance (%)	32.193	16.150	11.606

Factor 1, General Food & Beverage Preparation Pattern; Factor 2, Traditional Culinary Pattern; Factor 3, Meal Structure Pattern

Factor 1 of the second EFA, named Contemporary Food and Beverage Preparation Pattern, and contained 4 items measuring cooking and breakfast preparation specific to Turkish cuisine. Factor 2 was called Traditional Culinary Pattern and contained 3 items measuring a more advanced level of food preparation techniques, beverage preparation (i.e. brewing tea and making Turkish coffee), and eating on the floor. Finally, Factor 3 of the second EFA was called Meal Structure Pattern and contained 3 items that measured regularity and social aspect of meals.

4.1.3. Known Groups Discriminant Validity Results

For every factor, the mean scores of immigrant participants and the reference population from Turkey were compared with the aim of retaining the factors that differ significantly between the two groups. For the total sample, there were significant differences between immigrant and participants for patterns of Basic, Contemporary Food Preparation, Traditional Culinary, and Meal Structure after controlling for age.

As a result, the final scale had 19 visual items **(Appendix 5).** Therefore, those factors were elected to remain in the final version of the inventory and z-scores were calculated for Basic Pattern by itself, a second one by adding up the three factors of the culinary domain of the instrument, and then finally adding up the z-scores of the Basic and Culinary patterns to have an overall z-score of CAAI (see Table 4.5). The higher the z-scores, the higher the culinary acculturation to Turkish cuisine was found.

Table 4.5. Comparison of each factor score between immigrants vs. Turkish people after adjusting for age

	Immigrants (n=162)	People from Turkey (n=94)	ANCOVA F - Value		Partial Eta Square	
			Unadjusted	Adjusted	Unadjusted	Adjusted
Basic Pattern[1]	18.45±9.31	34.4±10.14	**163.269****	**147.756****	0.391	0.369
Meat-heavy Pattern[1]	5.81±4.85	5.95±3.8	0.056	1.390	0	0.005
Starch-heavy Pattern[1]	2.88±3.02	2.53±2.23	0.941	0.058	0.04	0
Accessory Foods Pattern[1]	12.95±7.95	14.95±7.24	4.012	3.03	0.016	0.012
Contemporary Food[1] Preparation Pattern[1]	8.16±7.67	13.05±11.24	**17.04****	**11.143****	0.063	0.042
Traditional Culinary Pattern[1]	4.04±5.1	7.5±5.52	**25.55****	**23.58****	0.091	0.085
Meal Structure Pattern[1]	21.01±8.44	25.09±7.61	**14.89****	**9.43***	0.055	0.036
Basic Dietary Pattern z-score[2]	-0.48±0.76	0.82±0.82	**163.269****	**147.756****	0.391	0.369
Culinary Pattern z-score[2]	-0.36±0.84	0.38±1.03	**38.95****	**28.81****	0.102	0.133
Total z-score[2]	-0.84±1.32	1.2±1.49	**128.35****	**110.48****	0.336	0.304

[1]: mean monthly frequency value± SD [2]: mean z-score value± SD, ANCOVA (co-variate: age), * $p<0.05$, **$p<0.001$

4.1.4. Preliminary Convergent Validity Results of CAAI with Acculturation Proxies

Correlations were performed between each CAAI factor mean scores and total z-scores with proxies of acculturation. In general, the correlations were in the expected direction, however they were low. Command of Turkish language was the proxy measure that correlated the highest with mean scores of CAAI (Figure 4.1), whereas age at immigration and percentage of life spent in Turkey had lower and length of residence having the lowest correlation values (see Table 4.6).
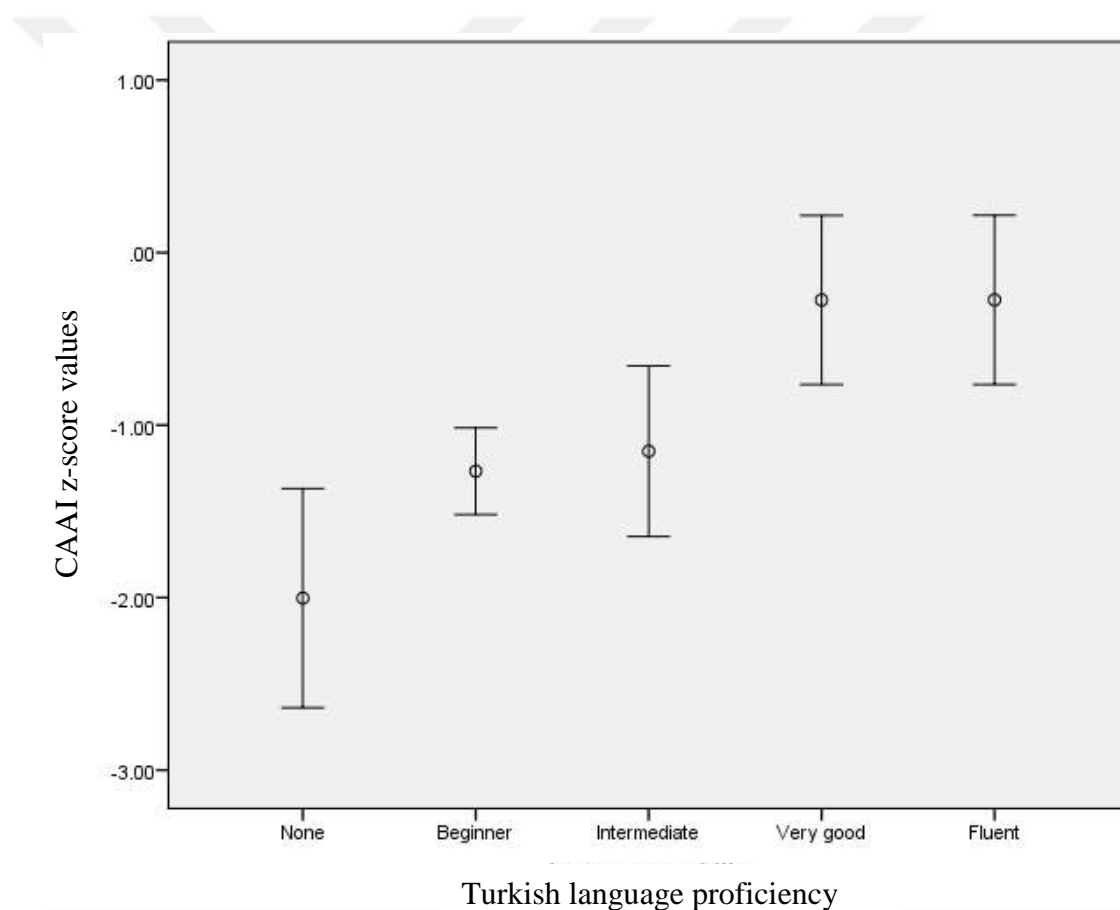
Figure 4.1 Error bar graph of language proficiency categories according to CAAI z-scores

Table 4.6. Partial correlations between each factor score for immigrants and proxy acculturation measures

Patterns	Command of Turkish Language		Percentage of Life Spent in Turkey		Length of Residence in Turkey		Age at Immigration	
	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted	Unadjusted	Adjusted
Basic Pattern	**0.286****	**0.303****	-0.024	0.00	-0.039	-0.018	-0.101	-0.09
Contemporary Food Preparation Pattern	0.125	0.095	0.092	0.030	0.080	0.023	**0.252***	**0.232***
Traditional Culinary Pattern	**0.257****	**0.252****	**0.186***	**0.177***	0.130	0.120	-0.102	-0.110
Meal Structure Pattern	**0.237****	**0.224***	0.116	0.088	**0.162***	0.137	0.124	0.111
Culinary Pattern z-score	**0.303****	**0.282****	**0.187***	0.136	**0.187***	0.141	**0.174***	**0.152***
Total z-score	**0.356****	**0.348****	0.105	0.084	0.097	0.077	0.053	0.042

For the non-parametric correlation coefficient calculations between factor scores and command of Turkish language analyses were adjusted for age and sex while rest of the proxy acculturation measures of length of stay, acculturation score, and age at immigration were adjusted for sex only, * $p<0.05$, **$p<0.001$.

4.1.5. Reliability Results of CAAI

Consequently, the Cronbach's alpha values of the dietary intake sub-scale was 0.729 and the culinary domain sub-scale was 0.732. Since the culinary domain contained only 10 items, a total Cronbach's alpha value was provided, however the individual Cronbach's alpha values of the culinary domain were 0.826 for Contemporary Food and Beverage Preparation Pattern, 0.376 for Traditional Culinary Pattern, and 0.477 for Meal Structure Pattern.

4.1.6. Stability of CAAI & PCFA Results

Dietary and culinary patterns as measured by CAAI were found to be very stable over time period of 2 to 4 weeks (See Tables 4.7 and 4.8). Only the item on "preparation frequency of Turkish breakfast" showed a significant difference (p=0.044) between the two administration times. PCFA results confirmed the factor structure of the patterns identified in EFA. Model fit statistics were Chi-square implied: 144.158, df: 101 (p=0.003), Chi-square null: 1470.135, df: 171 (p<0.001), RMSEA: 0.002, TLI: 0.944, CFI: 0.967, NFI: 0.902.

Table 4.7. Results of ICC Calculation for test-retest reliability, Absolute-Agreement, 2-Way Random-Effects Model

	Intraclass Correlation	95% Confidence Interval		F Test with True Value 0		
		Lower Bound	Upper Bound	Value	df1	Sig
Basic Pattern	.843	.674	.925	6.22	30	.000
Contemporary Food & Beverage Prep Pattern	.855	.698	.930	6.71	30	.000
Traditional Culinary Pattern	.922	.838	.962	12.52	30	.000
Meal Structure Pattern	.279	-.498	.653	1.39	30	.189

Table 4.8. The comparison between the test and retest administration of Culinary Acculturation Scale for each retained item (n=31)

Pair	Administration Order	Scale Item	Median (IQR)	Wilcoxon Test p	ICC
Basic Pattern					
1	1	Bread	1095 (365, 1095)	0.058	0.720
	2	Bread	1095 (365, 1095)		
2	1	Soups	130 (130, 365)	0.425	0.744
	2	Soups	130 (130, 365)		
3	1	Stews	365 (365, 365)	0.437	0.223
	2	Stews	365 (365, 365		
4	1	Vegan olive oil dishes	52 (30, 130)	0.959	0.954
	2	Vegan olive oil dishes	52 (30, 130)		
5	1	Vegetables	365 (365, 1095)	0.546	0.692
	2	Vegetables	365 (365, 1095)		
6	1	Breakfast	365 (365, 365)	0.496	0.401
	2	Breakfast	365 (365, 365)		
7	1	Yogurt and yogurt products	365 (365, 1095)	0.390	0.719
	2	Yogurt and yogurt products	130 (130, 365)		
8	1	Brewed black tea	365 (365, 1095)	0.056	0.920
	2	Brewed black tea	1095 (365, 1095)		
9	1	Turkish coffee	52 (12, 130)	0.082	0.907
	2	Turkish coffee	52 (12, 130)		

Pair	Administration Order	Scale Item	Median (IQR)	Wilcoxon Test p	ICC
Contemporary Food & Beverage Preparation Pattern					
1	1	Cooking frequency with oils and butter	130 (12, 365)	0.285	0.826
	2	Cooking frequency with oils and butter	130 (2.5, 365)		
2	1	Cooking frequency of Turkish dishes	130 (2.5, 365)	0.615	0.872
	2	Cooking frequency of Turkish dishes	52 (2.5, 365)		
3	1	Preparation frequency of Turkish breakfast	365 (130, 365)	**0.044***	0.741
	2	Preparation frequency of Turkish breakfast	365 (130, 365)		
4	1	Frequency of cooking onion & tomato-based foods	130 (2.5, 365)	0.660	0.820
	2	Frequency of cooking onion & tomato-based foods	52 (2.5, 365)		

*p<0.05

Table 4.8. (cont'd). The comparison between the test and retest administration of Culinary Acculturation Scale for each retained item (n=31)

Traditional Culinary Pattern

Pair	Administration Order	Scale Item	Median (IQR)	Wilcoxon Test p	ICC
1	1	Preparation frequency of Turkish beverages	365 (52, 365)	0.777	0.920
	2	Preparation frequency of Turkish beverages	365 (52, 365)		
2	1	Frequency of preparing traditional ingredients	2.5 (0, 12)	0.635	0.716
	2	Frequency of preparing traditional ingredients	2.5 (0, 12)		
3	1	Frequency of eating on the floor	0 (0, 2.5)	0.750	0.999
	2	Frequency of eating on the floor	0 (0, 2.5)		

Meal Structure Pattern

Pair	Administration Order	Scale Item	Median (IQR)	Wilcoxon Test p	ICC
1	1	Frequency of commensality	365 (365, 365)	0.785	0.842
	2	Frequency of commensality	365 (365, 365)		
2	1	Frequency of consuming regular meals	365 (365, 365)	0.157	0.980
	2	Frequency of consuming regular meals	365 (365, 365)		
3	1	Frequency of having three main meals per day	365 (365, 365)	0.564	0.677
	2	Frequency of having three main meals per day	365 (365, 365)		

*p<0.05

4.2. Culinary Acculturation Assessment Results of the Study Participants

The CAAI z-scores differed significantly between immigrant and Turkish participants ($p < 0.0001$), between Turkish people that had high vs. low foreign exposure ($p = 0.011$), and between regions that immigrant participants came from ($p = 0.001$) (Figure 4.2).

Among immigrants from 53 different countries, the highest number of immigrants for single countries were US (n=12), Russia (n=12), Turkmenistan (n=11), France (n=9), and Nigeria (n=8). The highest mean CAAI z-scores were found for immigrants from Burkina Faso (mean z-score=2.96, n=1) and Uzbekistan (mean z-score=1.59, n=4) and both scores were higher than the mean CAAI z-score of Turkish

people (mean z-score=1.20, n=94) (Table 4.9). The lowest scores were found for immigrants coming from Spain (mean z-score=-2.45, n=1), Bahrein (mean z-score=-2.41, n=1), and Ireland (mean z-score=-2.34, n=1) (Figure 4.3 and Table 4.9).

