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Health-related behaviour among young Turkish and Moroccan people in the Netherlands

Prevalence and underlying mechanisms among the first and second generation aged 15-30 years

Karen Hosper

Health-related behaviour among young Turkish and Moroccan people
in the Netherlands. Prevalence and underlying mechanisms among the first and second generation aged 15-30 years.
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Health-related behaviour among young Turkish and Moroccan people in the Netherlands

Prevalence and underlying mechanisms among the first and second generation aged 15-30 years

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1

General introduction

1.1 Introduction

Health damaging behaviour is an important preventable cause of morbidity and mortality. In many countries around the world, smoking, alcohol use, physical inactivity and obesity are among the top ten leading risk factors in terms of the burden of disease.[1;2] They are the major cause of cardiovascular diseases, many forms of cancer and diabetes mellitus.[3-5] In the last two decades a growing number of health promotion programs aimed at reducing the prevalence of health damaging behaviour by stimulating more healthy lifestyles.[1]

Despite the increasing ethnic diversity of many Western populations, there are few preventive interventions that specifically aim to improve the health-related behaviour of ethnic groups from a non-Western background. In the Netherlands, approximately 10% of the total population, is non-Western in origin, with the largest groups coming from Turkey, Morocco or Suriname.[6] Within this population, young people are over-represented. In Amsterdam, for example, more than 43% of newborn babies in 2005 were of non-Western origin and therefore regarded as second generation ethnic groups.[7]

Current public health policy in the Netherlands seems to implicitly assume that health-related behaviour in young second generation people of non-Western origin converges towards rates observed in the ethnic Dutch population. In addition, there is limited attention for the fact that the mechanisms underlying these behaviours of particular ethnic groups, might differ from the ethnic Dutch population. Consequently no specific initiatives are considered to be necessary to improve the health status of these ethnic groups. There is, however, little evidence to support this view. On the contrary, the few studies that were carried out among Turkish and Moroccan children and young adults indicate for example, that overweight and obesity are much more prevalent within these groups compared to the ethnic Dutch population.[8] In addition, the prevalence of smoking appears to be much higher among young Turkish adults than among ethnic Dutch people.[9] These findings may be an indication that current health promotion activities are not successful in reaching out to these "high risk" groups within the Turkish and Moroccan population. More insight is therefore needed into the prevalence of healthy and unhealthy behaviours and their underlying causes within particular ethnic groups. This information is important from a public health perspective as it can shed light on whether targeting these groups, through the use of more ethnic-specific health promotion programs, is necessary. More specifically, knowledge about the prevalence of particular behaviours on the basis of underlying determinants such as socioeconomic and cultural characteristics will be useful in identifying the high-risk sub-groups within these populations. Furthermore, the knowledge on specific determinants will help to 'adjust' current interventions in order to effectively reach these particular ethnic groups.

To date, most European studies have focused solely on assessing ethnic differences between the host population and first generation older adults.[10-16] In addition, these studies presented ethnic groups as homogenous populations and little attention was paid to underlying socioeconomic and cultural influences.

The main objective of this thesis is to provide insight into the prevalence and underlying determinants of health-related behaviour in young first and second generation Turkish and Moroccan people (15-30 years) living in the Netherlands. These groups make up the largest proportion of people of non-Western origin in the Netherlands.[17] More background information on the Turkish and Moroccan population is given in Box 1.1.

The focus on adolescents and young adults has advantages. It enabled us to include a large number of both first and second generation people making it possible to study differences between generations taking age differences into account. In addition, within this young population there is considerable differentiation in socioeconomic and cultural characteristics, allowing us to study their effects on health-related behaviour.[18] And finally, by including young people, the results of this study might eventually contribute to the reduction of unhealthy behaviour and a decrease in the risk of developing related diseases such as diabetes and cardiovascular disease later in life.

