

**Culture, Acculturation,
and Eating Behaviour in Adolescence:
A Comprehensive Analysis of Turkish Migrants in
Comparison to Germans and Turks**

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General abstract

Unhealthy eating behaviour among adolescents is a worldwide problem. In Germany, adolescents with a Turkish migration background constitute a high-risk group. Furthermore, the level of acculturation was found to be linked to eating behaviour and its social-cognitive determinants. In order to develop effective interventions, it is important to identify relevant social-cognitive determinants of eating behaviour and to find out whether cultural differences exist. The present thesis therefore combined the research line on explaining health/risk behaviour via social-cognitive theories using the prototype-willingness model (PWM) with the line of research on culture and acculturation. For the explanation of eating behaviour, the PWM was firstly differentiated. Social norms whose influence was identified to be culture-specific were operationalised as descriptive and subjective norms. Secondly, this differentiated PWM was extended by acculturation as a background factor. The level of acculturation was hypothesised to influence every variable of the differentiated PWM.

The models were tested in one cross-sectional study (Study II) and in two longitudinal studies (Study I and III). Study I analysed adolescent Turkish migrants' eating behaviour in comparison to adolescent non-migrants in the host country Germany using the differentiated PWM. Study II conducted an analogical analysis with adolescent Turkish migrants in Germany compared to adolescent non-migrants in the home country Turkey. Latent mean differences, associations of variables, and group differences within these associations were analysed using multiple-group structural equation modelling. Study III analysed associations of variables within the differentiated and extended PWM using structural equation modelling in a sample of adolescent Turkish migrants.

Latent mean differences across adolescent Turkish migrants and non-migrants in Germany as well as non-migrants in Turkey, prediction patterns for the given cultural groups, and the association between acculturation and the differentiated PWM for adolescent Turkish migrants were revealed.

Theoretical implications for the PWM, culture, and acculturation as well as influences of adolescent Turkish migrants' eating behaviour in comparison to adolescent non-migrants in Germany and Turkey are shown. These influences are targets for effective culture-specific and generic interventions regarding healthy eating among adolescents in the given cultural groups.

Abstract Study I

Adolescent Turkish migrants constitute a high-risk group for unhealthy eating behaviour in Germany. It is important to identify relevant social-cognitive determinants of eating behaviour, and to find out whether cultural differences between adolescent Turkish migrants and non-migrants in Germany exist, in order to develop effective intervention strategies for them. The present longitudinal study combined research on culture within an application of a differentiated prototype-willingness model (PWM) for the explanation of eating behaviour. To do so, social norms whose influence was identified to be culture-specific were differentiated into descriptive and subjective norms. Adolescent Turkish migrants' eating behaviour was comparatively analysed to non-migrants in Germany. It was hypothesised that adolescent Turkish migrants had less favourable extents of PWM-variables compared to adolescent non-migrants, that the predictions of the differentiated PWM were confirmed in both groups but with cultural variations, and that behavioural intentions and behavioural willingness of adolescent Turkish migrants would more strongly be based on social influences, whereas non-migrants' behavioural intentions and behavioural willingness would more strongly be based on attitudes.

A sample of adolescent Turkish migrants ($n = 131$) and non-migrants ($n = 303$) aged between 10 to 17 years filled out a questionnaire regarding social-cognitive variables to eat unhealthy and healthy foods at wave 1. Eating behaviour was assessed via a food frequency questionnaire two to four weeks later at wave 2. Multiple-group structural equation modelling was used to analyse latent mean differences and associations of variables within the differentiated PWM. Separate models were conducted introducing social-cognitive variables to eat either unhealthy foods (unhealthy model) or healthy foods (healthy model).

Adolescent Turkish migrants compared to non-migrants in Germany had a less favourable eating behaviour, attitude to eat unhealthy foods, descriptive norm to eat unhealthy and healthy foods, perception of the unhealthy eater, behavioural intention to eat unhealthy

foods, and behavioural willingness to eat healthy foods. Their eating behaviour was predicted via the reasoned action pathway in both the unhealthy and the healthy model. Adolescent non-migrants' eating behaviour was predicted via the social reaction pathway in the unhealthy model, and via the reasoned action and the social reaction pathway in the healthy model. Significant group differences in influence strengths from eating behaviour's distal antecedents on behavioural intentions and behavioural willingness were found.

Implications for theory are provided. Furthermore, the results reveal influences of adolescent Turkish migrants' eating behaviour in comparison to influences of adolescent non-migrants' eating behaviour in Germany. Thus, targets for effective culture-specific and generic interventions regarding healthy eating among adolescents in the given cultural groups are shown.

Abstract Study II

Unhealthy eating behaviour is a threatening health issue among adolescent Turkish migrants in Germany but also among adolescents in Turkey. In order to develop effective intervention strategies, it is important to identify relevant social-cognitive determinants of eating behaviour, and to find out whether cultural differences between adolescent Turkish migrants in Germany and non-migrants in Turkey exist. This cross-sectional study combined research on culture within an application of a differentiated prototype-willingness model (PWM) for the explanation of eating behaviour. To do so, social norms whose influence was identified to be culture-specific were differentiated into descriptive and subjective norms. A comparative analysis of both cultural groups' eating behaviour was conducted. Adolescent Turkish migrants in Germany and non-migrants in Turkey were expected to differ in extents of PWM-variables and in their prediction patterns of eating behaviour. Furthermore, it was hypothesised that the behavioural intentions and the behavioural willingness of adolescent Turkish migrants would more strongly be based on attitudes, whereas the behavioural intentions and the behavioural willingness of adolescent non-migrants in Turkey would more strongly be based on social influences.

Social-cognitive variables to eat unhealthy and healthy foods and eating behaviour were assessed via questionnaire in a sample of adolescent Turkish migrants in Germany ($n = 102$) and non-migrants in Turkey ($n = 270$) aged between 10 to 14 years. Within the differentiated PWM, latent mean differences and associations of variables were analysed using multiple-group structural equation modelling. Social-cognitive variables to eat unhealthy foods (unhealthy model) and healthy foods (healthy model) were introduced into separate models.

Adolescent Turkish migrants in Germany compared to non-migrants in Turkey were found to have more favourable attitudes to eat unhealthy and healthy foods, subjective norms to eat unhealthy and healthy foods, behavioural intentions to eat unhealthy foods, and

behavioural willingness to eat unhealthy foods as well as a less favourable behavioural willingness to eat healthy foods. In adolescent Turkish migrants, eating behaviour was predicted via the reasoned action pathway in both the unhealthy and the healthy model. Non-migrants' eating behaviour was predicted via the social reaction pathway in the unhealthy model, and via the reasoned action and the social reaction pathway in the healthy model. Significant group differences in the influence strengths from eating behaviour's distal antecedents on behavioural intentions were shown.

Implications for theory are provided. Furthermore, the findings identify influences of adolescent Turkish migrants' eating behaviour in comparison to influences for adolescent non-migrants in Turkey and thus give targets for effective culture-specific and generic interventions regarding healthy eating among adolescents in the given cultural groups.

Abstract Study III

Adolescent Turkish migrants constitute a high-risk group for unhealthy eating behaviour among adolescents in Germany. However, the level of acculturation may be associated with eating behaviour and its social-cognitive determinants. In order to develop effective intervention strategies for adolescent Turkish migrants, it is important to identify relevant social-cognitive determinants of their eating behaviour and to find out whether eating behaviour and its social-cognitive determinants are associated with acculturation. Thus, this longitudinal study combined research on culture and acculturation within an application of a differentiated and extended prototype-willingness model (PWM) for the explanation of eating behaviour. To do so, social norms whose influence was identified to be culture-specific were firstly differentiated into descriptive and subjective norms. Secondly, this differentiated PWM was extended by acculturation as a background factor. Within this differentiated and extended PWM, the level of acculturation was hypothesised to influence every PWM-variable.

A sample of adolescent Turkish migrants in Germany ($N = 155$) filled out a questionnaire regarding social-cognitive variables to eat unhealthy and healthy foods and eating behaviour at wave 1. Eating behaviour was once more assessed two to four weeks later at wave 2. Associations of variables were analysed using structural equation modelling. Social-cognitive variables to eat unhealthy foods (unhealthy model) and healthy foods (healthy model) were introduced into separate models and all analyses were conducted cross-sectionally as well as longitudinally.

The higher the level of acculturation was, the more favourable the attitudes and subjective norms to eat healthy foods, the perception of the unhealthy eater as well as the behavioural intentions and the behavioural willingness to eat unhealthy foods. Thus, the higher the level of acculturation was, the more favourable the extents of the given PWM-constructs. Adolescent Turkish migrants' eating behaviour was predicted via the reasoned action pathway in both the unhealthy and the healthy model.

The findings provide implications for theory. Furthermore, influences of adolescent Turkish migrants' eating behaviour are shown. In general, PWM-constructs of the reasoned action pathway should be targets for effective interventions regarding healthy eating among adolescent Turkish migrants in Germany. Less acculturated adolescent Turkish migrants would especially benefit from interventions for healthy eating that focus on the PWM-constructs associated with acculturation.

1. Introduction

Adolescent Turkish migrants are a high-risk group for unhealthy eating behaviour in Germany. This constitutes a major health issue as unhealthy eating behaviour was found to be causative for noncommunicable diseases (NCDs¹; WHO, 2003). From a psychological perspective, it is hence important to identify relevant social-cognitive determinants of adolescent Turkish migrants' eating behaviour, in order to develop effective interventions for this cultural group.

There are two psychological research lines that are central for the explanation of health/risk behaviour in a specific cultural group. The first one devotes to explaining health/risk behaviour through social-cognitive theories, whereas the second line devotes to culture and acculturation. One social-cognitive theory, the prototype-willingness model (PWM), was especially developed for the explanation of health/risk behaviour in children and adolescents and was therefore chosen for analysis. However, culture and acculturation are not integral parts of the PWM. The model thus disregards the question whether the unhealthy eating behaviour found in adolescent Turkish migrants is determined by culture and/or acculturation.

A growing body of literature provides evidence for cultural differences in the extents of eating behaviour's social-cognitive determinants, in the influence strengths from eating behaviour's distal on its proximal antecedents (e.g. Blanchard et al., 2009), and for the influence of acculturation on eating behaviour and its social-cognitive determinants (e.g. Diaz, Marshak, Montgomery, Rea, & Backman, 2009). Nevertheless, these studies have so far never comprehensively analysed migrants' eating behaviour in comparison to their host and home culture nor have they extended social-cognitive health behaviour models by acculturation as a background factor.

¹ Noncommunicable diseases (NCDs), also known as chronic diseases, are of long duration and generally slow progression. Cardiovascular diseases (e.g. heart attacks and strokes), different types of cancer, chronic respiratory diseases such as chronic obstructed pulmonary disease (COPD) and asthma as well as diabetes are the four main types (WHO, 2013).

This thesis therefore combines the research line on explaining health/risk behaviour through social-cognitive theories via the PWM with the line of research on culture and acculturation. Its aim is a comprehensive analysis of adolescent Turkish migrants' eating behaviour in comparison to adolescent non-migrants in Germany (host culture) and Turkey (home culture) using the PWM. For analysis, social norms are differentiated into descriptive and subjective norms, as their influence was found to be culture-specific (e.g. Bagozzi, Lee, & van Loo, 2001). Cultural differences in the extents of PWM-variables, in prediction patterns, in influence strengths from eating behaviour's distal on its proximal antecedents, and an extension of the differentiated PWM by acculturation as a background factor are regarded.

2. Background

The high prevalence of unhealthy eating behaviour among adolescents is a major health issue as healthy eating constitutes a key element in the prevention of NCDs and their intermediating risk factors (WHO, 2003). NCDs are the leading cause of death in the world and were estimated to account for 92 % of all deaths in Germany in 2008 (WHO, 2011). More specifically, 45 % of deaths were caused by cardiovascular diseases, 26 % by cancers, 4 % by respiratory diseases, and 3 % by diabetes. Unhealthy eating behaviour was, amongst other individual risk factors, confirmed to be causative for NCDs. Such individual risk factors, non-modifiable risk factors like sex, and socioeconomic, cultural and environmental conditions cause NCDs through the intermediating factors hypertension, diabetes, overweight, obesity, blood pressure, blood lipids, and impaired blood glucose (Darnton-Hill, Nishida, & James, 2004). These multiple interactions are presented in Figure 1.

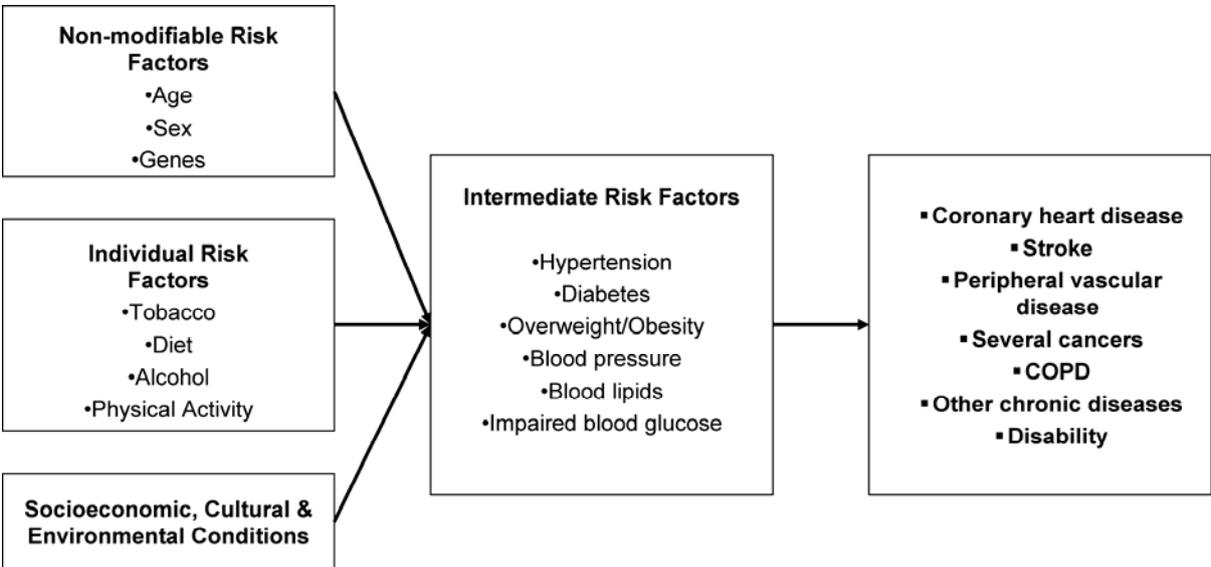


Figure 1. Causative and intermediate risk factors of NCDs (Darnton-Hill et al., 2004).

A number of these intermediate risk factors were found in children and adolescents whose diets contained excessive fat intake, refined carbohydrates, cholesterol, salt, and an

inadequate intake of fibre and potassium (Aboderin et al., 2002). Eating behaviour in childhood has a continuing effect on later body composition, physiology, and cognition. This implies the importance of long-term prevention of morbidity and mortality through an alteration of eating behaviour (Roberts, 2001). A change in eating behaviour may therefore have positive and negative effects on both present health and the development of NCDs in the future life (WHO, 2003). During adolescence, three critical issues which impact NCDs are presumed (Darnton-Hill et al., 2004). The first one is the development of risk factors like an unhealthy eating behaviour during the given period, while the second one is the tracking of risk factors throughout life. It is alarming that once an unhealthy eating behaviour is established in childhood, there is a high risk of persistence during adolescence and adulthood. Thirdly in terms of prevention, the development of healthy habits like a healthy eating behaviour is an immense issue.

2.1. Nutrition recommendations

The question is how the growing trend towards unhealthy eating behaviour among adolescents can be defied and which targets for effective interventions are available.

A starting point is to establish nutrition recommendations for a healthy eating behaviour. These already exist numerously: The German Nutrition Society (2011), for instance, announced 10 dietary guidelines based on most recent research results which explain how to keep a wholesome diet. The guidelines recommend an ample consumption of cereal products, potatoes, water, five portions of vegetables and fruit every day, daily consumption of milk and dairy products, weekly consumption of fish as well as a moderate consumption of meat, sausages, eggs, fat, fatty foods, sugar, and salt. Furthermore, they recommend to maintain versatile eating habits, the preparation of tasty and carefully cooked dishes which are to be consumed slowly and joyfully, to be conscious of ones' weight, and engagement in physical activity.

A further recommendation for a healthy eating behaviour is the Optimized Mixed Diet (OMD or optimiX®). The OMD constitutes a total diet concept especially developed for children and adolescents by the Research Institute of Child Nutrition, Dortmund (Forschungsinstitut für Kinderernährung Dortmund, FKE). Based on nutritional and practical considerations, the OMD categorised foods into 11 food groups. According to the food groups' nutrient densities, nine were then classified as recommended and two food groups were classified as tolerated. Within the nine recommended food groups, a distinction was made resulting in the two OMD food categories of plant foods and beverages and of animal foods. Already 100 % of nutrient requirements but only 90 % of energy intake are fulfilled by the recommended food groups. This leaves 10 % of energy intake to the tolerated food groups which contribute only low nutrient densities. They refer to the OMD food category of high-fat and high-sugar foods. Simplified messages for consumption amounts were established according to the given OMD food categories: Plant foods and beverages are to be consumed in ample amounts (76 %), animal foods are to be consumed moderately (20 %), and high-fat as well as high-sugar foods are to be consumed sparingly (4 %; Kersting, Alexy, & Clausen, 2005). Table 1 presents the consumption recommendations of the 11 food groups.

Table 1

OMD food categories of assigned food groups, OMD consumption recommendations (Mensink, Heseke, Richter, Stahl, & Vohmann, 2007), and OMD consumption messages (Kersting et al., 2005)

OMD food categories	assigned food groups	OMD consumption recommendations (for 13 to 17-year-olds)	OMD messages for consumption
plant foods and beverages	vegetables and fruit	males and females: 260 – 350 grams/day	ample
	bread/cereals	males: 300-350, females: 250-280 grams/day	
	potatoes/pasta	males: 330-350, females: 270-300 grams/day	
	beverages	males: 1300-1500, females: 1200-1400 ml/day	
animal foods	milk/milk products	males: 450-500, females: 425-450 ml/day	moderate
	meat/sausages	males: 75-85, females: 65-75 grams/day	
	eggs	males and females: 2-3 pieces/week	
	fish	males and females: 100 grams/week	
high-fat, high-sugar foods	high-sugar/high-fat products and oil/fats	males: 40-45, females: 35-40 grams/day	sparing

2.2. Eating behaviour of adolescents in Germany

Representative data on the health status of adolescents in Germany are provided by the German Health Interview and Examination Survey for Children and Adolescents (KiGGS). The extra module EsKiMo (Ernährungsstudie als KiGGS-Modul) analysed adolescents' consumption frequencies of selected foods and compared them to the OMD consumption recommendations (Mensink et al., 2007). In general, it was found that consumption frequencies of the recommended plant foods and beverages were too low for adolescents aged

between 12 and 17 years, whereas their consumption frequencies of tolerated foods were excessive. This is described in detail for the given age group in the following sections.

For fruits, 100 % and more of the recommended consumption frequency was only eaten by 16 % of male and 25 % of female adolescents. Less than 100 % and more than 50 % of the recommended amount was consumed by 25 % of males and 29 % of females, while 59 % of male and 46 % of female adolescents ate less than 50 % of the recommended amount. A similar percentage distribution was found for the consumption frequency of vegetables: Only 18 % of male and 29 % of female adolescents complied the recommendations to 100 % and more, 34 % of males and 34 % of females consumed less than 100 % and more than 50 %, and 48 % of male and 37 % of female adolescents ate less than 50 % of the recommended vegetable amount. Recommendations for consumption frequencies of foods rich in carbohydrates such as bread, cereals, potatoes, and pasta were only achieved to 100 % and more by 10 % of males and 5 % of females. Less than 100 % and more than 50 % of the recommended amount was eaten by 61 % of male and 58 % of female adolescents, and 29 % of males and 37 % of females consumed less than 50 % of the recommended amount. Adolescents' consumption frequencies of beverages showed that the majority of them met 100% and more of the OMD consumption recommendations (79 % of males and 73 % of females). Only 19 % of male and 24 % of female adolescents consumed less than 100 % and more than 50 % of the recommended amount. A small proportion of 2 % for males and 3 % for females drank less than 50 % of the recommended amount.

The consumption frequencies of tolerated foods like soft drinks, sweets, and salty snacks exceeded OMD recommendations for 87 % of male and 79 % of female adolescents. The consumed amount was twice to three times as high as the recommended one for 24 % of male and 21 % of female adolescents. For sweets, even more than three times of the recommended amount was consumed by 34 % of males and 24 % of females.

It must be concluded that the OMD consumption recommendations for plant foods and for foods high in sugar and fat were not achieved by the majority of adolescents in Germany. Even though detailed practical dietary guidelines exist, the consumption frequencies of recommended foods such as fruit, vegetables, and foods high in carbohydrates are too low, whereas the consumption frequencies of tolerated foods such as soft drinks, sweets, and salty snacks are too high. From a psychological perspective, it is thus an essential issue to detect risk groups for an unhealthy eating behaviour and to identify their social-cognitive determinants of eating behaviour, in order to develop effective intervention strategies for them.

2.3. Eating behaviour of adolescents with a Turkish migration background in Germany

For children and adolescents in Germany, having a migration background², higher age, being male, having a lower socio-economic status, being a resident of Eastern Germany, and of less urbanised areas were identified to be significantly associated with a less favourable eating behaviour in KiGGS (Kleiser, Mensink, Scheidt-Nave, & Kurth, 2009). Groups for which any of these correlates apply are thus considered to be of high-risk for an unfavourable eating behaviour.

With respect to migration background, differentiated analyses showed that adolescents with a Turkish migration background constitute a risk group for unhealthy eating behaviour in Germany. Their eating behaviour compared to non-migrants was broadly analysed in KiGGS based on both a dietary score for healthy eating and on consumption frequencies of foods high in fat and sugar (Kleiser, Mensink, Kurth, Neuhauser, & Schenk, 2010). The given dietary score was based on self-reported consumption frequencies of seven foods (fresh fruit, sweets,

² Migration background here included both a two- and a one-sided migration background. A two-sided migration background applied to children and adolescents who either migrated to Germany themselves and one parent was not born in Germany nor held a German citizenship or to children and adolescents whose parents were not born in Germany nor held a German citizenship. A one-sided migration background applied to children and adolescents who were born in Germany and one parent was not born in Germany or did not hold a German citizenship (Lange et al., 2007).

vegetables, wholemeal bread, soft drinks, fast food, chocolate, and salty snacks) and classified eating behaviour into unfavourable, neutral, and favourable. The proportion of children and adolescents having an unfavourable eating behaviour was found to be highest among participants with a Turkish migration background (10.8 %) and lowest among non-migrants (3.4 %; Kleiser et al., 2010). The first group had the lowest proportion of participants with a favourable eating behaviour (16.5 %), whereas non-migrants showed the highest proportion (38.4 %) of participants with a favourable eating behaviour (Figure 2).

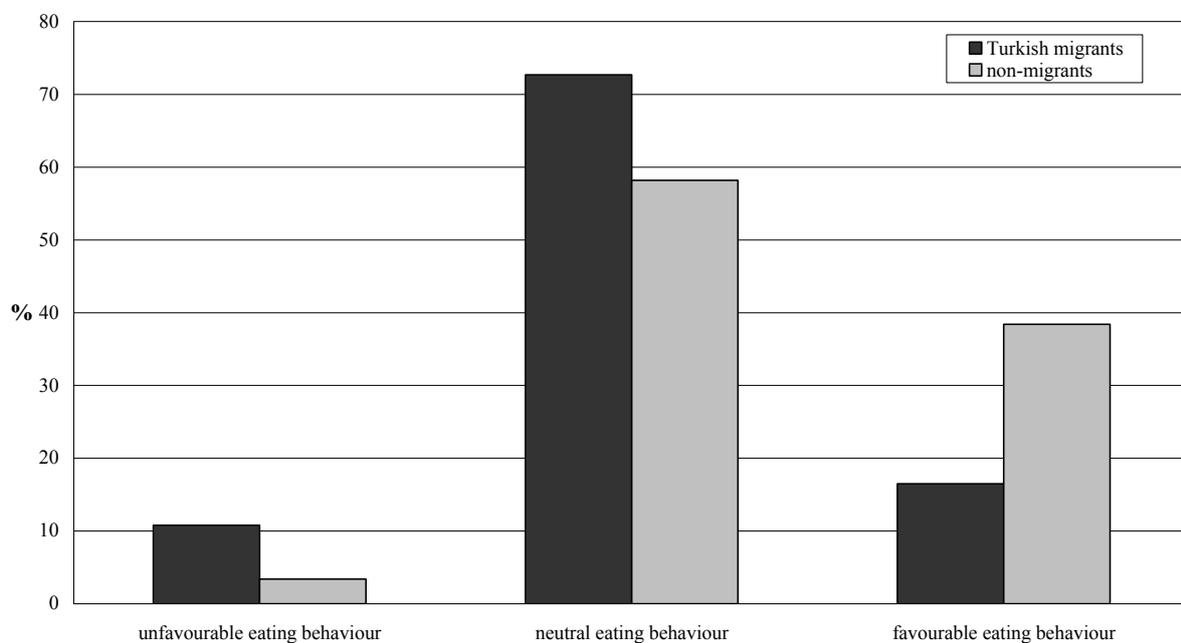


Figure 2. Distribution of the dietary score for healthy eating among adolescent Turkish migrants and non-migrants (Kleiser et al., 2010).

Among Turkish migrants and non-migrants, the proportion of adolescents with a favourable eating behaviour increased as the socio-economic status rose. Nonetheless, the proportion of children and adolescents with an unfavourable eating behaviour was significantly higher among Turkish migrants in all social classes but for high socio-economic status. A final logistic model verified Turkish migration background, male sex, increasing age

and socio-economic status to be significantly and independently associated with an unfavourable eating behaviour. The likelihood (odds ratio) for an unfavourable eating behaviour at a given age increased per year of age by 1.1 for male sex, by 2.1 for adolescents with a Turkish migration background, and by 5.1 and 3.2 for adolescents with a low and a middle socio-economic status, respectively (Kleiser et al., 2010).

Differences and similarities in consumption frequencies of foods high in fat and sugar between adolescent Turkish migrants and non-migrants were as follows. The former consumed significantly more soft drinks, cornflakes, smacks, chocolate hazelnut spread, cookies, chocolate, chocolate bars, sweets, pudding, salty snacks, fast food, and fried potatoes than non-migrants. No significant differences between the two groups were found in consumption frequencies of cakes and pastries (Kleiser, & Mensink, 2008).

These representative data from KiGGS lead to the conclusion that adolescents with a Turkish migration background are a risk group for an unfavourable eating behaviour with regards to both the generated dietary score for healthy eating and the consumption frequencies of single foods high in fat and sugar.

2.4. Eating behaviour of adolescents in Turkey

Unhealthy eating behaviour is not only a health issue of adolescents residing in Germany. Studies reported that Turkey is facing similar health problems (e.g. Akman et al., 2010; Currie et al., 2012; Garipagaoglu et al., 2008). Representative data on percentages for daily consumption of fruit and soft drinks among Turkish adolescents are provided by the Health Behaviour in School-aged Children (HBSC, a collaborative cross-national study conducted by the World Health Organisation) study. The HBSC study revealed that among 15-year-olds in Turkey, only 37 % of females and 23 % of males consume fruit daily. However, a daily consumption of soft drinks was reported by 18 % of female and 21 % of male adolescents (Currie et al., 2012). Furthermore, non-representative studies showed that only 1.9 % of 625 students from Istanbul aged between 11 to 15 years consume food groups

as recommended by the Food Guide Pyramid³, only 15 % ate the recommended portions of vegetables and fruit, only 27.2 % consumed fat as recommended, and about one third of participants reported daily consumption of fast food. Participants' eating behaviour was neither related to gender nor socio-economic status (Akman et al., 2010). The analysis of the nutritional status among 12 to 17-year-olds from Edirne Province indicated insufficient macro- and micronutrients intake such as iron, calcium, magnesium, vitamin A and E, folic acid, and fibre resulting in an inadequate energy distribution: While carbohydrate and protein intakes were appropriate, fat intake was too high. This was due to excessive consumption of fatty foods like cookies, pies, almond cakes, and fried potatoes as well as insufficient intake of vegetables, fruit, legumes, and grains. Eating behaviour was found to be more favourable in males compared to females (Garipagaoglu et al., 2008).

In summary, it can be said that adolescents in Turkey do not meet nutrition recommendations for a healthy eating behaviour either. Equivalent to the situation found in Germany, the consumption frequencies of recommended foods were too low, whereas the ones of tolerated foods were too high.

2.5. The phenomena of culture, migration, and acculturation

The present state of scientific knowledge raises the question why adolescent Turkish migrants in Germany are at high risk for an unhealthy eating behaviour. It is unclear whether this issue has been brought from their home country Turkey to their host country Germany, or whether it has arisen in the context of migration and acculturation. From a psychological perspective, it is unclear whether the social-cognitive determinants of eating behaviour are generic or culture-specific for adolescent Turkish migrants and for adolescent non-migrants in Germany and Turkey. Before addressing these matters, the terms culture, migration, and acculturation shall be defined.

³ The Food Guide Pyramid refers to dietary guidelines for Americans (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2005).

2.5.1. Culture.

Hofstede, Hofstede, and Minkov (2010) defined culture as a collective programming of the mind which distinguishes members of one group or category of people from another. As culture is shared with people living in the same social environment where it was acquired, the phenomenon of culture is thought to be collective. It is said to be learned instead of inherited, as it derives from the social environment, and not from genes. Furthermore, culture has to be distinguished from human nature and from an individual's personality. Human nature on the one hand is universal and inherited, while personality on the other hand is specific to an individual as well as learned and inherited. Culture or the collective programming includes superior patterns of thinking, feeling, and acting as well as basic things like greeting or eating. It is a result of thousands of years of evolution. Individuals pass through most of their programming in childhood before puberty. Cultures enable a group of human beings to function smoothly and exist at different levels.

A prominent level of culture is the national level which holds a national culture. National cultures were shown to differ particularly in cultural values which are held by the majority of people in one nation. Cultural values represent the core of a national culture. They are defined as the broad preferences for one state of affairs over others and take place in form of feelings. Cultural values are acquired in early childhood and are thus unconscious to those who hold them. Therefore, they can neither be discussed nor directly observed by non-members of each national culture. However, these early acquired cultural values lead to remarkable stable national cultures, as the change of a nation's cultural values is a matter of generation. Consequently, differences between nations maintain over an immense time span. Hofstede et al. (2010) name four main cultural values that distinguish one nation from another. They correspond to the four main anthropological issues nations deal differently with: The way of coping with inequality, the relationship of individuals with their primary group, the emotional implications of being male or female, and the way of coping with

uncertainty. These cultural values constitute the four original dimensions of a national culture: Power distance (PDI), individualism vs. collectivism (IDV), masculinity vs. femininity (MAS), and uncertainty avoidance (UAI; a general description of the two subsequently added dimensions named long-term orientation and indulgence versus restraint can be found in Hofstede et al., 2010). Hofstede et al. derived the original four dimensions of national cultures from a survey on values with employees from the multinational corporation International Business Machines (IBM). The survey was conducted in subsidiaries of IBM in more than 70 nations between 1967 and 1973. Analysis revealed four common problems across nations for which each nation had a different solution for. The four problems reflected the given anthropological issues and represent the four original dimensions of national cultures.

Power distance describes the extent to which subordinate members of a society expect and accept an unequal distribution of power. Where power distance is high, a hierarchical order with no need for further justification is usually found in societies. Societies with a low extent of power distance demand an equal distribution of power and justification for inequalities.

The individualism vs. collectivism dimension states the definition of a society's members' self images which can be seen in terms of "I" or "we". A high rank on this dimension refers to individualism which is defined as a preference for a loose social framework. Individuals primarily take care of themselves and their immediate family members. Collectivism, in contrast, outlines a preference for a tight social framework in which relatives or particular in-group members look after individuals, usually in exchange for unquestioning loyalty.