After grouping the immigrants based on regions, the immigrants that stayed longest in Turkey were Slavic (7.8 ±6.38 years) and Western (7.6±7.84 years) people followed by Asian (6.3±5.21 years), Mediterranean (3.7±6.4 years), and Sub-Saharan African (4.4±6.76 years) participants of the study (Table 4.10).The highest culinary acculturation score was found for Slavic people, then Asian, Sub-Saharan, and Western participants (Figure 4.3 and Table 4.9). The lowest culinary acculturation scores were found for people from Mediterranean countries. For immigrant participants, women had significantly higher mean scores for the culinary sub-section of CAAI, which included cooking and preparing Turkish foods, meal schedule, and ergonomics of eating (p:0,001); whereas men scored higher for the dietary sub-section, however the difference was not statistically significant. For male immigrant participants, BMI was negatively correlated with CAAI mean scores, whereas BMI was positively correlated with high scores of CAAI for Turkish women after controlling for age (p:0.02) (Table 4.9).
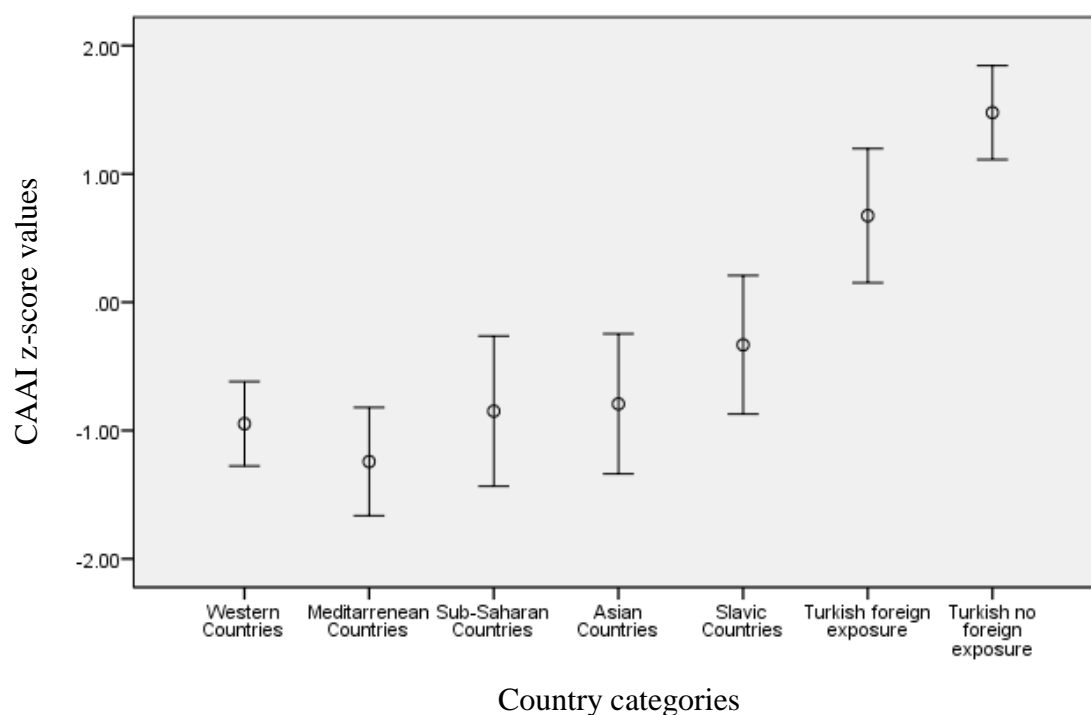

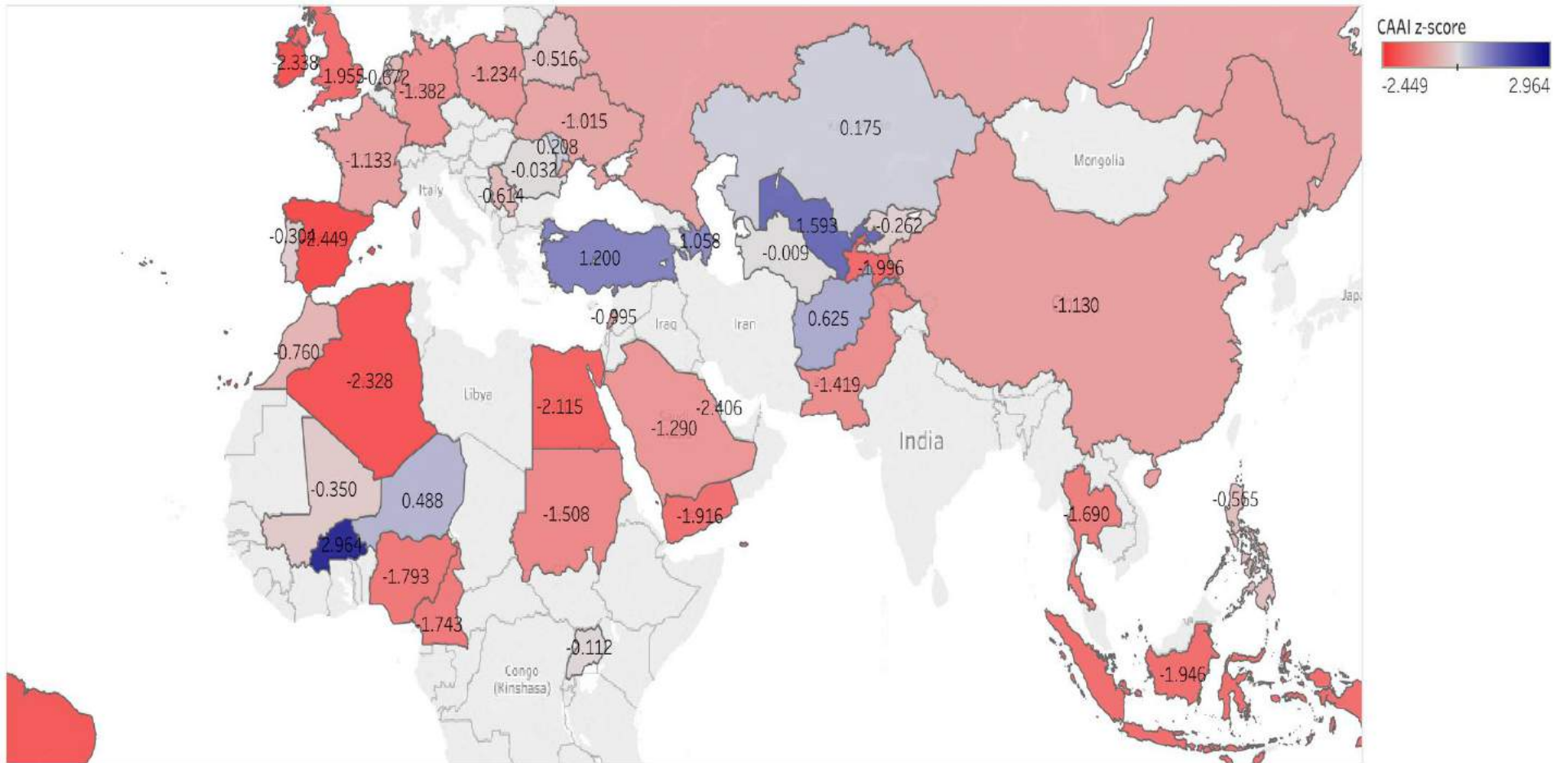**Figure 4.2.** Error bar graph of participant categories according to CAAI z-scores

Figure 4.3. Color coding of the mean CAAI z-scores on a world map; scores are increasing as the color turns from red to blue

Table 4.9. Comparison of country categories depending on culinary acculturation z-scores

Country Category of Immigrants (n=162)	Years of Stay in Turkey mean (± SD)	Basic Pattern z-score (mean ± SD)	Culinary Pattern z-score (mean ± SD)	Total culinary acculturation z-score (mean ± SD)
Slavic (n=32)	7.8 ±6.38	-0.42±0.7	0.09±0.99	-0.33±1.5 [a]
Western (n=47)	7.6±7.84	-0.63±0.69	-0.32±0.67	-0.95±1.12 [a b c]
Asian (n=31)	6.3±5.21	-0.48±0.67	-0.32±0.97	-0.79±1.49 [a b c]
Sub-Saharan (n=22)	3.7±6.4	-0.18±1.04	-0.67±0.66	**-0.85±1.32** [b c]**
Mediterranean (n=30)	4.4±6.76	-0.51±0.74	-0.73±0.66	**-1.24±1.13* [b c]**
p-value	N/A	0.362	**0.001**	0.17

Same superscripts letters of a, b, c depict statistical insignificance, whereas different superscripts depict statistical significance (p<0.05) for pair-wise comparison of Kruskal Wallis tests for the dependent variable of total culinary acculturation z-scores. Mediterranean vs. Slavic countries p=0.001, and Sub-Saharan vs. Slavic countries p=0.009 (Note: * p<0.01, ** p<0.001)

Table 4.10. Partial correlations between z-scores of dietary and culinary sub-sections of CAAI with BMI of immigrants (n:162)

Scores	Current BMI	
	Unadjusted	**Adjusted**
Basic pattern z-score	-0.082	0.116
Culinary z-score	-0.01	0.095
Total z-score	-0.053	0.127

Analyses were adjusted for immigrants' BMI before moving to Turkey

More than half of the immigrants reported an increase their raw vegetable, total vegetable, and dairy product intake. Close to half of the immigrants perceived to increase their fruit, dessert and white meat intake while more than half reported a decrease in their perceived red meat intake. Around half of the participants reported no change in their soda and confectionary consumption (Figure 4.4).

For the domain of food preparation and consumption, over a third of participants reported to decrease their portion size and barbecuing. For all the cooking types, mostly more than half of the participants reported no change. For shallow-frying, deep-frying, barbecuing, grilling, and microwaving there is more decrease than increase whereas for oven-cooking and boiling, more immigrants reported an increase rather compared to decrease (Figure 4.5).

Using Pearson's Chi-square analysis, acculturation categories were significantly associated with deep-frying ($\chi2= 9.38$, $p=0.05$), microwaving ($\chi2= 17.12$, $p<0.002$), oven-cooking ($\chi2= 14.22$, $p=0.007$), grilling ($\chi2= 16.89$, $p=0.002$), rice consumption ($\chi2= 17.41$, $p=0.002$), dessert consumption ($\chi2= 11.79$, $p=0.002$), confectionary consumption ($\chi2= 20.71$, $p<0.001$), and red meat consumption ($\chi2=11.78$, $p=0.02$). The results of ordinal regression showed that using deep-frying, microwaving, oven-cooking, and grilling increased as immigrant participants acculturate more to Turkey, although among those only microwaving and grilling reached $p<0.05$ significance levels. For food consumption, the results revealed that odds of dessert and confectionary consumption decreased significantly as people acculturate to Turkey ($p<0.05$). Conversely, the odds of increasing rice and red meat