We studied smoking behaviour, alcohol use, physical inactivity and overweight, with a special focus on the health outcomes that seemed most unfavourable in both ethnic groups, i.e. overweight and physical inactivity.[19]

In the following paragraphs of this chapter, a conceptual framework will be discussed that presents the expected influences on health-related behaviour that are examined within this thesis. This will be followed by the general aim and specific research questions and a short description of the methods of the study. The chapter concludes with an outline of the thesis.

Box 1.1: Background of Turkish and Moroccan ethnic groups in the Netherlands.

The majority of young second generation Turkish and Moroccan people in the Netherlands today, are the children of first generation labour migrants who were recruited by the Dutch Government in the 1960s for unskilled labour in the Netherlands. These families mostly came from rural areas in Turkey and Morocco.[20;21] As a result, the Turkish and Moroccan population today still has a generally lower socioeconomic position than ethnic Dutch people, although the position of young second generation adults is improving.[18] The young first generation, mostly came for marriage, and this proportion increased over the years. Others came because of family reunion or economic reasons (labour). The Turkish and Moroccan population is relatively young, approximately 25% to 30% is aged between 15 and 30 years, (17% in the ethnic Dutch population).[17] The majority of the Turkish and Moroccan population adheres to Islam. Religion plays an important role in the ethnic and cultural identity of these populations.[22]

1.2 A conceptual framework

Figure 1.1 presents a conceptual framework of the dynamics underlying health-related behaviour that will be examined in this thesis. This framework is based on a previous model introduced by Stronks et al. (1999) that presents the possible explanations for the associations between ethnic background and health.[23] Within the framework in this thesis, the following concepts are distinguished. Firstly, the *ethnic background*, including generational status, which is based on country of birth. Secondly, we assume that ethnic or generational differences in health-related behaviour are partly a result of differences in *predisposing factors,* including socioeconomic position, level of acculturation and religion. Thirdly, in turn, the influence of predisposing factors is assumed to affect health-behaviour through *motivational factors*, which include beliefs and norms towards a particular behaviour. Furthermore, we added *contextual barriers* to the model which refers to barriers within the social and physical environment that may influence health related behaviour.