Masculinity vs. femininity refers to the degree to which rather masculine than feminine values apply to a society. A rather masculine society is more competitive and expresses a preference for achievement, heroism, assertiveness, and material reward for

success. This is opposed by femininity which represents a more consensus-oriented society with a preference for cooperation, modesty, caring for the weak, and quality of life.

The underlying issue of the uncertainty avoidance dimension is the uncertainty of the future. This dimension measures the extent to which society members feel uncomfortable with uncertainty and ambiguity. Societies high in uncertainty avoidance obey strict rules of belief and behaviour. Unorthodox behaviour and ideas are not tolerated. In contrast, societies with a low uncertainty avoidance index accept uncertainties, establish only a small number of rules, and tolerate a diverse number of religious and philosophical views.

The four dimensions generate a four-dimensional model of differences across national cultures. Each nation is characterised by a score from zero to 100 on each of the four dimensions. It has to be annotated that culture only exists by making a comparison from one to the other – a nation's scores on the dimensions are relative to the ones of another nation. Figure 3 displays a characterisation of the German and the Turkish culture by means of the cultural dimensions. This will allow a direct comparison of the given national cultures (Hofstede et al., 2010).

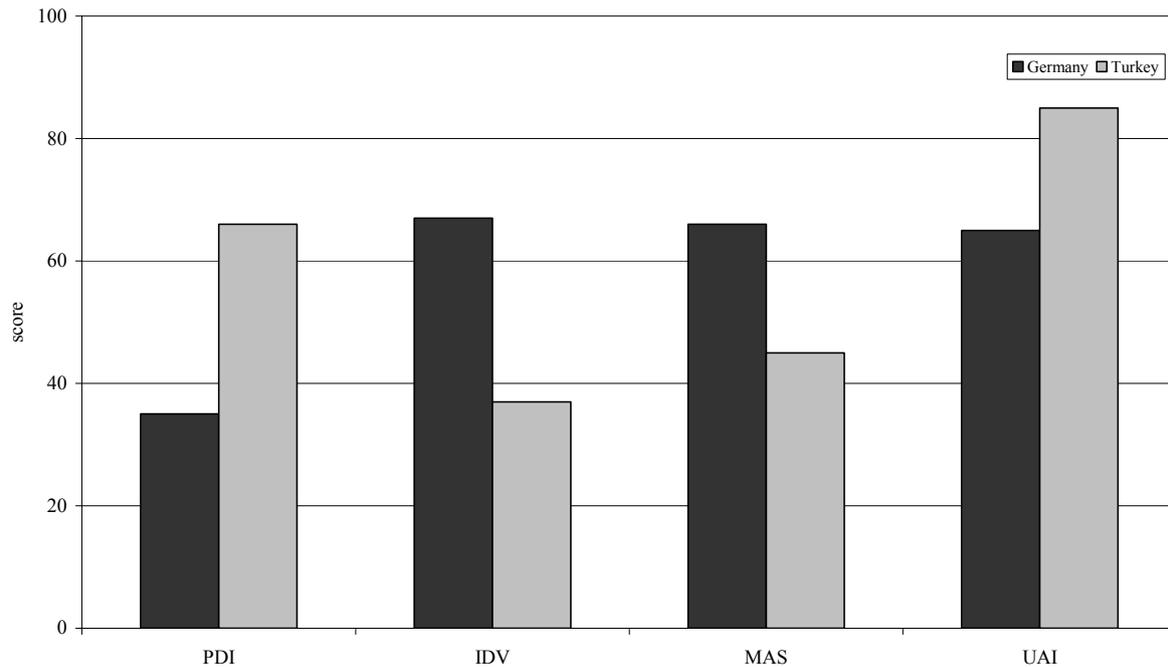


Figure 3. Extents of Germany's and Turkey's cultural values according to Hofstede et al. (2010).

Germany's score on power distance is low, implying that an even distribution of power is favoured. Members of the German nation prefer a direct and participative communication and meeting style. Leaders' acceptance is based on their expertise. Turkey, in contrast, scores high on this dimension. This implies unevenly distributed power, reliance on rules and superiors, an indirect communication style, and a hierarchical and dependent society structure. Family units show analogical formations led by the father.

With a high score on the individualism vs. collectivism dimension, Germany can be called truly individualistic. The nation is structured in small families most commonly focusing on the parent-child relationship. People tend to believe in the ideal of self-actualisation and base their loyalty on personal preferences for people as well as a sense of duty and responsibility. This is opposed by the collectivistic culture found in Turkey. The "We" is important and people belong to in-groups that care for each other in exchange for loyalty.

Communication style and feedback is always indirect, satisfying the high demand of harmony and conflict avoidance.

The masculinity in Germany's nation expresses itself in a high respect for performance. A great extent of people's self-esteem is drawn from work tasks. People like to show their status through status symbols such as cars or watches. Turkey's score on this dimension is close to the scale's mean but still on the feminine pole. It emphasises softer aspects of culture such as encouragement for showing sympathy for social outcasts. A great part of time is contributed to leisure activities, when the whole family and friends meet and enjoy life.

The German nation is one whose members like to avoid uncertainty. Deductive rather than inductive approaches are preferred, whereas details are important to prove that a certain topic is well thought-out. Turkey scores even higher on this dimension and thus has a high preference for laws and rules. Anxiety and tension are reduced by the use of rituals or traditional social patterns which often refer to "Allah".

This detailed comparison of Germany's and Turkey's cultural dimensions shows that the two national cultures are highly different. The question is what happens when these deviating cultures encounter each other as a result of a migration activity.

2.5.2. Migration.

The International Organization for Migration (IOM; 2004) defines migration as a movement of a person or a group which can either take place across national cultures or within a nation. It is a population movement which encompasses any kind of people (e.g. refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification), lengths, compositions, and causes. Therefore, migrants are a very heterogeneous group of individuals with different motives for migration, cultural, religious, and linguistic roots as well as life situations. However, all of them share the migration experience which either they or their parents have gone through. At international

level there is no universally accepted definition of the term migrant. The notation usually covers individuals which have freely decided to migrate. The migrant status does not solely apply to persons that have experienced first-hand migration but also to members of following generations. Their situation is characterised by social reorientation and acquiring of cultural practices (Schenk & Neuhauser, 2005).

In Germany, 650,000 immigrants arrive per year. The country's total population has a 19 % proportion of migrants of which 18.5 % hold a Turkish migration background. The number of Turkish migrants in Germany accounted for 2.965 million in the year 2011. Thus, they constitute one of the largest migrant groups in Germany (BAMF, 2013).

The history of immigration from Turkey to Germany started after World War II when Germany was rebuilt. Migration recruitment agreements between Turkey and Germany were negotiated in 1961. A high demand for labour workers led to the immigration of guest workers ("Gastarbeiter") inter alia from Turkey. In the 1960s and 1970s a large number of Turkish migrants came to Germany as guest workers who usually pursued jobs unattractive to Germans. As Germany's economy stagnated in the 1970s, the recruitment of guest workers and their immigration ended. However, Turks continued to migrate to Germany often for the purpose of family reunifications. By the year 1998, over 2 million Turks had immigrated to Germany (Berry et al., 2006a).

2.5.3. Acculturation.

Acculturation is, according to the classical definition, a collective phenomenon which takes place when two independent cultural groups have continuous first-hand contact over an extended period of time e.g. in case of migration. The results are subsequent changes in the original culture patterns of either one or both cultural groups (Redfield, Linton, & Herskovits, 1963). Further, a distinction between collective acculturation and psychological acculturation was made (Graves, 1967). The former comprises changes in the culture of a group such as

customs, whereas the latter refers to psychological changes in an individual regarding for instance behaviour, attitudes, and cultural identity (Berry, Phinney, Sam, & Vedder, 2006b).

The occurrence of psychological acculturation inevitably leads to social and psychological problems an acculturating individual is confronted with. However, the difficulties of these problems vary according to the extent necessary resources and coping strategies are available for the acculturating individual. The given problems can be structured in three different levels of difficulty: The first one is referred to as behavioural shifts, followed by the second level named acculturative stress, and lastly the third level of psychopathology. The level of behavioural shift can be achieved effortlessly. It includes culture shedding and culture learning which involves loss of as well as replacement of behaviours to better fit the new culture. Individuals acquire a new behavioural repertoire appropriate for the new cultural context. These behavioural shifts concern changes from eating behaviour, clothing, language use, and religious views through to fundamental alterations of one's value system. In the level of acculturative stress moderate cultural conflicts occur, as individuals cannot easily adjust their behavioural repertoire. One case might be insufficient language proficiency resulting in e.g. psychosomatic problems. Nevertheless, necessary resources and coping strategies for stress relief are still available to the acculturating individual. At the level of psychopathology major difficulties exist. Individuals do not have the ability to cope with the difficulties they experience and consequently suffer serious psychological disorders such as clinical depression. There are a number of factors that influence psychological acculturation. A higher length of residence, male sex, and a higher educational status were inter alia found to contribute to a smoother acculturation experience (Berry, 1997).

The most prominent model of acculturation is the one set forth by J.W. Berry (1997). His bidimensional model of acculturation describes the issue of how individuals acculturate (a discussion on uni- vs. bidimensional models of acculturation can e.g. be found in Ryder,

Alden, & Paulhus, 2000). Berry (1997) postulates four acculturation strategies which emerge from the issues of cultural maintenance as well as of contact and participation (Figure 4). Cultural maintenance is the extent to which cultural identity and original cultural characteristics are important and thus maintained. Contact and participation is the extent to which migrants interact with other cultural groups. Both issues are viewed as orthogonal dimensions which combined characterise the acculturation strategies *assimilation*, *separation*, *integration*, and *marginalisation*. Assimilation is defined, when migrants do not wish to maintain their cultural identity and seek daily interaction with the other culture. When migrants hold onto their original culture and avoid interaction with other cultures, separation is defined. Integration combines maintaining one's original culture and daily interactions with other cultures. When there is no effort in both maintaining one's original culture and in daily interaction with other cultures, marginalisation is defined.

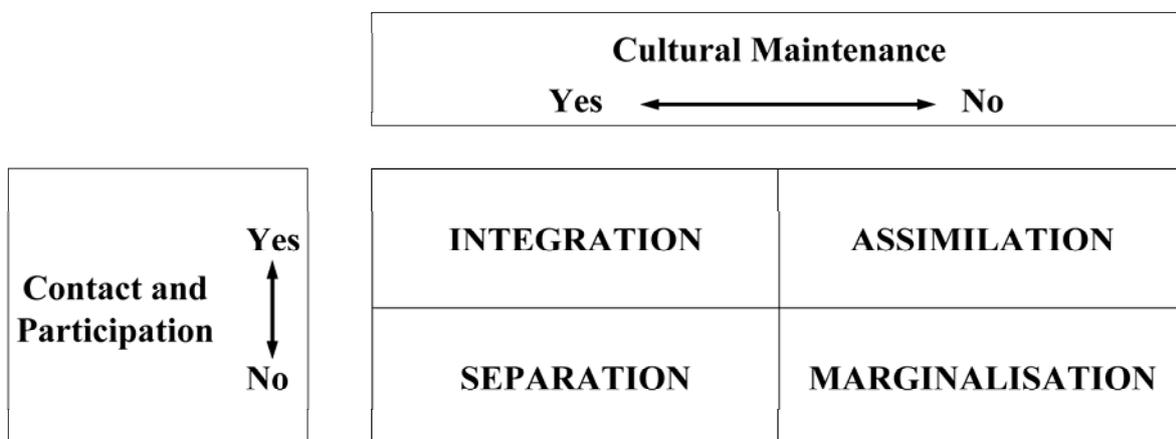


Figure 4. Acculturation strategies according to Berry (1997).

As psychological acculturation leads to psychological changes in an individual, adaptation is the eventual outcome that results from an individual's acculturation experience. Three aspects of adaptation can be distinguished: Psychological, sociocultural, and economic. The first aspect refers to a set of internal psychological outcomes like a clear sense of

personal and cultural identity, good mental well-being, and personal satisfaction in the new culture. Sociocultural adaptation addresses a set of external psychological outcomes which includes the ability to deal with day-to-day problems in family, work, and school life. The behaviours or customs of the host culture are adopted. This aspect of adaptation links individuals to their new cultural context. Economic adaptation relates to whether work in the new culture is obtained, satisfying, and effective (Berry, 1997).

An analysis of the acculturation⁴ experience of Turkish migrant youth in six European nations showed that separation was the prevailing acculturation strategy among them: The given group lived in neighbourhoods predominated by members of their own culture and the majority (91 %) showed Islam as their religious view. Identification and involvement with their own cultural group was dominant among them (Vedder, Sam, van de Vijver, & Phinney, 2006). In terms of adaptation, this was associated with good psychological adaptation but poor sociocultural adaptation. Higher psychological adaptation in migrant youth was found to be correlated with higher life satisfaction, higher self-esteem, and less psychological problems, whereas higher sociocultural adaptation was correlated with higher school adjustment and less behavioural problems.

A similar picture of the acculturation experience among Turkish migrant youth emerged in Germany. Currently, 70.3 % of Turkish migrants have been living in Germany for more than 20 years, and even a total of 32.0 % was born in Germany. In the group of adolescents under the age of 18 even 90.7 % were born in Germany. However, the percentage (26.3 %) of Turkish migrants with a German citizenship is surprisingly low (BAMF, 2013). One reason for this small percentage of naturalisation is that the German Government had claimed for decades that Germany was not a country of immigration and that migrants would eventually return home (Berry et al., 2006a). As a consequence, little effort was made towards facilitating their integration into German society. The belief in re-migration caused many

⁴ The term acculturation is henceforth used to denote psychological acculturation.

Turkish migrants in Germany to hold a strong Turkish identity, to maintain separated from the German culture, and to stay fluent in the Turkish language. The desire for re-migration has successfully been passed onto younger generations of Turkish migrants (Vedder et al., 2006).

It can be concluded that the phenomena of culture, migration, and acculturation influence various areas of life such as eating behaviour. The four acculturation strategies demonstrate that adolescent Turkish migrants in Germany can either fully participate in the eating behaviour of the host country, strictly hold on to the original eating behaviour of their home country, combine the maintenance of their original eating behaviour with a simultaneous participation in the one of their host country, or decline both. In other words, adolescent Turkish migrants in Germany can either be assimilated, separated, integrated, or marginalised. The question is which acculturation strategy adolescent Turkish migrants in Germany pursue for eating behaviour and its social-cognitive determinants, and whether these variables are associated with the level of acculturation.

2.6. The prototype-willingness model as explanation for health/risk behaviour

There are numerous social-cognitive theories that can be used for the explanation of health/risk behaviour. However, a social-cognitive theory which was especially developed for the usage in children and adolescents is the PWM by F. X. Gibbons and M. Gerrard (cf. Gibbons, Gerrard, & Lane, 2003; Gibbons, Gerrard, Reimer, & Pomery, 2006). Therefore, the PWM was chosen for the analysis of adolescent Turkish migrants' eating behaviour in comparison to adolescent non-migrants from Germany and Turkey. The PWM uses a dual-processing approach for the explanation of health/risk behaviour and differentiates a reasoned action and a social reaction pathway (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008). Figure 5 displays an outline of the PWM.

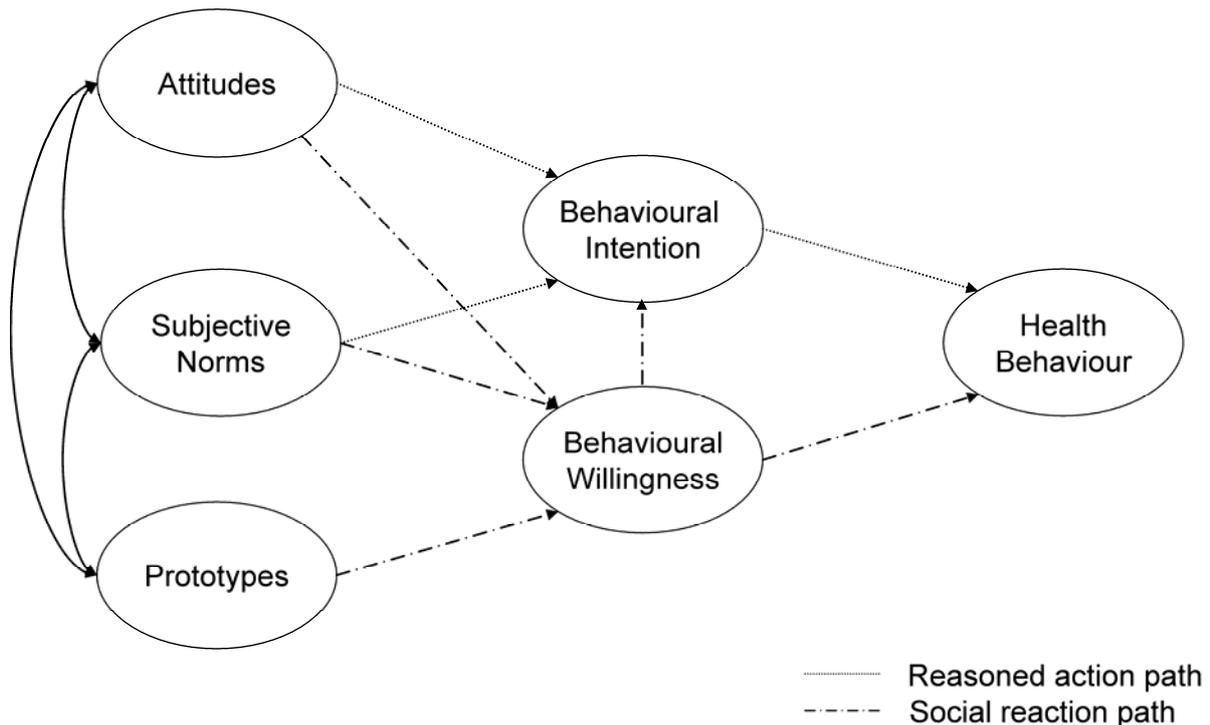


Figure 5. The prototype-willingness model (Gibbons et al., 2003; Gibbons et al., 2006).

The reasoned action pathway stems from the theory of reasoned action (TRA) by Martin Fishbein and Icek Ajzen (cf. Fishbein & Ajzen, 1975). It is assumed that engagement in behaviour takes place because of a deliberate decision to do so. The following elements are included: Attitudes, subjective norms, and behavioural intentions. The relevant behaviour is said to be predicted by its proximal antecedent behavioural intention which in return depends on behaviour's more distal antecedents attitudes and subjective norms. The definition of the given elements and their operationalisation as proposed by the authors of the PWM are as follows.

Attitude is defined as the degree to which someone has a favourable or unfavourable evaluation toward the relevant behaviour (Ajzen, 1991). The operationalisation of the attitude-construct in terms of the PWM focuses on perceived personal vulnerability to negative consequences via asking for instance "if you were to..., what do you think the chances are that you would...?". Attitude is not assessed conventionally via an affective dimension as this

shows little variance. Young people perceive risk behaviour to be both exciting and frightening. The extent to which they feel vulnerable to the negative outcomes of risk behaviour is found to vary more widely (Gibbons et al., 2003).

Subjective norms are defined as beliefs about the extent to which members of a peer group expect someone to engage in the relevant behaviour. Descriptive norms are an additional measure for social norms. They are defined as the extent to which members of a peer group assume their peers to have engaged in the relevant behaviour (Ajzen & Fishbein, 1973). The PWM conventionally includes descriptive instead of subjective norms for the reason that young peoples' peer groups rarely want their friends to engage in risk behaviour. Even though it is not directly asked to engage in risk behaviour, it might be accepted or even supported by one's peer group. So, subjective norms are operationalised via asking "what do you think your friends are doing?" instead of "what do your friends want you to do?" (Gibbons et al., 2003).

Behavioural intentions are indicators of someone's volition to try and efforts invested in order to refrain from or perform the relevant behaviour (Ajzen, 1991). According to the operationalisation of the PWM, behavioural intentions can either be assessed conventionally via asking for the plan to engage in the relevant behaviour or via behavioural expectations. The latter measures the perceived likelihood that a person will actually engage in the relevant behaviour (Gibbons et al., 2003).

The second pathway is the social reaction pathway and reflects the three main assumptions of the PWM. The first assumption claims adolescents' risk behaviour to be rather a reaction to a potentially risky situation than an action performed upon an intention. Secondly, it is assumed that adolescents associate clear risk images of the type of person their age who engages in specific risk behaviours, as risky situations are usually public and social. Adolescents usually engage in risk behaviour while being with their friends. The third

assumption of the model claims that these risk images or prototypes⁵ significantly influence risk behaviour for the reason that adolescents are assumed to be very image-conscious. As risk behaviours are found to be rarely intentional, risk images are strongly associated with behaviour's proximal antecedent behavioural willingness. The social reaction pathway thus includes the PWM's unique elements prototypes and behavioural willingness. Behaviour is predicted by its proximal antecedent behavioural willingness which is in return influenced by behaviour's distal antecedents prototypes and the elements attitudes and subjective norms from the reasoned action pathway (Gibbons et al., 2003). Prototypes and behavioural willingness are defined and operationalised as follows.

Prototypes are cognitive representations of the type of person with the same age that engages in certain behaviour. Adolescents connect with the sense of this person rather than having a visual image. In order to assess the perception of prototypes, respondents are instructed to think about the typical person their age who engages in the relevant behaviour. The prototype is then either evaluated with a set of six to 20 antonymous adjectives (e.g. attractive-unattractive; Gibbons et al., 2003) or on a scale from *not at all* to *very* with an evaluation thermometer (Rivis, Sheeran, & Armitage, 2006).

Behavioural willingness is defined as openness to engage in unintended behaviour in a risk opportunity: An individual might engage in risk behaviour under certain circumstances and avoid thinking about possible consequences. For assessment of behavioural willingness, respondents are asked to think about a risk-conducive situation followed by options with increasing risk levels questioning their willingness to engage in a relevant behaviour. The options are summed up to an index (Gibbons et al., 2003).

2.6.1. Empirical support for the reasoned action pathway.

Empirical findings regarding the application of the TRA and of the theory of planned behaviour (TPB; cf. Ajzen, 1991) on a wide range of health behaviours can be used to support

⁵ The terms image and prototype are used interchangeably.

the reasoned action pathway of the PWM. A meta-analysis has reviewed the predictive power of the TPB (Armitage & Conner, 2001): Attitudes and subjective norms accounted for 25 % of the variance in behavioural intentions which in return accounted for 31 % of variance in behaviour.

According to eating behaviour, a meta-analysis showed that attitudes, subjective norms, and perceived behavioural control predicted 50.3 % of variance in behavioural intentions. Out of these three, attitudes were found to have the strongest relationship to behavioural intentions. TPB-variables then accounted for 21.2 % of variance in behaviour (McEachan, Conner, Taylor, & Lawton, 2011). Among adults, even 26.7 % of variance in behaviour was predicted. However, adolescents' eating behaviour is poorly predicted by means of the TPB. Only 9.6 % of its variance can be explained among them. Age differences were also found in strength of relationships: In adolescents, behavioural intentions were found to have the strongest relationships with behaviour, whereas perceived behavioural control was associated strongest with behaviour among adults. Furthermore, the relationship between behaviour and behavioural intentions was weaker in adolescents compared to adults and vice versa was found for the relationship between subjective norms and behavioural intentions. In adolescence, subjective norms were found to be the strongest predictor of behavioural intentions, whereas attitudes were found to be the strongest predictor of behavioural intentions in adulthood. These findings may underline the importance of social influences in explaining adolescents' eating behaviour as well as their lower tendency to engage in intended behaviour compared to adults. Thus, a weakness of the TPB in predicting adolescents' eating behaviour was detected, speaking in favour of the PWM's social reaction pathway.

The following section shows a selection of TPB-studies that tested the reasoned action pathway in explaining adolescents' eating behaviour in different national cultures.

In a sample of US high school students in New York City, the relationship between TPB-variables and food choice behaviours regarding organic and locally grown foods was

tested (Bissonnette & Contento, 2001). Attitudes explained 20.3 % and 16.8 % of variance in behavioural intentions in the organic domain and the local domain, whereas subjective norms explained 8.4 % and 9.6 of variance in the given domains, respectively. Perceived behavioural control showed poor reliability and was thus dropped from analyses. Behavioural intentions accounted for 7.3 % and 12.3 % of variance in food choice behaviour in the organic domain and the local domain, respectively. In another US sample of adolescents aged 14 to 19 years in California, attitudes, subjective norms, and perceived behavioural control explained 42 % of variance in behavioural intentions which in return explained 17 % of variance in eating behaviour (Backman, Haddad, Lee, Johnston, & Hodgkin, 2002). Within a sample of 10 to 13-year-olds in New Zealand, attitudes and subjective norms predicted behavioural intentions to eat healthy. Adolescents' behavioural intentions then accounted for 39 % of variance in their eating behaviour (Hewitt & Stephens, 2007). In a sample of 11 to 19-year-old Chinese students from Hong Kong, attitudes, subjective norms, and perceived behavioural control were found to explain 45 % of variance in behavioural intentions to eat healthy (Chan & Tsang, 2011).

In summary, it can be concluded that the reasoned action pathway of the PWM was supported in explaining adolescents' eating behaviour across different nations with deviating national cultures (cf. Hofstede et al., 2010). However, a low percentage of explained variance in eating behaviour among adolescents was found in a meta-analytic review (McEachan et al., 2011). This weakness claims for the dual-processing approach of the PWM implemented by the addition of the social reaction pathway.

2.6.2. Empirical support for the social reaction pathway.

A number of studies on several health behaviours give empirical support for the social reaction pathway: It was for instance shown that drinker prototypes accounted for 43 % of variance in the behavioural willingness to do so which in return explained 79 % of variance in alcohol consumption using structural equation modelling (*SEM*) in a longitudinal study with a

sample of adolescents from Iowa, United States (Gerrard et al., 2002). With regards to smoking behaviour, it was found that smoker prototypes had a direct path to the behavioural willingness to smoke which was in return specified to have a direct path to smoking behaviour in a sample of 10 to 12-year-olds in the United States (Gerrard, Gibbons, Stock, Lune, & Cleveland, 2005).

Up to date, very few studies examined the social reaction pathway in the context of eating behaviour (Fuchs, Steinhilber, & Dohnke, 2013; Gerrits, de Ridder, de Wit, & Kuijer, 2009; Gerrits et al., 2010; Steinhilber, Fuchs, & Dohnke, 2013).

The direct association between adolescents' prototype perception of an unhealthy and healthy eater and self-reported eating behaviour was probed in the Netherlands, in Hungary, in the United States, and in Germany. For Dutch adolescents, it was found that the more favourable the unhealthy eater was perceived, the higher the consumption of unhealthy foods and soft drinks (Gerrits et al., 2009). Among US, Dutch, and Hungarian adolescents, a more favourable perception of the healthy eater was associated with higher fruit and vegetable consumption. Furthermore, a favourable perception of the unhealthy eater was found to be a predictor of fatty food across adolescents in the given nations (Gerrits et al., 2010). In the sample of German adolescents, both the unhealthy and the healthy eater were associated with eating behaviour: The more favourable the perception of the unhealthy and healthy eater, the higher adolescents' dietary score for healthy eating (Steinhilber et al., 2013).

The association between adolescents' behavioural willingness and eating behaviour was analysed in a sample of German adolescents (Fuchs et al., 2013): The behavioural willingness to eat unhealthy foods predicted a self-reported dietary score for healthy eating negatively as well as observed unhealthy eating behaviour positively. Furthermore, the behavioural willingness to eat healthy foods predicted observed healthy eating behaviour positively.

In conclusion, different parts of the social reaction pathway of the PWM have successfully been tested with regards to adolescents' eating behaviour across nations with deviating national cultures (cf. Hofstede et al., 2010). However, the social reaction pathway as a whole and eventually both paths, thus the entire PWM, need to be tested in explaining adolescents' eating behaviour.

2.6.3. Empirical support for the entire prototype-willingness model.

So far, the entire PWM has only been tested in a few studies. The first one to test the overall PWM was conducted for the explanation of US college students' pregnancy-risk behaviour (Gibbons, Gerrard, Blanton, & Russell, 1998). *SEM* supported the major premises of the theory. All relations among the study variables were as postulated by the PWM and statistically significant. Subsequently, the PWM has successfully been applied for the explanation of substance use in Norway (Hukkelberg & Dykstra, 2009) as well as in modified forms for the explanation of substance use in the United States (Andrews, Hampson, Barckley, Gerrard, & Gibbons, 2008; Gibbons et al., 2004) in the Netherlands (Spijkerman, van den Eijnden, Vitale, & Engels, 2004), and in Germany (Zimmermann & Sieverding, 2010b; Zimmermann & Sieverding, 2010a) as well as for the explanation of physical activity in the UK (Rivis & Sheeran, 2003b), use of contraception in Norway (Myklestad & Rise, 2007), and organ donation in Australia (Hyde & White, 2010).

Up to date, only one study has probed the entire PWM in explaining adolescents' eating behaviour in a sample of high school students in Southern Germany (Dohnke, Steinhilber, & Fuchs, 2012). All elements of the model were included in a single longitudinal study. *SEM* were conducted with either social-cognitive variables to eat unhealthy or healthy foods. The *SEM* with social-cognitive variables to eat unhealthy foods thoroughly confirmed the reasoned action pathway: Attitudes and subjective norms had a direct path to behavioural intentions which were in return specified to have a direct path to adolescents' eating behaviour. The social reaction pathway was confirmed for single paths: Behavioural

willingness had a direct path to behavioural intentions, and the perception of the unhealthy eater was specified to have a direct path to eating behaviour. The *SEM* with social-cognitive variables to eat healthy foods confirmed a direct path from attitudes to behavioural intentions which were in return found to have a direct path to adolescents' eating behaviour. Furthermore, attitudes had a direct path to behavioural willingness, and the perception of the healthy eater was specified to be directly related to eating behaviour.

It can be concluded that the entire PWM was successfully tested in explaining several health/risk behaviours across different nations with deviating national cultures (cf. Hofstede et al., 2010). Nevertheless, comparative studies using the PWM for the explanation of health/risk behaviours across cultural groups are missing. For the explanation of eating behaviour, the PWM has only been tested in the German culture. Thus, it is yet unknown whether eating behaviour's relevant social-cognitive determinants differ across cultural groups such as across adolescent Turkish migrants in comparison to adolescent non-migrants in Germany and Turkey.

2.7. Cultural aspects in research on the prototype-willingness model

There is evidence that the PWM is culture-specific. Cultural aspects have been included in research on health/risk behaviours using parts of the PWM. These cultural aspects can be structured into three domains:

- (1) Cultural differences in the extents of PWM-constructs (e.g. Gibbons, Helweg-Larsen, & Gerrard, 1995),
- (2) cultural differences in the influence strengths from behaviour's distal antecedents on behavioural intentions (Bagozzi et al., 2001; Blanchard et al., 2003; Hagger et al., 2007; Walker, Courneya, & Deng, 2006) and on behavioural willingness (Gibbons et al., 1995),
- (3) and the association of acculturation with PWM-variables (e.g. Diaz et al., 2009).

The given cultural differences were either analysed across nations (e.g. Norway and Spain; Olsen, Heide, Dopico, & Toften, 2008) or within a nation's ethnic (Black vs. Whites in the United States; Blanchard et al., 2009) or migrant groups (British vs. Chinese migrants in Canada; Walker et al., 2006).

With regards to eating behaviour, few studies have taken cultural aspects into account. Cultural differences have, however, been found in the extents of various PWM-constructs (Blanchard et al., 2009; Gerrits et al., 2010; Olsen et al., 2008) and in the influence strength from social norms on behavioural intentions (Blanchard et al., 2009). The association of acculturation with various PWM-variables has also been analysed before (Carrus, Nenci, & Caddeo, 2009; Diaz et al., 2009; Kleiser et al., 2010; Nicolaou et al., 2009; Unusan, Sanlier, & Danisik, 2006; Wandel, Raberg, Kumar, & Holmboe-Ottesen, 2008).