consumption were higher as people acculturate, but this value did not reach statistical significance (Table 4.11).
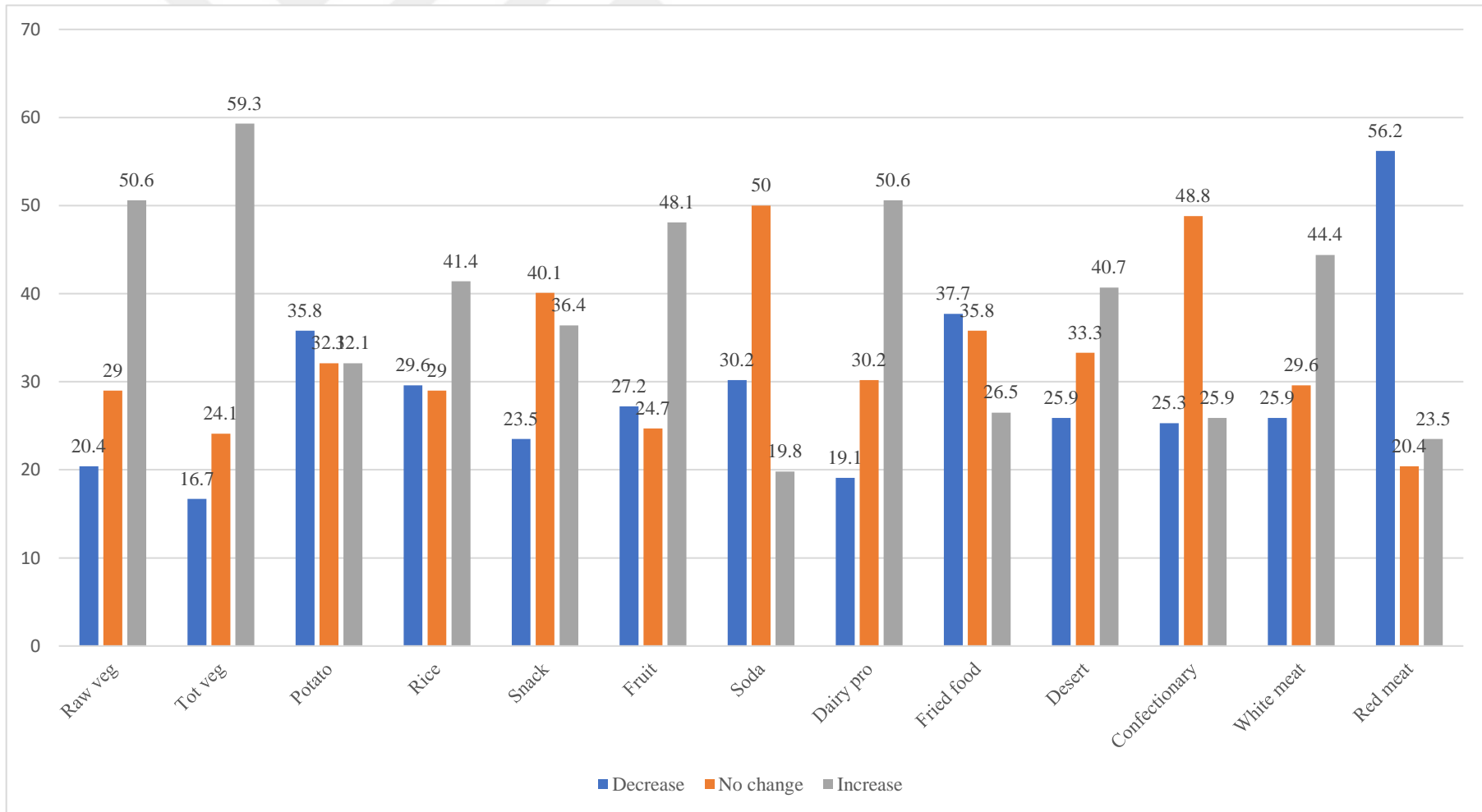
Figure 4.4. Percentages of perceived change in dietary intake for the immigrant participants (n=162)
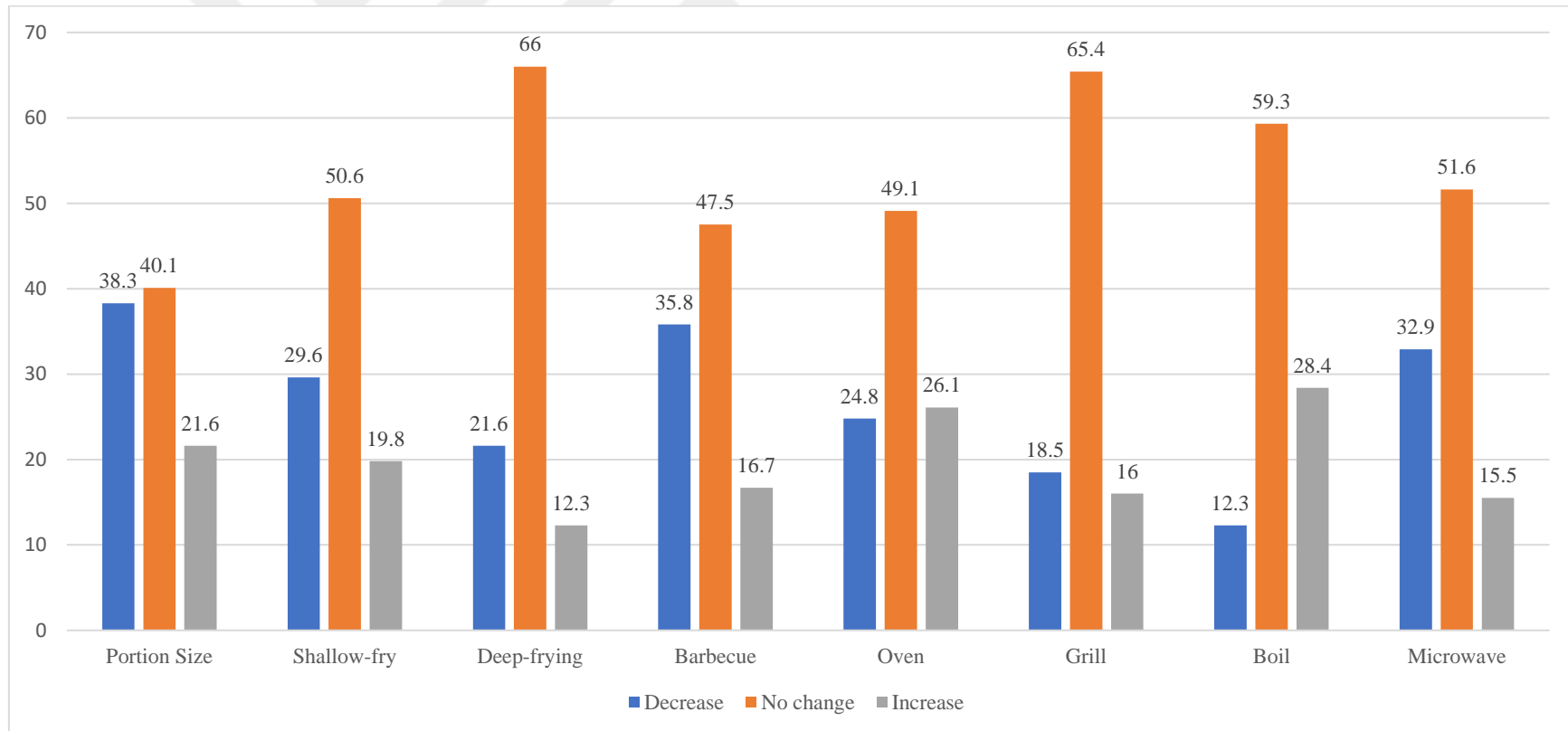
Figure 4.5. Percentages of perceived change in food preparation and cooking for the immigrant participants (n=162).

Table 4.11. Adjusted odds ratios of acculturation category (tertiles) with 4 cooking variables and 4 food variables of perceived change (n=162)

	Odds Ratio	95% CI	p-value
Deep-frying			
Acculturation Category			
Low	0.60	0.25 - 1.44	0.250
Medium	0.66	0.30 - 1.48	0.311
High	Ref	Ref	Ref
Microwaving			
Acculturation Category			
Low	0.22	0.10 - 0.53	**0.001***
Medium	0.27	0.12 - 0.59	**0.001***
High	Ref	Ref	Ref
Oven-cooking			
Acculturation Category			
Low	0.85	0.38 - 1.97	0.623
Medium	0.747215	0.36 - 1.54	0.439
High	Ref	Ref	Ref
Grilling			
Acculturation Category			
Low	0.30	0.12 - 0.73	**0.008***
Medium	0.34	0.15 - 0.79	**0.012**
High	Ref	Ref	Ref
Rice consumption			
Acculturation Category			
Low	0.55	0.25 - 1.21	0.135
Medium	0.71	0.34 - 1.48	0.362
High	Ref	Ref	Ref
Dessert consumption			
Acculturation Category			
Low	2.61	1.18 - 5.80	**0.018***
Medium	1.19	0.58 - 2.44	0.632
High	Ref	Ref	Ref
Confectionary consumption			
Acculturation Category			
Low	2.25	1.01 - 4.99	**0.047***
Medium	1.15	0.55 - 2.38	0.715
High	Ref	Ref	Ref
Red meat consumption			
Acculturation Category			
Low	0.94	0.43 - 2.09	0.886
Medium	0.52	0.24 - 1.12	0.095
High	Ref	Ref	Ref

The adjusted model included age, sex, education, and BMI. (*p<0.05)

Similarly, using Pearson's Chi-square analysis, Turkish language proficiency categories were significantly associated with deep-frying ($\chi2= 37.26$, p<0.001), boiling ($\chi2= 15.52$, p=0.017), grilling ($\chi2= 25.99$, p<0.001), and dessert consumption ($\chi2= 20.85$, p=0.002). The results of ordinal regression showed that the odds of using

increased deep-frying and grilling cooking methods increased when participants' level of Turkish ameliorate, while boiling decreased as immigrant participants acculturate more to Turkey (p<0.005). Furthermore, the odds of increased dessert consumption decreased as people speak Turkish better, yet fluent Turkish speakers had higher odds of increased dessert consumption compared to advanced speakers. However, none of the values regarding dessert consumption reached statistical significance (Table 4.12).

Table 4.12. Adjusted odds ratios of Turkish language proficiency with 3 cooking variables and 1 food variable of perceived change (n=162)

	Odds Ratio	95% CI	p-value
Deep-frying			
Turkish Language Proficiency			
Beginner	0.40	0.16 - 0.98	**0.045***
Intermediate	0.09	0.03 - 0.26	**0.0001****
Advanced	0.86	0.30 - 2.44	0.771
Fluent	Ref	Ref	Ref
Grilling			
Turkish Language Proficiency			
Beginner	0.40	0.17 - 0.96	**0.041***
Intermediate	0.16	0.06 - 0.48	**0.001***
Advanced	1.64	0.61 - 4.46	0.329
Fluent	Ref	Ref	Ref
Boiling			
Turkish Language Proficiency			
Beginner	1.20	0.87 - 4.57	0.103
Intermediate	2.07	0.76 - 5.66	0.155
Advanced	4.74	1.76 - 12.74	**0.002***
Fluent	Ref	Ref	Ref
Dessert Consumption			
Turkish Language Proficiency			
Beginner	1.26	0.60 - 2.68	0.551
Intermediate	1.08	0.43 - 2.71	0.867
Advanced	0.68	0.28 - 1.67	0.406
Fluent	Ref	Ref	Ref

The adjusted model included age, sex, education, and BMI. (*p<0.05, **p<0.001

As indicated in Table 4.13., all socio-demographic characteristics of age, sex, education, and marital status were associated with CAAI z-scores. Additionally, the dichotomous variable of being Turkish or an immigrant, BMI, and regular exercise were also significantly correlated. The correlation matrix in Table 4.14 shows that increase in age and BMI were positively associated with CAAI z-scores (p<0.001) and overall, men had lower CAAI z-scores than women participants (p<0.001). People that

do regular exercise also had higher CAAI z-scores (p<0.001). Additionally, the number of years of education was inversely associated with CAAI z-scores (p<0.05). Finally, being married was associated with having higher CAAI z-scores (p<0.001).

Table 4.13. Pearson correlation coefficients between predictors and control variables (n = 256)

	Total CAAI z-score (r)
Total CAAI z-score	1.000
Precise age	.301**
Sex	-.232**
Dichotomous Turkishness	.579**
BMI	.206**
Regular exercise	.206**
Total years of education	-.169**
Marital Status	-.301**

* p<0.05, **p<0.001

Consequently, according to MLR analysis results, for every one-year increase in age, CAAI z-score would increase by 0.02 unites (p<0.05). After keeping all the covariates constant, men would have 0.59 unites less z-score values compared with women. Being Turkish was associated with 1.83 z-score unites higher CAAI z-scores compared to immigrants after accounting for all the covariates. For every one year increase in education, CAAI z-score will decrease by 0.045 z-score units (p<0.05). Being single will decrease CAAI z-scores by 0.66 units. BMI and regular exercise were not significantly associated with CAAI z-scores after controlling all the other covariates.

Table 4.14. The coefficients of MLR for independent variables on CAAI z-score (n = 256)

Variables	β Coefficients with 95% CI for Total CAAI z-score
Constant	-0.69 (-2.12, 0.73)
Dichotomous Turkishness	**1.837**** (1500, 2.18)
Marital Status	**-0.66**** (-1.011, -0.31)
Sex	**-0.57*** (-0.90, -0.24)
Total years of education	**-0.042*** (-0.08, -0.01)
Regular exercise	0.453 (-0.40, 1.30)
BMI	0.02 (-0.02, -0.05)
Precise age	0.01 (-0.01, 0.02)

n=256 s=1.28 R=0.671 R²=0.45 (F=28.99, p<0.001) * p<0.01, ** p<0.001

5.   DISCUSSION

Since global migration is on the rise and immigration is related to change in diet and culinary environment, there has been an increasing interest in assessing culinary acculturation process to inform more inclusive and culturally sensitive health-related policies. Therefore, a measure to capture culinary acculturation was developed and its validity and reliability were demonstrated in a sample of immigrants from differing parts of the world. As a case study, Turkey was chosen, which has become the epicenter of immigrants during the last decade (21).

5.1. Validity and Reliability Assessment

5.1.1. Participant Characteristics

Newly developed scale CAAI was administered among 256 participants to assess its validity and reliability, among which 64% of them were immigrants. Although the sample was found through snowball sampling, the immigrant participants' demographic profile (Table 4.1) was highly concordant with the extensive "The Profile and Living Conditions of Immigrants who are Legally Residing in Turkey" report, which was published in collaboration with Hacettepe University's Institute of Population and Republic of Turkey Ministry of Interior Directorate General of Migration Management in 2017 (92). In their report about immigrants from all over Turkey, they showed that 82% of the immigrants had high level of education with high-school or higher degrees (92). Similarly, in the sample of 162 immigrants, total year of education was found to be 15.98±3.58 years. Parallel with that, the sample of 94 people from Turkey also had 15.62±5.34 years of education in this study. Although the similarity in education levels between immigrants and Turkish people eased the comparison and interpretation of the results for this study, it is acknowledged that the sample from Turkey was overly educated. According to 2010 Turkey Nutrition and Health Survey (*Turkiye Beslenme Saglik Arastirmasi*), which was representative of the 12 NUTS regions of Turkey, only 20.9% of Turkish people had high-school or higher degrees (131).

Another similarity between this study and the aforementioned immigrant report was the average length of stay for the first-generation immigrants. In that report, the

average length of stay in Turkey was found as 4.7 years (92) when this study's immigrant sample's average length of stay was 6.26±6.83 years. However, in the same report among immigrants, 76% of the women and 60% of men claimed to speak Turkish whereas in this study's sample only 24.1% of the immigrants' sample said they could speak Turkish fluently and 18.5% claimed to have advance level of Turkish.

Another aspect that worth discussing is the exclusion of neighboring countries from the immigrant sample. In Turkey the largest number of immigrants are coming from Syria and Iraq for all the purposes and immigrants from Georgia have the second largest share of legal work permit (92, 93). Therefore, excluding these sizeable groups of immigrants from this work made the participant recruitment part of the field work significantly more difficult. However, the decision to exclude the immigrants from countries that are surrounding Turkey was done considering the shared history and cultural similarities with them. Before Turkish Republic was established in 1923, Ottoman Empire ruled for 624 years and although it is unrealistic to expect a homogenous culinary culture throughout the empire, it is even more unrealistic to expect a division between culinary cultures due to the presence of physical borders (132, 133). Having stated that, immigrants from non-neighboring countries that were formerly part of Ottoman Empire were included, but by excluding the direct neighbors a more neutral sample selection was aimed.