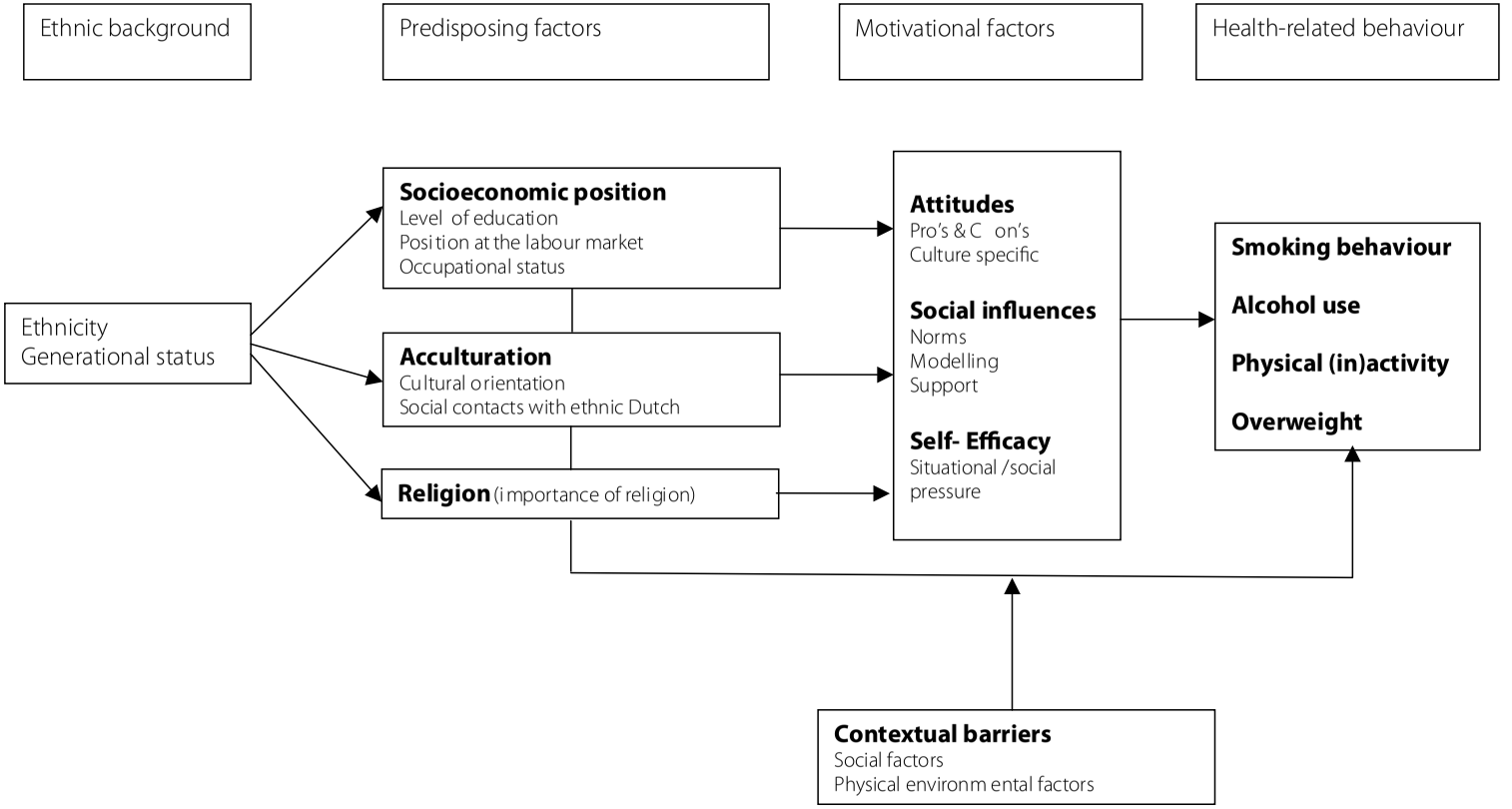
In this thesis we will explore whether this framework model is useful in understanding health-related behaviour of the young Turkish and Moroccan populations in the Netherlands. Below, we discuss the different components within the framework, the questions that will be addressed in this thesis and what the expected results are on the basis of previous studies.

Ethnic background and generational status

An increasing number of studies has focused on differences in health related behaviour between ethnic (mostly non-Western) and host populations.[10-16;24-26] To a lesser extent these studies paid attention to differences within these populations according to generational status, in particular within Europe. The most widely used definition of generation considers persons who are born outside the host country as first generation, and those persons who are born in the host country, but have at least one parent born outside the host country, as second generation.[27]

Many studies, mostly in the US, have assessed generational differences in health- related behaviour. These studies found amongst others higher rates of overweight and smoking in second generation ethnic groups compared to their foreign born counterparts.[28-35] In addition, positive differences were found for physical activity, which seems to be higher in second generation ethnic groups compared to first generation.[36-38] Few studies, however, assessed whether prevalence rates converge towards the rates found in the host population, because they did not explicitly compare the generations with the host population. In this thesis we will assess whether prevalence of health behaviour in second generation groups is more similar to rates found in the young ethnic Dutch population, than those among the first generation. Within the framework, generational status precedes the *predisposing factors* socioeconomic position and acculturation, as we assume that these factors partly account for generational differences in health-related behaviour. These factors will be discussed below (see also Figure 1.1).