Among the given studies, only one or two of the three cultural aspects were tested. So far, no study has been conducted that included all three cultural aspects in a cross-cultural application of the PWM. The following sections provide the findings of the given studies with regards to the three cultural aspects mentioned above.

2.7.1. Cultural differences in the extents of prototype-willingness model-constructs.

Cultural differences in the extents of PWM-constructs have been found for various behaviours in a number of studies.

For attitudes, cultural differences were e.g. analysed between Norwegians and the Spanish in their attitudes towards a fish-burger (Olsen et al., 2008) as well as in the attitude towards eating five servings of fruit and vegetables every day between Blacks and Whites (Blanchard et al., 2009): The Spanish were found to have a more negative attitude towards fish-burgers compared to Norwegians, and Whites had a more positive attitude towards eating five servings of fruit and vegetables every day compared to Blacks.

For social norms, an analysis of cultural differences between Danish and US adolescents regarding their social norms towards sexual behaviour showed that the latter group reported higher social norms than its Danish counterpart (Gibbons et al., 1995).

Cultural differences in the prototype perception have been found for the typical pregnant teenager, the typical smoker (Gibbons et al., 1995) and the typical unhealthy and healthy eater (Gerrits et al., 2010). Danish adolescents had a more positive perception of the typical pregnant teenager and the typical smoker compared to US adolescents. Adolescents' perception of eater prototypes was analysed in the United States, in the Netherlands, and in Hungary. The extent to which eater prototypes were evaluated unfavourably and favourably differed significantly across nations. While the unhealthy eater was evaluated more unfavourably in the United States and in the Netherlands compared to Hungary, the healthy eater was perceived differently across all three nations: It was evaluated most favourably in the United States, followed by the Netherlands and lastly, the evaluation of the healthy eater was least favourable in Hungary.

Lastly, cultural difference in behavioural intentions and behavioural willingness were shown. Behavioural intentions to eat five servings of fruit and vegetables every day were found to be higher among Whites compared to Blacks (Blanchard et al., 2009), while Danish adolescents reported higher behavioural intentions and behavioural willingness to have sex compared to US adolescents (Gibbons et al., 1995).

It can be concluded that cultural differences in the extents of PWM-constructs were found for every construct of the PWM across different behavioural contexts, inter alia for eating behaviour. Therefore, it can be said that the extents of PWM-constructs differ according to culture. With regards to eating behaviour, cultural differences have so far been found in attitudes, in perceptions of the unhealthy and healthy eater, and in behavioural intentions to eat healthy. Comprehensive studies which analyse cultural differences for all PWM-constructs in the context of eating behaviour are lacking. Thus, it has so far not been

tested whether adolescent Turkish migrants and adolescent non-migrants from Germany and Turkey differ in their extents of PWM-constructs. Based on the present state of scientific knowledge, this could be expected among the given groups.

2.7.2. Cultural differences in influence strengths from behaviour's distal on its proximal antecedents.

Most studies that have analysed cultural differences in influence strengths from behaviour's distal on its proximal antecedents were conducted in terms of the TPB. They regarded differences in influence strengths from behaviour's distal antecedents on behavioural intentions (e.g. Blanchard et al., 2003; Hagger et al., 2007). Few studies additionally assumed that behavioural intentions are formed more strongly by personal attitudes in individualistic cultures, and that behavioural intentions are more heavily based on social influences in collectivistic cultures (Bagozzi et al., 2001; Walker et al., 2006). This assumption was based on prevailing cultural values in accordance with the individualism vs. collectivism dimension (cf. Hofstede et al., 2010). Up to date, only one study looked at cultural differences in the influence strengths from behaviour's distal on its proximal antecedents with elements from the social reaction pathway of the PWM (Gibbons et al., 1995). With regards to eating behaviour, differences in influence strengths from behaviour's distal antecedents on behavioural intentions were analysed within the US culture across Blacks and Whites (Blanchard et al., 2009). The results of the abovementioned studies are as follows.

In the context of physical activity, it was found that the influence strength from attitudes on behavioural intentions differed significantly between Blacks and Whites (Blanchard et al., 2003). Furthermore, differences in the influence strengths from attitudes and subjective norms on behavioural intentions were also found among adolescents from five different nations (Hagger et al., 2007): For attitudes, this was stronger in a British sample compared to Estonian, Greek, Singaporean and Hungarian samples. The three latter groups had a significantly lower influence strength than the Estonian sample. Greek participants had

a significantly lower influence strength than Singaporeans and Hungarians. For subjective norms, the two latter groups had a significantly higher influence strength compared to the British, Estonians, Greeks, and Singaporeans.

Additionally, cultural differences in the influence from attitudes and subjective norms on behavioural intentions to donate bone marrow were examined across nationals from an individualistic culture (United States) and a collectivistic culture (Hong Kong; Bagozzi et al., 2001). For attitudes, the influence was stronger in the individualistic culture, namely, among US compared to Hong Kong nationals, and reverse was found for the influence of subjective norms. Furthermore, a moderator effect of culture was found for the influence of attitudes and social norms on gambling intentions for males with individualistic cultural values (British migrants) and collectivistic cultural values (Chinese migrants) in Canada: For attitudes and descriptive norms, the influence on gambling intentions were only significant among British migrants, whereas the influence of subjective norms was only significant among Chinese migrants (Walker et al., 2006). In summary, the relative contribution of attitudes and social norms to behavioural intentions tends to vary across individualistic and collectivistic cultures. However, a pattern based on the assumption that behavioural intentions are formed more strongly by personal attitudes in individualistic cultures, and on social influences in collectivistic cultures was only confirmed across groups of non-migrants in two nations (cf. Bagozzi et al., 2001), and not across different migrant groups in one nation (cf. Walker et al., 2006).

A moderation of culture regarding influence strengths with the social-reactive elements of the PWM has solely been explored in a single study (Gibbons et al., 1995). It was specifically found that the influence strength of social norms on the behavioural willingness towards sexual behaviour was stronger in US adolescents compared to their Danish counterparts. Moreover, it was revealed that the influence strength of the perception of the typical smoker on smoking behaviour was stronger in US compared to Danish adolescents.

In the context of eating behaviour, cultural differences in the influence strength of subjective norms on behavioural intentions were analysed between Blacks and Whites. The influence strength from subjective norms on behavioural intentions to eat five servings of fruit and vegetables per day was found to be stronger among Blacks compared to Whites (Blanchard et al., 2009).

In summary, cultural differences in the influence strengths from behaviour's distal on its proximal antecedents have been found for elements of the reasoned action as well as for the social reaction pathway. These differences have been demonstrated between individualistic and collectivistic cultures in various behavioural contexts regarding the reasoned action pathway, between US and Danish adolescents regarding sexual and smoking behaviour with regards to the social reaction pathway, and between Blacks and Whites in the context of eating behaviour. A comprehensive test of the given cultural differences in the context of eating behaviour in an individualistic (German culture) and collectivistic (Turkish culture) setting as well as in a setting with a compound structure of individualistic and collectivistic cultural values (Turkish migrants in Germany) is yet to be executed. The present state of scientific knowledge leads to the assumption that the given groups may differ in accordance with the values of the individualism vs. collectivism dimension proposed by (Hofstede et al., 2010). More precisely, it could be expected that cultural differences in influence strengths from the distal (attitudes, descriptive and subjective norms, and prototype perception) on the proximal (behavioural intentions and behavioural willingness) antecedents of eating behaviour exist across the given groups.

2.7.3. The association between acculturation and the prototype-willingness model.

The association of different indicators of acculturation with eating behaviour and its social-cognitive determinants has only been analysed in a small number of studies. Indicators of acculturation in the given studies were either designated scales or length of residence,

migration generation, and behavioural shifts in terms of acquiring new behavioural repertoires.

The associations of acculturation assessed via a designated scale with the consumption of fatty foods, purchase rate of ethnic food products, its respective behavioural intentions, and behavioural intentions to eat unhealthy were analysed (Wandel et al., 2008; Carrus et al., 2009; Diaz et al., 2009). In detail, the assessments of acculturation and its association with the given variables were as follows. For Sri Lankans in Oslo, the acculturation level was assessed unidimensionally with an index of integration comprising three items on reading Norwegian newspapers, socialising with ethnic Norwegians, and participation in organisations in Norway. A high level of acculturation was found to predict the consumption of foods rich in fat and a mostly Norwegian diet (Wandel et al., 2008). For Indian female migrants in Italy, acculturation was assessed via the ethnic identity and perceived ethnic group norms. These were seen as an inverse indicator of their acculturation level (Carrus et al., 2009). The higher their level of acculturation was, the lower their purchase rate of ethnic food products and its respective behavioural intentions. To assess acculturation among Latino adolescents in California, United States, four items on language use of the unidimensional Short Acculturation Scale for Hispanics (SASH; cf. Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987) were used. The level of acculturation correlated negatively with behavioural intentions to eat healthy. Furthermore, lesser and highly acculturated adolescents differed significantly in their attitude towards giving up preferred food items, with less acculturated adolescents showing more tolerance for this (Diaz et al., 2009).

Further indicators of acculturation such as the length of residence, migration generation and the acquirement of a new behavioural repertoire were found to be associated with an increased risk for an unfavourable eating behaviour (Kleiser et al., 2010), changed preferences for specific meals (Unusan et al., 2006; Nicolaou et al., 2009), and altered social norms (Nicolaou et al., 2009). Detailed study results were as follows. The higher the length of

residence and migration generation of adolescent Turkish migrants in Germany was, the higher their risk for an unfavourable eating behaviour. Belonging to second- or higher generation of immigration increased the risk for an unfavourable eating behaviour by a factor of 2.2 independent of age, sex, and socio-economic status. Furthermore, the risk for an unfavourable eating behaviour was increased by a factor of 1.03 for every additional year and by a factor of 1.2 for every additional 5-year period the parents stayed in Germany, respectively (Kleiser et al., 2010). For the following two studies, behavioural change is considered as an indicator of acculturation, as new behavioural repertoires are acquired. Foods chosen for breakfast were assessed and compared across fourth graders with a Turkish migration background in Germany and their counterparts in Turkey. The former seemed to have acquired a new behavioural repertoire, as they preferred the consumption of a Western breakfast (cereals and fruit juice) instead of the original Turkish breakfast consisting of cheese, butter, bread, egg, honey, jam, pie, cake, and tea (Unusan et al., 2006). Among Turkish and Moroccan migrants in the Netherlands, changes in eating behaviour and in the influence of social norms were explored with qualitative focus groups. Firstly, migrants reported that their children had acquired a new behavioural repertoire, as they prefer French fries, hamburgers, and pizza over traditional dishes. Secondly, it was revealed that hospitality plays an important role in the Turkish and Moroccan culture. This is usually expressed by serving a variety of foods. Hosts are expected to serve a large amount of food and guests are expected to anticipate this. Refusal of food is only accepted due to health issues. As migration led to better economic circumstances, even larger numbers of special dishes were prepared. However, a decline in these social norms was reported by many of the younger participants (Nicolaou et al., 2009).

In conclusion, various indicators of acculturation were associated with eating behaviour, social norms, and behavioural intentions. These associations were found within migrant groups from varying home and host cultures. Therefore, the present state of scientific

knowledge indicates that an analysis of adolescent Turkish migrants' eating behaviour using the PWM is not fully covered without its extension by acculturation.

To sum up, it must be annotated that the three abovementioned domains of cultural aspects have so far not been included in a comprehensive study that explains adolescent Turkish migrants' eating behaviour using the PWM. Thus, it is firstly unknown whether cultural differences exist in extents of PWM-constructs and in influence strengths from behaviour's distal on its proximal antecedents across adolescent Turkish migrants in Germany and adolescents from both the home and the host country. Secondly, it is not known whether acculturation influences the elements of the PWM among adolescent Turkish migrants in Germany.

2.8. Aim and main research questions

In the light of the above, the present thesis aims at combining the line of research on explaining health/risk behaviour through social-cognitive theories choosing the PWM with the research line on culture and acculturation. The combined research lines are used for the explanation of adolescent Turkish migrants' eating behaviour in Germany in comparison to non-migrants from Germany and Turkey.

A one-sided view on explaining adolescent Turkish migrants' eating behaviour solely through the PWM disregards the question on whether their eating behaviour is determined by culture and acculturation. There is no information provided whether their unhealthy eating behaviour was brought from Turkey or arose in Germany and might be a result of acculturation. Additionally, it seems appropriate for the current research to differentiate social norms into descriptive and subjective norms, as people from collectivistic cultures like Turkey are integrated into strong, cohesive, and protective in-groups with high social norms. These in-groups in return offer life-long loyalty (Hofstede et al., 2010). Furthermore, a meta-analysis on TPB-studies showed that the explained variance of behaviour increased by 5 %

with an addition of descriptive norms (Rivis & Sheeran, 2003a). Therefore, a differentiated PWM is used for analysis.

The research line on culture and acculturation compares different national cultures to each other and examines the acculturation experience of migrants in a host culture. However, the information is not used for the explanation of health behaviours such as eating behaviour.

A combination of both research lines thus results in a comprehensive analysis: Adolescent Turkish migrants' eating behaviour in Germany is explained in comparison to non-migrants in the host culture (Germany) and in the home culture (Turkey) using a differentiated PWM. Furthermore, the differentiated PWM is extended by acculturation as a background factor. Therefore, the combination of both research lines additionally determines whether acculturation contributes to the explanation of adolescent Turkish migrants' eating behaviour in Germany. Figure 6 displays an outline of this differentiated and extended PWM.

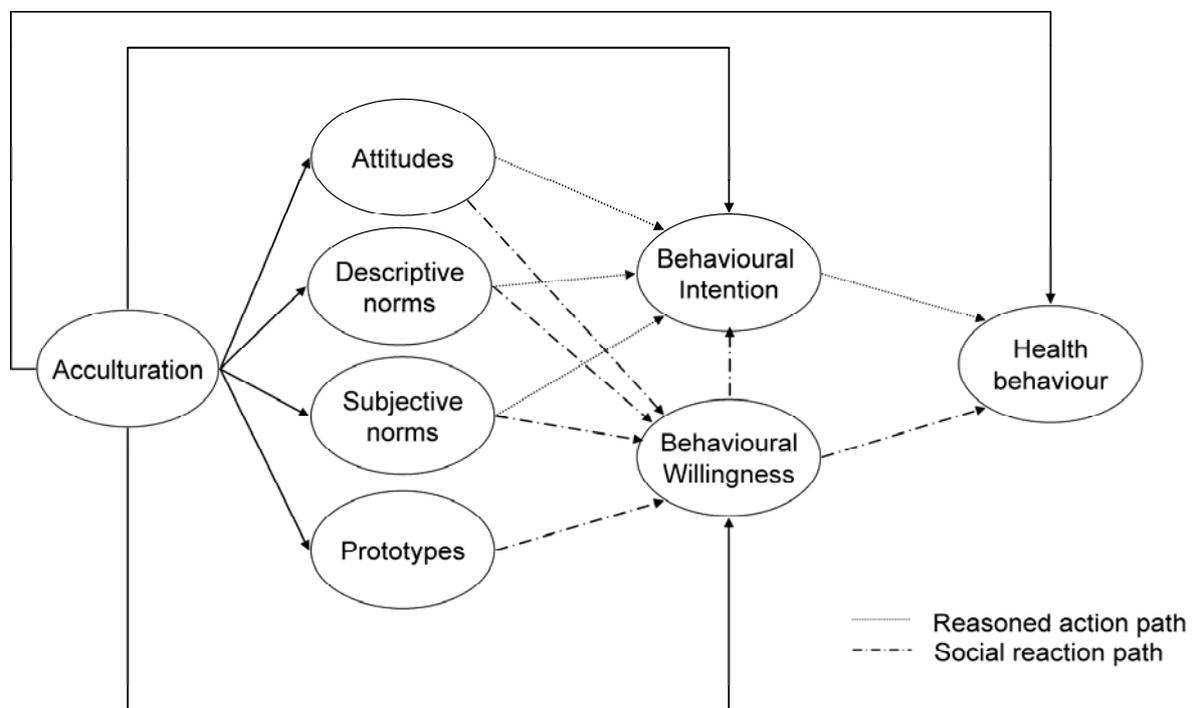


Figure 6. The prototype-willingness model (cf. Gibbons et al., 2003; Gibbons, Houlihan, & Gerrard, 2009) differentiated into descriptive and subjective norms and extended by acculturation as a background factor.

A combination of the given research lines is an important gap, as the following contributions will be provided to the literature:

- (1) Analyses will provide a direct comparison of adolescents' eating behaviour from three groups with diverse cultural values: Adolescents with prevailing individualistic cultural values (non-migrants in Germany), adolescents with prevailing collectivistic cultural values (non-migrants in Turkey), and adolescents with a compound structure of individualistic vs. collectivistic cultural values (Turkish migrants in Germany).
- (2) It will be tested whether the differentiated PWM explains eating behaviour across the given cultural groups. This will identify cultural variations in their prediction patterns. Moreover, the thesis will test whether cultural differences exist in the extents of PWM-variables and in influence strengths from eating behaviour's distal on its proximal antecedents.
- (3) For adolescent Turkish migrants, the differentiated PWM is extended by acculturation as a background factor and its contribution to the explanation of migrants' eating behaviour will be analysed.
- (4) Theoretical implications for the PWM, culture, and acculturation will be provided and culture-specific and/or generic targets for effective interventions on healthy eating among adolescents of the given cultural groups will be shown.

In order to investigate the given research questions, three studies were conducted. They were part of the research project *Healthy eating among socially deprived adolescents (HESDA)*. The project is administered at the University of Education – Schwäbisch Gmünd and funded by the German Federal Ministry of Education and Research. Study I tested the differentiated PWM in explaining eating behaviour of adolescents with a Turkish migration background compared to non-migrants in Germany. In Study II, an analogous analysis of the differentiated PWM was applied to adolescents with a Turkish migration background in

Germany in comparison to non-migrants in Turkey. Study III analysed the differentiated and extended PWM in explaining eating behaviour of adolescents with a Turkish migration background in Germany.

3. Study I

3.1. Study hypotheses

The present study aims to test the differentiated PWM in explaining eating behaviour across adolescents with a Turkish migration background in Germany and adolescent non-migrants in Germany⁶ in a comparative analysis using *SEM*.

(1) The first hypothesis presumes that the formulated items operate equivalently across both cultural groups. Their invariant factorial structure is tested by investigating invariant factor loadings and invariant observed variable intercepts.

(2) Secondly, mean differences in eating behaviour as well as latent mean differences in PWM-constructs across migrants and non-migrants are expected. As a Turkish migration background significantly predicted unfavourable eating behaviour among adolescents (cf. Kleiser et al., 2010), it is assumed that the social-cognitive variables of the differentiated PWM reflect this group difference. Specifically, it is hypothesised that migrants compared to non-migrants have a significantly less favourable eating behaviour, significantly less favourable extents of attitudes, descriptive and subjective norms, a significantly less favourable perception of eater prototypes, significantly less favourable behavioural intentions, and a significantly less favourable behavioural willingness to eat unhealthy and healthy foods.

(3) It is thirdly expected that the predictions of the differentiated PWM are confirmed in both groups but with cultural variations.

(4) Lastly, it is assumed that the influences of eating behaviour's distal antecedents on behavioural intentions and behavioural willingness vary in strength across migrants and non-migrants according with the values of the individualism vs. collectivism dimension. More specifically, it is expected that migrants' behavioural intentions and behavioural willingness are based more strongly on social influences (descriptive and subjective norms, and prototype perception) compared to non-migrants. Furthermore, it is expected that non-migrants'

⁶ The terms *migrants* and *non-migrants* are henceforth used to denote these two groups.

behavioural intentions and behavioural willingness are formed more strongly by personal attitudes compared to migrants.

3.2. Method

3.2.1. Participants and procedure.

Participants in this longitudinal study were a sample of 434 secondary school students in Southern Germany. Within the sample, 30.2 % ($n = 131$) of participants had a two-sided Turkish migration background and 69.8 % ($n = 303$) were non-migrants. Only students with a two-sided Turkish migration background and non-migrants were eligible for the present study. Students with a one-sided Turkish migration background or a migration background other than Turkish were excluded. Participants attended grade 5 (47 %) and 8 to 10 (53 %) and were aged between 10 and 17 years ($M = 12.87$ years, $SD = 2.19$; 47.5 % girls). No significant differences in the female-to-male ratio, $\chi^2(1) = 0.15$, ns , and participants' ages by gender distribution, $\chi^2(8) = 3.87$, ns , were found within the subsamples. However, migrants (M age = 13.37, $SD = 2.08$) were significantly older than the non-migrants (M age = 12.65, $SD = 2.20$), $t(259.55) = -3.29$, $p < .01$. According to body mass index (BMI), 66.6 % were normal weight (underweight: 4.7 %, overweight: 16.4 %, obese: 10.6 %, no data: 1.8 %).

As permission for data collection was granted by supervisory school authorities, schools in Southern Germany were randomly selected for participation. A total of 41 classes were recruited (types of schools: 37 classes of Haupt- und Werkrealschule, two classes of Realschule and two classes of Gymnasium). An incentive of 100 Euro was given to each volunteering class, if students' informed consent could be obtained from parents.

Data were collected via questionnaire in two waves by three members of the research team during class time. Socio-demographic information and social-cognitive variables were measured at wave 1. Eating behaviour was assessed two to four weeks later at wave 2. The dropout rate from wave 1 to wave 2 was 7.1 % ($n = 31$). Participants in both waves and dropouts did not differ significantly in migration background, age, sex, and social-cognitive

variables (all $ps > .10$). Data on eating behaviour were incomplete for 10 individuals. Accordingly, the final data set for analysis consisted of 434 cases of which 393 cases included data for both waves.

3.2.2. Measures.

The questionnaire at wave 1 contained items on socio-demographic data, attitudes, descriptive and subjective norms, prototype perception, behavioural intentions, and behavioural willingness. At wave 2, eating behaviour was assessed via a food frequency questionnaire (FFQ).

Socio-demographic data. Items on socio-demographic information included questions on sex, age, type of school, grade, BMI⁷, and migration background. Migration background was assessed with three items enquiring places of birth for participants themselves as well as for their mothers and fathers (Lampert, Schenk, & Stolzenberg, 2002). Based on these data, a two-sided or a one-sided migration background can be determined. A two-sided migration background applies to children and adolescents who themselves and at least one parent was not born in Germany or to children and adolescents whose parents were both not born in Germany. A one-sided migration background applies to children and adolescents born in Germany with one parent not born in Germany (Lange et al., 2007).

Assessment of PWM-constructs. The assessment of all social-cognitive variables but behavioural willingness was conducted with nine items differing in five unhealthy (sweets, salty snacks, fast food, soft drinks, and chocolate) and four healthy foods (fresh fruit, salad, wholemeal bread, and cooked vegetables)⁸. All items made reference to eating behaviour.

⁷ In order to provide objective data, participants' body weight and height were measured with a scale and a folding rule, respectively. Their BMI was determined based on Kromeyer-Hauschild et al. (2001).

⁸ The selection of foods was made on theoretical and empirical considerations. Theoretically, the selection was based on foods (sweets, salty snacks, fast food, soft drinks, chocolate, fresh fruit, raw vegetables or salad, wholemeal bread, and cooked vegetables) included in a dietary score derived from KiGGS (Kleiser and Mensink, 2008). Empirically, the selection was based on a pilot study with 327 participants attending grades 5, 9 and 10 in different types of German secondary schools. The pilot study analysed the perception of the typical sweets-, salty snacks-, fast food-, fresh fruit-, salad-, and wholemeal bread-eater prototypes. The prototypes of the typical sweets- and salty snacks-eater were evaluated as neutral, and the evaluation of the typical fast food-eater differed according to school type ranging from neutral to significantly negative. The perceptions of the

Attitudes. Attitudes to eat unhealthy and healthy foods were assessed by asking e.g. “How much do you like eating fresh fruit?” on a five-point scale with equidistant smileys (Jäger, 2004). The smileys-scale is illustrative and thus recommended for the usage in children and adolescents (Bortz & Döring, 2006). Internal consistency was good for the attitudes to eat unhealthy foods (migrants: $\alpha = .80$, non-migrants: $\alpha = .84$) and questionable for the attitudes to eat healthy foods (migrants: $\alpha = .63$, non-migrants: $\alpha = .64$).

Descriptive norms. Descriptive norms to eat unhealthy and healthy foods were assessed by asking participants e.g. “How many of your friends eat fresh fruit every day?” on a four-point scale (1 *none*, 2 *some*, 3 *many*, 4 *all*) referring to Gibbons and Eggleston (1996). The internal consistency was good for the descriptive norms to eat unhealthy foods (migrants: $\alpha = .83$, non-migrants: $\alpha = .83$). For the descriptive norms to eat healthy foods, the internal consistency was poor in migrants ($\alpha = .59$) and acceptable in non-migrants ($\alpha = .73$).

Subjective norms. Subjective norms to eat unhealthy and healthy foods were assessed by asking participants e.g. “Do you think your friends/best friend would approve when you eat fresh fruit every day?” on a five-point scale ranging from 1 = *definitely not* to 5 = *definitely yes* based on van den Eijnden, Spijkerman, and Engels (2006). The internal consistency was found to be good for the subjective norms to eat unhealthy foods (migrants: $\alpha = .83$, non-migrants: $\alpha = .84$). For the subjective norms to eat healthy foods, the internal consistency was questionable in migrants ($\alpha = .65$) and acceptable in non-migrants ($\alpha = .76$).

Eater prototypes. Prior to the presentation of items, participants received a general definition of prototypes and were instructed to think about the typical person their age who engages in the specific behaviour described in each item (cf. Gerrard et al., 2005). Participants were then asked to evaluate nine specific eater-prototypes (e.g. what do you think of the

typical fresh fruit-, salad, and wholemeal bread-eater were evaluated significantly positive. These theoretical and empirical considerations led to the selection of five unhealthy (sweets, salty snacks, fast food, soft drinks, and chocolate) and four healthy foods (fresh fruit, salad, wholemeal bread, and cooked vegetables).

typical person your age that eats fresh fruit every day?) on a five-point scale with equidistant smilies (cf. Jäger, 2004). The smilies-scale was used instead of the evaluation thermometer (cf. Ravis et al., 2006) as it is illustrative and recommended for the usage in children and adolescents (Bortz & Döring, 2006). The internal consistency was found to be good for the unhealthy eater (migrants: $\alpha = .86$, non-migrants: $\alpha = .85$), whereas the internal consistency of the healthy eater was questionable in migrants ($\alpha = .64$) and acceptable in non-migrants ($\alpha = .71$).

Behavioural intentions. Behavioural intentions to eat unhealthy and healthy foods were assessed by asking e.g. “For the following weeks, do you plan to eat fresh fruit every day?” on a five-point scale ranging from 1 = *no, not at all* to 5 = *yes, very strongly* (Gibbons et al., 2004). The internal consistency was good for the behavioural intentions to eat unhealthy foods (migrants: $\alpha = .82$, non-migrants: $\alpha = .82$) and acceptable for the behavioural intentions to eat healthy foods (migrants: $\alpha = .70$, non-migrants: $\alpha = .73$).

Behavioural willingness. Behavioural willingness to eat unhealthy and healthy foods was assessed in accordance with Gibbons et al. (1998). Participants were instructed to imagine themselves in two situations with their close friends. One of them would either offer fresh fruit, salad or wholemeal bread (situation I) or sweets, salty snacks or fast food (situation II). It was then asked how likely it was that participants would do each of the following “try a little bit”, “eat a lot”, and “tell him/her ‘no thanks’” on a five-point scale from 1 = *very unlikely* to 5 = *very likely*. The internal consistency of the behavioural willingness to eat unhealthy foods was questionable in migrants ($\alpha = .65$) and poor in non-migrants ($\alpha = .53$). For the behavioural willingness to eat healthy foods, the internal consistency was acceptable in migrants ($\alpha = .70$) and questionable in non-migrants ($\alpha = .65$).

Eating behaviour. A modified retrospective quantitative FFQ based on KiGGS was used to assess consumption frequencies of four unhealthy foods (salty snacks, fast food, soft

drinks, and chocolate) and three healthy foods (fresh fruit, salad/cooked vegetables combined, and wholemeal bread) on a five-point scale: 1 *less or never*, 2 *once per week*, 3 *2-4 times per week*, 4 *5-6 times per week*, 5 *every day* (Mensink & Burger, 2004). The given foods were indicator foods categorised in highly recommended (fresh fruit, salad/cooked vegetables combined, and wholemeal bread) and not recommended (salty snacks, fast food, soft drinks, and chocolate) for consumption. A dietary score was computed comprising the seven indicator foods based on Kleiser et al. (2010). To do this, consumption frequencies were categorised as favourable (2 points), neutral (1 point), and unfavourable (0 points) and summed up. The dietary score ranged from zero to 14 points. Points from zero to five define an unfavourable, six to 10 a neutral, and 11 to 14 a favourable eating behaviour.

3.2.3. Data analysis.

The Mplus Programme, version 6.12, was employed for *SEM* with latent variables in order to investigate the relationship pattern within the overall data set.

A *SEM* consists of a measurement model and a structural model. The measurement model - a confirmatory factor analysis (*CFA*) - presents a multivariate regression model portraying the relationships between a set of observed dependent variables (factor indicators) and a set of continuous latent variables (factors). The relationships among factors, among observed variables, and between factors and observed variables that are not factor indicators are expressed in the structural model in one set of multivariate regression equations (Muthén & Muthén, 1998-2010). *SEM* was chosen for analysis for the following reasons: The theoretical order among factors and the relationships among predictors can be detected. A multi-group *SEM* analyses measurement invariance across groups. Lastly, *SEM* with latent variables compared to regression analysis with observed variables estimates regression parameters free of measurement errors and is therefore more precise. As perfect reliable measures are presumed in regression analysis with observed variables, the use of latent variables are in particular beneficial if scale reliabilities are moderate (Geiser, 2010).

Model fit. The fit of the resultant models were assessed using following incremental and absolute goodness-of-fit indices: χ^2 , χ^2/df , *Comparative Fit Index (CFI)*, *Root Mean Square Error of Approximation (RMSEA)*, and *Standardised Root Mean Square Residual (SRMR)*. The higher the probability associated with χ^2 , the closer the fit between the hypothesised model and the perfect fit. Due to a number of problems such as sensitivity to sample size associated with the χ^2 statistic, the ratio of χ^2/df is additionally reported (Byrne, 2012). A ratio less than 2.0 indicates good overall model fit, whereas a value greater than 5.0 is unacceptable (Marsh, Balla, & McDonald, 1988). The *CFI* is measured by comparing the hypothesised model with the baseline model. It ranges from zero to 1.00 with values close to 1.00 being indicative as a well-fitting model. A value of $> .90$ is originally considered representative of a well-fitting model. The absolute indices of fit *RMSEA* and *SRMR* decrease as goodness-of-fit improves and thereby reach the value of zero when the model fits perfectly. The *RMSEA* takes the error of approximation in the population into account and estimates how well the model, with unknown but optimally chosen parameter values, would fit the population covariance matrix, if it were available. Values less than .05 indicate good fit, and less than .10 are acceptable. The *SRMR* represents the average value across all standardised residuals, and ranges from zero to 1.00. Its value would be small in a well-fitting model (Byrne, 2012). To correct for non-normality, robust maximum likelihood estimation was used.