5.1.2. Validity and Reliability of CAAI

Standard scale development methods were employed including item pool development through literature search and focus groups, expert panel review, EFA with other construct validity and reliability measures (134). The final culinary acculturation assessment inventory contains 9 items on dietary intake and 10 items on culinary domains that are specific to cuisine of Turkey. The factor structure of the dietary section of the inventory revealed a theoretically relevant pattern that is consistent with Kocturk's model (54, 114). Both dietary and the culinary domains of CAAI showed face validity and acceptable internal consistency. Relationship of CAAI with acculturation proxies revealed a preliminary proof of construct validity as all the correlations were in the expected directions. Although those correlations were small

due to the challenging sample size and recent immigration status, language acquisition was the variable that correlated the most with the CAAI z-scores values (Table 4.6). Higher ability to speak Turkish might not directly affect the culinary behavior but may affect interaction with host culture people and access to culinary resources such as online recipes, books on contemporary and traditional food preparation techniques (135). This is in line with Lopez's and Wandel's research findings of higher positive correlations between dietary acculturation and language skills, rather than length of stay or nativity (136, 137).

CAAI is not the first instrument that captures the effect of immigration on diet, however the novelty of this inventory is in the assessment of dietary acculturation as part of a more inclusive culinary acculturation process. Secondly, while existing acculturation instruments mostly capture dietary intake or patterns with long instruments either with the language of the host country or with the language of the specific immigrant group; this current visual scale allowed us to work with immigrants from all around the world with limited Turkish language skills. Furthermore, since the dietary intake section of the instrument was not captured quantitatively, the risk of under or over-estimating portion sizes was eliminated. Moreover, calculating z-scores for the two sub-sections of the inventory was used to equate the different response patterns. This was a unique approach, which made the results more interpretable.

The preliminary factor structure of the dietary section of the inventory yielded dietary patterns that are similar to patterns identified in other low, middle, and high-income countries (138-140). Similarly, a "prudent pattern" was identified, which was called "basic pattern" along with a "meat heavy pattern" and a "sweet pattern", which was called a "starch-heavy pattern" (141, 142). However, eventually the last three patterns were elected to be deleted in the grounds for not being differentiating enough between immigrants vs. Turkish people for this study's sample. Plus, the average mean score of the last two patterns were very low, for the starch-heavy pattern Turkish people scoring lower than the immigrant participants. The low consumption of meat and starch heavy patterns could be explained by financial and health concerns in addition to the non-static nature of culinary culture of Turkey and nutrition transition (5). Historically, pre-Ottoman, Ottoman, and Republic eras had very different reflections on Turkish cuisine, especially in terms of dessert culture (51). During the

pre-Ottoman Era, recent nomads from Central Asia did not have a big emphasis on desserts, which completely changed during Ottoman Era that was influenced by the three continents' culinary legacies that the empire was present. However, beginning with the end of Crimean War, foreign ingredients like chocolate and industrially produced biscuits entered Ottoman market, the dessert culture started to be more Europeanized, and this trend continued into the Republic Era as well (143). Although seemingly low consumption of Turkish desserts in this study could be perceived as a researchers' delight, future research on Turkish dietary patterns could incorporate the consumption of chocolates, cakes, and other commonly consumed deserts that have been adopted from the Western countries.

Although pattern analyses were performed to see the combined effect of multiple foods and culinary practices to move away from analyzing single foods or nutrients (142, 144); it is worthwhile to discuss the content of basic pattern to capture the culinary zeitgeist in Turkey. Eventually, the only dietary pattern that clearly differentiated between immigrants and Turkish participants was the one that included bread, yogurt, soup, casserole, vegetarian olive oil dishes, seasonal vegetables, breakfast, tea, and coffee (Table 4.3). Among the constituents, soup and yogurt have always been the principal elements of the cuisine since the nomadic period from Central Asia; then bread, casseroles, seasonal vegetables, and coffee still remain as part of the basic pattern from the Anatolian Seljuk and Era, and next olive oil dish and tea consumption could be attributed mostly to the Republican Era, although both items were also consumed during the Ottoman Era (51). However, an unexpected finding was the absence of meat, *pilav*, savory pastry (*borek*), and any dessert from the basic pattern (145). In CAAI, since dietary intake was captured in the style of an FFQ **(See Appendix 4)**, preferences in a hypothetical scenario without any financial and health concerns and were not inquired, the actual intake in the last one year was documented. Therefore, the results indicate that meat, *pilav* and *borek* consumption are not listed among the core elements of the dietary intake.

Additionally, three culinary patterns were identified in CAAI, which were a blend of contemporary and traditional food preparation techniques and the meal structure, all of which were fundamental in assessing the participants' fluency of Turkish cuisine. However, due to methodological differences, the comparison to

current literature is difficult. To begin with, most studies have not examined culinary patterns and their link to acculturation. Some studies examined the link between individual food preparation questions and acculturation, however those specific items were mostly relevant to the culinary culture of the immigrant groups studied (7, 16, 80). Investigating empirically derived culinary patterns paints a broader picture that enables researchers to evaluate the behavioral and physiological impact of the new culinary environment.

Furthermore, according to literature search this is the first instrument development study that has a reference group from the host population to evaluate the effect of immigration on the culinary competency of immigrants. Comparing immigrant vs. Turkish participants for the known-group discriminant validity phase provided insight into the robustness of both dietary and culinary patterns, independent of level of acculturation. Thirdly, the other instrument development studies were mostly from Western countries that have mostly voluntary immigrants of first and multiple generations (7, 81, 146). Turkish Republic, a country of emigration and immigration of mostly Turkish descent people, first started having a huge influx of asylum seekers in the late 1980s during the Iran-Iraq war (93). Then since the early 2000s, all categories of migrants to Turkey have gone up, especially from 2011 with the Syria crisis (93, 143). To give a comparison, the number of voluntary Turkish immigrants since 1961 with the bilateral labor agreement in Germany is similar to the number of forced asylum seekers from Syria in Turkey in 2018 (93). The considerable difference in the rate and nature of immigration in this setting complicates the comparison of dietary acculturation studies not only from the Western countries, but also the ones from Korea, where studies were mostly conducted with international students and voluntary migrant workers (147, 148).

One of the major limitations of existing dietary acculturation assessment tools is their restricted utility for the particular immigrant group that the instrument was developed for, however results of this study showed that CAAI is capable of measuring culinary acculturation of a mixed group of immigrants to the cuisine of the Turkey. Also, with slight modifications, it be could easily be adapted to other cuisines as well.

Nevertheless, following limitations were acknowledged. Firstly, although a broad group of immigrants were included from 53 countries, both the immigrant and the Turkish sample were overly educated, therefore Turkish participants might have foreign influence through speaking foreign languages or going on vacations to foreign countries. In the MLR analysis, the years of education was found to be negatively associated with CAAI z-scores after adjusting for age, sex, dichotomous Turkishness, marital status, regular exercise, and BMI ($p<0.001$). However, the Beta coefficient was very small (-0.042 z-score points for ever year of education). Also, the number of restaurants, cook books, TV and internet channels that cover the content of non-Turkish food is on the rise. Therefore, the Turkish sample might have an unintended bias towards foreign exposure and some differences might be underestimated in comparison with immigrants since dietary habits change across time and between socioeconomic levels which are related to education status (4). Another aspect could be avoidance of some Turkish foods like bread due to health concerns.

Also, in this study the visualization of the scale was mostly done with freely available and royalty-free photos that were downloaded from the Internet. Although the participants did not report any difficulty understanding the content of items with selected visuals, future studies could incorporate new visuals that were completely created by the researchers.

Additionally, future studies need to replicate these investigations in a larger population, preferably in a longitudinal manner to further assess longitudinal construct validity too. In addition, although proxy measures of acculturation are commonly used indicators in minority health research and have been repeatedly shown to highly correlate with multidimensional acculturation scale, future studies could include multicomponent scales that identify both cultural and structural factors that construct acculturation (39). Analyzing convergent and divergent validity by using multi-dimensional measures, which would better capture the non-linear process of acculturation, could yield more accurate information on culinary acculturation's relationship with acculturation process (135, 149). Finally, it is acknowledged that inventory development is an iterative process and there is a clear need for conducting a CFA and test-retest reliability with immigrants in Turkey for CAAI for future

research. These recommendations are justified on the basis of the supplementary analyses of stability assessment and PCFA values.

5.2. Culinary Acculturation Assessment of the Study Participants

The study results demonstrated not only the difference between CAAI z-score values for immigrant participants vs. reference population from Turkey, but also the difference among immigrant participants who were from 53 different countries. Consistent with the secondary aim research questions, a significant difference between differing regions of immigrants to Turkish cuisine were found. The region that had the highest culinary acculturation score was Slavic and this could be explained by their length of stay being the longest among all the other groups, their geographical proximity to Turkey, and majority of the participants being women and some having Turkish spouses. Although participants from Western region have the second longest mean years of stay in Turkey, their comparatively low CAAI z-scores could be attributable to the culinary cultural distance between Turkish and western cuisines. Since the Western influenced culinary items were not incorporated while developing CAAI and eventually the decision was made to retain the basic culinary traits of Turkey, participants from Western region might have had difficulties acculturating to the cuisine in average of 7.6±7.84 years of stay in Turkey. Studies conducted among first-generation immigrants to Western countries have also shown to significantly acculturate after 10 years (137, 150). A surprising finding was for the Mediterranean region to have the lowest CAAI z-scores compared to other groups of immigrants. Since Turkey is considered as a Mediterranean country (151), the results could be the short mean stay of the immigrants that are coming from this region as well as countries could have Mediterranean diets while having different culinary patterns. Although there have been a few studies that have compared the dietary patterns of their most dominant immigrant groups, a study that assessed the culinary acculturation of immigrants from all around the world that live in one country could not be identified.

The reported perceived changes to diet since immigrating to Turkey were mostly positive. More than half of the immigrants increased their raw and cooked vegetable and dairy product consumption. This finding is important because it further validates some of the constituent of the basic dietary pattern sub-scale of CAAI.

6.   CONCLUSION AND IMPLICATIONS FOR RESEARCH AND PRACTISE

Using standardized scale development methods, a visual instrument called Culinary Acculturation Assessment Inventory (CAAI) was developed to capture and quantify culinary acculturation of first generation of immigrants in Turkey and then the scale's validity and reliability were assessed. Our results indicate that CAAI is a useful addition to the literature and have a potential to expand the knowledge on the acculturation process of immigrants to new culinary environments.

Conclusions

1. After a through literature search, qualitative phase, and expert review for content validity as parts of standard scale development process; initially 44-item draft scale became 40-item.

2. In order to assess the construct validity of the scale, it was administered to 256 participants of 162 immigrants and 94 Turkish people.

3. Immigrant and Turkish participants did not differ significantly in demographic characteristics other than age and even the age difference was minimal that the average of Turkish participants was 39.65 years whereas the average age for immigrant participants was 34.15 years.

4. More than 50% of the participants were women both for immigrants (86 people, 53%) and participants from Turkey (55 people, 58.5%).

5. Both immigrant and Turkish participants were highly educated with 15.98±3.58 years and 15.62±5.34 years.

6. In both groups of participants, majority of the participants were employed (overall 69%).

7. In both groups of participants, majority of the participants considered themselves to have low income (overall 57%).

8. In both groups of participants, majority of the participants had healthy BMI (overall 54.7%).

9. 29% of the immigrant participants and 37% of the Turkish participants were overweight (p>0.05).

10. 6% of the immigrant participants and 15% of the Turkish participants had obesity (p>0.05).

11. Only 1.9% of immigrants and 8.5% of Turkish participants were engaging in regular exercise (p>0.005).

12. 10% of immigrants and 35% of Turkish participants had chronic diseases.

13. The mean length of stay in Turkey was 6.26±6.83 years for immigrants in the sample.

14. The mean percentage of life spent in Turkey was 17.02±15.87 for immigrants in the sample.

15. For the immigrant sample, the Turkish language proficiency was 24.1% fluent, 18.5% very good, 17.3% good, 38.3% basic, and 1.9% none.

16. 6% of the immigrant participants stated to read only Turkish news media sources, 36.4% them read sources from Turkish and other languages, and 59.9% of the participants read news solely from non-Turkish sources.

17. 27,2% of the immigrant participants have at least one Turkish family member (spouse or parent(s)).

18. 17.3% of the immigrant participants own property in Turkey.

19. As part of construct validity, two separate EFAs were conducted, the first one on the 30 dietary items and the second one on 10 culinary culture items. As a result, four factors from the first EFA and 3 factors from the second EFA were identified.

20. Since only the factors that differed significantly between immigrants and Turkish participants were retained after accounting for age, as part of known groups discriminant validity, the resulting instrument had one dietary factor with 9 items and 3 culinary factors with 10 items.

21. The final scores of CAAI were calculated based on z-scores to equate the findings of dietary and culinary sub-sections.

22. CAAI was shown to be valid and reliable measure of culinary acculturation of first-generation immigrants to cuisine of Turkey with a potential to expand the understanding of the concept of dietary acculturation.

23. The Cronbach's alpha values of the dietary intake sub-scale was 0.834 and the culinary domain sub-scale was 0.732.

24. When the scale was re-administered on a subgroup of 31 Turkish participants to assess the stability of the inventory, both dietary and culinary patterns as measured by CAAI were found to be very stable over time period of 2 to 4 weeks.

25. As part of the supplementary analyses, PCFA results confirmed the factor structure of the patterns identified in EFA.