Figure 1.1 Conceptual framework of the dynamics underlying health-related behaviour that are examined within this thesis



Predisposing factors

Socioeconomic position

Health-related behaviour of people shows strong associations with socioeconomic indicators, such as educational level, income or occupational status. In most populations, a lower socio-economic status is associated with worse health outcomes such as a higher prevalence of smoking, overweight and physical inactivity.[39-42] Reversed socioeconomic patterns were found for non-Western ethnic groups, for example, with regard to smoking.[43] For smoking these patterns are described in a model, known as the Tobacco Epidemic. It seems that developing countries are in the earlier stages of the Tobacco Epidemic which means that smoking rates are still high among the higher educated. Most Western societies however are in the later stage of the Tobacco Epidemic where smoking is highly prevalent within the lower socio-economic groups.[44] Also with regard to overweight or obesity, these associations are not consistent across ethnic groups and might depend on the indicators used.[39;45;46] For example, positive associations have been found in developing countries were people with a higher socioeconomic status were more often overweight compared to people from a lower socioeconomic class.[47] However, with increasing socioeconomic development and Westernization of developing countries, the socioeconomic patterns in overweight start to resemble those of Western developed countries. A more recent study among Turkish women in Turkey found similar associations with overweight as among women in Western European countries.[48] Conflicting results were found in the Moroccan population, in which economic status (measured by level of expenditure) was positively associated while educational level was negatively associated with overweight. This discrepancy was explained by the fact that in Morocco, level of education does not increase with income - richer people may even be illiterate.[49] Furthermore, in these countries, associations with socioeconomic status vary largely between rural and urban areas.[50;51]

With these findings in mind, it might be expected that socioeconomic patterns among Turkish and Moroccan people living in the Netherlands are not necessarily similar to the pattern found in the ethnic Dutch population. In this thesis we will assess whether socioeconomic indicators are associated with overweight and physical inactivity. In addition, we will test whether differences in overweight among first and second generation Turks and Moroccans are explained by differences in their socioeconomic position.

Acculturation

Apart from socioeconomic conditions, cultural influences have been shown to be an important determinant of health-related behaviour. This is generally based on the assumption that culturally based knowledge, attitudes and beliefs cause people to make behavioural choices. Following migration, people come into contact with a different social and cultural environment which leads to changes in their cultural orientation. In relation to health-related behaviour, this has often been referred to as a process of acculturation. Redfield and others

originally defined acculturation as "those phenomena which result when groups of individuals having different cultures come into continuous first hand contact, with subsequent changes in the original cultural patterns of either of both groups".[52] Many studies have used indicators such as language use or years since migration, which should quantify the extent to which individuals orientate towards "mainstream" culture versus culture of origin.[53;54]

The effects of acculturation on health-related behaviour are most commonly studied among Hispanic/Latino or Asian ethnic groups in the US.[55-57] These studies show both positive and negative effects of acculturation, with different results for different ethnic groups and risk factors. Prevalence of smoking, alochol use and overweight generally seem to increase in most ethnic groups with greater language acculturation.[45;55;56;58;59] However, other studies showed that a preference for speaking the English language can also have a protective effect against overweight among Mexican Americans.[55;60-62] Most positive effects of acculturation were found for physical activity, which tends to increase in most ethnic groups as a result of acculturation.[36-38;63]

Based on these findings and taking into account the prevalence rates within the countries of origin (Turkey and Morocco), we expect both positive and negative influences of acculturation on health-related behaviour among the Turkish and Moroccan population. For example, overweight and physical inactivity are much more common in this population compared to ethnic Dutch people, therefore we assume that increasing acculturation might lead to a decline in prevalence of these risk factors.

Within the Dutch context, these associations have not yet been explored. Moreover, it has not been tested whether differentiation in acculturation underlies the differences in health behaviour between first and second generation Turks and Moroccans. These issues will be addressed in this thesis.