Study hypotheses were tested in a series of analyses which were conducted in the following order: Testing multiple-group invariance, establishing a multiple-group *CFA*, and establishing a multiple-group *SEM*. All social-cognitive variables were assessed for both healthy and unhealthy foods leading to separate analyses which introduced factor indicators regarding either unhealthy (sweets, salty snacks, fast food, soft drinks, and chocolate) or healthy (fresh fruit, salad, wholemeal bread, and cooked vegetables) foods. The resultant models are henceforth referred to as *unhealthy model* and *healthy model*. For both models, the factors attitudes, descriptive norms, subjective norms, prototype perception, behavioural

intentions, and behavioural willingness were indicated by the questionnaire items pertaining to each PWM-construct. This resulted in three to five factor indicators each. As described in the measures section above, nine foods were repeatedly used for item formulation in each construct (except behavioural willingness) throughout the questionnaire. This identical use of wording throughout the questionnaire might have led to an inadequate model fit. In order to remedy this, artificial food factors with five indicators each were additionally modelled. For the unhealthy model, the factors soft drinks, salty snacks, fast food, and chocolate and for the healthy model, the factors fresh fruit, salad, and wholemeal bread were added to the analyses. The dependent variable eating behaviour was entered as observed variable into the *SEM*. Structural paths were modelled in line with the assumptions of the differentiated PWM (cf. Figure 8).

Testing multiple-group invariance (cf. Byrne, 2012). Multiple-group invariance is a premise for analysing latent mean differences and differing strengths of structural paths across groups. This was tested in a series of steps that build upon each other. A sequence of nested measurement models with increasing restrictions was established. After separate baseline models had been established for both subsamples, a well-fitting multiple-group baseline model named configural model was tested. The configural model (model 1) is the least restricted one. The next model constrained equal factor loadings (model 2) across subsamples followed by a more constrained model testing invariant observed variable intercepts (model 3). Lastly, model 4 tested differences in latent means across groups. The latent factor means were fixed to zero for one group which thus served as a reference group the other group was compared to. This procedure was conducted separately for the unhealthy and the healthy model. The minimum acceptable criterion for measurement invariance is invariance of factor loadings (Byrne, Shavelson, & Muthén, 1989). Measurement invariance of the nested models across groups is indicated by the $\Delta\chi^2$. If the difference value is statistically significant, the two models are not equivalent across groups. Then again, if the difference value is not statistically

significant, the χ^2 -test suggests that all specified equality constraints are acceptable. Due to its sensitivity to sample size and non-normality, the $\Delta\chi^2$ has gradually been thought to be an impractical and unrealistic criterion to proof evidence of invariance (Cheung & Rensvold, 2002). A more practical approach is achieving both a continuously adequate multiple-group model fit and negligible ΔCFI values between models. The latter should not exceed a value of .05 (McGaw & Jöreskog, 1971).

Multiple-group CFA and SEM. In order to test the validity of the indicator variables, it is recommended to conduct a *CFA* model prior to the *SEM*. In the present study, two multiple-group *CFA* models (model 4) and two multiple-group *SEM* in accordance with the multiple-group *CFA* models were run separately for the unhealthy model and the healthy model⁹. In addition to the structural paths modelled in line with the assumption of the differentiated PWM, the distal antecedents were regressed onto age serving as a background factor¹⁰. Furthermore, equal path constraints for the single paths from the distal antecedents on behavioural intentions and on behavioural willingness were modelled. Analyses were performed separately for the unhealthy and the healthy model.

Remaining analyses were conducted with SPSS, version 19.0. Mean scores were computed across all social-cognitive variables separately for unhealthy and healthy foods and correlated with the dietary score.

Missing data were treated with full information maximum likelihood (FIML) in all analyses conducted with Mplus. If analyses were conducted with SPSS, missing data were deleted listwise. Excluded data in computation of scale reliability in SPSS were below 2 %.

⁹ As item formulation of behavioural willingness included the offering of fresh fruit, an overlap in wording existed between the artificial factor fruit and the behavioural willingness. This overlap caused poor model fit. To improve the model fit, a cross-loading (fruit by behavioural willingness) was added for the healthy model.

¹⁰ Age was introduced as a background factor as increasing age was significantly associated with unfavourable eating behaviour among adolescents and the subsamples differed significantly in age (cf. Kleiser, Mensink, Kurth, Neuhauser, and Schenk, 2010). Migrants were found to be older than non-migrants.

3.3. Results

3.3.1. Descriptive findings.

The mean dietary scores among both migrants ($M = 7.66$, $SD = 1.86$) and non-migrants ($M = 8.14$, $SD = 2.29$) categorised their eating behaviour as neutral. As expected in hypothesis 2, migrants had a significantly less favourable dietary score than non-migrants, $t(282.93) = 2.20$, $p < .05$. The distribution of the dietary score among migrants portrayed that 8.4 % had an unfavourable, 80.9 % a neutral, and 3.8 % a favourable eating behaviour (no data: 6.9 %). Non-migrants' distribution of eating behaviour was as follows: 11.2 % unfavourable, 61.4 % neutral, and 16.8 % favourable. No data were available for 10.6 % of participants. Correlations of the dietary scores with social-cognitive variables were as expected significantly negative with social-cognitive variables to eat unhealthy foods and significantly positive with social-cognitive variables to eat healthy foods (Table 2). The only insignificant correlation was the one between the dietary scores and behavioural willingness to eat healthy foods in the group of migrants.

Table 2

Correlations among latent factors, and between eating behaviour and mean scores of social-cognitive variables across migrants (n =131) and non-migrants (n =303)

	healthy	1	2	3	4	5	6	7
unhealthy								
1. behaviour								
migrants			.45***	.22*	.21*	.31**	.51***	.14
non-migrants			.42***	.32***	.30***	.29***	.25***	.53***
2. attitude								
migrants		-.58***		.83***	.81***	.80***	.97***	.28**
non-migrants		-.60***		.68***	.72***	.74***	.96***	.34***
3. descriptive norms								
migrants		-.41***	.54***		.67***	.71***	.83***	.39***
non-migrants		-.35***	.53***		.70***	.50***	.63***	.42***
4. subjective norms								
migrants		-.40***	.66***	.48***		.81***	.85***	.42***
non-migrants		-.42***	.58***	.53***		.66***	.70***	.40***
5. prototype perception								
migrants		-.47***	.57***	.44***	.60***		.79***	.30**
non-Migrants		-.47***	.62***	.39***	.56***		.73***	.34***
6. behavioural intentions								
migrants		-.58***	.84***	.63***	.71***	.72***		.32**
non-migrants		-.55***	.79***	.50***	.57***	.63***		.32***
7. behavioural willingness								
migrants		-.21*	.66***	.44***	.45***	.39***	.69***	
non-migrants		-.49***	.85***	.39***	.49***	.62***	.71***	

Note. Values above/below the diagonal refer to the healthy/unhealthy model. Correlations among latent factors were computed with Mplus; correlations between eating behaviour and mean scores of social-cognitive variables were computed with SPSS.

* $p < .05$ ** $p < .01$, *** $p < .001$.

3.3.2. Testing multi-group invariant factorial structure of the questionnaire.

After single well-fitting baseline *CFA* models for unhealthy and healthy across both groups had been computed (Table 3), a 2-group *CFA* was established for the unhealthy and healthy model each.

Invariant factorial structure as postulated in hypothesis 1 was tested in a series of nested models. The least constrained 2-group *CFA* models (model 1) were compared to more constrained models with invariant factor loadings (model 2) which were again compared to more constrained models with invariant observed variable intercepts (model 3). The $\Delta\chi^2$ value for all comparisons was significant for both the unhealthy and the healthy models suggesting measurement noninvariance at first. Bearing the $\Delta\chi^2$'s sensitivity to sample size and non-normality in mind, both the multiple-group overall model fits and the ΔCFI values were analysed. As an adequate multiple-group model fit was continuously achieved and ΔCFI values were $\leq .01$ for all four comparisons, invariant factorial structure across groups was confirmed for both the unhealthy and the healthy model (Table 3).

Table 3

CFA-Goodness-of-fit indices and model comparisons for two-group nested models with increased constraints

	χ^2		<i>df</i>	χ^2/df	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>	$\Delta \chi^2$	Δdf	ΔCFI
unhealthy										
single baseline <i>CFA</i> models										
migrants	323.45		285	1.13	.98	.03	.04			
non-migrants	428.92	***	285	1.50	.97	.04	.04			
two-group nested models										
model 1	752.37	***	570	1.32	.97	.04	.04	-	-	-
model 2	809.71	***	618	1.31	.97	.04	.05	57.34	48	< .01
model 3	865.85	***	646	1.34	.96	.04	.06	56.14	**	28
model 4	807.77	***	626	1.29	.97	.04	.04	58.08	***	20
healthy										
single baseline <i>CFA</i> models										
migrants	232.46	**	179	1.30	.95	.05	.05			
non-migrants	248.49	**	179	1.39	.97	.04	.04			
two-group nested models										
model 1	480.95	***	358	1.34	.96	.04	.04	-	-	-
model 2	541.78	***	396	1.37	.96	.04	.05	60.83	*	38
model 3	580.26	***	419	1.38	.96	.04	.06	38.48	*	23
model 4	552.10	***	401	1.38	.96	.04	.05	26.16		18

* $p < .01$, ** $p < .01$, *** $p < .001$.

3.3.3. Testing latent mean differences in constructs of the prototype-willingness model across Turkish migrants and non-migrants.

As measurement invariance was met for both the unhealthy and the healthy model, latent mean analysis (model 4; Table 3) could be conducted testing hypothesis 2. Migrants were expected to have significantly less favourable extents of attitudes, descriptive and subjective norms, a significantly less favourable perception of eater prototypes, significantly less favourable behavioural intentions, and behavioural willingness to eat unhealthy and healthy foods.

For analysis, non-migrants' latent factor means were fixed to zero serving as a reference group which migrants were compared to. The comparison is displayed in Figure 7. Analysis revealed migrants to have a significantly less favourable attitude to eat unhealthy foods ($M = 0.25, p < .05$), descriptive norm to eat unhealthy ($M = 0.61, p < .001$) and healthy foods ($M = -0.27, p < .05$), perception of the unhealthy eater ($M = 0.25, p < .05$), behavioural intention to eat unhealthy foods ($M = 0.23, p < .05$), and behavioural willingness to eat healthy foods ($M = -0.27, p < .05$) compared to non-migrants. No significant latent mean differences between migrants and non-migrants were found in the attitude to eat healthy foods, in the subjective norms to eat unhealthy and healthy foods, in the perception of the healthy eater, in the behavioural intentions to eat healthy foods, and in the behavioural willingness to eat unhealthy foods.

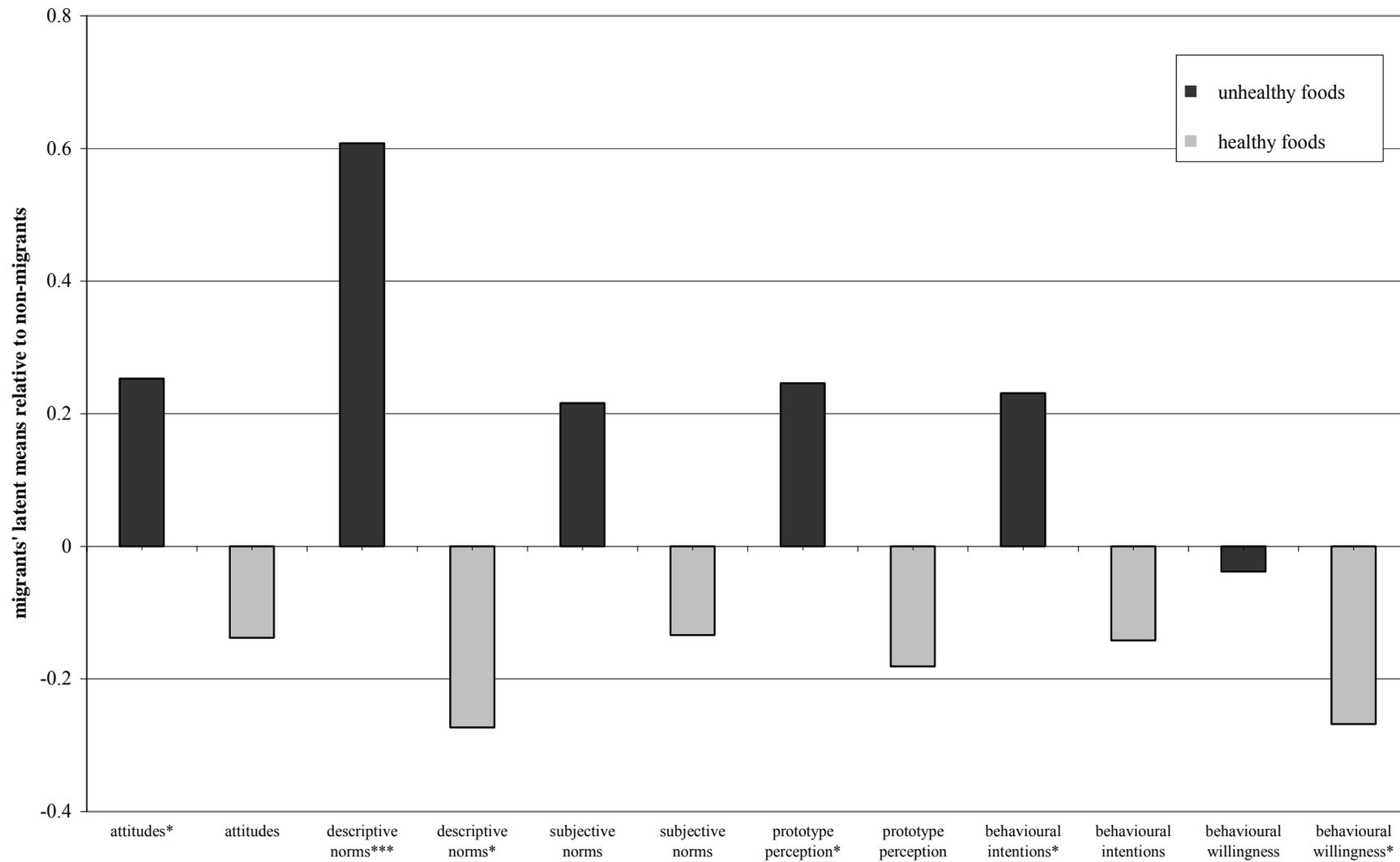


Figure 7. Latent means of PWM-constructs across migrants and non-migrants. * $p < .05$, *** $p < .001$.

3.3.4. Multiple-group structural equation modelling.

Prior to the multiple-group *SEM*, the parameters of the multiple-group *CFA* run in model 4 were evaluated for the unhealthy and healthy model: Goodness-of-fit statistics for the two multiple-group *CFA* models suggested that the models fit the data well. This implies that the hypothesised models adequately accounted for the covariance matrices of the data (model 4; Table 3). For both models, all standardised factor loadings on the latent factors¹¹ were positive and significant. The recommended minimum of .50 for standardised factor loadings was exceeded by all factor indicators (Ford, MacCallum, & Tait, 1986) except for one item loading on behavioural willingness to eat unhealthy foods ($r = .476$) in the group of non-migrants. The correlations among latent factors were all as expected significantly positive (Table 2).

As adequacy of the multiple-group *CFA* models was given, multiple-group *SEM* testing hypothesis 3 and 4 were conducted. Hypothesis 3 postulated that the predictions of the differentiated PWM are confirmed in both groups but with cultural variations in the prediction patterns. Within the identification of these varying prediction patterns, hypothesis 4 additionally expected migrants' behavioural intentions and behavioural willingness to be more strongly based on social influences (descriptive and subjective norms, and prototype perception), whereas non-migrants' behavioural intentions and behavioural willingness were assumed to be formed more strongly by attitudes. The *CFA* run in model 4 were expanded by the structural model. In order to test hypothesis 4, equal path constraints for the single paths from eating behaviour's distal antecedents on behavioural intentions and on behavioural willingness were added to the models. Goodness-of-fit statistics are presented in Figure 8 and Figure 9 for the unhealthy and healthy model, respectively, showing that the data were represented well or moderately across both models. Standardised parameter estimates for the

¹¹ Reporting is henceforth limited to modelled latent factors included in theoretical assumptions of the PWM.

structural relations among the latent constructs and eating behaviour are given in corresponding figures.

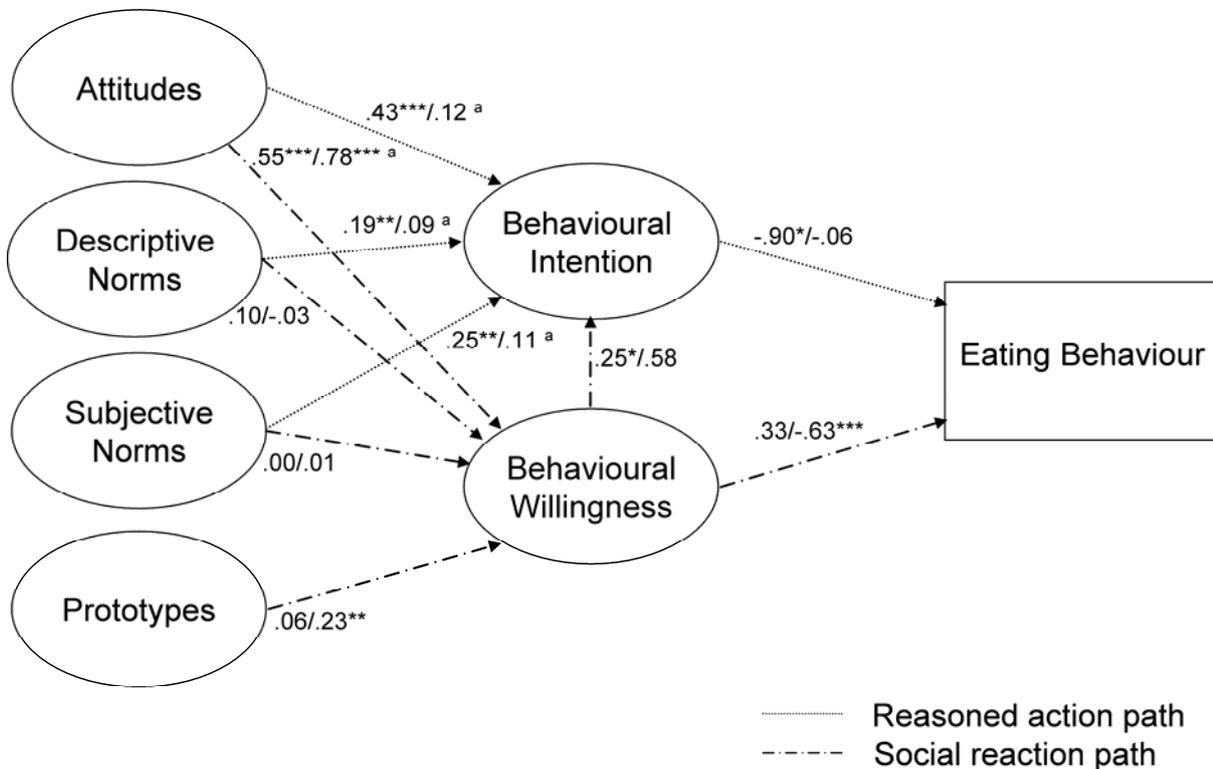


Figure 8. Standardized coefficients for the structural equation model of the unhealthy model across both subsamples. Path coefficients are reported migrants/non-migrants. Correlations between distal antecedents were modelled and proven to be significant but not plotted here. Age was included as a background factor. Multiple-group *SEM* fit indices: $\chi^2 = 1115.47^{***}$, $df = 778$, $\chi^2/df = 1.43$, $CFI = .95$, $RMSEA = .05$, $SRMR = .06$; ^a path coefficients differ significantly between groups, * $p < .05$, ** $p < .01$, *** $p < .001$.

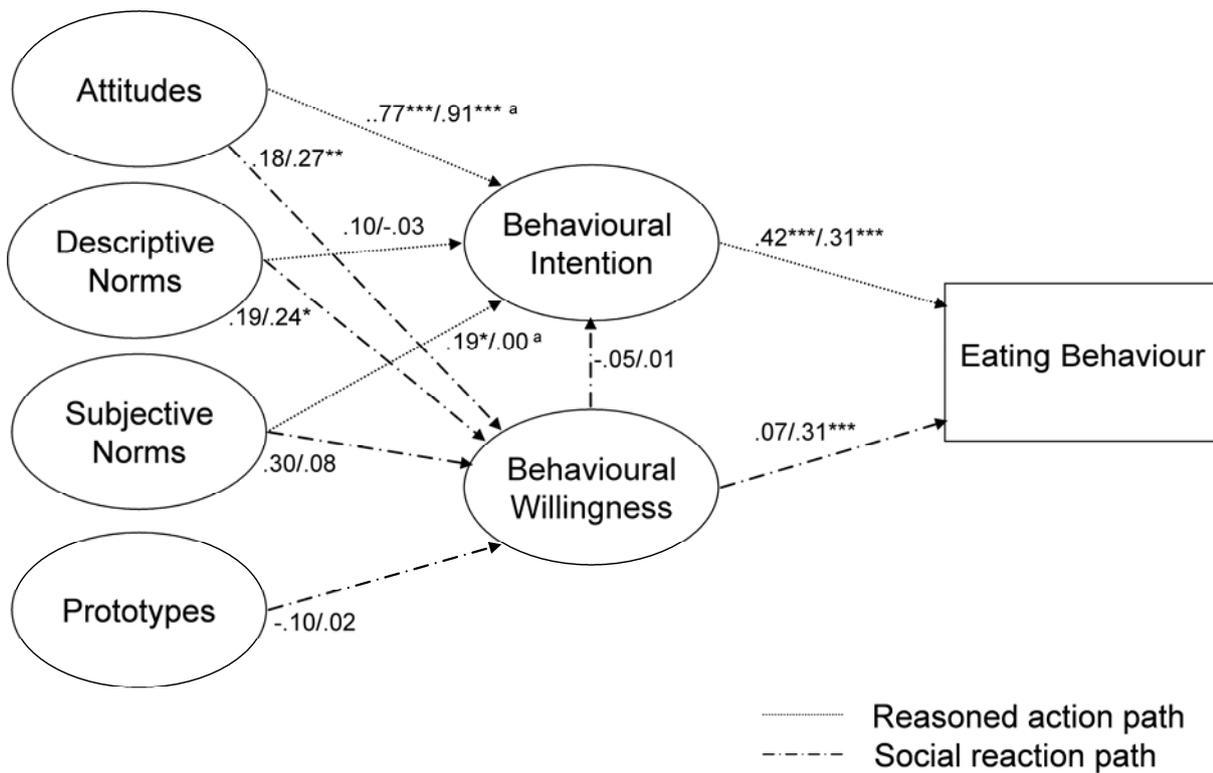


Figure 9. Standardized coefficients for the structural equation model of the healthy model across both subsamples. Path coefficients are reported migrants/non-migrants. Correlations between distal antecedents were modelled and proven to be significant but not plotted here. Age was included as a background factor. Multiple-group *SEM* fit indices: $\chi^2 = 889.37^{***}$, $df = 521$, $\chi^2/df = 1.71$, $CFI = .91$, $RMSEA = .06$, $SRMR = .08$; ^a path coefficients differ significantly between groups, * $p < .05$, ** $p < .01$, *** $p < .001$.

The prediction patterns for the unhealthy model across migrants and non-migrants were as follows: For migrants, all single paths of the reasoned action pathway were significant. Attitudes, descriptive and subjective norms to eat unhealthy foods (positively) predicted behavioural intentions to eat unhealthy foods which in return (negatively) predicted eating behaviour. Regarding the social reaction pathway, attitudes to eat unhealthy foods significantly (and positively) predicted behavioural willingness to eat unhealthy foods which again significantly (and positively) predicted behavioural intentions to eat unhealthy foods. Remaining single paths of the social reaction pathway were not significant. A nearly reverse prediction pattern occurred in the group of non-migrants: Whereas the reasoned action pathway was completely insignificant, the following single paths of the social reaction pathway were significant: Attitudes to eat unhealthy foods and prototype perception of the unhealthy eater (positively) predicted behavioural willingness to eat unhealthy foods which in return (negatively) predicted eating behaviour. Residuary single paths of the social reaction pathway were not significant. Significant differences in the strength of structural paths between the two groups were found in the single paths from attitudes ($b = .76, p < .001$), descriptive ($b = .33, p < .01$) and subjective norms to eat unhealthy foods ($b = .41, p < .01$) on behavioural intentions as well as from attitudes to eat unhealthy foods ($b = 1.91, p < .05$) on behavioural willingness to eat unhealthy foods. Among the given structural paths, the single paths belonging to the reasoned action pathway were stronger in migrants (bearing the insignificance for non-migrants in mind), whereas the influence of attitudes to eat unhealthy foods on behavioural willingness to eat unhealthy foods was weaker in migrants.

The explained variances of the multiple-group *SEM* of the unhealthy model was as follows: For migrants, 81.7 % of the variance in behavioural intentions was explained, 42.2 % in behavioural willingness, and 50.2 % in eating behaviour. For non-migrants, 65.5 % of behavioural intentions' variance, 86.5 % of behavioural willingness' variance, and 45.4 % of eating behaviour's variance were explained.

The *SEM* for the healthy model revealed the following prediction patterns across migrants and non-migrants: For migrants, the following single paths of the reasoned action pathway were significant: Attitudes and subjective norms to eat healthy foods (positively) predicted behavioural intentions to eat healthy foods which in return (positively) predicted eating behaviour. The remaining single paths of the reasoned action pathway as well as the entire social reaction pathway were not significant. Again, a divergent prediction pattern occurred among the group of non-migrants. For the reasoned action pathway, attitudes to eat healthy foods (positively) predicted behavioural intentions to eat healthy foods which (positively) predicted eating behaviour. Furthermore, three single paths of the social reaction pathway were significant: Attitudes and descriptive norms to eat healthy foods (positively) predicted behavioural willingness to eat healthy foods which in return (positively) predicted eating behaviour. Remaining single paths were not significant. Significant differences in the strength of structural paths between the two groups were found in the single paths from attitudes ($b = 1.67, p < .001$) and subjective norms to eat healthy foods ($b = .50, p < .05$) on behavioural intentions to eat healthy foods. The influence from attitudes to eat healthy foods on behavioural intentions to eat healthy foods was weaker among migrants, whereas the influence from subjective norms to eat healthy foods on behavioural intentions to eat healthy foods was stronger among migrants (as it was only significant in this group).

Finally, the explained variances for migrants in the healthy model accounted for 87.6 % in behavioural intentions, 48.3 % in behavioural willingness, and for 20.5 % in eating behaviour, respectively. For non-migrants, the explained variance in the multiple-group model accounted for 80.8 % in behavioural intentions, 62.4 % in behavioural willingness, and for 26.6 % in eating behaviour, respectively.

3.4. Discussion

The aim of the present study was to test the differentiated PWM in explaining eating behaviour of migrants compared to non-migrants using *SEM*. It was particularly hypothesised

that (1) the factorial structure of the psychometric instrument would be invariant across both groups, (2) that migrants would have unfavourable extents of both eating behaviour and constructs of the differentiated PWM compared to non-migrants, (3) that the predictions of the differentiated PWM would be confirmed in both groups but with cultural variations, (4) and that the influence strengths from the distal antecedents on behavioural intentions and behavioural willingness would vary across migrants and non-migrants in accordance with the values of the individualism vs. collectivism dimension (cf. Hofstede et al., 2010).

Analyses which tested measurement invariance confirmed that the factorial structure of the psychometric instrument was invariant across groups. Invariance of factor loadings as the minimum acceptable criterion for measurement invariance (cf. Byrne et al., 1989) was complied and confirmed hypothesis 1. The existence of measurement invariance illustrates that all participants interpreted the questionnaire items identically. An invariant factorial structure is a premise for group comparisons, as findings of differences in group means and correlation patterns could otherwise not be interpreted unambiguously. Without ensuring measurement invariance, differences in group means and correlation patterns could also indicate differences in measurement operations (Horn & McArdle, 1992). Therefore, measurement invariance needs to be guaranteed in order to clearly interpret latent mean differences as well as differing prediction patterns and strengths of structural paths across groups.

Hypothesis 2, which expected mean differences in eating behaviour and latent mean differences in social-cognitive variables between migrants and non-migrants with migrants' extents being less favourable, was confirmed partially.

In accordance with previous findings in KiGGS (cf. Kleiser et al., 2010), migrants had a less favourable eating behaviour than non-migrants. Additionally, hypothesis-confirming significant latent mean differences were found in the attitudes to eat unhealthy foods, in the descriptive norms to eat unhealthy and healthy foods, in the perception of the typical

unhealthy eater, in the behavioural intentions to eat unhealthy foods, and in the behavioural willingness to eat healthy foods. The culture-dependency of the given PWM-constructs was shown before, for some such as for attitudes and the perceptions of the unhealthy eater even in the context of eating behaviour. Their culture-dependency can hereby be supported by the present findings. For attitudes, cultural differences were found across the Spanish and Norwegians (Olsen et al., 2008). The former had a more negative attitude towards a fish-burger compared to the latter. The perception of the typical unhealthy eater was found to be less favourable among adolescents from the United States and the Netherlands compared to Hungarian adolescents (Gerrits et al., 2010). Cultural differences in social norms, behavioural intentions, and behavioural willingness towards sexual behaviour were analysed across US and Danish adolescents. The former were found to have higher social norms than Danish adolescents, whereas the extents of behavioural intentions and behavioural willingness were higher among Danish compared to US adolescents (Gibbons et al., 1995).

Hypothesised latent mean differences between migrants and non-migrants could not be confirmed for the attitudes to eat healthy foods, the subjective norms to eat unhealthy and healthy foods, the perception of the typical healthy eater, the behavioural intentions to eat healthy foods, and the behavioural willingness to eat unhealthy foods. Even though cultural differences in the extents of attitudes towards eating healthy (Blanchard et al., 2009), in the perception of the typical healthy eater (Gerrits et al., 2010), and in the behavioural intentions to eat healthy (Blanchard et al., 2009) were found before, the present study could not support them across migrants and non-migrants in the context of eating behaviour. As expected, migrants had a less favourable attitude to eat healthy foods, a less favourable perception of the healthy eater, and less favourable intentions to eat healthy foods, but not at a significant level. When opposing the differences found by Blanchard et al. (2009) and Gerrits et al. (2010) to the present findings, one has to keep in mind that the present study compared migrants to non-migrants instead of Blacks to Whites or adolescents across three different nations. Thus, the

cultural groups compared in those studies may have been more distinct than the ones analysed here. For subjective norms and behavioural willingness to eat unhealthy foods, no findings regarding cultural mean differences are known in the context of eating behaviour. Their insignificance in the present study might indicate that the cultural mean differences found in social norms and behavioural willingness towards sexual behaviour across US and Danish adolescents (Gibbons et al., 1995) cannot be transferred one-to-one to a different behavioural and cultural setting.

Altogether, the present findings lead to the conclusion that migrants and non-migrants differ significantly in the extents of some PWM-constructs only. Therefore, the existing cultural difference in eating behaviour across migrants and non-migrants is only partly expressed in the latent means of its social-cognitive determinants. In general, it should be annotated that a great amount of cultural differences found before in PWM-constructs were either in a different behavioural and/or cultural contexts. These findings cannot be transferred one-to-one as different aspects have to be considered for each behavioural and cultural setting.

It was thirdly hypothesised that the predictions of the differentiated PWM would be confirmed in both groups but with cultural variations. This could be confirmed. An inspection of the prediction patterns across groups showed a great amount of variation in both the unhealthy and the healthy model. This is discussed in the following sections.

In terms of the unhealthy model, migrants' eating behaviour was influenced by constructs of the reasoned action pathway. Attitudes, descriptive and subjective norms predicted behavioural intentions which in return predicted eating behaviour. Behavioural willingness as the only construct of the social reaction pathway involved in migrants' prediction pattern was influenced by attitudes and contributed to the prediction of behavioural intentions and not directly to eating behaviour. Non-migrants' eating behaviour was, in contrast, solely predicted by components of the social reaction pathway. Attitudes and

prototype perception predicted the behavioural willingness which in return showed a direct path to eating behaviour.

A look at the healthy model showed that in the group of migrants, eating behaviour was once more merely predicted by the reasoned action pathway. Behavioural intentions showed a direct path to eating behaviour and were in return influenced by attitudes and subjective norms. For non-migrants, the prediction pattern involved components of both the reasoned action and the social reaction pathway. Eating behaviour was predicted by behavioural intentions and behavioural willingness which were both in return influenced by attitudes. Behavioural willingness was additionally influenced by descriptive norms.