26. The CAAI z-scores differed significantly between immigrant and Turkish participants (p<0.000).

27. The CAAI z-scores differed significantly between Turkish people that high vs. low foreign exposure (p: 0.011).

28. The CAAI z-scores differed significantly between regions that immigrant participants came from (p: 0.001).

29. Among immigrants from 53 different countries, the highest number of immigrants for single countries were US (n=12), Russia (n=12), Turkmenistan (n=11), France (n=9), and Nigeria (n=8).

30. The highest mean CAAI z-scores were found for immigrants from Burkina Faso (mean z-score=2.96, n=1) and Uzbekistan (mean z-score=1.59, n=4) and both scores were higher than the mean CAAI z-score of Turkish people (mean z-score=1.20, n=94).

31. The lowest scores were found for immigrants coming from Spain (mean z-score=-2.45, n=1), Bahrein (mean z-score=-2.41, n=1), and Ireland (mean z-score=-2.34, n=1).

32. After grouping the immigrants based on regions, the immigrants that stayed longest in Turkey were Slavic (7.8 ±6.38 years) and Western (7.6±7.84 years) people followed by Asian (6.3±5.21 years), Mediterranean (3.7±6.4 years), and Sub-Saharan African (4.4±6.76 years) participants in this study.

33. The highest culinary acculturation score was found for Slavic people, then Asian, Sub-Saharan, and Western participants.

34. The lowest culinary acculturation scores were found for people from Mediterranean countries.

35. For immigrant participants, women had significantly higher mean scores for the culinary sub-section of CAAI, which included cooking and preparing

Turkish foods, meal schedule, and ergonomics of eating (p:0,001); whereas men scored higher for the dietary sub-section, however the difference was not statistically significant.

36. For male immigrant participants, BMI was negatively correlated with CAAI mean scores, whereas BMI was positively correlated with high scores of CAAI for Turkish women after controlling for age (p:0.02).

37. More than half of the immigrants perceived an increase in their raw vegetable, total vegetable, and dairy product intake.

38. Close to half of the immigrants perceived to increase their fruit, dessert and white meat intake while more than half reported a decrease in their perceived red meat intake.

39. Around half of the participants reported no change in their soda and confectionary consumption.

40. For the domain of food preparation and consumption, over a third of participants reported to decrease their portion size and barbecuing.

41. For all the cooking types, mostly more than half of the participants reported no change. For shallow-frying, deep-frying, barbecuing, grilling, and microwaving there is more decrease than increase whereas for oven-cooking and boiling, more immigrants reported an increase rather compared to decrease.

42. Using Pearson's Chi-square analysis, acculturation categories were significantly associated with deep-frying (X^2= 9.38, p=0.05), microwaving (X^2= 17.12, p<0.002), oven-cooking (X^2= 14.22, p=0.007), grilling (X^2= 16.89, p=0.002), rice consumption (X^2= 17.41, p=0.002), dessert consumption (X^2= 11.79, p=0.002), confectionary consumption (X^2= 20.71, p<0.001), and red meat consumption (X^2=11.78 , p=0.02).

43. The results of ordinal logistic regression showed that using deep-frying, microwaving, oven-cooking, and grilling increased as immigrant participants acculturate more to Turkey, although among those only microwaving and grilling reached p<0.05 significance levels.

44. For food consumption, the results revealed that odds of dessert and confectionary consumption decreased significantly as people acculturate to Turkey (p<0.05).

45. The odds of increasing rice and red meat consumption were higher as people acculturate, but this value did not reach statistical significance.

46. Using Pearson's Chi-square analysis, Turkish language proficiency categories were significantly associated with deep-frying (X^2= 37.71, p<0.001), boiling (X^2= 15.8, p=0.045), grilling (X^2= 26.81, p=0.001), and dessert consumption (X^2= 22.4, p=0.004).

47. The results of ordinal logistic regression showed that the odds of using increased deep-frying and grilling cooking methods increased while boiling decreased as immigrant participants ameliorate their level of Turkish language proficiency (p<0.005).

48. The odds of increased dessert consumption decreased as people acculturate, yet fluent Turkish speakers had higher odds of increased dessert consumption compared to advanced Turkish speakers (p>0.05).

49. All socio-demographic characteristics of age, sex, education, and marital status were associated with CAAI z-scores for all the participants (n:256).

50. The dichotomous variable of being Turkish or an immigrant, BMI, and regular exercise were also significantly correlated.

51. Increase in age and BMI were positively associated with CAAI z-scores (p<0.001) and overall, men had lower CAAI z-scores than women participants (p<0.001).

52. People that do regular exercise also higher CAAI z-scores (p<0.001).

53. The number of years of education was inversely associated with CAAI z-scores (p<0.05).

54. Being married was associated with having higher CAAI z-scores (p<0.001).

55. According to MLR analysis results, for every one-year increase in age, CAAI z-score would increase by 0.02 unites (p<0.05).

56. After keeping all the covariates constant, men would have 0.59 unites less z-score values compared with women.

57. Being Turkish was associated with 1.83 z-score unites higher CAAI z-scores compared to immigrants after accounting for all the covariates.

58. For every one-year increase in education, CAAI z-score will decrease by 0.045 z-score units ($p<0.05$).

59. Being single will decrease CAAI z-scores by 0.66 units.

60. BMI and regular exercise were not significantly associated with CAAI z-scores after controlling all the other covariates.

Recommendations

1. Evaluating culinary acculturation level of immigrants would contribute to understanding the health-related processes post-migration

2. CAAI could be used in all the immigrant related research studies to understand the culinary acculturation process of immigrants in Turkey

3. By using the methodology outlined here, similar measurement tools could be developed for other countries to capture the culinary acculturation of their immigrants.

4. Current theories and models on the effect of migration on health and nutrition need to be revised to include the elements of culinary exposures.

5. The discourse of dietary acculturation should be acknowledged as a sub-domain of culinary acculturation, and more studies need to assess culinary acculturation.

6. Future research could be done to make comparisons between differing immigrant groups of immigrants vs. refugees vs. asylum seekers in terms of culinary acculturation to distinguish their experiences and processes

7. Confirmatory factor analysis should be done on a probabilistic sample of voluntary immigrants that are living in Turkey for further validation of CAAI

8. Another version of CAAI could be developed to further validate the inventory on immigrant participants that are coming from neighboring countries

9. Since language was found to be associated with higher scores of culinary acculturations, government policies could provide more comprehensive Turkish language courses for immigrants.

10. Since CAAI is a visual scale, another version of it could be further developed for children and/or adolescent immigrant participants.

11. Further validation studies could be conducted with second and third generation immigrants.

12. According to the literature search, this is the first project that aimed to quantify culinary acculturation in a visual manner. This pioneering work is hoped to shed light into this area that needs to be researched more in depth.

***Parts of this thesis have been submitted to conference presentations, posters, and publications.

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8. APPENDICES

Appendix 1. Copy of ethical committee approval that was obtained from Hacettepe University Non-interventional Clinical Researches Ethics Board

REPUBLIC OF TURKEY

HACETTEPE UNIVERSITY

Non-interventional Clinical Researches Ethics Board

Number: 16969557 – 881

Subject:

RESEARCH PROJECT EVALUATION REPORT

Meeting Date   : 09 AUGUST 2016 TUESDAY

Meeting Number   : 2016/16

Project Number   : GO 16/527 (Evaluation Date: 09.08.2016)

Decision Number   : GO 16/527-28

The research project proposal titled *"Development Of A New Scale To Measure Culinary Acculturation Of Immigrants Who Are Living In Turkey: Validity And Reliability Assessment"* with the registry number GO 16/527 which is led by the principal investigator Associate Professor Dr. Aylin AYAZ from our university's Health Sciences Faculty and the Department of Nutrition and Dietetics along with Prof. Dr. Ahmet Uğur DEMİR for the doctoral thesis of Expert Dietitian Z. Begüm KALYONCU was evaluated considering research rationale, aim, approach, methods, and ethical approval was granted on the condition of completion of administrative permits.

1.	Prof. Dr. Sevda F. MÜFTÜOĞLU	(Chair)	10.	Prof. Dr. Oya Nuran EMİROĞLU	(Member)
2.	Prof. Dr. Nurten AKARSU	(Member)	11.	Ass. Prof. Dr. Özay GÖKÖZ	(Member)
3.	Prof. Dr. M. Yıldırım SARA	(Member)	12.	Assoc. Prof. Dr. Gözde GİRGİN	(Member)
4.	Prof. Dr. Necdet SAĞLAM	(Member)	13.	Assoc. Prof. Dr. Fatma Visal OKUR	(Member)
5.	Prof. Dr. Hatice Doğan BUZOĞLU	(Member)	14.	Ass. Prof. Dr. Can Ebru KURT	(Member)
6.	Prof. Dr. R. Köksal ÖZGÜL	(Member)	15.	Ass. Prof. Dr. H. Hüsrev TURNAGÖL	(Member)
7.	Prof. Dr. Ayşe Lale DOĞAN	(Member)	16.	Lect. Dr. Müge DEMİR	(Member)
8.	Prof. Dr. Elmas Ebru YALÇIN	(Member)	17.	Lect. Meltem ŞENGELEN	(Member)
9.	Prof. Dr. Mintaze Kerem GÜNEL	(Member)	18.	Lawyer Meltem ONURLU	(Member)

Hacettepe University Non-interventional Clinical Researches Ethics Board

06100 Sıhhiye-Ankara

Telephone: 0 (312) 305 1082   – Fax: 0 (312) 310 0580 – E-mail: goetik@hacettepe.edu.tr ------------------

İşbu çeviri ....
Asl........................ 10.11.12.
tarafımdan çevrilmiştir.

Yeminli Mütercim

Filiz CANBAZ

T.C.
HACETTEPE ÜNİVERSİTESİ
Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu

Sayı : 16969557 – 881

Konu :

ARAŞTIRMA PROJESİ DEĞERLENDİRME RAPORU

Toplantı Tarihi	: 09 AĞUSTOS 2016 SALI
Toplantı No	: 2016/16
Proje No	: GO 16/527 (Değerlendirme Tarihi: 09.08.2016)
Karar No	: GO 16/527– 28

Üniversitemiz Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Bölümü öğretim üyelerinden Doç. Dr. Aylin AYAZ' ın sorumlu araştırmacı olduğu, Prof. Dr. Ahmet Uğur DEMİR ile birlikte çalışacakları, Uzm. Dyt. Z. Begüm KALYONCU' nun doktora tezi olan, GO 16/527 kayıt numaralı ve *"Türkiye'de Yaşayan Göçmenlerin Türk Mutfağına Uyumlarını Saptamaya Yönelik Yeni Bir Ölçek Geliştirme: Geçerlik ve Güvenirlik Çalışması"* başlıklı proje önerisi araştırmanın gerekçe, amaç, yaklaşım ve yöntemleri dikkate alınarak incelenmiş olup, idari izinlerin tamamlanması kaydı ile etik açıdan uygun bulunmuştur.

1. Prof. Dr. Sevda F. MÜFTÜOĞLU   (Başkan)

2. Prof. Dr. Nurten AKARSU   (Üye)

3. Prof. Dr. M. Yıldırım SARA   (Üye)

4. Prof. Dr. Necdet SAĞLAM   (Üye)

5. Prof. Dr. Hatice Doğan BUZOĞLU   (Üye)

6. Prof. Dr. R. Köksal ÖZGÜL   (Üye)

7. Prof. Dr. Ayşe Lale DOĞAN   (Üye)

8. Prof. Dr. Elmas Ebru YALÇIN   (Üye)

9. Prof. Dr. Mintaze Kerem GÜNEL   (Üye)

10. Prof. Dr. Oya Nuran EMİROĞLU   (Üye)

11. Yrd. Doç. Dr. Özay GÖKÖZ   (Üye)

12. Doç. Dr. Gözde GİRGİN   (Üye)

13. Doç. Dr. Fatma Visal OKUR   (Üye)

14. Yrd. Doç. Dr. Can Ebru KURT   (Üye)

15. Yrd. Doç. Dr. H. Hüsrev TURNAGÖL   (Üye)

16. Öğr. Gör. Dr. Müge DEMİR   (Üye)

17. Öğr. Gör. Meltem ŞENGELEN   (Üye)

18. Avu. Meltem ONURLU   (Üye)

Appendix 2. Copy of administrative permit that was obtained from Ozyegin University Research Ethics Committee

Özyeğin Üniversitesi Gastronomi ve Mutfak Sanatları öğretim görevlisi Zeynep Begüm Kalyoncu'nun yürütücülüğünü üstleneceği "Türkiye'de Yaşayan Göçmenlerin Türk Mutfağına Uyumlarını Saptamaya Yönelik Yeni Bir Ölçek Geliştirme: Geçerlik ve Güvenirlik Çalışması" başlıklı proje değerlendirilmiştir.

Proje etik açısından uygun bulunmuştur.	☒
Projenin etik açısından geliştirilmesi gerekmektedir.	☐
Proje etik açısından uygun bulunmamıştır.	☐

İmzalar:

Prof. Dr. Canan Ergin
Etik Kurulu Başkanı

Dr. Sibel Oktar
Etik Kurulu Üyesi

Dr. F. Seçil Bayraktar Kazozcu
Etik Kurulu Üyesi

Appendix 3. Initial Pilot Study Questionnaire on Turkish Cuisine

PILOT STUDY QUESTTIONNAIRE ON TURKISH CUSINE

1. Where are you from? (country and city)?

   ....

2. How old are you?

   ....

3. How many years have you been living in Turkey?

   ....

4. What is/are your favorite food(s) in Turkish cuisine?

   ....

5. What is/are your favorite beverage(s) in Turkish cuisine?

   ....

6. What is/are your least favorite food(s) in Turkish cuisine?

   ....

7. What is/are your least favorite beverage(s) in Turkish cuisine?

   ....

8. What are the foods that you consume the most for your breakfast in Turkey?

   ....

9. What are the foods that you consume the most for your lunch in Turkey?

……

10. What are the foods that you consume the most for your dinner in Turkey?

……

11. What are some foods that you do not like very much about Turkish cuisine, but still consume more than you desire due to convenience, availability, lack of availability, price, health?