We focused on the socio-cultural aspects of acculturation instead of the more commonly-used indicators, such as years since migration or generational status, which have been criticized by many researchers.[54;64;65] These measures are merely *indirect* indicators of the underlying socio-cultural process. We proceeded from Berry's approach in which he distinguished two components that determine the position of minority populations in the host country: cultural orientation towards the host culture and social contacts with the host population (see more detailed information on these scales in chapter 3). [66]

Religion

The majority of the Turkish and Moroccan population adheres to the religion of Islam. In general, being Muslim is an important aspect of the identity of young Turkish and Moroccan people in the Netherlands.[22] Therefore, we included religion as a possible predisposing factor of health-related behaviour. In particular, the large number of alcohol abstainers and low prevalence of smoking among Muslims is related to religious prescriptions.[67-69] In addition, qualitative studies among Muslim women have shown that religion might indirectly be a barrier against becoming physically active. For example, women emphasized the importance that religion places on the separation of genders in certain contexts and the maintenance of dress codes, that imply

that women prefer to cover their bodies.[70-72] The extent to which people, in particular women, perceive religion as important may therefore be related to their physical activity behaviour, and consequently to their risk of being overweight. This will be tested within this thesis.

Contextual barriers

In the last decade, attention has increasingly focused on the influence of the social and physical environment on health and health-related behaviour. It is assumed that some characteristics of the environment where people live might hinder or stimulate particular behaviour. This has often been embedded in social ecological models in which physical as well as social environmental factors are addressed.[73;74] For example, many studies have shown that people living in neighbourhoods with few sidewalks, a high volume of traffic, no aesthetic attributes or high crime levels (i.e. a less attractive and less exercise-supportive context), are less likely to engage in physical activity than those who live in more attractive and more exercise-supportive areas.[75-78] Due to the generally lower socioeconomic position of Turkish and Moroccan ethnic groups in the Netherlands, they often reside in deprived neighbourhoods that are generally less attractive. This might therefore contribute to their low levels of physical activity. In addition to barriers in the physical environment, social circumstances might also pose barriers such as having children (time barrier) or engaging in occupational physical activity (lack of energy).[79;80] Parallel to these contextual barriers, greater acculturation leads to increased physical activity during leisure time (see section on acculturation). We questioned whether this positive effect of acculturation was also present among people with barriers in their social and physical environment. Therefore, we examined the effect of acculturation on physical activity during leisure time stratified by the presence of particular barriers.

Motivational factors

It is assumed that the above-described predisposing factors (e.g. socioeconomic, acculturation) influence health-related behaviour through motivational factors, such as attitudes, social influence and norms towards a particular behaviour.[81] These determinants originate from social cognitive theories and from within the field of social psychology such as the Theory of Planned Behaviour, the Social Cognitive Theory, the Transtheoretical Model and the Health Belief Model.[82-84] A model that integrates these models is the Integrated Change model, which has proved to be useful in explaining different health-related behaviour among the Dutch population.[81] Three main types of motivational factors are distinguished: attitudes, social influences and self-efficacy. The attitudes people have towards a particular behaviour is formed by several beliefs they hold regarding the positive or negative consequences of that behaviour. Social influences can be described as a combination of the influence of the behaviour of other people, the subjective norms of other people towards a particular behaviour and the social support or pressure that people experience from others. Finally, self-efficacy refers to the expectations a person has of his/her capability to perform the desired behaviour. The usefulness of this model in predicting

the behaviour of non-Western ethnic groups has previously been illustrated by a Dutch study on smoking behaviour among Turkish and Moroccan adults.[85]
To date, very few studies combined this perspective of social psychology with the perspective of social epidemiology, which focuses on predisposing factors. We suggest this may be useful for developing prevention programs, as it provides information on the background characteristics of the groups that should be targeted, as well as providing information about the cultural beliefs and norms that are salient within those groups. Therefore, in the last chapter we attempt to assess how the influence of predisposing factors, more specifically acculturation, on one specific behaviour (participation in sport), can be explained by differences in underlying motivational factors.

1.3 General aim and specific research questions

The general aim of this thesis is to gain insight into the prevalence and underlying determinants of health-related behaviour in first and second generation Turkish and Moroccan people aged 15-30 years living in Amsterdam, the Netherlands.