PWM-constructs accounted for 50.2 % and 45.4 % of variance in eating behaviour for the unhealthy model as well as for 20.5 % and 26.6 % of variance for the healthy model across migrants and non-migrants, respectively. The proportions of explained variance in eating behaviour were greater for the unhealthy model compared to the healthy model across both groups. This might be due to modelling of factors and foods included in the dietary score. For the unhealthy model, five factor indicators were introduced for each factor (except behavioural willingness), whereas only four factor indicators were introduced for each factor (except behavioural willingness) in the healthy model. For the computation of the dietary score, consumption frequencies of four unhealthy foods, but only of three healthy foods were summed up. This consistently higher number of unhealthy foods might clarify the greater amount of explained variance in eating behaviour for the unhealthy model compared to the healthy model.

In conclusion, migrants' eating behaviour was rather based on rational decision making than a result from social reaction regarding social-cognitive determinants to eat both unhealthy and healthy foods. Non-migrants' eating behaviour was, in contrast, based on social-reactive and reasoned social-cognitive determinants. Their predictive social-cognitive determinants to eat unhealthy foods were rather a reaction to a potentially risky situation than

an action performed upon an intention, whereas their predictive social-cognitive determinants to eat healthy foods were both intentional and socially-reactive. However, the presented cultural variations in the prediction patterns are in contrast to Hagger et al. (2007) who found a consistent prediction pattern of the TPB across five different nations in a physical activity context. This might again emphasize that findings regarding culture cannot be generalised across different behavioural and cultural settings.

It can be summarised that the data confirmed the pattern of the differentiated PWM but with cultural variations across groups. The finding that not all relations postulated by the differentiated PWM were significant, yet, contradicts the results of Gibbons et al. (1998) who confirmed all relations of the PWM-constructs in prediction college students' pregnancy-risk behaviour as foresaid by the authors. The results of the present study are, however, in line with the prediction pattern found for adolescents' eating behaviour in Germany, as not all relations postulated by the PWM had been significant here as well (Dohnke et al., 2012). This might show again that the prediction pattern of the PWM cannot be transferred one-to-one across different behavioural and cultural settings.

Hypothesis 4, which expected varying influence strengths of eating behaviour's distal antecedents on behavioural intentions and behavioural willingness across migrants and non-migrants, could be confirmed partly. In detail, it was assumed that migrants' behavioural intentions and behavioural willingness would more strongly be based on social influences (descriptive and subjective norms, and prototype perception) compared to non-migrants and that non-migrants' behavioural intentions and behavioural willingness would be formed more strongly by personal attitudes compared to migrants.

For the unhealthy model, four significant differences in the strengths of paths across migrants and non-migrants were found. The influences from attitudes, descriptive and subjective norms on behavioural intentions were stronger in migrants compared to non-migrants, whereas the influence from attitudes on behavioural willingness was weaker. It is

not surprising that the paths of the reasoned action pathway were stronger in migrants, as non-migrants' eating behaviour was influenced by social-reactive elements to eat unhealthy foods only. The path from attitudes to behavioural willingness was significant in both groups, however weaker in migrants than in non-migrants, and thus confirmed hypothesis 4. Furthermore, this finding supports cultural differences in influence strengths among elements of the social reaction pathway which was firstly and solely shown by Gibbons et al. (1995).

No significant differences in the strengths of paths across migrants and non-migrants were found in descriptive and subjective norms and prototype perception on behavioural willingness. As the single paths from descriptive and subjective norms on behavioural willingness were not significant in both groups, the insignificant difference in the strengths of the given paths across groups can plausibly be attributed to this. Nevertheless, the influence from prototype perception on behavioural willingness was significant in non-migrants only but did not differ significantly between the given groups. This might be due to the definition of the prototype construct as a cognitive representation of the type of person with the same age that engages in certain behaviour (Gibbons et al., 2003). Unlike social norms, the construct of prototypes may not underlie the assumptions the hypothesis was based on. It was assumed that migrants' behavioural willingness would more strongly be based on social influences as a result of prevailing collectivistic cultural values. Prototype perception, however, might not contribute to higher social influences, and thus might not lead to the harmonious in-groups of collectivistic societies (cf. Hofstede et al., 2010).

Regarding the healthy model, two significant differences in the strengths of paths across migrants and non-migrants were found. Both confirmed hypothesis 4: The influence from attitudes on behavioural intentions was weaker in migrants compared to non-migrants, whereas the influence from subjective norms on behavioural intentions was higher. Furthermore, the latter finding supports cultural differences in influence strength from

subjective norms on behavioural intentions to eat healthy previously found by Blanchard et al. (2009).

The remaining paths did not differ in strength across migrants and non-migrants. Possible explanations for this are as follows. The differences in the influences from descriptive norms on behavioural intentions as well as from subjective norms and prototype perception on behavioural willingness were unsurprisingly not significant, as the paths themselves were too in both groups. Nonetheless, the influences of the single paths from attitudes and descriptive norms on behavioural willingness did not differ significantly between groups, but were only significant in non-migrants. This may be attributed to migrants' compound structure of individualistic vs. collectivistic cultural values. As acculturation takes place, changes in either one or both cultural groups occur (Berry, 1997) which might lead to a relocation of migrants' position on the individualism vs. collectivism dimension. Therefore, it is unclear whether migrants' compound structure of individualistic vs. collectivistic cultural values is rather individualistic, collectivistic or something in-between.

Altogether, it can be concluded that the significant differences in the strengths of the paths from the distal antecedents on behavioural intentions and behavioural willingness between migrants and non-migrants reflect differences between individualistic and collectivistic cultures. The results thereby support previous findings that showed variations in influence strengths from attitudes and subjective norms on behavioural intentions across nationals from individualistic and collectivistic cultures in accordance with the values of the individualism vs. collectivism dimension (Bagozzi et al., 2001).

There are several limitations to the present study. Firstly, data were based on self-reports which may have been distorted by memory or social desirability bias. Thus, the assessment of eating behaviour might be subject to under- or over-reporting. An alternative assessment via 24-hour recalls or weighed food records could on the one hand provide more

detailed data. On the other hand, this would increase costs in terms of time (Straßburg, 2010). As conscious reflection is involved in self-report measures, the impulsive processes of the social reaction pathway may not have been captured accurately. Implicit measures might be a more appropriate method for the assessment of eater prototypes and behavioural willingness. Secondly, the internal consistencies of the social-cognitive variables were only of poor to good size. This issue was however remedied by using *SEM* with latent variables for data analysis. The given method tests the relationship among factors free of measurement errors and is hence in particular beneficial, if scale reliabilities are low (Geiser, 2010). Thirdly, the subsamples differed significantly in age. Migrants were found to be older than non-migrants. This aspect limits the direct comparability of the given cultural groups. Future studies should recruit subsamples similar in age.

Despite these limitations, a number of theoretical implications for the PWM and for culture and acculturation as well as several practical implications for effective interventions can be derived from the present findings. The theoretical implications for the PWM might be as follows. (1) As the predictions of the differentiated PWM were confirmed across both migrants and non-migrants, the PWM seems to be a fitting social-cognitive theory for the explanation of eating behaviour across the given cultural groups. (2) Furthermore, the differentiation of social norms into descriptive and subjective norms is found to be appropriate for cross-cultural studies that include cultural groups with collectivistic values. Both norms contributed to the prediction of behavioural intentions in migrants. For culture and acculturation the following implications might apply. (3) Study results showed that cultural differences in eating behaviour and in some of its social-cognitive determinants exist. Thus, the affiliation to a cultural group can be used to predict the extents of PWM-variables. (4) Moreover, the prediction patterns of eating behaviour were found to be different across migrants and non-migrants. This difference might imply that the affiliation to a cultural group can also be used to determine how eating behaviour is predicted by means of the PWM. (5)

Additionally, study results might imply that a nation's position on the individualism vs. collectivism dimension (cf. Hofstede et al., 2010) can be used to determine cultural differences in influence strengths from eating behaviour's distal on its proximal antecedents across migrants and non-migrants. Conclusively, the following contributions for theory may be provided as a result of the combination of the given research lines. (6) The use of a differentiated PWM seems appropriate for cross-cultural studies that include cultural groups with collectivistic values. (7) Moreover, the cultural differences found between migrants and non-migrants lead to the conclusion that culture might be a relevant background factor of the PWM. This is also the case for other social-cognitive theories such as the TPB (cf. Ajzen, 2005). Affiliation to one's cultural group should hence not be neglected in cross-cultural applications of the PWM.

In addition to the presented implications for theory, the following practical implications for effective interventions on healthy eating among migrants and non-migrants may be derived from study results. Even though migrants' eating behaviour was significantly less favourable than non-migrants', both cultural groups' dietary score categorised their eating behaviour to be neutral only. Therefore, both migrants and non-migrants are in need of interventions on healthy eating.

For migrants, interventions should focus on promoting attitudes, subjective norms, and behavioural intentions to eat healthy foods and on downgrading attitudes, descriptive and subjective norms, behavioural intentions, and behavioural willingness to eat unhealthy foods. Therefore, mainly constructs to eat both unhealthy and healthy foods of the reasoned action pathway should be targeted. In contrast to this, the promotion of attitudes, descriptive norms, behavioural intentions, and behavioural willingness to eat healthy foods as well as the downgrading of attitudes to eat unhealthy foods, the perception of an unhealthy eater, and the behavioural willingness to eat unhealthy foods should be targets for effective interventions in non-migrants. Thus, constructs to eat unhealthy foods of the social reaction pathway and

constructs to eat healthy foods of the reasoned action and social reaction pathway should be targeted for them. The listing of possible targets for both groups shows that a number of generic targets for effective interventions exist across migrants and non-migrants. These are the promotion of attitudes and behavioural intentions to eat healthy foods as well as the downgrading of attitudes and behavioural willingness to eat unhealthy foods. However, as migrants were found to have less favourable attitudes to eat unhealthy foods compared to non-migrants, a focus on the given construct might be more beneficial in migrants. Moreover, to improve the behavioural intentions to eat healthy foods, addressing attitudes to eat healthy foods might be less effective in migrants compared to non-migrants. This is assumed as the influence of attitudes to eat healthy foods on behavioural intentions to eat healthy foods was lower in migrants than in non-migrants.

Future research should investigate whether the differentiated PWM can be used for the explanation of adolescents' eating behaviour in Turkey. A comparative analysis of migrants and adolescent non-migrants from Turkey set in relation to the present findings would provide information on how an acculturation experiences shapes eating behaviour and its social-cognitive determinants. Additionally, the differentiated PWM should be extended by acculturation strategies as background factors and tested in a sample of migrants. This would reveal their associations with PWM-variables. Furthermore, the abovementioned implications for interventions should be implemented and tested for their effectiveness in migrants and non-migrants.

4. Study II

4.1. Study hypotheses

Study II aims to test the differentiated PWM in explaining eating behaviour in a comparative analysis across adolescents with a Turkish migration background in Germany and adolescent non-migrants in Turkey¹² using *SEM*.

(1) The first hypothesis presumes that the psychometric instrument operates equivalently across both cultural groups and stands testing of invariant factor loadings and invariant observed variable intercepts. This will test invariance of the psychometric instrument's factorial structure.

(2) As cultural differences in eating behaviour and in PWM-constructs e.g. in the perception of the healthy eater (Gerrits et al., 2010) have been found across adolescents from different cultures before, secondly mean differences in eating behaviour as well as latent mean differences in PWM-constructs between migrants and Turks are expected.

(3) Thirdly, it is expected that the predictions of the differentiated PWM are confirmed for eating behaviour in both groups but with cultural variations among migrants and Turks.

(4) Finally, the influences of eating behaviour's distal antecedents on behavioural intentions and behavioural willingness are assumed to vary in strength across the cultural groups in accordance with the values of the individualism vs. collectivism dimension. In detail, migrants' behavioural intentions and behavioural willingness are hypothesised to be formed more strongly by personal attitudes compared to Turks, whereas the latter group's behavioural intentions and behavioural willingness are expected to be based more heavily on social influences (descriptive and subjective norms, and prototype perception) compared to migrants.

¹² The terms *migrants* and *Turks* are henceforth used to denote the two groups.

4.2. Method

4.2.1. Participants and procedure.

Participants in this cross-sectional study were a sample of 372 secondary school students in Southern Germany (27.4 %, $n = 102$) and Turkey (72.6 %, $n = 270$). The German subsample included participants with either a one-sided (6.2 %) or a two-sided (21.2 %) Turkish migration background only. Students with a migration background other than Turkish were not eligible for participation. The recruited subsample in Turkey included non-migrants only. Participants attended grade 5, 7, 8 or 9 and were aged between 10 to 14 years (M age = 12.47 years, $SD = 1.38$; 51.2 % girls). Within the subsamples (migrants and Turks), no significant differences were found in the female-to-male ratio, $\chi^2(1) = 0.08$, ns , nor in participants' ages by gender distribution, $\chi^2(4) = 4.30$, ns . However, migrants (M age = 11.92, $SD = 1.60$) were significantly younger than Turks (M age = 12.67, $SD = 1.23$), $t(148.27) = 4.27$, $p < .001$. Nonetheless, homogeneity of the developmental stage can be assumed for the subsamples, as all participants were classified to be in the developmental stage of early adolescence ranging from 10 to 14 years (cf. Grob & Jaschinski, 2003). According to BMI, 73.3 % of participants were normal weight (underweight: 7.0 %, overweight: 15.0 %, obese: 4.8 %, no data: 26.6 %).

As permission for data collection was granted from supervisory school authority in Germany, schools in Southern Germany were randomly selected for participation. A total of 39 classes were recruited (types of schools: 35 classes of Haupt- und Werkrealschule, two classes of Realschule and two classes of Gymnasium). If students' informed consent could be obtained from parents, an incentive of 100 Euro was given to each volunteering class in Germany. Schools in Turkey were recruited on voluntary basis resulting in three participating private schools and one public school. Data were collected via questionnaire by members of the research team during class time.

4.2.2. Measures.

The questionnaire contained items on socio-demographic data, social-cognitive variables, and eating behaviour. Measures and design were equivalent to the ones described in Study I except that eating behaviour was assessed at the same time as socio-demographic data and social-cognitive variables.

A translation of the questionnaire into the Turkish language was conducted by a certified translator for the subsample living in Turkey. To ensure analogous meanings of items, the translation was double-checked by a native Turkish speaker working as a Turkish lecturer at the University of Education in Schwäbisch Gmünd, Germany.

The internal consistencies of the social-cognitive variables to eat unhealthy foods were found to be acceptable to good across migrants and Turks, except for the behavioural willingness to eat unhealthy foods. The latter was only poor to questionable across the given groups. For the social-cognitive variables to eat healthy foods, the internal consistencies of the eater prototype, the behavioural intentions, and the behavioural willingness were found to be acceptable across both groups but for the one of behavioural intentions in Turks. The latter as well as the ones of attitudes, descriptive and subjective norms were questionable except for the internal consistency of descriptive norms in migrants. This was found to be poor. Details on internal consistency of the social-cognitive variables for unhealthy and healthy are presented in Table 4 across migrants and Turks.

Table 4

Internal consistency (Cronbach's alpha) of social-cognitive variables for eating unhealthy and healthy foods across migrants and Turks

measure	unhealthy		healthy	
	migrants	Turks	migrants	Turks
attitude	.84	.82	.69	.61
descriptive norms	.82	.74	.59	.67
subjective norms	.79	.84	.69	.66
prototype perception	.88	.89	.73	.74
behavioural intentions	.84	.86	.70	.67
behavioural willingness	.67	.59	.70	.73

4.2.3. Data analysis

The relationship pattern within the overall data set was investigated using *SEM* with the Mplus Programme, version 6.12. Study hypotheses were tested in a series of analyses which were conducted in the following order: Testing multiple-group invariance, establishing multiple-group *CFA*, and establishing multiple-group *SEM*. Evaluation of model fit, modelling of factors and structural paths, and data analysis were equivalent to Study I. A detailed explanation of each step is provided in the data analysis section of Study I. However, the multi-group *SEM* across migrants and Turks did not include age as a background factor for the reason that the complete sample was classified in the same developmental stage of adolescence. In contrast to Study I, there was no need to add the cross-loading of the factors fresh fruit and behavioural willingness to the healthy model to further improve the model fit.

Remaining analyses were conducted with SPSS, version 19.0. Mean scores across all social-cognitive variables were computed separately for unhealthy and healthy foods and correlated with the dietary score.

Missing data were treated with full information maximum likelihood (FIML) in all analyses conducted with Mplus. If analyses were conducted with SPSS, missing data were deleted listwise. Excluded data in computation of scale reliability in SPSS were below 7.5 %.

4.3. Results

4.3.1. Descriptive findings.

Both migrants' ($M = 7.85$, $SD = 2.42$) and Turks' ($M = 7.54$, $SD = 2.30$) dietary scores categorised their eating behaviour as neutral. The groups did not differ significantly in eating behaviour, $t(352) = -1.12$, *ns*, and thus hypothesis 2 could not be confirmed. The distribution of the dietary score among migrants displayed that 16.7 % had an unfavourable, 63.7 % a neutral, and 13.7 % a favourable eating behaviour (no data: 5.9 %). Among Turks, the distribution of the dietary score showed the following: 16.7 % had an unfavourable eating behaviour, 68.9 % a neutral, and 10.0 % a favourable eating behaviour (no data: 4.4 %). Correlations between the dietary score and social-cognitive variables for both subsamples are presented in Table 5. The correlations were as expected significantly negative with social-cognitive variables to eat unhealthy foods and significantly positive with social-cognitive variables to eat healthy foods.

Table 5

Correlations among latent factors, and between eating behaviour and mean scores of social-cognitive variables across migrants (n = 102) and Turks (n = 270)

	healthy	1	2	3	4	5	6	7
unhealthy								
1. behaviour								
migrants			.51**	.30**	.27**	.33**	.58***	.28**
Turks			.52***	.26***	.29***	.50***	.49***	.36***
2. attitude								
migrants				.75***	.82***	.77***	.96***	.32**
Turks				.55***	.68***	.74***	.87***	.51***
3. descriptive norms								
migrants					.63***	.65***	.72***	.38**
Turks					.56***	.34***	.55***	.33***
4. subjective norms								
migrants						.82***	.85***	.34**
Turks						.63***	.54***	.39***
5. prototype perception								
migrants							.74***	.34**
Turks							.62***	.59***
6. behavioural intentions								
migrants								.33**
Turks								.43***
7. behavioural willingness								
migrants								.63***
Turks								.70***

Note. Values above/below the diagonal refer to the healthy/unhealthy model. Correlations among latent factors were computed with Mplus; correlations between eating behaviour and mean scores of social-cognitive variables were computed with SPSS.

* $p < .05$, ** $p < .01$, *** $p < .001$.

4.3.2. Testing multi-group invariant factorial structure of the questionnaire.

As well-fitting single baseline *CFA* models for unhealthy and healthy had been established across both groups (Table 6), two 2-group *CFA* models for unhealthy and healthy were determined. Hypothesis 1 postulating invariance of the factorial structure across groups was tested in a series of nested models with increased constraints. Initially, least constrained 2-group *CFA* models (model 1) were compared to more constrained models with invariant factor loadings (model 2). The latter were again compared to more constrained models with invariant observed variable intercepts (model 3). Significant $\Delta\chi^2$ values for all comparisons concerning the unhealthy and the healthy model suggested measurement variance at first. As the $\Delta\chi^2$ is known for its sensitivity to sample size and non-normality, both the multiple-group overall model fits and the ΔCFI values were regarded instead. The multiple-group fit was continuously adequate and ΔCFI values were $\leq .05$ for all four comparisons (Table 6). Thus, invariance of the factorial structure across groups was confirmed for both models.

Table 6

CFA-goodness-of-fit indices and model comparisons for two-group nested models with increased constraints

	χ^2	<i>df</i>	χ^2/df	<i>CFI</i>	<i>RMSEA</i>	<i>SRMR</i>	$\Delta \chi^2$	Δdf	ΔCFI
unhealthy									
single baseline <i>CFA</i> models									
migrants	338.28 *	285	1.19	.97	.04	.05			
Turks	422.80 ***	285	1.48	.96	.04	.04			
two-group nested models									
model 1	761.09 ***	570	1.33	.97	.04	.04	-	-	-
model 2	853.17 ***	618	1.38	.96	.05	.06	92.08 ***	48	.01
model 3	1057.60 ***	646	1.64	.92	.06	.08	204.43 ***	28	.04
model 4	879.20 ***	626	1.40	.95	.05	.05	178.40 ***	20	.03
healthy									
single baseline <i>CFA</i> models									
migrants	245.49 ***	179	1.37	.93	.06	.05			
Turks	259.66 ***	179	1.45	.96	.04	.04			
two-group nested models									
model 1	505.15 ***	358	1.41	.95	.05	.04	-	-	-
model 2	570.05 ***	396	1.44	.94	.05	.06	64.91 **	38	.01
model 3	663.95 ***	419	1.58	.92	.06	.07	93.89 ***	23	.02
model 4	592.50 ***	401	1.48	.94	.05	.05	71.45 ***	18	.02

** $p < .01$, *** $p < .001$.

4.3.3. Testing latent mean differences in constructs of the prototype-willingness model across Turkish migrants and Turks.

Latent mean differences in PWM-constructs between migrants and Turks (hypothesis 2) were tested, as preconditioned measurement invariance was given. Thus, latent mean analyses for the unhealthy and the healthy model (model 4; Table 6) were conducted. For analysis, Turks' latent factor means were fixed to zero serving as a reference group which migrants were compared to. Migrants were revealed to have a significantly more favourable attitude to eat unhealthy ($M = -0.48$, $p < .001$) and healthy foods ($M = 0.32$, $p < .01$), subjective norm to eat unhealthy ($M = -1.39$, $p < .001$) and healthy foods ($M = 0.61$, $p < .001$),

behavioural intention to eat unhealthy foods ($M = 0.44, p < .01$), and behavioural willingness to eat unhealthy foods ($M = -0.42, p < .01$) compared to Turks. However, migrants' behavioural willingness to eat healthy foods was significantly less favourable than Turks' ($M = -0.31, p < .05$). No significant latent mean differences were found in descriptive norms to eat unhealthy and healthy foods, in the perception of the unhealthy and the healthy eater, and in behavioural intentions to eat healthy foods (Figure 10).

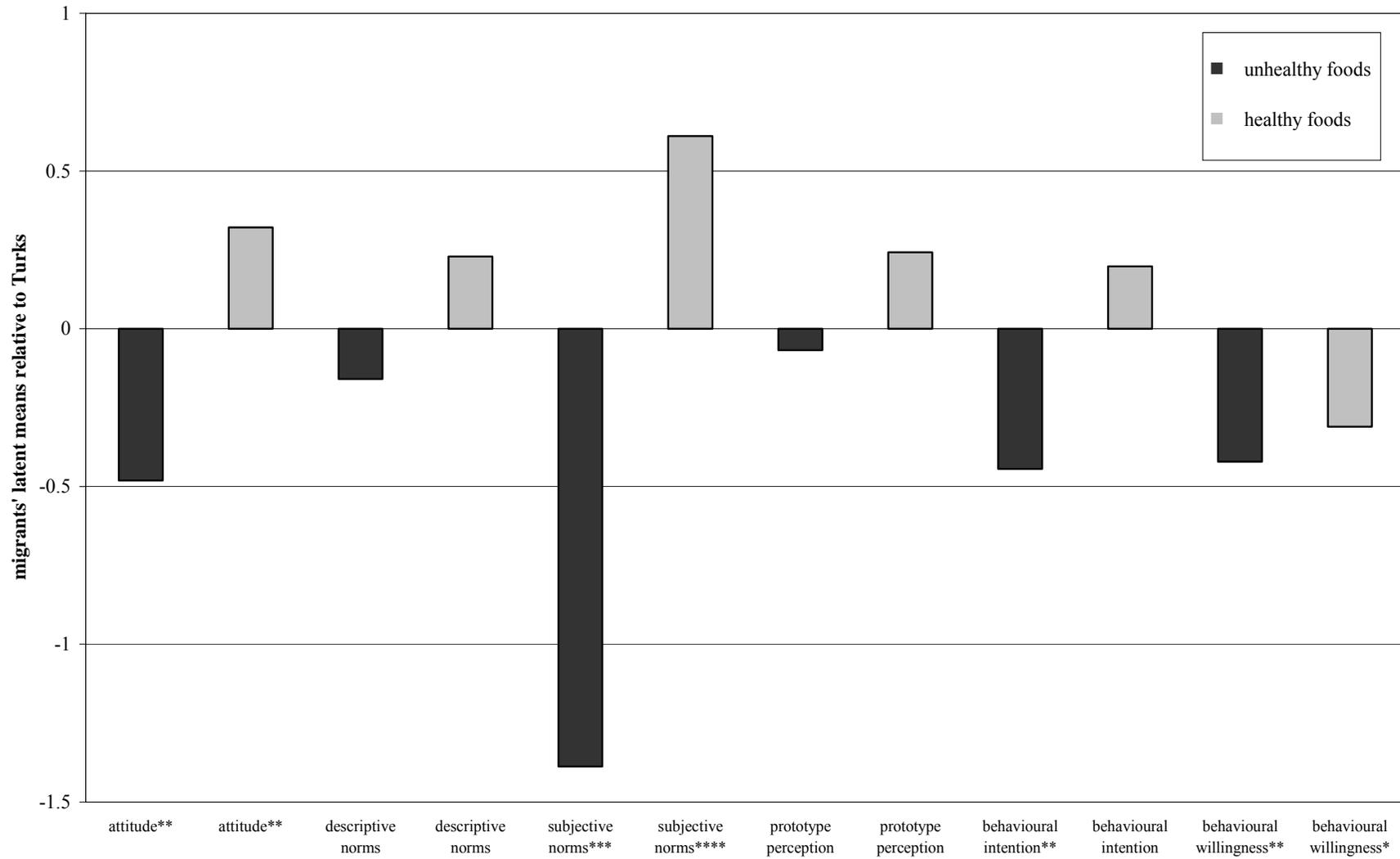


Figure 10. Latent means of PWM-constructs across migrants and Turks. * $p < .05$ ** $p < .01$ *** $p < .001$.

4.3.4. Multiple-group structural equation modelling.

In order to ensure validity of the multiple-group *SEM*, prior multiple-group *CFA* were run. To do so, parameters of the multiple-group *CFA* run in model 4 were evaluated achieving good and moderate goodness-of-fit statistics for the unhealthy and the healthy model, respectively. Thus, the hypothesised models adequately accounted for the covariance matrices of the data (Table 6). All standardised factor loadings on the latent factors¹³ were significantly positive and exceeded the recommended minimum of .50 for standardised factor loadings (Ford et al., 1986). Correlations among latent factors are presented in Table 5 and were as expected throughout significantly positive.

Given the adequacy of the multiple-group *CFA* models, the structural model was added to the *CFA* run in model 4. Hypothesis 3 and 4 were tested in multiple-group *SEM*. Hypothesis 3 expected that the predictions of the differentiated PWM are confirmed in both groups but with cultural variations in the prediction patterns across migrants and Turks. Within these varying prediction patterns, differences in the influence strengths from eating behaviour's distal antecedents on behavioural intentions and behavioural willingness across groups were assumed in hypothesis 4: Turks' behavioural intentions and behavioural willingness were expected to be more heavily based on social influences (descriptive and subjective norms, and prototype perception) compared to migrants, whereas migrants' behavioural intentions and behavioural willingness were assumed to be formed more strongly by personal attitudes than those of Turks. In order to test hypothesis 4, equal path constraints for the single paths from eating behaviour's distal antecedents on behavioural intentions and on behavioural willingness were added to the structural model. The data were represented moderately across both the unhealthy and the healthy model. Goodness-of-fit statistics are presented in Figure 11 and Figure 12 along with standardised parameter estimates for the structural relations among the latent constructs and eating behaviour.

¹³ Reporting is henceforth limited to modelled latent factors included in theoretical assumptions of the PWM.

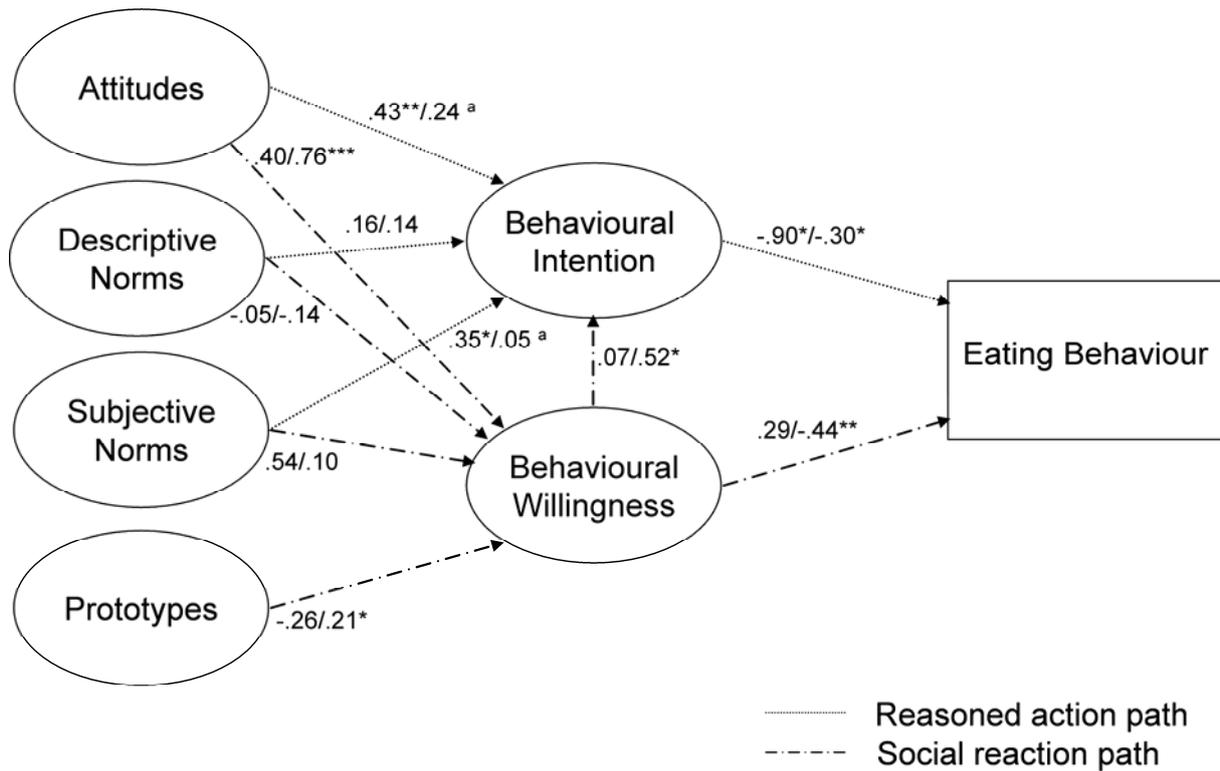


Figure 11. Standardized coefficients for the structural equation model of the unhealthy model across both subsamples. Path coefficients are reported migrants/Turks. Correlations between distal antecedents were modelled and proven to be significant but not plotted here. *SEM* fit indices: $\chi^2 = 1031.75***$, $df = 696$, $\chi^2/df = 1.48$, $CFI = .94$, $RMSEA = .05$, $SRMR = .05$; ^a path coefficients differ significantly between groups, * $p < .05$, ** $p < .01$, *** $p < .001$.