……

12. If you were to live in another country in the future, which aspects of Turkish cuisine (spices, cooking style, devices, foods, dishes) would you bring with you or continue to consume?

……

13. If you are not from Istanbul, are there any foods or dishes that you consume that are from the city or the country of your family's origin?

……..

THANK YOU VERY MUCH!

Appendix 4. Full questionnaire that was administered to participants (Turkish and English versions)

<u>**Türkiye'de Yaşayan Göçmenlerin Türk Mutfağına Uyumlarını Saptamaya Yönelik Yeni Bir Ölçek Geliştirme: Geçerlik ve Güvenirlik Çalışmasının Soru Formu**</u>

ANKET NO: **TARİH:**

Sayın Katılımcılar,

Türkiye'de yaşayan göçmenlerin Türk mutfağına uyumunu ölçmeyi amaçlayan bu araştırma, Hacettepe Üniversitesi Beslenme ve Diyetetik Bölümü'nde yürütülen bir doktora tez projesi kapsamında yapılmaktadır. Sizin yanıtlarınızdan elde edilecek sonuçlarla görseller kullanarak Türk mutfağına uyumu belirleyen bir ölçek geliştirilecek ve geliştirilen ölçeğin tekrarlı ölçümlerde benzer sonuçlar verip vermediği değerlendirilecektir. Tekrarlı ölçümlerle tutarlılığı belirleyebilmek adına iki hafta içinde size yeniden ulaşmamız gerekebilir. Bu araştırmanın sonuçlarına göre halk sağlığının geliştirilmesini sağlamak adına önerilerde bulunulabilecek ve şartların iyileştirilmesi adına olumlu adımların atılması planlanabilecektir. Bu nedenle soruların tümüne ve içtenlikle cevap vermeniz büyük önem taşımaktadır. Bu çalışma yaklaşık on beş dakika sürecektir.

Araştırmaya katılmanız gönüllülük esasına dayalıdır. Bu form aracılığı ile elde edilecek bilgiler gizli kalacaktır ve sadece araştırma amacıyla (veya "bilimsel amaçlar için") kullanılacaktır. Çalışmaya katılmamayı tercih edebilirsiniz veya anketi doldururken istemezseniz son verebilirsiniz.

<u>Anket formuna adınızı ve soyadınızı yazmayınız.</u>

Yanıtlarınızı, soruların altında yer alan seçenekler arasından uygun olanı daire içine alarak ya da açık uçlu sorularda sorunun altında bırakılan boşluğa yazarak belirtiniz. Birden fazla seçenek işaretleyebileceğiniz sorularda, size uygun gelen bütün seçenekleri işaretleyiniz. Eğer sorunun yanıtları arasında "diğer" seçeneği mevcutsa ve yanıtınız var olan seçenekler arasında yer almıyorsa, bu durumda yanıtınızı diğer seçeneğindeki boşluğa yazınız.

Anketi yanıtladığınız için teşekkür ederiz.

Çalışma ile ilgili herhangi bir sorunuz olduğunda aşağıdaki kişiler ile iletişim kurabilirsiniz:

Uzm. Dyt. Z. Begüm Kalyoncu

Özyeğin Üniversitesi Uygulamalı Bilimler Yüksekokulu Gastronomi ve Mutfak Sanatları

Telefon: 0533 6514373

Doç. Dr. Aylin Ayaz

Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi Beslenme ve Diyetetik Anabilim Dalı

Telefon: 0312 3051096

Araştırma Ekibi

Doç. Dr. Aylin Ayaz

Uzm. Dyt. Z. Begüm Kalyoncu

Prof. Dr. Ahmet Uğur Demir

Çalışmaya katılmayı kabul ediyorsanız aşağıdaki kutucuğu X ile işaretleyip imzalayınız ve ankete devam ediniz. ☐ Kabul ediyorum

1	Ne kadar süredir Türkiye'de yaşıyorsunuz?	
		…………………………………………………………..ay
		…………………………………………………………..yıl
2	Düzenli diyet yapmanızı gerektiren hekim tarafından teşhisi konulmuş kronik hastalığınız var mı?	1.Evet 2. Hayır (EVET DİYENLER ALINMAYACAK).

A) TÜRK MUTFAĞINA UYUM ÖLÇEĞİ TASLAĞI

1) Lütfen aşağıdaki ifadeleri *genel beslenme alışkanlıklarınızı ve tüketim sıklığınızı düşünerek* değerlendiriniz.

1- **Her öğün**
2- **Günde bir kez**
3- **Haftada iki - üç kez**
4- **Haftada bir kez**
5- **Ayda iki - üç kez**
6- **Ayda bir kez**
7- **Yılda bir**
8- **Hiç tüketmedim**

1	Her ana öğünde ekmek (yufka, bazlama, lavaş, vb.) tüketirim	1	2	3	4	5	6	7	8
2	Hamur işi (börek, mantı, erişte, gözleme, poğaça, vb.) tüketirim	1	2	3	4	5	6	7	8
3	Simit tüketirim	1	2	3	4	5	6	7	8
4	Pirinç veya bulgur (sade pilav, nohutlu pilav, tavuklu pilav, vb.) tüketirim	1	2	3	4	5	6	7	8
5	Türk mutfağında yer alan çorbaları (mercimek, tarhana, yoğurt-yayla, işkembe, vb.) tüketirim	1	2	3	4	5	6	7	8
6	Dışarda yemek yediğimde ve eve yemek sipariş ettiğimde kebap, pide, lahmacun tüketirim	1	2	3	4	5	6	7	8
7	Etli veya etsiz sıcak tencere yemeği (yahni, tas kebabı, bamya, taze fasulye yemeği, yumurtalı yemekler, dolma, vb. tüketirim	1	2	3	4	5	6	7	8
8	Türk mutfağında çeşitli şekilde yapılan köfteleri (Akçaabat, Sultanahmet, İnegöl, Tekirdağ, kuru köfte, sulu köfte, terbiyeli köfte, içli köfte) tüketirim	1	2	3	4	5	6	7	8
9	Türk mutfağında yer alan sucuk, pastırma ve et kavurmayı tüketirim	1	2	3	4	5	6	7	8
10	Türk mutfağında yer aldığı şekilde sakatat tüketirim (Arnavut ciğeri, baş pilavı, kelle paça çorbası, beyin salatası, dil söğüşü, kokoreç, şirdan dolması, vb.)	1	2	3	4	5	6	7	8

		1	2	3	4	5	6	7	8
11	Soğuk ve sıcak servis edilen zeytinyağlı bitkisel yemeklerden (barbunya, taze fasulye, pırasa, bamya, vb.) tüketirim	1	2	3	4	5	6	7	8
12	Türk mutfağındaki geleneksel piyaz, çoban salatası, mevsim salatası, kısır, patates salatası, semizotu veya ıspanak salatası gibi salataları tüketirim	1	2	3	4	5	6	7	8
13	Türk mutfağında yer alan turşuları tüketirim	1	2	3	4	5	6	7	8
14	Salata sosu olarak sıvıyağ, limonsuyu, sirke, nar ekşisi, turunç ekşisi veya sumak ekşisi eklerim	1	2	3	4	5	6	7	8
15	Mevsiminde taze sebze (patlıcan, bamya, taze bakla, lahana, asma yaprağı, havuç, vb.) tüketirim	1	2	3	4	5	6	7	8
16	Mevsiminde taze meyve (dut, ayva, kavun, karpuz, Malta eriği, Trabzon hurması, erik, vb.) tüketirim	1	2	3	4	5	6	7	8
17	Türk kahvaltısı tüketirim (domates, salatalık, peynir, yumurta, çorba vb.)	1	2	3	4	5	6	7	8
18	Ay çekirdeği, kabak çekirdeği, leblebi ve karpuz çekirdeği tüketirim	1	2	3	4	5	6	7	8
19	Yemeklerin yanında yoğurt, ayran, cacık ve kefir tüketirim	1	2	3	4	5	6	7	8
20	Yemeğime nane, sumak, kırmızı pul biber, kekik, kimyon ve zahter gibi baharatlar eklerim	1	2	3	4	5	6	7	8
21	Türk mutfağı hamur tatlılarını (baklava, revani, lokma, şekerpare vb.) tüketirim	1	2	3	4	5	6	7	8
22	Türk mutfağı sütlü tatlılarını (kazandibi, tavukgöğsü, güllaç, keşkül, sütlaç, muhallebi, irmik tatlısı vb.) tüketirim	1	2	3	4	5	6	7	8
23	Taze meyve kompostosu veya kuru meyve hoşafı tüketirim	1	2	3	4	5	6	7	8
24	Unlu tatlılar (irmik veya un helvası gibi) ve kurabiye (acıbadem kurabiyesi gibi) tüketirim	1	2	3	4	5	6	7	8
25	Türk mutfağına özgü hafif tatlılar (aşure, zerde, pelte, vb.) tüketirim	1	2	3	4	5	6	7	8
26	Türk mutfağına özgü meyve ve sebze tatlıları (ayva tatlısı, elma tatlısı, şeftali tatlısı, kabak tatlısı, vb.) tüketirim	1	2	3	4	5	6	7	8
27	Türk tipi şekerlemeleri (lokum, akide şekeri, kestane şekeri, pişmaniye, koz helvası, çekme helva, mesir macunu, Beyoğlu çikolatası) tüketirim	1	2	3	4	5	6	7	8
28	Türk usulü demleme siyah çay tüketirim	1	2	3	4	5	6	7	8
29	Türk kahvesi tüketirim	1	2	3	4	5	6	7	8
30	Yerel Türk içecekleri (salep, boza, şalgam suyu, şerbet, şıra, rakı ve şarapları) tüketirim	1	2	3	4	5	6	7	8

2) Lütfen aşağıdaki ifadeleri yemek hazırlama ve yiyecek tüketimine ilişkin davranışlarınızı *düşünerek* değerlendiriniz.

1- **Her gün**
2- **Haftada iki - üç kez**
3- **Haftada bir kez**
4- **Ayda iki - üç kez**
5- **Ayda bir kez**
6- **Yılda iki – üç kez**
7- **Hiçbir zaman**

31	Türk kahvaltısı (domates, zeytin, beyaz peynir, ekmek, çorba) hazırlarım	1	2	3	4	5	6	7
32	Geleneksel Türk içecekleri hazırlarım (siyah çay demleme, Türk kahvesi yapma, nane limon kaynatma, ıhlamur veya adaçayı yapma, vb.)	1	2	3	4	5	6	7
33	Geleneksel Türk yemekleri pişiririm	1	2	3	4	5	6	7
34	Yemekleri ay çiçek yağı, zeytinyağı ve tereyağı kullanarak pişiririm	1	2	3	4	5	6	7
35	Tencere yemeklerini kuru soğan, domates ve salça (biber veya domates) ile pişiririm	1	2	3	4	5	6	7
36	Türkiye'ye özgü olan şekliyle salça, turşu, tarhana, erişte, reçel, konserve gibi geleneksel ürünleri yaparım	1	2	3	4	5	6	7
37	Öğle ve akşam yemeklerimi genellikle ailem veya arkadaşlarımla beraber tüketirim	1	2	3	4	5	6	7
38	Öğün saatlerim Türkiye'deki öğün saatlerine benzerdir	1	2	3	4	5	6	7
39	Üç ana öğün tüketirim	1	2	3	4	5	6	7
40	Yer sofrasında yemek yerim	1	2	3	4	5	6	7

B) GENEL ÖZELLİKLER

1	**Yaş**	
2	**Doğum Tarihiniz(gün/ay(yıl)**	
3	**Cinsiyet**	1.Erkek 2. Kadın
4	**Vücut ağırlığınız**	……………………………………………………. kg
5	**Boyunuz**	……………………………………………………. m
6	**Eğitim Durumunuz**	1. Okur-yazar değil 2. Okur-yazar

		3. İlkokul		
		4. Ortaokul		
		5. Lise		
		6. Üniversite		
		7. Lisansüstü (Yüksek lisans / Doktora)		
7	**Eğitim süresi**			
9	**Meslek**	1. Memur		
		2. Sigortalı İşçi		
		3. Serbest Meslek		
		4. Emekli		
		5. Ev hanımı / ev erkeği		
		6. İşsiz		
		7. Diğer……………….		
10	**Medeni durum**	1. Evli	2. Bekâr	
11	**Ekonomik durum**	1. Gelir giderden az		
		2. Gelir gidere denk		
		3. Gelir giderden fazla		
12	**Hekim tarafından teşhis edilmiş bir hastalığınız var mı?**	1. Hayır	2. Evet (adı)…………………………	
13	**Düzenli spor/egzersiz yapıyor musunuz?**	1. Hayır		
		2. Evet (Cevabınız Evet ise aşağıdaki soruyu yanıtlayınız)		

14 Yapılan spor/egzersizin türü, sıklığı ve süresi,	Egzersiz türü	Sıklığı Haftada.....(gün)	Süresi (dk)

15	**Alkol kullanıyor musunuz?**	1. Hayır 2. Evet…………………. (alkolün türü)
		…………………..miktar…………………hafta/gün

c) GÖÇMENLİKLE İLGİLİ BİLGİLER

1	**Nerelisiniz?**	
2	**Ne kadar süredir Türkiye'de yaşıyorsunuz?**	……………………………………………yıl
3	**Türkçe konuşma düzeyiniz nedir?**	1. Akıcı 2. Çok iyi 3. İyi 4. Az 5. Hiç konuşmuyorum
4	**Haberleri hangi kaynaklardan takip ediyorsunuz?**	1. Sadece yazım dili Türkçe olan kaynaklardan 2. Sadece yazım dili Türkçe olmayan kaynaklardan 3. Yazım dili Türkçe olan ve olmayan kaynaklardan beraber
5	**Çekirdek ailenizde Türkiyeli birisi (eş, anne, baba) var mı? Varsa, kim?**	1. Hayır 2. Evet (kim olduğu)……………………
6	**Yaşadığınız mekanı Türkiyeli biri (ev arkadaşı, oda arkadaşı, sevgili gibi) ile paylaşıyor musunuz?**	1.Evet 2. Hayır
7	**Türkiye'de mal varlığınız (ev, araba, arsa, vs.) var mı?**	1.Evet 2. Hayır