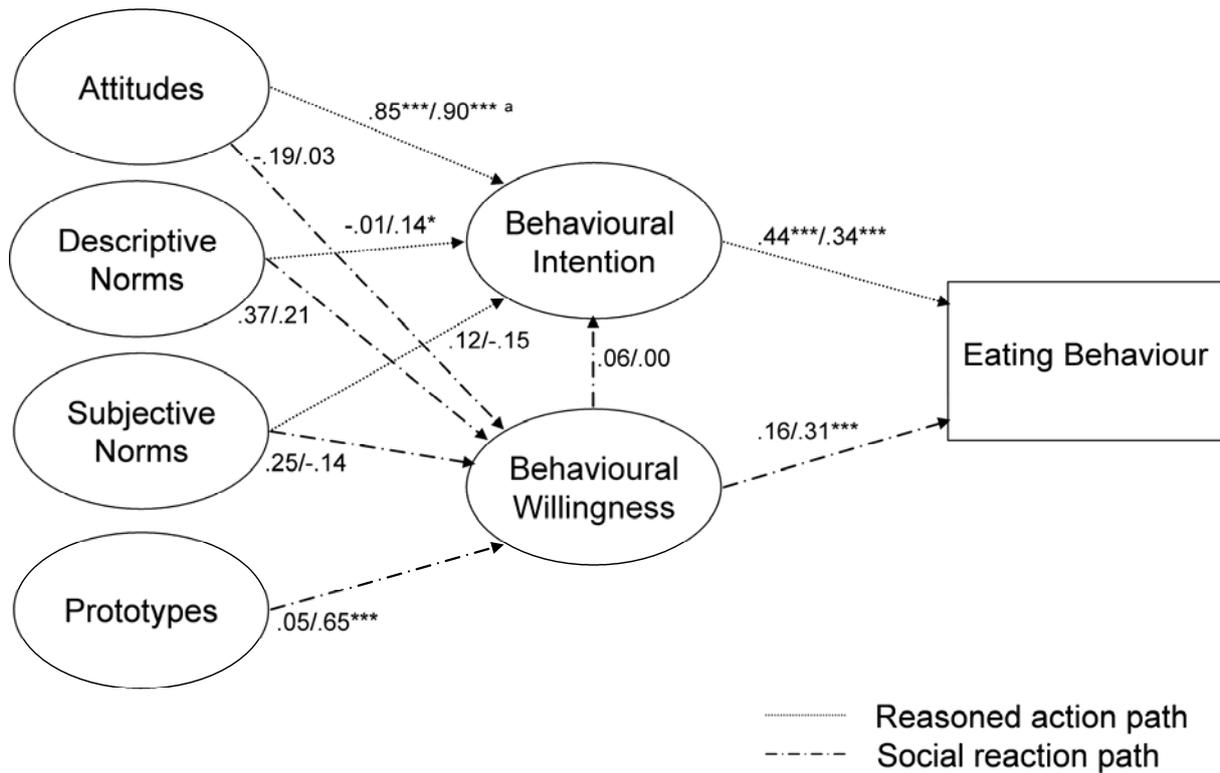


Figure 12. Standardized coefficients for the structural equation model of the healthy model across both subsamples. Path coefficients are reported migrants/Turks. Correlations between distal antecedents were modelled and proven to be significant but not plotted here. *SEM* fit indices: $\chi^2 = 721.15***$, $df = 457$, $\chi^2/df = 1.58$, $CFI = .92$, $RMSEA = .06$, $SRMR = .06$; ^a path coefficients differ significantly between groups, * $p < .05$, *** $p < .001$.

The *SEM* for the unhealthy model revealed the following prediction patterns across migrants and Turks: For migrants, all single paths of the reasoned action pathway were significant, except the one from descriptive norms to eat unhealthy foods on behavioural intentions to eat unhealthy foods. Behavioural intentions to eat unhealthy foods were (positively) predicted by attitudes and subjective norms to eat unhealthy foods and in return (negatively) predicted eating behaviour. No significant single paths were found in the social reaction pathway for the given group. A different prediction pattern occurred for Turks: Eating behaviour was (negatively) predicted by behavioural intentions to eat unhealthy foods. This was the only significant path in the reasoned action pathway. Regarding the social reaction pathway, attitudes to eat unhealthy foods and the perception of the unhealthy eater significantly (and positively) predicted behavioural willingness to eat unhealthy foods. The latter predicted both behavioural intentions to eat unhealthy foods (positively) and eating behaviour significantly (and negatively). The single paths from descriptive and subjective norms to eat unhealthy foods on behavioural willingness to eat unhealthy foods were not significant. Significant differences in the strength of structural paths between migrants and Turks were found in the single paths from attitudes ($b = .71, p < .001$) and subjective norms ($b = 0.74, p < .05$) to eat unhealthy foods on behavioural intentions to eat unhealthy foods. Both paths were only significant in migrants and thus stronger in this group.

Eventually, the following variances were explained by the multiple-group *SEM* for the unhealthy model: In migrants, 86.6 % of the variance in behavioural intentions was explained, 49.2 % in behavioural willingness, and 55.6 % in eating behaviour. In Turks, 76.0 % of behavioural intentions' variance, 77.9 % of behavioural willingness' variance, and 50.4 % of eating behaviour's variance were explained.

The prediction patterns for the healthy model across migrants and Turks were as follows. For migrants, it was revealed that attitudes to eat healthy foods significantly (and positively) predicted behavioural intentions to eat healthy foods which in return significantly

(and positively) predicted eating behaviour. Those were the only significant paths of the reasoned action pathway. Not a single path of the social reaction pathway was significant in the given group. For Turks, following paths of the reasoned action pathway were significant. Behavioural intentions to eat healthy foods were significantly and (positively) predicted by attitudes and descriptive norms to eat healthy foods. In return, behavioural intentions to eat healthy foods significantly and (positively) predicted eating behaviour. Two single significant paths were found in the social reaction pathway: The perception of the healthy eater (positively) predicted behavioural willingness to eat healthy foods which in return (positively) predicted eating behaviour. The strength of the influence from attitudes to eat healthy foods ($b = 1.69, p < .001$) on behavioural intentions to eat healthy foods was significantly weaker in migrants compared to Turks.

Finally, the following variances were explained by the multiple-group *SEM* for the healthy model: For migrants, the explained variances accounted for 93.0 % in behavioural intentions, 20.1 % in behavioural willingness, and for 27.5 % in eating behaviour. For Turks, the explained variances accounted for 78.1 % in behavioural intentions, for 45.9 % in behavioural willingness, and for 31.0 % in eating behaviour.

4.4. Discussion

The aim of Study II was to test the differentiated PWM in explaining eating behaviour of migrants compared to Turks using *SEM*. It was particularly expected (1) that the psychometric instrument would operate equivalently across both cultural groups verifying its invariant factorial structure, (2) that migrants and Turks would differ in both eating behaviour and PWM-constructs, (3) that the predictions of the differentiated PWM would be confirmed for migrants and Turks but with cultural variations in the prediction patterns, (4) and that the influences of eating behaviour's distal antecedents on behavioural intentions and behavioural willingness would vary in strength across the given groups in accordance with the values of the individualism vs. collectivism dimension proposed by Hofstede et al. (2010).

Analyses testing measurement invariance confirmed hypothesis 1. It was shown that the factorial structure of the psychometric instrument was invariant across migrants and Turks. Invariance of factor loadings, which is the minimum acceptable criterion for measurement invariance, could be met (cf. Byrne et al., 1989). It can therefore be assumed that the items of the questionnaire were interpreted identically among all participants. This is a prerequisite for comparisons of differences and correlations across groups. Thus, differences in measurement operation leading to differences in group means, prediction patterns, and strengths of structural paths can be eliminated (Horn & McArdle, 1992).

Hypothesis 2, which expected differences in eating behaviour and latent mean differences in social-cognitive variables across migrants and Turks, was confirmed partially. Even though migrants and Turks did not differ in eating behaviour, a number of latent mean differences could be found in its social-cognitive determinants across the given groups. In particular, significant latent mean differences were found in the attitudes to eat unhealthy and healthy foods, in the subjective norms to eat unhealthy and healthy foods, in behavioural intentions to eat unhealthy foods, and in the behavioural willingness to eat unhealthy and healthy foods. The differences were always in favour of migrants except for the difference in the behavioural willingness to eat healthy foods. The latter was found to be less favourable among migrants compared to Turks. The culture-dependency of the given PWM-constructs was shown before, for attitudes even in the context of eating behaviour, and can hereby be supported by the present findings. For attitudes, cultural differences were found across the Spanish and Norwegians (Olsen et al., 2008). The former had a more negative attitude towards a fish-burger compared to Norwegians. Furthermore, the attitude to eat healthy was more positive in Whites compared to Blacks (Blanchard et al., 2009). For social norms, behavioural intentions, and behavioural willingness, cultural differences towards sexual behaviour were found across US and Danish adolescents. US adolescents had higher social

norms than their Danish counterparts, whereas behavioural intentions and behavioural willingness were higher among Danish compared to US adolescents (Gibbons et al., 1995).

Hypothesised latent mean differences between migrants and Turks could not be confirmed for the descriptive norms to eat unhealthy and healthy foods, the perception of the unhealthy and healthy eater, and behavioural intentions to eat healthy foods. Although cultural differences in the perception of the typical unhealthy and healthy eater (Gerrits et al., 2010) and in the behavioural intentions to eat healthy (Blanchard et al., 2009) were found in the context of eating behaviour before, the present study could not support them across migrants and Turks. When opposing the differences found by Gerrits et al. (2010) and Blanchard et al. (2009) to the present findings, one has to keep in mind that differences between certain cultural groups cannot be transferred one-to-one to another pair of cultural groups. The present study compared migrants to Turks instead of either Blacks to Whites or adolescents in three different nations. Thus, the cultural groups compared in those studies may have been more distinct than the ones analysed here. No findings with regards to cultural mean differences in descriptive norms are known in the context of eating behaviour. The present insignificant differences in descriptive norms to eat unhealthy and healthy foods show that the differences found in social norms towards sexual behaviour across US and Danish adolescents (Gibbons et al., 1995) cannot be transferred one-to-one to a different behavioural and cultural setting.

In summary, study results revealed that migrants and Turks had a similar eating behaviour in terms of favourability. Nonetheless, some extents of its social-cognitive determinants were found to differ across the given groups. These inconsistent findings enable first insights into the culture-dependency of eating behaviour and its social-cognitive determinants. In general, it has to be annotated that the great amount of variation found in cultural differences across different groups and behavioural settings might indicate that

findings regarding culture have to be considered autonomously for each behavioural and cultural setting and cannot be transferred one-to-one.

Hypothesis 3 expected that the predictions of the differentiated PWM would be confirmed in both groups but with cultural variations. This could be confirmed. A great amount of variation is shown in the prediction patterns across groups for both the unhealthy and the healthy model.

In respect of the unhealthy model, migrants' eating behaviour was solely predicted by elements of the reasoned action pathway. Attitudes and subjective norms predicted eating behaviour via behavioural intentions. In contrast to this, Turks' eating behaviour was primarily predicted by elements of the social reaction pathway. Attitudes and prototype perception predicted behavioural willingness. The latter predicted eating behaviour directly and indirectly via behavioural intentions.

A look at the prediction patterns of the healthy model showed that migrants' eating behaviour was again solely predicted by elements of the reasoned action pathway from attitudes via behavioural intentions. Turks' prediction pattern was shaped by elements of both the reasoned action and the social reaction pathway. In detail, eating behaviour was predicted by both attitudes and descriptive norms via behavioural intentions and by eater prototypes via behavioural willingness.

For the unhealthy model, PWM-constructs explained 55.6 % and 50.4 % of variance in eating behaviour in migrants and Turks as well as 27.5 % and 31.0 % of eating behaviour's variance for the healthy model, respectively. The proportion of explained variance in eating behaviour was greater for the unhealthy model compared to the healthy model for both groups. This might be due to factor modelling and foods included in the dietary score. Five factor indicators were introduced for each factor (except behavioural willingness) in the unhealthy model, whereas only four factor indicators were introduced for each factor (except behavioural willingness) in the healthy model. Furthermore, consumption frequencies of four

unhealthy foods, but only of three healthy foods were summed up for the computation of the dietary score. This consistently higher number of unhealthy foods might lead to the greater amount of explained variance in eating behaviour for the unhealthy model compared to the healthy model.

In conclusion, migrants' eating behaviour was rather based on rational decisions than on social-reactive processes. In contrast, Turks' eating behaviour was based on social-reactive and reasoned processes. The revealed cultural variations in the prediction patterns of eating behaviour do not support the consistent prediction pattern of TPB-constructs across five nations in a physical activity context found by Hagger et al. (2007). This contradiction might again reinforce that findings regarding culture cannot be generalised across different behavioural and cultural settings.

In summary, the pattern of the differentiated PWM was confirmed by the data but with cultural variations across groups. As not all relations postulated by the differentiated PWM were significant, a contradiction to Gibbons et al. (1998) exists. The results of the given study had previously confirmed all relations of the PWM-constructs as foresaid by the authors (cf. Gibbons et al., 2006) in predicting college students' pregnancy-risk behaviour. However, the present findings are in line with the prediction pattern of adolescents' eating behaviour in Germany. Only some relations postulated by the PWM had been significant here as well (Dohnke et al., 2012). This might show that the prediction pattern of the PWM cannot be transferred one-to-one across different behavioural and cultural settings.

Hypothesis 4 expected Turks' behavioural intentions and behavioural willingness to be based more heavily on social influences (descriptive and subjective norms, and prototype perception) compared to migrants, and migrants' behavioural intentions and behavioural willingness were expected to be formed more strongly by personal attitudes than Turks'. This could not be confirmed.

For the unhealthy model, two significant differences in the strengths of paths across migrants and Turks were found. The influences from attitudes and subjective norms on behavioural intentions were stronger among migrants compared to Turks. Even though this seems to contradict the hypothesis, the result does not seem unexpected as Turks' eating behaviour was influenced by distal antecedents via the social reaction pathway only.

No significant differences in the strengths of the paths across migrants and Turks were found in descriptive norms on behavioural intentions and in the distal antecedents on behavioural willingness. As the single paths from descriptive norms on behavioural intentions and from descriptive and subjective norms on behavioural willingness were not significant in both groups, the insignificant differences can plausibly be attributed to this. However, the influences from attitudes and prototype perception on behavioural willingness were significant in Turks only but did not differ significantly between the given groups. These results are not surprising as well, as migrants' eating behaviour was influenced by distal antecedents via the reasoned action pathway only. The insignificant difference in the influence from prototype perception on behavioural willingness between migrants and Turks might as well refer to the following explanation: The prototype construct is defined as a cognitive representation of the type of person with the same age that engages in certain behaviour (Gibbons et al., 2003). This construct may, unlike social norms, not underlie the assumptions the hypothesis was based on. Due to prevailing collectivistic cultural values, it was assumed that Turks' behavioural willingness would more strongly be based on social influences. The perception of the unhealthy eater, nonetheless, might not contribute to higher social influences which shape the harmonious in-groups of collectivistic societies (cf. Hofstede et al., 2010).

For the healthy model, a single group difference in the influence strength from attitudes on behavioural intentions was found. However, the influence was lower in migrants compared to Turks and thus, hypothesis 4 was opposed. One explanation for this might be the

occurrence of acculturation. As acculturation takes place, changes in either one or both cultural groups arise (Berry, 1997). This could result in a compound structure of migrants' individualistic vs. collectivistic cultural values. Migrants' position on the individualism vs. collectivism dimension might be relocated. Thus, it is unclear whether migrants' compound structure of individualistic vs. collectivistic cultural values is rather individualistic, collectivistic or something in-between.

Further significant differences between migrants and Turks in the influence strengths from eating behaviour's distal antecedents on behavioural intentions and behavioural willingness could not be found. This might be explained as follows. As the paths from subjective norms on behavioural intentions and from attitudes, descriptive and subjective norms on behavioural willingness were not significant in both groups, it is not surprising that the influence strengths from the given distal on eating behaviour's proximal antecedents were neither. Even though the single paths from descriptive norms on behavioural intentions and from prototype perception on behavioural willingness were only significant in Turks, their influences on behavioural intentions and behavioural willingness were not stronger among them. The insignificant difference in the influence from descriptive norms on behavioural intentions across the given groups might again indicate that migrants hold a compound structure of individualistic and collectivistic cultural values. The similar strength of the influence from prototype perception on behavioural willingness might again point out that this construct may not be an indicator of a harmonious in-groups claimed for in collectivistic societies (cf. Hofstede et al., 2010).

It can be concluded that the small number of the differences in influence strengths from eating behaviour's distal on its proximal antecedents across migrants and Turks cannot be explained by means of the individualism vs. collectivism dimension (cf. Hofstede et al., 2010). Thereby, they do not support previous findings that showed variations in influence strengths from attitudes and subjective norms on behavioural intentions across nationals from

individualistic and collectivistic cultures in accordance with the values of the individualism vs. collectivism dimension (Bagozzi et al., 2001). It has to be annotated that these differences were found across non-migrants from different national cultures. The present study however analysed migrants in comparison to non-migrants from their home culture, namely Turks. Migrants may hold a compound structure of individualistic and collectivistic cultural values and are thus not as distinct from Turks as non-migrants of different national cultures from one another. This might again indicate that specific findings regarding culture have to be considered autonomously and cannot be transferred one-to-one from one behavioural and cultural setting to another.

Several limitations to the present study exist. Firstly, the self-report measures used for data collection might have led to a distortion by memory or social desirability bias. Assessment of consumption frequencies in the FFQ might hence be subject to under- or over-reporting. More elaborated methods such as 24-hour recalls or weighed food records would have provided more detailed data. However, data collection would have been more costly in terms of time (Straßburg, 2010). The conscious reflection involved in self-report measures and thus in the assessment of eater prototypes and behavioural willingness might have not precisely assessed the impulsive processes of the social reaction pathway. Therefore, implicit measures could be a more appropriate method for the assessment of these constructs. Secondly, the internal consistencies of the social-cognitive variables were only poor to good. This could be remedied by choosing *SEM* with latent variables for data analysis. The given method is particularly beneficial if scale reliabilities are low, as the relationship among factors is tested free of measurement errors (Geiser, 2010). Thirdly, adolescents of the two cultural groups were recruited in convenience samples. Consequently, participants from private and public schools were unevenly distributed across subsamples. Future studies should correct this via a random selection of students. Fourthly, the cross-sectional design of the study does not

allow for causal inferences. It would be desirable for future research to have a longitudinal design.

Despite the given limitations, several theoretical and practical implications can be derived from the present findings. The following theoretical implications might apply for the PWM. (1) The predictions of the differentiated PWM were confirmed across migrants and Turks. Therefore, the PWM seems to be an appropriate social-cognitive theory for the explanation of eating behaviour in the given cultural groups. (2) Furthermore, study results may imply that the differentiation of social norms into descriptive and subjective norms is appropriate for cross-cultural studies that include cultural groups with collectivistic values. Both norms contributed to the prediction of behavioural intentions. For culture and acculturation the following can be derived. (3) The results showed that some cultural differences in eating behaviour's social-cognitive determinants exist. Thus, the affiliation to a cultural group can be used to predict the extents of PWM-constructs. (4) Moreover, the prediction patterns of eating behaviour were found to be different across migrants and Turks. This might imply that the affiliation to a cultural group can also be used to determine the pattern of how eating behaviour is predicted. The combination of both research lines in the present study provides the following contributions for theory. (5) The use of the differentiated PWM seems appropriate for cross-cultural studies that include cultural groups which hold collectivistic values. (6) Additionally, the cultural differences found between migrants and Turks lead to the conclusion that culture might be a relevant background factor of the PWM. This is in line with other social-cognitive theories such as the TPB which also claims culture as its background factor (cf. Ajzen, 2005). Affiliation to one's cultural group should hence be included in cross-cultural applications of the PWM.

Additionally, the present findings may lead to a number of practical implications for interventions on healthy eating across migrants and Turks. As adolescents' mean dietary

scores of both groups categorised their eating behaviour to be neutral only, both migrants and Turks are in need of interventions for healthy eating.

In migrants, targets for effective interventions would be the promotion of attitudes and behavioural intentions to eat healthy foods and the downgrading of attitudes, subjective and behavioural intentions to eat unhealthy foods. Thus, constructs to eat both unhealthy and healthy foods solely from the reasoned action pathway should be targeted. Among Turks, the promotion of attitudes and descriptive norms to eat healthy foods, a positive perception of the healthy eater, behavioural intentions, and behavioural willingness to eat healthy foods as well as the downgrading of attitudes to eat unhealthy foods, the perception of an unhealthy eater, behavioural intentions, and behavioural willingness to eat unhealthy foods should be targets for effective interventions. Consequently, constructs to eat unhealthy and healthy foods from both the social reaction and the reasoned action pathway should be targeted for them. Eventually, a number of generic targets for effective interventions exist across migrants and Turks. These are the promotion of attitudes and behavioural intentions to eat healthy foods as well as the downgrading of attitudes and behavioural intentions to eat unhealthy foods. However, migrants might benefit less from interventions on attitudes to eat unhealthy and healthy foods as well as on behavioural intentions to eat unhealthy foods compared to Turks for the reason that migrants already have more favourable extents in the given constructs. With regards to addressing behavioural intentions to eat unhealthy and healthy foods through a focus on attitudes to eat unhealthy and healthy foods, respectively, the former might be more effective in migrants, whereas the latter might be more effective in Turks. This is assumed as the influence from attitudes to eat unhealthy foods on behavioural intentions to eat unhealthy foods was stronger, and the influence from attitudes to eat healthy foods on behavioural intentions to eat healthy foods was lower in migrants, respectively.

Future research should extend the differentiated PWM by acculturation strategies as background factors and test this differentiated and extended PWM in a sample of migrants.

Associations between acculturation strategies and PWM-variables would be revealed. Furthermore, the practical implications for effective interventions should be implemented and tested for their effectiveness in a sample of migrants and Turks.

5. Study III

5.1. Study hypotheses

The aim of Study III is to test the differentiated and extended PWM (Figure 6) with regards to social norms and acculturation in explaining eating behaviour among adolescents with a Turkish migration background¹⁴ living in Germany. The influence of acculturation on eating behaviour and its social-cognitive determinants will be identified.

(1) Firstly, it is hypothesised that acculturation influences all variables of the differentiated PWM.

(2) Secondly, it is hypothesised that the predictions of the differentiated and extended PWM are confirmed in migrants.

5.2. Method

5.2.1. Participants and procedure.

A total of 168 secondary school students participated in this longitudinal study. Only participants with either a two-sided or a one-sided Turkish migration background were eligible for the present study. Students with a migration background other than Turkish and non-migrants were not included. Participants with missing data on the acculturation scale ($n = 13$) were excluded from analysis. The remaining sample attended grade 5 (42.9 %) and 8 to 10 (57.1 %) in Southern Germany (age range in years: 10–17, M age = 13.19, $SD = 2.14$; 51.6 % girls). Within the sample, 76.1 % had a two-sided and 23.9 % had a one-sided Turkish migration background. The sample's mean acculturation score was 34.67 ($SD = 8.51$). Among participants, 35.5 % were categorised as low-, 50.3 % as moderate-, and 14.2 % as high-acculturated to the German culture. Within the sample, there were neither significant differences in participants' ages by gender distribution, $\chi^2(7) = 2.75$, ns , as well as participants' distribution of acculturation scores by gender, $\chi^2(43) = 39.92$, ns , nor was age

¹⁴ Adolescents with a Turkish migration background in Germany are henceforth referred to as migrants.

significantly correlated with acculturation. According to BMI, 63.9 % were normal weight (underweight: 5.1 %, overweight: 18.8 %, obese: 10.3 %, no data: 1.9 %).

As permission for data collection was granted from supervisory school authority, schools in Southern Germany were randomly selected for participation. A total of 41 classes were recruited (types of schools: 37 classes of Haupt- und Werkrealschule, two classes of Realschule, and two classes of Gymnasium). If students' informed consent could be obtained from parents, an incentive of 100 Euro was given to each volunteering class.

Data were collected via questionnaire in two waves by three members of the research team during class time. Socio-demographic information, social-cognitive variables, and eating behaviour were measured at wave 1. Eating behaviour was once more assessed two to four weeks later at wave 2. The dropout rate from wave 1 to wave 2 was 4.2 % ($n = 7$). Participants in both waves and the seven dropouts did not differ significantly in age, sex, two- or one-sided Turkish migration background, social-cognitive variables, and eating behaviour at wave 1 (all $ps > .10$). According to missing data on acculturation, the final data set consisted of 155 cases of which 148 cases had data for eating behaviour at wave 2.

5.2.2. Measures.

The questionnaire at wave 1 contained items on socio-demographic information, social-cognitive variables, eating behaviour, and acculturation. At wave 2, the questionnaire solely assessed eating behaviour. Measures on socio-demographic data, social-cognitive variables, and eating behaviour were equivalent to Study I and II. The internal consistencies of the social-cognitive variables to eat unhealthy foods were found to be good except for the one of the behavioural willingness. The latter as well as the internal consistencies of attitudes, descriptive norms, and behavioural intentions to eat healthy foods were found to be questionable. The internal consistencies of subjective norms to eat healthy foods, the perception of the healthy eater, and the behavioural willingness to eat healthy foods were

found to be acceptable. Details on internal consistency of the social-cognitive variables for unhealthy and healthy foods are presented in Table 7.

Table 7

Internal consistency (Cronbach's alpha) of social-cognitive variables for eating unhealthy and healthy foods

measure	unhealthy	healthy
attitude	.80	.66
descriptive norms	.83	.60
subjective norms	.81	.70
prototype perception	.86	.74
behavioural intentions	.80	.65
behavioural willingness	.67	.71

Acculturation was measured via a unidimensional acculturation scale. It was based on the Short Acculturation Scale for Hispanic Youth (SASH-Y; Barona & Miller, 1994; Serrano & Anderson, 2003) which assesses acculturation of Hispanic youth to the US culture. SASH-Y was especially developed for the usage in children and adolescents. It is an adapted version of SASH, an acculturation scale for adults (cf. Marin et al., 1987). For the present study, SASH-Y was modified to assess acculturation to the German culture among migrants. Twelve items referring to the factors language use (e.g. "what languages do you read and speak?"), ethnic social relations (e.g. "you prefer going to parties at which the people are?"), and media usage (e.g. "in what languages are the television programmes you usually watch?") were presented on a five-point scale with responses as follows: 1 *only Turkish*, 2 *more Turkish than German*, 3 *both equally*, 4 *more German than Turkish*, 5 *only German*. It ranged from highly traditional (Turkish) at one pole, through biculturalism (Turkish and German) at the midpoint of the scale, to highly assimilated (German) at the other pole. The twelve items were added up to a total acculturation score with good internal consistency ($\alpha = .85$). A score ranging from 12 to 30 is considered low, 30 to 45 moderate, and 45 to 60 high in acculturation to the German culture (Serrano & Anderson, 2003). SASH-Y had before been found to be positively

correlated with a higher preference for foods of the host country (Serrano & Anderson, 2003) and the language factor of SASH had been found to be negatively correlated with higher intentions to eat healthy among Latino adolescents in the United States (Diaz et al., 2009).

5.2.3. Data analysis.

The Mplus Programme, version 6.12, was employed for *SEM* with latent variables to explore the relationship pattern within the overall data set. Purpose, model fit evaluation, procedure, and benefits of *SEM* are described in the data analysis section of Study I.

In order to test the hypotheses of Study III, *CFA* and *SEM* were conducted. All social-cognitive variables were assessed for both healthy and unhealthy foods leading to separate analyses which introduced factor indicators regarding either unhealthy (sweets, salty snacks, fast food, soft drinks, and chocolate) or healthy (fresh fruit, salad, wholemeal bread, and cooked vegetables) foods. The resulting models are henceforth referred to as the *unhealthy model* and the *healthy model*. For both models, the factors attitudes, descriptive norms, subjective norms, prototype perception, behavioural intentions, and behavioural willingness were indicated by the questionnaire items pertaining to each PWM-construct resulting in three to five factor indicators each. As described in the method section of Study I, nine foods were repeatedly used for item formulation in each construct (except behavioural willingness) throughout the questionnaire. This identical use of wording throughout the questionnaire might have led to an inadequate model fit. In order to remedy this, artificial food factors with five indicators each, were modelled additionally. For the unhealthy model, the factors soft drinks, salty snacks, fast food, and chocolate and for the healthy model the factors fresh fruit, salad, and wholemeal bread were added to the analyses. Both the independent variable acculturation and the dependent variable eating behaviour were entered as observed variables into the *SEM*.

CFA. In order to test the validity of the indicator variables, it is recommended to conduct a *CFA* model prior to the *SEM*. In the present study, two *CFA* models were run separately for the unhealthy and the healthy model.

SEM. In accordance with the *CFA*, four *SEM* introducing eating behaviour either at wave 1 or wave 2 were run separately for the unhealthy and the healthy model. Structural paths were modelled in line with the assumptions of the differentiated and extended PWM. PWM-constructs and eating behaviour were regression onto acculturation to the German culture (cf. Figure 6). Paths are considered significant at $p \leq .055$.

Remaining analyses were conducted with SPSS, version 19.0. Mean scores were computed across all social-cognitive variables separately for unhealthy and healthy foods and correlated with the dietary score.

Missing data were treated with full information maximum likelihood (FIML) in all analyses conducted with Mplus. If analyses were conducted with SPSS, missing data were deleted listwise. Excluded data in computation of scale reliability in SPSS were below 3 % for variables treated as latent.

5.3. Results

5.3.1. Descriptive findings.

The mean sample dietary score at wave 1 was 7.53 ($SD = 2.20$) and therefore categorised the sample's eating behaviour as neutral. The sample distribution displayed that 17.4 % of participants had an unfavourable, 69.7 % a neutral, and 8.4 % a favourable eating behaviour (no data: 4.5 %). At wave 2 the mean sample dietary score amounted 7.54 ($SD = 1.96$). The sample distribution was as follows: 11.0 % had an unfavourable, 78.7 % a neutral, and 4.5 % of participants had a favourable eating behaviour. No data were available for 5.8 % of participants. Correlations of the dietary scores at wave 1 and wave 2 with social-cognitive variables are presented in Table 8. The dietary scores correlated as expected significantly negative with social-cognitive variables to eat unhealthy foods and significantly positive with

social-cognitive variables to eat healthy foods at both waves. The only insignificant correlation was the one between the dietary score assessed at wave 2 and the behavioural willingness to eat healthy foods.

5.3.2. Confirmatory factor analyses.

Goodness-of-fit indices for the two *CFA* models represented the data well (unhealthy model: $\chi^2 = 328.19^*$, $df = 285$, $\chi^2/df = 1.15$, $CFI = .98$, $RMSEA = .03$, $SRMR = .04$; healthy model: $\chi^2 = 294.99^{***}$, $df = 179$, $\chi^2/df = 1.65$, $CFI = .95$, $RMSEA = .05$, $SRMR = .04$; * $p < .05$, *** $p < .001$) suggesting that the hypothesised models adequately accounted for the covariance matrices of the data for both the unhealthy and the healthy model. Standardised factor loadings for the latent factors were positive and throughout significant. The recommended minimum of .50 for standardised factor loadings was exceeded by all factor indicators of the latent factors¹⁵ (Ford et al., 1986). Table 8 presents correlations among latent factors for both *CFA* models. All correlations were as expected significantly positive.

¹⁵ Reporting is henceforth limited to modelled latent factors that are included in theoretical assumptions of the differentiated and extended PWM.

Table 8

Correlations among latent factors, and among eating behaviour at wave 1 and 2, mean scores of social-cognitive variables, and acculturation

	healthy 1a	1b	2	3	4	5	6	7	8
<i>unhealthy</i>									
1. eating behaviour									
a. wave 1		.71***	.42***	.23**	.27**	.25**	.49***	.23**	-.02
b. wave 2			.51***	.25**	.26**	.35***	.52***	.12	.03
2. attitude	-.64***	-.53***		.77***	.80***	.76***	.76***	.26**	.13
3. descriptive norms	-.41***	-.38***	.54***		.64***	.64***	.96***	.32**	-.03
4. subjective norms	-.43***	-.38***	.61***	.50***		.79***	.82***	.33**	.13
5. prototype perception	-.49***	-.40***	.59***	.63***	.47***		.72***	.30**	.12
6. behavioural intentions	-.64***	-.55***	.81***	.60***	.68***	.65***		.27**	.08
7. behavioural willingness	-.26**	-.18*	.55***	.45***	.48***	.32**	.58***		-.01
8. acculturation			-.03	-.04	-.05	-.17*	-.13	-.14	

Note. Values above/below the diagonal refer to the healthy/unhealthy model. Correlations among latent factors were computed with Mplus; correlations between eating behaviour, mean scores of social-cognitive variables, and acculturation were computed with SPSS.

* $p < .05$, ** $p < .01$, *** $p < .001$.

5.3.3. Structural equation modelling.

Given the adequacy of the *CFA* models, structural equation models testing hypotheses 1 and 2 were estimated. It was firstly hypothesised that acculturation influences all elements of the differentiated PWM. Secondly, it was expected the predictions of the differentiated and extended PWM are confirmed in migrants. Goodness-of-fit statistics suggested a well-fitting representation of the data across all four models. Standardised parameter estimates for the structural relations among the latent constructs, behaviour at wave 1 and wave 2, and acculturation are given in corresponding Figure 13 and Figure 14, respectively.

The prediction patterns of the unhealthy models were identical for the *SEM* including eating behaviour either at wave 1 or at wave 2: All single paths of the reasoned action pathway were significant. Attitudes, descriptive and subjective norms to eat unhealthy foods (positively) predicted behavioural intentions to eat unhealthy foods which in return (negatively) predicted eating behaviour at wave 1 and at wave 2. Within the social reaction pathway, the single path from attitudes to eat unhealthy foods to the behavioural willingness to eat unhealthy foods was the only significant one for both *SEM*. Remaining paths of the social reaction pathway were not significant.

Paths from acculturation on the unhealthy eater-perception, on behavioural intentions, and on behavioural willingness to eat unhealthy foods were significant in both *SEM*: The higher the level of acculturation, the more negative the perception of the unhealthy eater and the lower the behavioural intentions and behavioural willingness to eat unhealthy foods. Thus, the higher the level of acculturation was, the more favourable the extents of the given PWM-constructs. Paths from acculturation on attitudes, descriptive and subjective norms to eat unhealthy foods, and on eating behaviour were not significant in both models.

For the *SEM* with eating behaviour at wave 1, 77.4 % of the variance in behavioural intentions to eat unhealthy foods was explained, 46.2 % in behavioural willingness to eat unhealthy foods, and 42.9 % of eating behaviour's variance was explained. Proportions of

explained variances for the *SEM* with eating behaviour at wave 2 were as follows: 76.4 % in behavioural intentions to eat unhealthy foods was explained, 43.4 % in behavioural willingness to eat unhealthy foods, and 37.5 % in eating behaviour's variance.

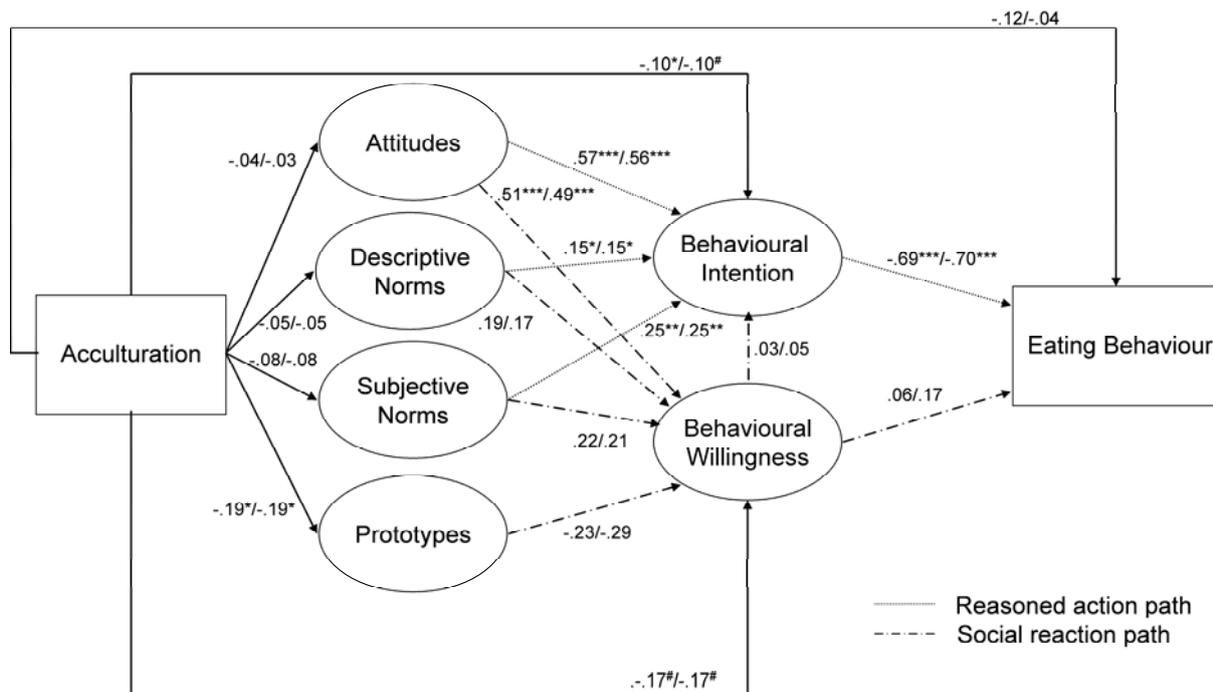


Figure 13. Standardized coefficients for the structural equation models of the unhealthy model across both waves. Path coefficients are reported with eating behaviour at wave 1/wave 2. Correlations between distal antecedents were modelled and proven to be significant but not plotted here. *SEM* fit in indices (wave 1): $\chi^2 = 454.50^{***}$, $df = 358$, $\chi^2/df = 1.30$, $CFI = .96$, $RMSEA = .04$, $SRMR = .05$; *SEM* fit indices (wave 2): $\chi^2 = 430.23^{**}$, $df = 358$, $\chi^2/df = 1.20$, $CFI = .97$, $RMSEA = .04$, $SRMR = .05$; # $\leq .055$, * $p < .05$, ** $p < .01$, *** $p < .001$.

The following prediction pattern was revealed for the healthy models. An identical prediction pattern occurred for the *SEM* with eating behaviour at wave 1 and at wave 2. For both *SEM*, only two single paths of the reasoned action pathway were significant: Attitudes to eat healthy foods (positively) predicted behavioural intentions to eat healthy foods which in return (positively) predicted eating behaviour. The social reaction pathway was throughout not significant for both models.

The single paths from acculturation on attitudes and subjective norms to eat healthy foods were significant in both models. The higher the level of acculturation was, the higher the attitudes and subjective norms to eat healthy foods. Therefore, the higher the level of acculturation was, the more favourable the extents of the given PWM-constructs. Remaining paths from acculturation on the residual PWM-constructs and eating behaviour were not significant in both models.

For the *SEM* with eating behaviour at wave 1, 88.3 % of the variance in behavioural intentions to eat healthy foods was explained, 14.8 % in behavioural willingness to eat healthy foods, and 16.2 % in eating behaviour's variance was explained. Lastly, for the *SEM* with behaviour at wave 2, 89.1 % of behavioural intentions to eat healthy foods' variance was explained, 15.1 % of behavioural willingness to eat healthy foods' variance, and 19.1 % in eating behaviour's variance was explained.

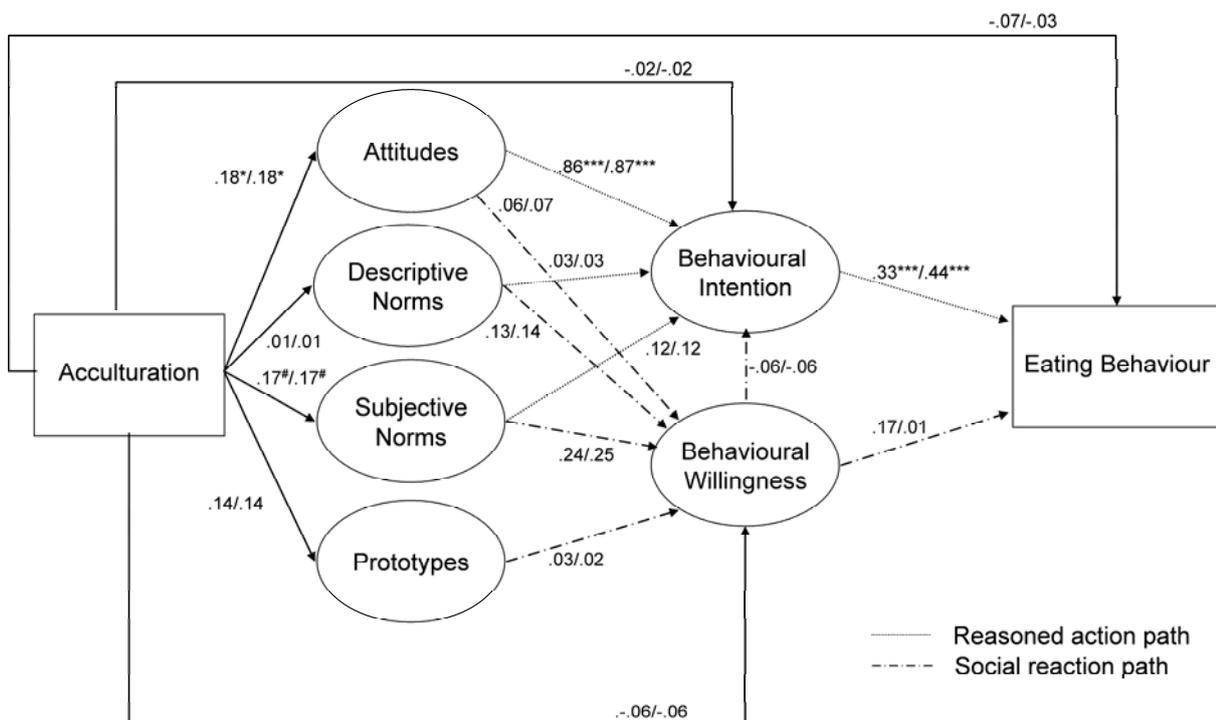


Figure 14. Standardized coefficients for the structural equation models of the healthy model across both waves. Path coefficients are reported eating behaviour at wave 1/wave 2.

Correlations between distal antecedents were modelled and proven to be significant but not plotted here. *SEM* fit indices (wave 1): $\chi^2 = 358.16^{***}$, $df = 236$, $\chi^2/df = 1.52$, $CFI = .92$, $RMSEA = .06$, $SRMR = .07$; *SEM* fit indices (wave 2): $\chi^2 = 380.09^{**}$, $df = 236$, $\chi^2/df = 1.61$, $CFI = .90$, $RMSEA = .06$, $SRMR = .08$; # $\leq .055$, * $p < .05$, *** $p < .001$.

5.4. Discussion

The aim of Study III was to test the differentiated and extended PWM in explaining migrants' eating behaviour using *SEM*. It was firstly hypothesised that acculturation would influence all elements of the differentiated PWM. Secondly, it was presumed that the predictions of the differentiated and extended PWM would be confirmed in migrants.

Hypothesis 1 was confirmed partly. The analysis revealed that acculturation influenced some variables of the PWM, independently of whether behaviour was assessed at wave 1 or wave 2. In detail, the higher the level of acculturation was, the more favourable the attitudes and subjective norms to eat healthy foods, the perception of the unhealthy eater as well as the behavioural intentions and the behavioural willingness to eat unhealthy foods. Thus, a definite direction of influence could be identified: The higher the level of acculturation, the more favourable the extents of the given PWM-constructs.

The given direction of the influence for acculturation on PWM-constructs, however, opposes the findings by Diaz et al. (2009), Kleiser et al. (2010), and Wandel et al. (2008), as the listed studies found indicators of acculturation to be rather negatively associated with behavioural intentions to eat healthy and with a favourable eating behaviour, respectively. Nonetheless, it must be annotated that these studies were either conducted in a different cultural contexts and/or with a different measure of acculturation. The results can thereby not be transferred one-to-one.

A number of empirical studies have already proven background factors like culture, and in a broader sense acculturation, to be influential on behavioural intentions and behaviour for other social-cognitive theories such as the TPB (cf. Ajzen, 2005). However, their influence was usually indirect through the proximal determinants of behavioural intentions (attitudes, social norms, and perceived behavioural control). This might as well apply for the PWM and hence, it is extremely gratifying that direct influences from acculturation on behavioural intentions and behavioural willingness to eat unhealthy foods could be revealed.

In contrast to hypothesis 1, the paths from acculturation on eating behaviour, attitudes to unhealthy foods, descriptive norms to eat unhealthy and healthy foods, subjective norms to eat unhealthy foods, the perception of the healthy eater, behavioural intentions and behavioural willingness to eat healthy foods were not significant. One explanation for the insignificance of the paths from acculturation on behavioural intentions and behavioural willingness to eat healthy foods, and on eating behaviour might as well refer to the TPB. The influences of background factors on the given variables are, as already mentioned above, usually indirect through the proximal determinants of behavioural intentions (attitudes, social norms, and perceived behavioural control, cf. Ajzen, 2005). Another possible explanation for the insignificance of all given paths could refer to the measure of acculturation itself. In the present study, SASH-Y (cf. Serrano & Anderson, 2003), a unidimensional instrument, was used which is limited to the assessment of the acculturation strategy assimilation. SASH-Y, originally developed to assess acculturation of Hispanic youth to the US culture, was modified to assess acculturation of migrants to the German culture for the present study. At the time of data collection, no designated acculturation scale for migrant youth in Germany existed. Therefore, neither the scale nor its association with eating behaviour and its social-cognitive determinants had so far been tested in German speaking regions. The use of a unidimensional approach could as well have provided a one-sided picture of migrants' acculturation level, as it failed to consider alternatives to assimilation such as the additional acculturation strategies separation, integration, and marginalisation (cf. Berry, Phinney, Sam, & Vedder, 2006a). The use of a bidimensional scale which assesses all four acculturation strategies would have been broader and potentially more inclusive (cf. Ryder et al., 2000). This would have provided a more detailed insight towards the influence of the acculturation strategies on the differentiated PWM. Thus, additional influences of the acculturation strategies separation, integration, and marginalisation on PWM-variables could have been revealed. In the meantime, the first generic German-language acculturation scale for

adolescents has been developed for the assessment of assimilation, separation, integration, and marginalisation and could therefore be used in future research (Frankenberg & Bongard, 2013).

Hypothesis 2 expected that the predictions of the differentiated and extended PWM would be confirmed in migrants. This could partly be supported. For the unhealthy models, migrants' eating behaviour was influenced only by constructs of the reasoned action pathway. Attitudes, descriptive and subjective norms predicted eating behaviour via behavioural intentions. Acculturation influenced eating behaviour indirectly through behavioural intentions. For the healthy model, the prediction pattern was also exclusively reasoned. Eating behaviour was predicted by attitudes via behavioural intentions. Acculturation had an indirect influence on eating behaviour via attitudes and behavioural intentions.

It can be concluded that migrants' eating behaviour was found to be based on rational social-cognitive determinants to eat unhealthy and healthy foods. The data confirmed the pattern of the differentiated and extended PWM partly, as not all postulated relations were significant. This opposes the findings by Gibbons et al. (1998) who confirmed all relations of the PWM-constructs in prediction college students' pregnancy-risk behaviour as foresaid by the authors (cf. Gibbons et al., 2006). The results are, nonetheless, in line with the prediction pattern of adolescents' eating behaviour from Germany, as only some relations postulated by the PWM had been significant for them as well (Dohnke et al., 2012). This might emphasise that the prediction pattern of the PWM cannot be transferred one-to-one across different behavioural and cultural settings.

The differentiated and extended PWM explained 42.9 % and 37.5 % of variance in eating behaviour at wave 1 and 2 for the unhealthy model, and 16.2 % and 19.2 % for the healthy model, respectively. The proportion of explained variance in eating behaviour was found to be greater for the unhealthy models compared to the healthy models. One explanation for this might refer to modelling of factors and foods included in the dietary

score. For the unhealthy model, five factor indicators were introduced for each factor (except behavioural willingness), whereas only four factor indicators were introduced for each factor (except behavioural willingness) in the healthy model. For the computation of the dietary score, consumption frequencies of four unhealthy foods, but only of three healthy foods were summed up. This consistently higher number of unhealthy foods might lead to the greater amount of explained variance in eating behaviour for the unhealthy model compared to the healthy model.

The present study is not free of limitations. Firstly, data were based on self-reports. This might have led to distortion of memory or social desirability bias. As a consequence, the assessment of eating behaviour might be subject to under- or over-reporting. The use of more elaborated methods such as 24-hour recalls or weighed food records would have provided more precise data. However, data collection would have been more costly in terms of time (Straßburg, 2010). Furthermore, the conscious reflection involved in self-report measures and thus in the assessment of eater prototypes and behavioural willingness might have not accurately captured the impulsive processes of the social reaction pathway. The use of implicit measures might be more appropriate for the assessment of the given constructs. Secondly, the internal consistencies of the social-cognitive variables were only questionable to good. This could be remedied by choosing *SEM* with latent variables for data analysis. This method tests the relationship among factors free of measurement errors and is hence particularly beneficial if scale reliabilities are moderate (Geiser, 2010).

Despite the given limitations, several theoretical and practical implications can be derived from the present findings. For the PWM, the following implications may apply. (1) The predictions of the differentiated and extended PWM were confirmed across migrants. Therefore, the PWM seems to be a fitting social-cognitive theory for the explanation of adolescents' eating behaviour. (2) Moreover, study results might imply that the differentiation of social norms into descriptive and subjective norms was appropriate. Both norms

contributed to the prediction of behavioural intentions in the unhealthy model. For culture and acculturation, it can be derived that (3) acculturation may influence some social-cognitive determinants of eating behaviour. Thus, the level of acculturation may influence eating behaviour through some of its social-cognitive determinants. Information on the level of acculturation could be used to predict the extents of some PWM-variables. Furthermore, the combination of both research lines in the present study showed that (4) the use of a differentiated PWM seems appropriate for studies that include cultural groups with collectivistic values. (5) Furthermore, an extension of this differentiated PWM by acculturation contributes to the explanation of eating behaviour among migrants. For that reason, acculturation might be identified as a relevant background factor of the PWM.

In addition to these implications for theory, the following practical implications for interventions may be derived from study results. It was shown that effective interventions for healthy eating designed for migrants should target both the promotion of attitudes and behavioural intentions to eat healthy foods and the downgrading of attitudes, descriptive and subjective norms, and behavioural intentions to eat unhealthy foods. Moreover, the analysis of the differentiated and extended PWM showed that acculturation influenced eating behaviour through attitudes to eat healthy foods and behavioural intentions to eat unhealthy foods. Lesser acculturated migrants might specifically benefit from interventions addressing these constructs.

In future research, the differentiated and extended PWM should be tested for the explanation of eating behaviour in other migrant groups. The differentiated and extended PWM could also be transferred to other health/risk behaviours such as smoking, drinking, and physical activity. It would be important to find out whether acculturation influences the given health/risk behaviours and their social-cognitive determinants as well. Moreover, the identification of further background factors of the PWM such as age, gender, intelligence, or knowledge might be a future research question. Furthermore, the abovementioned practical

implications for interventions should be implemented and tested for their effectiveness in migrants.

6. General discussion

The aim of the present thesis was to combine the research line on explaining health/risk behaviour through social-cognitive theories with the one on culture and acculturation. Both lines were used for the explanation of migrants' eating behaviour in comparison to non-migrants and Turks using *SEM*. This was implemented by choosing the PWM for analysis. The PWM was differentiated with regards to social norms into descriptive and subjective norms for the given cultural groups as well as extended by acculturation as a background factor for the group of migrants.

Within the analyses, invariance of the psychometric instrument's factorial structure, mean differences in eating behaviour and latent mean differences in PWM-constructs, cultural variation in the prediction patterns of the differentiated PWM and in the influence strengths from eating behaviour's distal antecedents on behavioural intentions and behavioural willingness across migrants and non-migrants as well as Turks were tested. Furthermore, the differentiated PWM was extended by acculturation as a background factor and tested among migrants.

6.1. Measurement invariance of the psychometric instrument

Measurement invariance of the psychometric instrument's factorial structure could be confirmed across migrants and non-migrants as well as across migrants and Turks. Consequently, it was ensured that all participants interpreted the questionnaire items identically. As differences in measurement operations had hereby been precluded, further findings regarding latent mean differences and group differences in prediction patterns and strengths of structural paths could be attributed to the samples (cf. Horn & McArdle, 1992).

6.2. Differences in extents of prototype-willingness model-variables

(Latent) mean differences were found in various PWM-variables across migrants, non-migrants, and Turks. Results of Study I and II are compared and discussed in relation to the acculturation strategies in the following sections.

The combined differences in extents of PWM-variables across migrants, non-migrants, and Turks may result in five different options for the order of groups' extents. These are as follows. (1) Firstly, migrants' extents of PWM-variables might not differ from the ones of non-migrants' but to the ones found in Turks. Such differences could point out that migrants have given up their original extents of PWM-variables and may have adapted to the extents prevailing in the German culture. (2) Secondly, migrants' extents of PWM-variables may differ from the ones found in non-migrants but not to the ones of Turks'. Such differences might indicate that migrants' extents of PWM-variables are still anchored in Turkey's original ones rather than being adapted to the ones of the host country Germany. (3) Thirdly, migrants' extents of PWM-variables may be in-between the extents of non-migrants and Turks. This may indicate that migrants are situated in a transitional stage. The extents of migrants might have already detached from the original Turkish ones but may not have fully adapted to ones held by non-migrants. (4) Fourthly, migrants' extents of PWM-variables could be different to the ones of both non-migrants and Turks, in other word resemble neither group. This might be a sign that migrants neither maintain the original Turkish extents nor do they adapted to the ones of non-migrants. (5) Fifthly, migrants' extents of PWM-variables may be similar to the ones of non-migrants and Turks. In other words, there are no differences across groups. This would mean that migrants show both a tendency of maintaining the original Turkish extents and of participating in the extents held by non-migrants. A possible explanation for this might be that non-migrants and Turks do not differ in their extents. If this is the case, there would be no need for migrants to alter the original extents of their home country, as these are equivalent to the ones in the host country. Furthermore, this could indicate that the German and the Turkish culture lead to similar extents.

For the present findings, option 1 applies to the extents' order of the given constructs: Attitudes to eat healthy foods, subjective norms to eat unhealthy and healthy foods, and the behavioural willingness to eat unhealthy foods. Option 2 applies to the extents' order of eating

behaviour, the descriptive norms to eat unhealthy and healthy foods, and to the one of the perception of the unhealthy eater. Option 3 applies to the extents' order of attitudes and the behavioural intentions to eat unhealthy foods, whereas option 4 applies to the extents' order of the behavioural willingness to eat healthy foods. Lastly, option 5 applies to the extents' order of the perception of the healthy eater and to the one of the behavioural intentions to eat healthy foods.

In summary, migrants throughout reported less favourable extents of PWM-variables compared to non-migrants in Study I. Significant differences were always in favour of non-migrants. Furthermore, if the results are put in relation with Study II, extents of significantly differing PWM-variables (except the behavioural willingness to eat healthy foods) were consistently in favour of migrants compared to Turks. Thus, a trend could be identified indicating the most favourable extents of PWM-variables among non-migrants, followed secondly by migrants, and lastly by Turks.

Considering the acculturation strategies postulated by Berry (1997), one could go one step further and classify migrants' extents of PWM-variables compared to non-migrants and Turks into the given acculturation strategies assimilation, separation, integration and marginalisation. They would correspond to the abovementioned options of order as follows. Assimilation would correspond to option 1, separation to option 2, integration to option 3, and marginalisation to option 4. Accordingly, migrants' extents of PWM-variables classified as assimilated would be the attitudes to eat healthy foods, the subjective norms to eat unhealthy and healthy foods, and the behavioural willingness to eat unhealthy foods. Migrants' eating behaviour, the extents of descriptive norms to eat unhealthy and healthy foods, and their perception of the unhealthy eater would be classified as separated. Integration would apply to migrants' extents of attitudes to eat unhealthy foods and behavioural intentions to eat unhealthy foods. Lastly, migrants' extent of the behavioural willingness to eat healthy foods would constitute marginalisation. Migrants' extents of the perception of the healthy eater and

of their behavioural intentions to eat healthy foods resembled both non-migrants and Turks. This corresponds to option 5 and cannot be classified into any of the acculturation strategies.

6.3. Prediction patterns

The prediction patterns of adolescents' eating behaviour among migrants, non-migrants, and Turks were analysed across studies I to III. Their prediction patterns are discussed and set in relation to the acculturation strategies in the following sections.

First of all, it can be summarised that migrants' eating behaviour was rather based on rational processes to eat unhealthy and healthy foods than a result from social reaction. Non-migrants' and Turks' eating behaviour was, in contrast to this, based on social-reactive and rational processes: For both groups, predictive social-cognitive determinants to eat unhealthy foods were rather a reaction to a potentially risky situation than an action performed upon an intention, whereas their predictive social-cognitive determinants to eat healthy foods were both intentional and social-reactive. Furthermore, the revealed prediction patterns of non-migrants and Turks support Gibbons et al. (2006) who claimed risk behaviours to be more impulsive than health behaviours. Eventually, it can be concluded that the prediction patterns of adolescents' eating behaviour showed a great amount of variation for migrants in comparison to non-migrants and Turks. The ones of non-migrants and Turks were, however, found to be a similar.

In terms of acculturation strategies (cf. Berry, 1997), migrants' prediction pattern could be classified as the strategy of marginalisation: Neither Turks' original prediction pattern nor the one of non-migrants was pursued. This finding is in line with the assumptions of Kleiser et al. (2010) who claimed that migrants might have developed a third eating behaviour: The original Turkish eating behaviour fades into the background and a new one is acquired which does not resemble the one of non-migrants. This third eating behaviour might be reflected by the prediction pattern found for migrants in the present studies. In KiGGS, it was further argued that the unfavourable eating behaviour of migrants may be a problem of

modernity, as migrants in particular frequently consumed large amounts of allegedly modern foods like soft drinks, fast food, and sweets (cf. Kleiser et al., 2010). Migrants were said to be specifically susceptible to these modern foods in terms of a backlog demand, as non-migrants had already shifted their thinking (Schenk, Neuhauser, & Ellert, 2008). The former might have to pass through a series of developmental stages to redeem these deficits. These assumptions are also supported by the present findings: In the unhealthy and the healthy model, migrants' consumption frequencies were exclusively intended. Non-migrants' and Turks' consumption frequencies, however, were determined through both intentional and social-reactive processes. Yet, it has to be annotated that their consumption frequencies in the unhealthy model were almost solely predicted by single paths of the social reaction pathway. For the healthy model, single paths of the reasoned action and the social reaction pathway predicted the consumption frequencies of non-migrants and Turks. Thus, non-migrants and Turks intended to eat healthy, whereas migrants actually intended to consume the unhealthy putatively modern foods like soft drinks, fast food, and sweets. Therefore, the original prediction pattern of the Turks might have faded into the background resulting in a new one which does not resemble the one of non-migrants either.

6.4. Differences in influence strengths from eating behaviour's distal on its proximal antecedents

Differences in influence strengths from eating behaviour's distal on its proximal antecedents were analysed across migrants, non-migrants and Turks. The results of Study I and II are compared and discussed with regards to the acculturation strategies in the following sections.

The combined differences in influence strengths from eating behaviour's distal on its proximal antecedents across the given cultural groups may result in five different options for the groups' order of influence strengths. The options are as follows. (1) Firstly, migrants' influence strengths from eating behaviour's distal on its proximal antecedents may not differ

from the ones of non-migrants' but to the ones found in Turks. Such differences could be a sign that migrants have given up the original Turkish influence strengths and may have adapted to the ones prevailing in the German culture. (2) Secondly, migrants' influence strengths from eating behaviour's distal on its proximal antecedents may differ from the ones found in non-migrants but not to the ones of Turks'. Such differences might point out that migrants' strengths of influence are still anchored in Turkey's original ones rather than adapted to the ones of the host country Germany. (3) Thirdly, migrants' influence strengths from eating behaviour's distal on its proximal antecedents may be in-between the ones of non-migrants and Turks. This may show that migrants are situated in a transitional stage. The influence strengths of migrants have already detached from the original Turkish ones but may not have fully adapted to ones of non-migrants. (4) Fourthly, migrants' influence strengths from eating behaviour's distal on its proximal antecedents may be different to the ones of both non-migrants and Turks, in other word resemble neither group. This might indicate that migrants neither maintain the original Turkish influence strengths nor do they adapt to the ones of non-migrants. (5) Fifthly, the given influence strengths may be similar to the ones of non-migrants and Turks. In other words, there are no differences across groups. This would mean that migrants show both a tendency of maintaining the original Turkish influence strengths and of participating in the ones of non-migrants. A possible explanation might be that non-migrants and Turks do not differ here. If this is the case, there would be no need for migrants to change the original influence strengths of their home country, as these are equivalent to the ones in the host country. Moreover, this could indicate that the German and the Turkish culture lead to similar influence strengths.

For the present findings, options 2 applies to the order of the influence strengths from descriptive norms to eat unhealthy foods on behavioural intentions to eat unhealthy foods, from subjective norms to eat healthy foods on behavioural intentions to eat healthy foods, and from attitudes to eat unhealthy foods on behavioural willingness to eat unhealthy foods.

Option 4 applies to the order of the influence strengths from attitudes to eat unhealthy and healthy foods on behavioural intentions to eat unhealthy and healthy foods, respectively, and from subjective norms to eat unhealthy foods on behavioural intentions to eat unhealthy foods. Lastly, option 5 applies to the order of influence strengths from descriptive norms to eat healthy foods on behavioural intentions to eat healthy foods, and to the one of all influence strengths from eating behaviour's distal antecedents (except for attitudes to eat unhealthy foods) on behavioural willingness. No order of influence strengths applies to option 1 and 3.

Furthermore, differences found in the influence strengths from eating behaviour's distal on its proximal antecedents across migrants and non-migrants could be explained by means of the individualism vs. collectivism dimension (Hofstede et al., 2010). In contrast to this, differences found across migrants and Turks could not be explained by the individualism vs. collectivism dimension. This might be a consequence of changes in either one or both cultural groups due to the occurrence of acculturation (Berry, 1997). Thus, migrants' position on the individualism vs. collectivism dimension could have been relocated and cannot be clearly assigned to the individualism vs. collectivism dimension.

As a further step, it might be interesting to classify migrants' compound structure of individualistic and collectivistic cultural values into the four conceptual acculturation strategies assimilation, separation, integration, and marginalisation (cf. Berry, 1997) by comparing the found differences and uniformities in the influence strengths from eating behaviour's distal on its proximal antecedents across the given cultural groups. The acculturation strategies would correspond to the abovementioned options as follows. Assimilation would correspond to option 1, separation to option 2, integration to option 3, and marginalisation to option 4. According to that, the strengths of the influences from descriptive norms to eat unhealthy foods on behavioural intentions to eat unhealthy foods, from subjective norms to eat healthy foods on behavioural intentions to eat healthy foods, and from attitudes to eat unhealthy foods on the behavioural willingness to eat unhealthy foods would

be classified as separated. Marginalisation would apply to the strengths of influences from attitudes to eat unhealthy and healthy foods on behavioural intentions to eat unhealthy and healthy foods, respectively, and from subjective norms to eat unhealthy foods on behavioural intentions to eat unhealthy foods. Migrants' strengths of influences, which were similar to both non-migrants and Turks, were the influence from descriptive norms to eat healthy foods on behavioural intentions to eat healthy foods as well as the influences from all distal antecedents (but attitudes to eat unhealthy foods) on behavioural willingness. They correspond to option 5 and cannot be classified into any of the acculturation strategies.