C) BESLENME ALIŞKANLIKLARINA YÖNELİK SORULAR

| 1 | Türkiye'ye geldikten sonra son bir yılda vücut ağırlığınızda nasıl bir değişim oldu? | 1.Değişim olmadı
 2. Kilo aldım, ………………….. kg değişim
 3. Kilo verdim, ………………….. kg değişim
 4. Kilo aldım; ama daha sonra verdim, …………………………. kg değişim | |

		5. Kilo verdim; ama daha sonra geri aldım, …………………….. kg değişim	
2	Türkiye'ye yerleştikten sonra her bir öğünde tükettiğiniz yiyeceklerin porsiyon miktarında herhangi bir değişiklik oldu mu?	1. Çok daha az tüketiyorum 2. Daha az tüketiyorum 3. Bir değişim olmadı 4. Daha fazla tüketiyorum 5. Çok daha fazla tüketiyorum	

3 Türkiye'ye yerleştikten sonra aşağıda bulunan yemek hazırlama veya pişirme yöntemlerinizde değişiklik oldu mu? (1. Bu yöntemleri çok daha az kullanır oldum, 2. Bu yöntemleri daha az kullanıyorum, 3. Bir değişim olmadı, 4. Bu yöntemleri daha fazla kullanıyorum, 5. Bu yöntemleri çok daha fazla kullanıyorum)

			1	2	3	4	5
1	Az yağda kızartma						
2	Bol yağda kızartma						
3	Mangalda pişirme						
4	Fırında pişirme						
5	Izgarada pişirme						
6	Haşlama						
7	Derin yağda kızartma						
8	Mikrodalgada pişirme						
9	Sebzeleri çiğ tüketmek						

4 Türkiye'ye yerleştikten sonra aşağıdaki yiyecek ve içecek tüketimlerinizde değişiklik oldu mu? (1. Çok daha az tüketiyorum, 2. Daha az tüketiyorum, 3. Bir değişim olmadı, 4. Daha fazla tüketiyorum, 5. Çok daha fazla tüketiyorum)

			1	2	3	4	5
1	Sebze tüketimi						
2	Patates tüketimi						
3	Pirinç tüketimi						
4	Atıştırmalık tüketimi						
5	Meyve tüketimi						
6	Şekerli gazlı içecek tüketimi						
7	Süt ürünleri tüketimi						
8	Yağlı/kızartılmış yiyecek tüketimi						
9	Tatlı tüketimi						
10	Şekerleme tüketimi						
11	Beyaz et tüketimi						
12	Kırmızı et tüketimi						

Development of a New Scale to Measure Culinary Acculturation of Immigrants Who Are Living in Turkey: Validity and Reliability Assessment Survey Form

Survey number: **DATE:**

Dear Participants,

I am doing my doctorate research project on the culinary acculturation of first-generation immigrants that are living in Turkey under the supervision of Assoc. Prof. Aylin Ayaz. The name of my research project is **"Construction and Validation of a Scale to Measure the Culinary Integration of First-Generation Immigrants in Turkey"**. Our research team is composed of Assoc. Prof. Aylin Ayaz., Prof. Dr. Ahmet Uğur Demir, and Z. Begüm Kalyoncu, MSc, RD, PhDc.

I would recommend you participate in this research that is totally based on voluntary participation without monetary compensation. Based on the information below, please sign the Participation Consent Form if you wish to take part in the research project. Your participation would be highly valuable to the success of the project.

Aim of the project: To develop a scale to measure the culinary integration of the first-generation immigrants that are living in Turkey and also conduct the validity and the reliability studies of the developed scale by comparing the results to other existing scales and taking a few anthropometric measurements.

Process: If you wish to take part in the research, Z. Begüm Kalyoncu, MSc, RD will be giving you a questionnaire about your opinions on Turkish cuisine, general dietary habits and health condition, and your social life. The researcher will also measure your height, body weight, waist, and hip circumference.

(The declaration of the participant)

I was provided with the aforementioned information about the research project that will be conducted among adults. After that, I was invited to participate in the project as a "participant".

I am convinced that my privacy will be kept confidential and not be shared with third parties during the course of this academic research project.

I am aware that I can withdraw from the research study whenever I want (however, I am also very well aware that it would be the most appropriate to let the investigators know in advance in order to not cause any inconveniences).

 During the research study, I can contact Assoc. Prof. Aylin Ayaz from *0312 3051096 (work phone) and* Z. Begüm Kalyoncu, MSc from *05336514373 (mobile phone).*

I hereby confirm that I was informed about the relevant details of the research study and all my questions (if any) were answered by the researcher. I consent to participate in this study voluntarily.

The signature of the participant

1	How long have you been living in Turkey?	…………………………………………………months
		…………………………………………………year(s)
2	Do you have a physician-diagnosed chronic condition that requires a special diet?	1.Yes 2. No (PEOPLE WHO RESPOND YES WILL BE EXCLUDED).

A) DRAFT CULINARY ACCULTURATION ASSESSMENT INVENTORY OF TURKISH CUISINE

1) Please evaluate the phrases below according to your consumption frequency

1- **Every meal**
2- **Once per day**
3- **Two or three times per week**
4- **Once per week**
5- **Two or three times per month**
6- **Once per month**
7- **Once per year**
8- **Never**

1	Consumption frequency of bread *(yufka, bazlama, lavaş,* etc.)?	1	2	3	4	5	6	7	8
2	Consumption frequency of savory pastry (*börek, mantı, erişte, gözleme, poğaça*, etc.)?	1	2	3	4	5	6	7	8
3	Consumption frequency of *simit*?	1	2	3	4	5	6	7	8
4	Consumption frequency of rice or bulgur (plain *pilav*, chickpea *pilav*, chicken *pilav*, etc.)?	1	2	3	4	5	6	7	8
5	Consumption frequency of soups (lentil, *tarhana*, yogurt, tripe, etc.)?	1	2	3	4	5	6	7	8
6	Consumption frequency of kebab, *pide, lahmacun* when dining out or ordering food for delivery?	1	2	3	4	5	6	7	8
7	Consumption frequency of warm stews (*yahni, tas kebabı*, okra, green beans, egg dishes, dolma, etc.)?	1	2	3	4	5	6	7	8
8	Consumption frequency of meatballs of Turkish cuisine (*Akçaabat, Sultanahmet, İnegöl, Tekirdağ, kuru köfte, sulu köfte, terbiyeli köfte, içli köfte*)?	1	2	3	4	5	6	7	8
9	Consumption frequency of processed deli meats (*sucuk, pastırma ve et kavurma*)?	1	2	3	4	5	6	7	8
10	Consumption frequency of offal (*Arnavut ciğeri, baş pilavı, kelle paça çorbası, beyin salatası, dil söğüşü, kokoreç, şirdan dolması*, etc.)	1	2	3	4	5	6	7	8

11	Consumption frequency of plant-based olive oil dishes (beans, green beans, leek, okra, etc.)?	1	2	3	4	5	6	7	8
12	Consumption frequency of traditional salads/mezes (*piyaz*, shepperd's salad, *kısır*, potato salad, purslane, spinach salad, etc.)?	1	2	3	4	5	6	7	8
13	Consumption frequency of pickles?	1	2	3	4	5	6	7	8
14	Consumption frequency of salad dressing of oil + lemon juice + vinegar?	1	2	3	4	5	6	7	8
15	Consumption frequency of seasonal vegetables?	1	2	3	4	5	6	7	8
16	Consumption frequency of seasonal fruits?	1	2	3	4	5	6	7	8
17	Consumption frequency of Turkish breakfast (tomatoes, cucumber, cheese, egg and/or soup, etc.)?	1	2	3	4	5	6	7	8
18	Consumption frequency of sunflower seeds, pumpkin seeds,*lebleb*i and watermelon seeds?	1	2	3	4	5	6	7	8
19	Consumption frequency of yogurt, *ayran, cacik*, and kefir along with meals?	1	2	3	4	5	6	7	8
20	Consumption frequency of sprinkling mint, sumac, paprika, *zahter* to your food?	1	2	3	4	5	6	7	8
21	Consumption frequency of pastry-based desserts of Turkish cuisine (baklava, *revani, lokma, şekerpare,* etc.)?	1	2	3	4	5	6	7	8
22	Consumption frequency of milk-based desserts (rice pudding, *kazandibi, tavukgöğsü, güllaç, keşkül, muhallebi, irmik tatlısı,* etc.)?	1	2	3	4	5	6	7	8
23	Consumption frequency of compote of dry fruit *hoşaf*?	1	2	3	4	5	6	7	8
24	Consumption frequency of flour based desserts (semolina or flour halva) or cookies (traditional bitter almond cookie)?	1	2	3	4	5	6	7	8
25	Consumption frequency of loght desserts of Turkish cuisine (aşure, zerde, pelte, etc.)?	1	2	3	4	5	6	7	8
26	Türk mutfağına özgü meyve ve sebze tatlıları (ayva tatlısı, elma tatlısı, şeftali tatlısı, kabak tatlısı, vb.) tüketirim Consumption frequency of fruit or vegetable desserts of Turkish cuisine (quince, apple, peach, pumpkin, etc.)	1	2	3	4	5	6	7	8
27	Consumption frequency of Turkish confectionary (*lokum, akide şekeri, kestane şekeri, pişmaniye, koz helvası, çekme helva, mesir macunu*, Beyoğlu chocolate, etc.)	1	2	3	4	5	6	7	8
28	Consumption frequency of tea?	1	2	3	4	5	6	7	8
29	Consumption frequency of Turkish coffee?	1	2	3	4	5	6	7	8

30	Consumption frequency of idiosyncratical beevrages (salep, boza, fermented turnip juice, sherbet, şıra, rakı, wines, etc.)?	1	2	3	4	5	6	7	8

2) Please evaluate the phrases below according to your culinary behaviors.

- 8- **Every day**
- 9- **Two or three times per week**
- 10- **Once per week**
- 11- **Two or three times per month**
- 12- **Once per month**
- 13- **Once per year**
- 14- **Never**

31	Preparation frequency of Turkish breakfast (tomatoes, cucumber, cheese, egg and/or soup, etc.)?	1	2	3	4	5	6	7
32	Preparation frequency of traditional Turkish beverages (brewing black tea, making Turkish coffee, mint & lemon tea, linden, sage tea, etc.)?	1	2	3	4	5	6	7
33	Cooking frequency of Turkish dishes?	1	2	3	4	5	6	7
34	The frequency of cooking meals with sunflower oil, olive oil and/or butter?	1	2	3	4	5	6	7
35	The frequency of cooking meals with the base of onion, tomato and/or tomato (or red pepper) paste?	1	2	3	4	5	6	7
36	Preparation frequency of traditional Turkish products such as yogurt, tomato paste, pickle, tarhana, *erişte*, jam, and bottled food products?	1	2	3	4	5	6	7
37	Frequency of commensality?	1	2	3	4	5	6	7
38	Frequency of having meals at the typical schedule of Turkish people (breakfast from 6 am till 8-9 am, lunch from 11.30 am till 1.30 pm, and dinner from 6 pm till 8 pm)?	1	2	3	4	5	6	7
39	Frequency of having regular three meals?	1	2	3	4	5	6	7
40	Frequency of eating while sitting on the floor?	1	2	3	4	5	6	7

A) GENERAL INFORMATION

1	**Age**		
2	**Date of birth (day/month(year)**		
3	**Sex**		
		1.Male	2. Female
4	**Body weight**	………………………………………………… kg	
5	**Height**	………………………………………………… m	

6	**Education status**	
		1. Illiterate
		2. Literate
		3. Graduate of primary school
		4. Graduate of middle school
		5. Graduate of high-school
		6. Graduate of university
		7. Having a graduate degree
7	**Total duration of education**	
9	**Occupation**	
		1. Government official
		2. Insured employee
		3. Freelancer
		4. Retired
		5. Home-maker
		6. Unemployed
		7. Other……………….

10	**Marital status**		
		1. Married	2. Single

11	**Economic status**	
		1. Income less than expenditure
		2. Income equals expenditure
		3. Income more than expenditure

12	**Presence of physician-diagnosed disease?**	1. No	2. Yes (name of the disease)

13	**Regular sports / exercise?**	
		1. No
		2. Yes (Please respond the question below if yes)

14	**Type of exercise, frequency, and duration?**	**Type of exercise**	**Frequency .....days/ week**	**Duration (min)**	

15	**Consumption of alcohol?**	1. No 2. Yes…………………..
		………........................(type of alcohol)
		………………….amount
		………………….days/week

B) IMMIGRATION-RELATED INFORMATION

1	**Which country are you coming from?**	
2	**How long have you been living in Turkey?**	………………………………………year(s)
3	**How would you rate your Turkish speaking skills?**	1. Fluent 2. Advanced 3. Intermediate 4. Beginner 5. I do not speak Turkish at all
4	**Language of the news channels that you follow?**	1. Only from Turkish resources. 2. Only from non-Turkish resources 3. Both from Turkish and non-Turkish resources
5	**Do you have anyone from Turkey in your nuclear family (spouse, mother or father)?**	1. No 2. Yes (relation status) …………
6	**Have you ever lived with a Turkish person?**	1.Yes 2. No
7	**Do you own property in Turkey (home, car, land, etc.)?**	1.Yes 2. No

D) QUESTIONS ON CHANGES IN DIETARY AND CULINARY PATTERNS

1	How has your body weight changed in the last one year after you move to Turkey?	1.There has been no change in my weight	
		2. I've put on weight of ………………….. kg	
		3. I've lost weight of ………………….. kg	
		4. I've gained, but then lost weight with a total change of …………………………. kg	
		5. I've lost, but then gained weight with a total change of …………………………. kg	

2	Has your general portion size changed after moving to Turkey?	1. Consume much less
		2. Consume less
		3. No change
		4. Consume more
		5. Consume much more

3	How has your method of food preparation changed after you moved to Turkey? (1. Use much less, 2. Use less, 3. No change, 4. Use more, 5. Use much more)						

			1	2	3	4	5
1	Stir-frying						
2	Deep-frying						
3	Barbequing						
4	Baking / cooking in oven						
5	Grilling						
6	Boiling						
8	Microwaving						
9	Consuming vegetables raw						

4	How have the foods you generally eat changed after moving to Turkey? (1. Consume much less , 2. Consume less, 3. No change, 4. Consume more, 5. Consume much more)						

			1	2	3	4	5
1	Vegetable consumption						
2	Potato consumption						
3	Rice consumption						
4	Snack consumption						
5	Fruit consumption						
6	Soft drink consumption						
7	Dairy product consumption						
8	Fatty/fried food consumption						
9	Desert consumption						
10	Candy/sweets consumption						
11	White meat consumption						
12	Red meat consumption						

Appendix 5. Culinary Acculturation Assessment Inventory (CAAI) – Final Version with Visual Items

Dietary Sub-Section

1) Consumption frequency of bread (*yufka, bazlama, lavaş,* etc.)?