6.5. The differentiated and extended prototype-willingness model

The differentiated PWM was extended by acculturation as a background factor and tested in Study III. It was found that the higher the level of acculturation was, the more favourable the attitudes and subjective norms to eat healthy foods, the perception of the unhealthy eater, and the behavioural intentions and behavioural willingness to eat unhealthy foods. Thus, a definite direction of acculturation's influence on PWM-constructs was found: The higher the level of acculturation, the more favourable the extents of the given PWM-constructs.

6.6. Limitations

There are a number of limitations to the conducted studies that need to be taken into consideration. Firstly, the studies were based on self-report measures. Therefore, the assessment of eating behaviour might be prone to under- or over-reporting, as participants might have had a biased or wrong memory of the assessed consumption frequencies (Straßburg, 2010). Alternatively, eating behaviour could have been assessed via more detailed methods such as 24-hour recalls or weighed food records. However, this would have certainly involved higher expenditure in time. The assessment of the constructs from the social reaction pathway via self-report measures involved a conscious reflection. The use of an implicit method for the assessment of eater prototypes and the behavioural willingness might capture

the impulsive process of the social reaction pathway more precisely and would hence antagonise measurement errors. Secondly, the internal consistencies of the social-cognitive variables were only of poor to good size across Study I to III. However, the use of *SEM* with latent variables for data analysis could remedy this issue. *SEM* tests the relationship among factors free of measurement errors and is thus in particular beneficial if scale reliabilities are low (Geiser, 2010). Thirdly, adolescents of the given cultural groups were recruited in convenience samples. This resulted in subsamples with an uneven distribution of private and public schools. Migrants and Turks were recruited in both private and public schools, whereas non-migrants mainly attended public schools. Future studies should correct for this via a random selection of students. Fourthly, the samples of Study I to III also differed in developmental stages of adolescence and composition of either a one- or a two-sided Turkish migration background for the samples of migrants. Both aspects limit the direct comparability of the results across the conducted studies. Therefore, future studies should recruit adolescent samples that are evenly distributed between private and public schools and share the same developmental stage as well as status of migration background. Fifthly, Study II had a cross-sectional design only which does not allow for causal inferences. It would be desirable for future research to include a longitudinal design for all analyses. Sixthly, the measure of acculturation was limited to the assessment of assimilation. This provides only a limited picture of acculturation's influence on PWM-variables. Future studies should use an acculturation scale that includes the assessment of all acculturation strategies postulated by Berry (1997)

6.7. Conclusions

Despite these limitations, the present research adds theoretical implications for the PWM and for culture and acculturation as well as practical implications for effective interventions on healthy eating.

The following theoretical implications for the PWM may be derived from study results. (1) The predictions of the differentiated PWM were confirmed across migrants, non-migrants, and Turks. Therefore, the PWM seems to be a fitting social-cognitive theory for the explanation of eating behaviour among the given cultural groups. Future studies might test whether this also applies for adolescents from other cultural groups and for other health/risk behaviours. (2) The conducted differentiation of social norms into descriptive and subjective norms seems appropriate for cross-cultural studies that include cultural groups with collectivistic values. Both social norms made independent contributions to explaining variance in behavioural intentions. Future studies should test whether the additional value of the conducted differentiation can be found for different health/risk behaviours, cultural groups and/or different group affiliations such as age or gender.

Theoretical implications for culture and acculturation are as follows. (1) Study results showed that some cultural differences in eating behaviour and its social-cognitive determinants exist. This may imply that the information on affiliation to a cultural group can be used to predict the extents of the dietary score and of PWM-constructs. Future studies could test whether cultural differences in extents of PWM-variables can be found for different health/risk behaviours and/or different cultural groups. (2) Moreover, the prediction pattern of migrants was found to differ from non-migrants in Germany and Turkey. In other words, the prediction pattern of eating behaviour was different when adolescents had a Turkish migration background. Further studies might analyse whether this is also the case for migrant groups in other cultural settings and whether the prediction pattern found across non-migrants is generalisable for non-migrants of other national cultures. (3) Study results might imply that a nation's position on the individualism vs. collectivism dimension (cf. Hofstede et al., 2010) can be used to determine differences in influence strengths from eating behaviour's distal on its proximal antecedents across migrants and non-migrants. Future studies could test whether cultural differences in the given influence strengths can be found for different health/risk

behaviours and/or different cultural groups. (4) Furthermore, it may be derived that acculturation influences social-cognitive determinants of eating behaviours. Thus, the acculturation experience might influence eating behaviour through its social-cognitive determinants. Future studies could test this influence for migrant groups in other cultural settings and for other health/risk behaviours.

Conclusively, the combination of the research lines on the PWM, culture and acculturation provides the following contributions for theory. (1) The use of a differentiated PWM seems appropriate for cross-cultural studies that include cultural groups with collectivistic values. (2) Furthermore, the cultural differences found across the given groups lead to the conclusion that culture may be a relevant background factor of the PWM. This is in accordance with other social-cognitive theories such as the TPB which also claims culture as one of its background factors (cf. Ajzen, 2005). Affiliation to a cultural group should hence not be neglected in an application of the PWM. Future studies might test whether these cultural differences can also be found for different health/risk behaviours, cultural groups and/or different group affiliations such as age or gender. (3) Moreover, an extension of this differentiated PWM by acculturation contributed to the explanation of migrants' eating behaviour. Acculturation may thus be identified as a relevant background factor of the PWM as well. Information on acculturation should not be neglected if the PWM is used for the explanation of eating behaviour among migrant groups. Future studies should test whether acculturation is a relevant background factor of the PWM in explaining other health/risk behaviours in the given and other cultural settings.

In addition to the implications for theory, a number of practical implications were provided on how to develop effective interventions for healthy eating among migrants, non-migrants and Turks. Even though a trend was identified that indicated least favourable PWM-extents for Turks, followed secondly by migrants, and lastly by non-migrants, all three groups

had mean dietary scores that categorised their eating behaviour as neutral only. Therefore, a need for interventions for healthy eating exists among adolescents of all given cultural groups.

Study results revealed that effective interventions for migrants should target the promotion of attitudes, subjective norms, and behavioural intentions to eat healthy foods and on downgrading attitudes, descriptive and subjective norms, behavioural intentions, and behavioural willingness to eat unhealthy foods. Moreover, the analysis of the differentiated and extended PWM exposed that migrants' eating behaviour is indirectly influenced by acculturation through attitudes to eat healthy foods and behavioural intentions to eat unhealthy foods. Thus, lesser acculturated migrants would particularly benefit from interventions addressing these two constructs.

Targets for effective interventions designed for non-migrants would be the promotion of attitudes, descriptive norms, behavioural intentions, and behavioural willingness to eat healthy foods as well as the downgrading of attitudes to eat unhealthy foods, the perception of the unhealthy eater, and the behavioural willingness to eat unhealthy foods.

Effective interventions designed for Turks should on the one hand promote attitudes and descriptive norms to eat healthy foods, a positive perception of the healthy eater, and behavioural intentions and behavioural willingness to eat healthy foods. On the other hand, the downgrading of attitudes to eat unhealthy foods, the perception of an unhealthy eater, behavioural intentions, and behavioural willingness to eat unhealthy foods could be implemented in effective intervention strategies.

Migrants and non-migrants were found to have a number of targets for effective interventions in common. For both groups, the promotion of attitudes and behavioural intentions to eat healthy foods as well as the downgrading of attitudes and behavioural willingness to eat unhealthy foods seem to be potentially meaningful. Migrants might benefit more from a focus on attitudes to eat unhealthy foods compared to non-migrants, as they had reported less favourable extents than non-migrants. However, in order to improve behavioural

intentions to eat healthy foods, the focus on attitudes to eat healthy foods might be more effective for non-migrants, as its influence strength was lower in migrants compared to non-migrants. Common targets for effective interventions on healthy eating were also identified for migrants and Turks. For both groups, the promotion of attitudes and behavioural intentions to eat healthy foods as well as the downgrading of attitudes and behavioural intentions, and behavioural willingness to eat unhealthy foods seem reasonable. As migrants had reported more favourable extents of attitudes to eat unhealthy and healthy foods as well as behavioural intentions and behavioural willingness to eat unhealthy foods, they might nonetheless profit less from a focus on the given constructs than Turks. In terms of influencing the behavioural intentions to eat unhealthy foods, a focus on attitudes to eat unhealthy foods might be more effective in migrants. However, a focus on attitudes to eat healthy foods might be less effective for migrants compared to Turks, in order to improve behavioural intentions to eat healthy foods. This is assumed as the influence of attitudes to eat unhealthy foods on behavioural intentions to eat unhealthy foods was stronger, and the influence of attitudes to eat healthy foods on behavioural intentions to eat healthy foods was lower in migrants.

This detailed presentation of various targets for effective interventions regarding healthy eating among adolescents exposed an overlap across all three cultural groups. Generic targets for effective interventions among adolescents in the given cultural settings might thus be the promotion of attitudes and behavioural intentions to eat healthy foods and the downgrading of attitudes and behavioural willingness to eat unhealthy foods. A summarised presentation of the targets for each cultural group is displayed in Table 9. Future studies should implement the abovementioned implications for interventions and test them for their effectiveness in the pertaining adolescent groups.

Table 9

Targets for effective interventions on healthy eating for migrants, non-migrants, and Turks

unhealthy social cognitions	migrants	non-migrants	Turks
attitudes	✓	✓	✓
descriptive norms	✓		
subjective norms	✓		
eater prototype		✓	✓
behavioural intentions	✓		✓
behavioural willingness	✓	✓	✓
healthy social cognitions			
attitudes	✓	✓	✓
descriptive norms		✓	✓
subjective norms	✓		
eater prototype			✓
behavioural intentions	✓	✓	✓
behavioural willingness		✓	✓

Note. Frames mark common targets among all three groups.

The combination of the research lines on social-cognitive theories via the PWM with culture and acculturation for the explanation of health/risk behaviour in the present thesis may deepen our understanding of the importance in regarding cultural aspects within multicultural settings. As our social environment is increasingly shaped by cultural diversity, and psychological variables in the context of health/risk behaviour may be individual for each cultural group, such research questions may be a promising field of health psychology. Further research is needed for the establishment of a strong empirically anchored basis that provides implications for the development of effective interventions regarding health/risk behaviour change in dependence on affiliation to a cultural group and acculturation level for migrant groups.

7. References

- Aboderin, I., Kalache, A., Ben-Shlomo, Y., Lynch, J., Yajnik, C., Kuh, D., & Yach, D. (2002). *Life course perspectives on coronary heart disease, stroke and diabetes: Key issues and implications for policy and research*. Geneva: World Health Organization.
- Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- Ajzen, I. (2005). *Attitudes, personality and behavior* (2nd ed.). Maidenhead: Open University Press.
- Ajzen, I., & Fishbein, M. (1973). Attitudinal and normative variables as predictors of specific behavior. *Journal of Personality and Social Psychology*, 27(1), 41–57.
- Akman, M., Akan, H., Izbirak, G., Tanriover, O., Tilev, S., Yildiz, A., ... (2010). Eating patterns of Turkish adolescents: A cross-sectional survey. *Nutrition Journal*, 9(67). Retrieved from <http://www.nutritionj.com/content/9/1/67>
- Andrews, J. A., Hampson, S. E., Barckley, M., Gerrard, M., & Gibbons, F. X. (2008). The effect of early cognitions on cigarette and alcohol use during adolescence. *Psychology of Addictive Behaviors*, 22(1), 96–106.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40, 471–499.
- Backman, D. R., Haddad, E. H., Lee, J. W., Johnston, P. K., & Hodgkin, G. E. (2002). Psychosocial predictors of healthful dietary behavior in adolescents. *Journal of Nutrition Education and Behavior*, 34(4), 184–192.
- Bagozzi, R., Lee, H.-M., & van Loo, M. (2001). Decisions to donate bone marrow: The role of attitudes and subjective norms across cultures. *Psychology and Health*, 16, 29–56.
- BAMF. (2013). *Migrationsbericht des Bundesamtes für Migration und Flüchtlinge im Auftrag der Bundesregierung: Migrationsbericht 2011*. Retrieved from

- http://www.bamf.de/SharedDocs/Anlagen/DE/Publikationen/Migrationsberichte/migrationsbericht-2011.pdf?__blob=publicationFile
- Barona, A., & Miller, J. A. (1994). Short Acculturation Scale for Hispanic Youth (SASH-Y): A Preliminary Report. *Hispanic Journal of Behavioral Sciences, 16*(2), 155-162.
- Berry, J. W. (1997). Immigration, acculturation, and adaptation. *Applied Psychology: An International Review, 46*(1), 5-68.
- Berry, J. W., Phinney, J. S., Sam, D. L., & Vedder, P. (Eds.). (2006a). *Immigrant youth in cultural transition: Acculturation, identity, and adaptation across national contexts*. Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Berry, J. W., Phinney, J. S., Sam, D. L., & Vedder, P. (2006b). Immigrant youth: Acculturation, identity, and adaptation. *Applied Psychology: An International Review, 55*(3), 303-332.
- Berry, J. W., Westin, C., Virta, E., Vedder, P., Rooney, R., & Sang, D. (2006a). Design of the study: Selecting societies of settlement and immigrant groups. In J. W. Berry, J. S. Phinney, D. L. Sam, & P. Vedder (Eds.), *Immigrant youth in cultural transition: Acculturation, identity, and adaptation across national contexts* (pp. 15-46). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Bissonnette, M. M., & Contento, I. R. (2001). Adolescents' perspectives and food choice behaviors in terms of the environmental impacts of food production practices: Application of a psychosocial model. *Journal of Nutrition Education, 33*(2), 72-82.
- Blanchard, C. M., Kupperman, J., Sparling, P. B., Nehl, E., Rhodes, R. E., Courneya, K. S., & Baker, F. (2009). Do ethnicity and gender matter when using the theory of planned behavior to understand fruit and vegetable consumption? *Appetite, 52*(1), 15-20.
- Blanchard, C., Rhodes, R., Nehl, E., Fisher, J., Sparling, P., & Courneya, K. (2003). Ethnicity and the theory of planned behavior in the exercise domain. *American Journal of Health Behavior, 27*, 579-591.

- Bortz, J., & Döring, N. (2006). *Forschungsmethoden und Evaluation für Human- und Sozialwissenschaftler*. Heidelberg: Springer.
- Byrne, B. M. (2012). *Structural equation modeling with Mplus: Basic concepts, applications, and programming*. New York: Routledge.
- Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and means structures: The issue of partial measurement invariance, *Psychological Bulletin*, 105(3), 456–466.
- Carrus, G., Nenci, A. M., & Caddeo, P. (2009). The role of ethnic identity and perceived ethnic norms in the purchase of ethnical food products. *Appetite*, 52, 65–71.
- Chan, K., & Tsang, L. (2011). Promoting healthy eating among adolescents: A Hong Kong study. *Journal of Consumer Marketing*, 28(5), 354–362.
- Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9(2), 233–255.
- Currie, C., Zanotti, C., Morgan, A., Currie, D., de Looze, M., Roberts, C., ... (2012). *Social determinants of health and well-being among young people: Health Behaviour in School-Aged Children (HBSC) study: International report from the 2009/2010 survey*. Retrieved from http://www.euro.who.int/__data/assets/pdf_file/0003/163857/Social-determinants-of-health-and-well-being-among-young-people.pdf
- Darnton-Hill, I., Nishida, C., & James, W. (2004). A life course approach to diet, nutrition and the prevention of chronic diseases. *Public Health Nutrition*, 7(1A), 101–121.
- Diaz, H., Marshak, H. H., Montgomery, S., Rea, B., & Backman, D. (2009). Acculturation and gender: Influence on healthy dietary outcomes for Latino adolescents in California. *Journal of Nutrition Education and Behavior*, 41(5), 319–326.
- Dohnke, B., Steinhilber, A. & Fuchs, T. (2012). *Adolescents' eating behaviour: Does the prototype willingness model provide an appropriate explanation?* Manuscript in preparation for publication.

- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Ford, J., MacCallum, R., & Tait, M. (1986). The application of factor analysis in psychology: A critical review and analysis. *Personnel Psychology, 39*, 291–314.
- Frankenberg, E., & Bongard, S. (2013). Development and preliminary validation of the Frankfurt Acculturation Scale for Children (FRACC-C). *International Journal of Intercultural Relations, 37*(3), 323–334.
- Fuchs, T., Steinhilber, A., & Dohnke, B. (2013). *Apple or chocolate – Predicting eating behaviour among adolescents by intentions and willingness*. Manuscript submitted for publication.
- Garipagaoglu, M., Oner, N., Vatansever, U., Inan, M., Kucukugurluoglu, Y., & Turan, C. (2008). Dietary intakes of adolescents living in Edirne, Turkey. *Journal of the American College of Nutrition, 27*(3), 394–400.
- Geiser, C. (2010). *Datenanalyse mit Mplus: Eine anwendungsorientierte Einführung*. Wiesbaden: VS Verlag für Sozialwissenschaften.
- German Nutrition Society. (2011). *10 guidelines of the German Nutrition Society (DGE) for a wholesome diet*. Retrieved from <http://www.dge.de/>
- Gerrard, M., Gibbons, F. X., Houlihan, A. E., Stock, M. L., & Pomery, E. A. (2008). A dual-process approach to health risk decision making: The prototype willingness model. *Developmental Review, 28*(1), 29–61.
- Gerrard, M., Gibbons, F. X., Reis-Bergan, M., Trudeau, L., Vande Lune, L. S., & Buunk, B. (2002). Inhibitory effects of drinker and nondrinker prototypes on adolescent alcohol consumption. *Health Psychology, 21*(6), 601–609.
- Gerrard, M., Gibbons, F. X., Stock, M. L., Vande Lune, L. S., & Cleveland, M. J. (2005). Images of smokers and willingness to smoke among African American pre-

- adolescents: An application of the prototype/willingness model of adolescent health risk behavior to smoking initiation. *Journal of Pediatric Psychology*, 30(4), 305–318.
- Gerrits, J. H., O'Hara, R. E., Piko B. F., Gibbons, F. X., de Ridder, D. T. D., Keresztes N., ... (2010). Self-control, diet concerns and eater prototypes influence fatty foods consumption of adolescents in three countries. *Health Education Research*, 25(6), 1031–1041.
- Gerrits, J. H., de Ridder, D. T. D., de Wit, J. B. F., & Kuijer, R. G. (2009). Cool and independent or foolish and undisciplined? Adolescents' prototypes of (un)healthy eaters and their association with eating behaviour. *Appetite*, 53(3), 407–413.
- Gibbons, F. X., & Eggleston, T. J. (1996). Smoker networks and the "typical smoker": A prospective analysis of smoking cessation. *Health Psychology*, 15(6), 469–477.
- Gibbons, F. X., Gerrard, M., Blanton, H., & Russell, D. W. (1998). Reasoned action and social reaction: Willingness and intention as independent predictors of health risk. *Journal of Personality and Social Psychology*, 74(5), 1164–1180.
- Gibbons, F. X., Gerrard, M., & Lane, D. J. (2003). A social-reaction model of adolescent health risk. In J. Suls & K. A. Wallston (Eds.), *Social psychological foundations of health and illness* (pp. 107–136). Oxford, UK: Blackwell.
- Gibbons, F. X., Gerrard, M., Lune, L. S., Wills, T. A., Brody, G., & Conger, R. D. (2004). Context and cognitions: Environmental risk, social influence, and adolescent substance use. *Personality and Social Psychology Bulletin*, 30(8), 1048–1061.
- Gibbons, F. X., Gerrard, M., Reimer, R. A., & Pomery, E. A. (2006). Unintentional behavior: A subrational approach to health risk. In D. T. D. de Ridder & J. B. F. de Wit (Eds.), *Self-regulation in health behavior* (pp. 45–70). Chichester: Wiley.
- Gibbons, F. X., Helweg-Larsen, M., & Gerrard, M. (1995). Prevalence estimates and adolescent risk behavior: Cross-cultural differences in social influence. *Journal of Applied Psychology*, 80(1), 107–121.

- Gibbons, F. X., Houlihan, A. E., & Gerrard, M. (2009). Reason and reaction: The utility of a dual-focus, dual-processing perspective on promotion and prevention of adolescent health risk behaviour. *British Journal of Health Psychology, 14*(2), 231–248.
- Graves, T. (1967). Psychological acculturation in a tri-ethnic community. *South-Western Journal of Anthropology, 23*, 337–350.
- Grob, A., & Jaschinski, U. (2003). *Erwachsen werden: Entwicklungspsychologie des Jugendalters*. Weinheim: Beltz.
- Hagger, M. S., Chatzisarantis, N. L. D., Barkoukis, V., Wang, J. C. K., Hein, V., Pihu, M., ... (2007). Cross-cultural generalizability of the Theory of Planned Behavior among young people in a physical activity context. *Journal of Sport & Exercise Psychology, 29*, 1–20.
- Hewitt, A. M., & Stephens, C. (2007). Healthy eating among 10-13-year-old New Zealand children: Understanding choice using the Theory of Planned Behaviour and the role of parental influence. *Psychology, Health and Medicine, 12*(5), 526–535.
- Hofstede, G. H., Hofstede, G. J., & Minkov, M. (2010). *Cultures and organizations: Software of the mind: Intercultural cooperation and its importance for survival* (3rd ed.). New York, NY: McGraw-Hill.
- Horn, J. L. & McArdle, J. J. (1992). A practical and theoretical guide to measurement invariance in aging research. *Experimental Aging Research, 18*(3), 117–144.
- Hukkelberg, S. S., & Dykstra, J. L. (2009). Using the Prototype/Willingness model to predict smoking behaviour among Norwegian adolescents. *Addictive Behaviors, 34*(3), 270–276.
- Hyde, M. K., & White, K. M. (2010). Are organ donation communication decisions reasoned or reactive? A test of the utility of an augmented theory of planned behaviour with the prototype/willingness model. *British Journal of Health Psychology, 15*, 435–452.

- IOM. (2004). *Glossary on migration*. Retrieved from http://www.iom.int/jahia/webdav/site/myjahiasite/shared/shared/mainsite/published_docs/serial_publications/Glossary_eng.pdf
- Jäger, R. (2004). Konstruktion einer Ratingskala mit Smilies als symbolische Marken. *Diagnostica, 50*(1), 31–38.
- Kersting, M., Alexy, U., & Clausen, K. (2005). Using the concept of food based dietary guidelines to develop an Optimized Mixed Diet (OMD) for German children and adolescents. *Journal of Pediatric Gastroenterology & Nutrition, 40*, 301–308.
- Kleiser, C., & Mensink, G. B. (2008). Ernährung. In L. Schenk, H. Neuhauser, & U. Ellert (Eds.), *Kinder- und Jugendgesundheitsurvey (KIGGS) 2003 - 2006. Kinder und Jugendliche mit Migrationshintergrund in Deutschland; Bericht im Auftrag des Bundesministeriums für Gesundheit* (pp. 43–50). Berlin: Robert-Koch-Inst. Retrieved from http://www.rki.de/DE/Content/Gesundheitsmonitoring/Gesundheitsberichterstattung/GBEDownloadsB/KiGGS_migration.pdf?__blob=publicationFile
- Kleiser, C., Mensink, G. B., Kurth, B. M., Neuhauser, H., & Schenk, L. (2010). *Ernährungsverhalten von Kindern und Jugendlichen mit Migrationshintergrund – KiGGS-Migrantenauswertung – Endbericht*. Retrieved from <http://edoc.rki.de/oa/articles/re3iVCTvueQJ/PDF/22bXuINRyKA6.pdf>
- Kleiser, C., Mensink, G. B., Scheidt-Nave, C., & Kurth, B. M. (2009). HuSKY: A healthy nutrition score based on food intake of children and adolescents in Germany. *British Journal of Nutrition, 102*(4), 610–618.
- Kromeyer-Hauschild, K., Wabitsch M., Kunze D., Geller F., Geiß H.C., Hesse V., ... (2001). Perzentile für den Body-mass-Index für das Kindes- und Jugendalter unter Heranziehung verschiedener deutscher Stichproben. *Monatsschrift Kinderheilkunde, 8*, 807–819.

- Lampert, T., Schenk, L., & Stolzenberg, H. (2002). Konzeptualisierung und Operationalisierung sozialer Ungleichheit im Kinder- und Jugendgesundheitsurvey. *Das Gesundheitswesen, 64*, 48–52.
- Lange, M., Kamtsiuris P., Lange C., Schaffrath Rosario A., Stolzenberg H., & Lampert T. (2007). Messung soziodemographischer Merkmale im Kinder- und Jugendgesundheitsurvey (KiGGS) und ihre Bedeutung am Beispiel der Einschätzung des allgemeinen Gesundheitszustands. *Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz, 50*, 578–589.
- Marin, G., Sabogal, F., Marin, B. V., Otero-Sabogal, R., & Perez-Stable, E. J. (1987). Development of a Short Acculturation Scale for Hispanics. *Hispanic Journal of Behavioral Sciences, 9*(2), 183–205.
- Marsh, H. W., Balla, J. R., & McDonald, R. P. (1988). Goodness-of-fit indexes in confirmatory factor analysis: The effect of sample size. *Psychological Bulletin, 103*, 391–410.
- McEachan, R. R. C., Conner, M., Taylor, N. J., & Lawton, R. J. (2011). Prospective prediction of health-related behaviours with the Theory of Planned Behaviour: A meta-analysis. *Health Psychology Review, 5*(2), 97–144.
- McGaw, B., & Jöreskog, K. G. (1971). Factorial invariance of ability measures in groups differing in intelligence and socio-economic status. *British Journal of Mathematical and Statistical Psychology, 24*, 154–168.
- Mensink, G. B., & Burger, M. (2004). Was isst du? Ein Verzehrshäufigkeitsfragebogen für Kinder und Jugendliche. *Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz, 47*(3), 219–226.
- Mensink, G. B., Hesecker, H., Richter, A., Stahl, A., & Vohmann, C. (2007). *Ernährungsstudie als KiGGS-Modul (EsKiMo)*. Retrieved from

- http://www.bmelv.de/SharedDocs/Downloads/Ernaehrung/EsKiMoStudie.pdf;jsessionid=3A0C656D79030B48B69742EA3D84B274.2_cid296?__blob=publicationFile
- Muthén, L., & Muthén, B. (1998-2010). *Mplus User's Guide* (6th ed.). Los Angeles, CA: Muthén & Muthén.
- Myklestad, I., & Rise, J. (2007). Predicting willingness to engage in unsafe sex and intention to perform sexual protective behaviors among adolescents. *Health Education & Behavior, 34*(4), 686–699.
- Nicolaou, M., Doak, C. M., van Dam, R. M., Brug, J., Stronks, K., & Seidell, J. C. (2009). Cultural and social influences on food consumption in Dutch residents of Turkish and Moroccan origin: A qualitative study. *Journal of Nutrition Education and Behavior, 41*(4), 232–241.
- Olsen, S. O., Heide, M., Dopico, D. C., & Toften, K. (2008). Explaining intention to consume a new fish product: A cross-generational and cross-cultural comparison. *Food Quality and Preference, 19*(7), 618–627.
- Redfield, R., Linton, R., & Herskovits, M. J. (1963). Memorandum on the study of acculturation. *American Anthropologist, 38*, 149–152.
- Rivis, A., & Sheeran, P. (2003a). Descriptive norms as an additional predictor in the Theory of Planned Behaviour: A meta-Analysis. *Current Psychology - Developmental Learning Personality Social, 22*(3), 218–233.
- Rivis, A., & Sheeran, P. (2003b). Social influences and the theory of planned behaviour: Evidence for a direct relationship between prototypes and young people's exercise behaviour. *Psychology and Health, 18*(5), 567–583.
- Rivis, A., Sheeran, P., & Armitage, C. J. (2006). Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology, 11*(3), 483–500.

- Roberts, S. B. (2001). Prevention of hypertension in adulthood by breastfeeding. *Lancet*, 357, 406–407.
- Ryder, A. G., Alden, L. E., & Paulhus, D. L. (2000). Is acculturation unidimensional or bidimensional? A head-to-head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology*, 79(1), 49–65.
- Schenk, L., & Neuhauser, H. (2005). Methodische Standards für eine migrantensensible Forschung in der Epidemiologie. *Bundesgesundheitsblatt-Gesundheitsforschung-Gesundheitsschutz*, 48, 279–286.
- Schenk, L., Neuhauser, H., & Ellert, U. (Eds.). (2008). *Kinder- und Jugendgesundheitsurvey (KIGGS) 2003 - 2006: Kinder und Jugendliche mit Migrationshintergrund in Deutschland; Bericht im Auftrag des Bundesministeriums für Gesundheit*. Berlin: Robert-Koch-Institut. Retrieved from http://www.rki.de/DE/Content/Gesundheitsmonitoring/Gesundheitsberichterstattung/GBEDownloadsB/KiGGS_migration.pdf?__blob=publicationFile
- Serrano, E., & Anderson, J. (2003). Assessment of a refined short acculturation scale for Latino preteens in rural Colorado. *Hispanic Journal of Behavioral Sciences*, 25(2), 240–253.
- Spijkerman, R., van den Eijnden, R. J. J. M., Vitale, S., & Engels, R. C. M. E. (2004). Explaining adolescents' smoking and drinking behavior: The concept of smoker and drinker prototypes in relation to variables of the theory of planned behavior. *Addictive Behaviors*, 29(8), 1615–1622.
- Steinhilber, A., Fuchs, T., & Dohnke, B. (2013). Die Wahrnehmung von Esser-Prototypen als Erklärung von Geschlechterunterschieden im Ernährungsverhalten unter Berücksichtigung des Alters. *Zeitschrift für Gesundheitspsychologie*, 21(2), 82–90.
- Straßburg, A. (2010). Ernährungserhebungen: Methoden und Instrumente. *Ernährungs Umschau*, 57(8), 422–430.

- U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2005). *Dietary Guidelines for Americans 2005* (6th ed.). Washington, DC: U.S. Government Printing Office.
- Unusan, N., Sanlier, N., & Danisik, H. (2006). Comparison of attitudes towards breakfast by Turkish fourth graders living in Turkey and Germany. *Appetite*, *46*(3), 248–253.
- van den Eijnden, R. J. J. M., Spijkerman, R., & Engels, R. C. M. E. (2006). Relative contribution of smoker prototypes in predicting smoking among adolescents: A comparison with factors from the theory of planned behavior. *European Addiction Research*, *12*(3), 113–120.
- Vedder, P., Sam, D. L., van de Vijver F. J. R., & Phinney, J. S. (2006). Vietnamese and Turkish immigrant youth: Acculturation and adaptation in two ethnocultural groups. In J. W. Berry, J. S. Phinney, D. L. Sam, & P. Vedder (Eds.), *Immigrant youth in cultural transition: Acculturation, identity, and adaptation across national contexts* (pp. 185–209). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Walker, G., Courneya, K., & Deng, J. (2006). Ethnicity, gender, and the Theory of Planned Behavior: The case of playing the lottery. *Journal of Leisure Research*, *38*, 224–248.
- Wandel, M., Raberg, M., Kumar, B., & Holmboe-Ottesen, G. (2008). Changes in food habits after migration among South Asians settled in Oslo: The effect of demographic, socio-economic and integration factors. *Appetite*, *50*(2-3), 376–385.
- WHO. (2003). *Diet, nutrition and the prevention of chronic diseases* (WHO technical report series No. 916). Retrieved from http://whqlibdoc.who.int/trs/who_trs_916.pdf
- WHO. (2011). *Noncommunicable diseases country profiles 2011*. Retrieved from http://www.who.int/nmh/publications/ncd_profiles2011/en/
- WHO. (2013). *Noncommunicable diseases: Fact sheet*. Retrieved from <http://www.who.int/mediacentre/factsheets/fs355/en/index.html>

-
- Zimmermann, F., & Sieverding, M. (2010a). Do psychological variables mediate sex differences in young adults' alcohol use? *Substance Use & Misuse*, *46*(4), 552–559.
- Zimmermann, F., & Sieverding, M. (2010b). Young adults' social drinking as explained by an augmented theory of planned behaviour: The roles of prototypes, willingness, and gender. *British Journal of Health Psychology*, *15*(3), 561–581.