White bread

Whole-wheat bread

Pide

Lavaş

Yufka

Bazlama

Vakfıkebir bread

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

2) Consumption frequency of soups (lentil, tarhana, yogurt-yayla, tripe, etc.)?

Lentil Soup

Tarhana Soup

Yogurt Soup

Tripe Soup

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

3) Consumption frequency of warm stews (*yahni, tas kebabı*, okra, green beans,egg dishes, dolma, etc.)?

Okra (casserole)

Dry Beans (casserole)

Tas kebabı

Yaprak Sarma

Kabak dolması

Menemen

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

4) Consumption frequency of plant-based olive oil dishes (beans, green beans, leek, okra, etc.)?

Green bean dish

Bean dish

Leek dish

Artichoke dish

Okra dish

Dolma dish

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

5) Consumption frequency of seasonal vegetables?

Broad beans Eggplant Vine leaves Okra
Chard Leek Cabbage Radish

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

6) Consumption frequency of Turkish breakfast (tomato, cucumber, cheese, egg and/or soup, etc.)?

Classic Turkish breakfast

Soup - breakfast
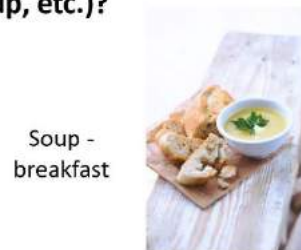
Simit – cheese – tea

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

7) Consumption frequency of yogurt, *ayran, cacık*, and kefir along with meals?

Yogurt

Ayran

Cacık

Kefir

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

8) Consumption frequency of Turkish style brewed tea?

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

9) Consumption frequency of Turkish coffee?

Every meal	Once a day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	Once a year	Never
1	2	3	4	5	6	7	8

Culinary Behaviors Sub-Section

1) Preparation frequency of Turkish breakfast (tomato, cucumber, cheese, egg and/or soup, etc.)?

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

2) Preparation frequency of traditional Turkish beverages (brewing black tea, making Turkish coffee, mint & lemon tea, linden, sage tea, etc.)?

Brewing black tea

Mint & lemon tea

Making Turkish coffee

Making linden tea

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

3) Preparation frequency of Turkish dishes?

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

4) The frequency of cooking meals with sunflower oil, olive oil, and/or butter?

Cooking with olive oil

Cooking with sunflower oil

Cooking with butter

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

5) The frequency of cooking meals with the base of onion, tomato, and/or tomato (or red pepper) paste?

Tomato paste

Cooking with onions

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

6) Preparation frequency of traditional Turkish products such as yogurt, tomato paste, pickle, *tarhana, erişte*, jam, etc?

Making pickles

Making *tarhana*

Making *erişte*

Making jam

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

7) Frequency of commensality (consuming food with the presence of others)?

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

8) Frequency of having meals roughly at the typical schedule of Turkish cuisine (breakfast from 6 till 8-9 am, lunch from 11.30 am till 1.30 pm, and dinner from 6 till 8 pm)?

Breakfast time

Lunch time

Dinner time

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

9) Frequency of having regular three meals?

Breakfast

Lunch

Dinner

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

10) Frequency of eating on the floor?

Every day	2 – 3 times per week	Once a week	2 – 3 times per month	Once a month	2-3 times per year	Never
1	2	3	4	5	6	7

Appendix 6. Turnitin Report

DEVELOPMENT OF A NEW SCALE TO MEASURE CULINARY ACCULTURATION OF IMMIGRANTS WHO ARE LIVING IN TURKEY: VALIDITY AND RELIABILITY ASSESSMENT

ORIGINALITY REPORT

9%	6%	8%	2%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	d.lib.msu.edu Internet Source	1%
2	worldwidescience.org Internet Source	1%
3	Tuba Uçar, Esra Güney, Büşra Cesur, Zeliha Burcu Yurtsal. "The scale for body image concerns during pregnancy: Development and validation", Perspectives in Psychiatric Care, 2018 Publication	1%
4	www.cambridge.org Internet Source	1%
5	www.mdpi.com Internet Source	1%
6	Park, S.Y.. "Mothers' Acculturation and Eating Behaviors of Korean American Families in California", Journal of Nutrition Education and	<1%

9. **CURRICULUM VITAE**

I. **PERSONAL DETAILS**

Name:	Zeynep Begüm Kalyoncu
Date of birth and place:	12 August 1988, Ankara
Nationality:	Turkish
Address:	Birlik Mah. Katar Cad. Oyak Sitesi 35. Giris 21 A Blok, Daire 13, Cankaya, Ankara
Telephone:	+90-533-651-4373

II. **EDUCATION**

PhD:	Hacettepe University Graduate School of Health Sciences, Nutrition and Dietetics Program (09.2012 -)
MSc:	Maastricht University, Health Food Innovation Management Program (09.2010-07.2012)
BSc:	Hacettepe University, Nutrition and Dietetics Program (09.2006 – 07.2010)
Highschool:	TED Ankara College Primary and High School (09.1999 – 06.200

III. **SCHOLARSHIPS AND STIPENDS**

2018 Summer: **Research Assistant Stipend** - Communities for Healthy Living Project in Nutrition Dept of Harvard T.H. Chan School of Public Health

2017 – 2018: **Fulbright Visiting Scholar Program** - selected for 2017-18 academic year, Harvard T.H. Chan School of Public Health, working under the supervision of Dr. Kirsten Davison & STRIPED Travel Scholarship to

participate in the Eating Disorders Coalition (EDC) Advocacy Day on Capitol Hill on Tuesday, April 24, 2018

2010 – 2012: **Universiteit Maastricht High Potential Scholarship** (full tuition and monthly allowance) – the Netherlands

2009-2010: **Georgia Rotary Scholarship Program** (full tuition, accommodation coverage, and financial support for meals and books) – United States of America

1 -6 / 2009: **ERASMUS Student Exchange Program Scholarship** (full tuition and monthly allowance) - Finland

IV. WORK EXPERIENCE

2018 - 2019: Co-investigator of the project titled "Development of a Scale to Measure Trans Fat Intake Frequency and Determining the Trans Fat Content of Food Products" – along Sağlığa Evet Derneği (Funding Source: Bloomberg Foundation)

2017 – 2018: Researcher at Harvard T.H. Chan School of Public Health, Dept. of Nutrition

2014 – 2017: Full-time lecturer in the Dept. of Gastronomy in Özyegin University, Istanbul

2015 – 2016: Co-authored a book on Cooking Techniques in Turkish with Dr. A. Aylin Alsaffar and wrote a chapter on Cereals in one of the core Nutrition and Dietetics text-books in Turkey

2013 – 2014: Columnist in Sözcü (popular Turkish daily newspaper)

2013: Dietician in Base Life Club Sports Center

2013: Social Media Manager and Blog Writer for Muscular Development Turkey

2013: Dietician in private clinic

2013: Project Assistant for Inprofood, 7th Framework EU Project

2012 - 2013:   Research Assistant at TNS Turkey Healthcare Research Istanbul, Turkey

V.   PUBLICATIONS AND ACADEMIC WORK

Science Citation Index Publication

Kalyoncu ZB, Pars H, Bora-Güneş N, Karabulut E, Aslan D. A systematic review of nutrition-based practices in prevention of hypertension among healthy youth. Turk J Pediatr. 2014 Jul-Aug;56(4):335-46.

Figueroa, R., Kalyoncu ZB, Saltzman JA, Davison KK. Autonomous motivation, sugar-sweetened beverage consumption, and healthy beverage intake in US families: Differences between mother-adolescent and father-adolescent dyads. Accepted for publication in Public Health Nutrition on November 30, 2018.

International Publication

Tettner S, Kalyoncu ZB. Gastrodiplomacy 2.0: Culinary Tourism Beyond Nationalism. Journal of Tourism Research. 2016; 6 - No. 2: 47-55.

National Publication in Turkey

Kalyoncu ZB. Pediyatrik Obezite: Tanımlar, Nedenleri, Sonuçları, Tedavisi ve Önleme Stratejileri. Clinic Pediatri. 2014; 9:38-45

National Books in Turkey

Temel Beslenme ve Diyetetik. Editör Prof. Dr. Türkan Kutluay Merdol. Bölüm 7: Dünyada Kullanılan Tahıl Türleri, Ürünleri, Kullanım Alanları ve Besin Değeri Farklılıkları. Güneş Tıp Kitabevleri. 2015. Uzm. Dyt. Z. Begüm Kalyoncu pages 207-227 (one chapter)

Alsaffar AA, Kalyoncu ZB. Pişirme Yöntemleri. Milli Eğitim Bakanlığı Yayınları, İstanbul, 2015. (co-authorship of the full book)

Oral Presentations in International Conventions

Kalyoncu ZB, Ayaz A., Demir AU., Davison KK. Culinary acculturation of first-generation immigrants settled in Turkey: a comparative cross-sectional analysis with a reference population. 3rd International Health Sciences Congress, upcoming – November 29, 2018, Ankara, Turkey.

Kalyoncu ZB. Assessing dietary acculturation among first generation immigrants: A scoping review. American Society of Nutrition. June 11, 2018.

Kalyoncu ZB. Construction and Validation of a Scale to Measure the Culinary Integration of First-Generation Immigrants in Turkey. 3rd Annual Student Faculty Retreat of Dept. of Nutrition, Harvard T.H. Chan School of Public Health. March 2, 2018.

Kalyoncu ZB., Figueroa, R., Davison K. Autonomous Motivation To Limit Sugar Sweetened Beverages And Healthy Beverage Intake In Parent-Adolescent Dyads. AAAS Annual Meeting 2018, February 19, 2018

Kalyoncu, Z. B., Alsaffar, A. A. Bioethical Evaluation of Genetically Modified Foods. 8th International Congress of Turkish Bioethics Association, November 9-12, 2015, Ankara (SS-015).

Invited Speaker

Kalyoncu, Z. B., The Sweet Culture of Turkey. 2016 Chulalongkorn Asian Heritage Forum, 17-18 August 2016, Bangkok. (https://www.youtube.com/watch?v=H7LMgfRQcfY)

Ilhan O, Kalyoncu, Z. B., Gıda Endüstrisinde Kullanılan Yenilebilir Film Ve Kaplamaların Özellikleri. TÜRKAS - Tüm Ürün, Kap ve Ambalaj Standartları Sempozyumu. 5-6 October 2016

Kalyoncu, Z. B., Tettner S., Gastrodiplomacy 2.0: Culinary Tourism Beyond Nationalism. Smart Tourism Congress Barcelona, 9-11 November 2016.

Posters

Kalyoncu Z.B., Kutluay-Merdol T., Merdol DS., Aslan D. Preliminary Look on Nutrition Policies in Turkey: Analysis and Recommendations for Improvement. 3rd International Health Sciences Congress, November 29, 2018, Ankara, Turkey.

Gavarkovs A., Aftosmes-Tobio A., Lansburg K., Kazik C., Beckerman J., Figueroa R., Kalyoncu Z.B., Jurkowski J., Davison KK., Innovation-specific and general capacity building among Head Start staff implementing a family-centered intervention to prevent childhood obesity. 11th Annual Conference on the Science of Dissemination and Implementation in Health, December 3, 2018, Washington D.C., United States

Kalyoncu Z.B., Ayaz A., Demir AU., Davison KK., Mohiyeddini C. Measuring the Culinary Integration of Immigrants: Construction and Validation of a Visual Scale for First Generation Immigrants in Turkey. American Society of Nutrition. June 10, 2018, Boston, United States

Kalyoncu ZB., Figueroa, R., Aftosmes-Tobio A. Assessing Culinary Knowledge and Skills of Adults in Health Promotion Research: A Systematic Review. Teaching Kitchen Collaborative Research Day. February 7, 2018, San Francisco, United States.

Kalyoncu B, Pars H, Bora-Güneş N, Karabulut E, Aslan D. Sağlıklı Gençler Arasında Hipertansiyonun Önlenmesi İçin Beslenme Temelli Uygulamalara İlişkin Bir Sistematik Derleme Çalışması, 57. Milli Pediyatri Kongresi (30 Ekim - 3 Kasım 2013), Antalya, Turkey.

Ilaslan K, Alsaffar AA, Ilhan Ö, Kalyoncu ZB. Gastronomide İleri Uygulamalar: Katkı Maddelerinin Gıdaların Tekstürel Özelliklerinin Geliştirilmesinde Kullanımı. 9. Gıda Mühendisliği Kongresi. (November 13, 2015), İzmir, Turkey