The following research questions are addressed:

1. Are second generation young Turks and Moroccans (aged 15-30 years) in the Netherlands more similar to the ethnic Dutch population in regard to prevalence of smoking behaviour, alochol use, physical inactivity and overweight, compared to first generation Turks and Moroccans of the same age? (chapter 2).

2. a) How are predisposing factors (socioeconomic position, acculturation and religion) associated with physical inactivity and overweight among Turkish and Moroccan young men and women, and b) to what extent are differences in overweight between the first and second generation accounted for by these predisposing factors? (chapter 3 and 4).

3. Is the influence of predisposing factors (i.e. acculturation) on physical activity during leisure time dependent on the presence of contextual barriers (e.g. unattractive neighbourhood)? (chapter 5)

4. To what extent does acculturation affect health behaviour, more specifically, physical activity, through motivational factors? (chapter 6)

1.4 Data and methods

LASER study

The study was referred to as the LASER study, which stands for: *Lifestyle among young people in Amsterdam: Study among Ethnic gRroups*. A random sample was drawn from the Amsterdam population registry that included persons with a Turkish or Moroccan origin, aged between 10 to 30 years. They were either born in Turkey or Morocco (first generation) or had at least one parent born in one of those countries (second generation). In total 1210 participants were interviewed by a trained interviewer of the same gender and similar ethnic background as the participant. Response rates were 55% among Moroccan and 57% among Turkish participants (see chapter 2 for more detailed information). For the present study we included only participants aged 15 to 30 years, which resulted in 505 Turkish and 291 Moroccan participants. The reason for excluding the participants aged 10 to 14 years, was that the prevalence rates and the differentiation of the potential determinants of the studied behaviour, differed substantially from the 15 to 30 years olds.

Using a structured questionnaire, participants were asked about their smoking behaviour, alcohol use and physical activity. In addition, weight and height were measured. Furthermore, information was gathered about demographic, socioeconomic characteristics (education, position at the labour market and occupational status), acculturation (cultural and social orientation), religion (perceived importance), contextual barriers (perceived neighbourhood environment, having children, occupational physical activity), and motivational factors (attitudes, social influences and self-efficacy) regarding physical activity.

Data collection took place between April 2003 and December 2004. In conducting the fieldwork, we were assisted by Foquz Etnomarketing. Ethnic Dutch population data were obtained from a national survey, "Periodiek Onderzoek Leefsituatie" from Statistics Netherlands.[86] This survey used generally similar outcome measures and was conducted within the same period as the LASER–study. More detailed information on the data collection and measurements is described in chapter 2-6.

Prior to the quantitative data collection, we conducted focus group interviews to explore the salient culturally beliefs regarding physical activity. In this way we could ensure that all the cultural relevant beliefs were included in the questionnaire. More information on the focus group interviews is described in chapter 6.

1.5 Outline of the thesis

Table 1 summarizes the topics covered in each chapter. *Chapter 2* presents the prevalence rates of health-related behaviour in first and second generation Turkish and Moroccan men and women, and compares these rates with ethnic Dutch people. Based on this comparison we assessed whether these rates among the second generation were more similar to ethnic Dutch people than among the first generation (question 1). *Chapter 3* describes the associations of

the predisposing factors (socioeconomic position, acculturation and religion) with physical inactivity and overweight in Turkish and Moroccan men and women (question 2a). In *chapter 4*, we tested which of these predisposing factors could account for the differences in overweight between the first and second generation (question 2b). *Chapter 5* illustrates how the influence of acculturation on physical activity during leisure time depends on the presence of contextual barriers such as living in a less attractive neighbourhood environment (question 3). *Chapter 6* provides insight into the motivational factors that underlie the relationship between acculturation (predisposing factor) and participation in sports in Turkish and Moroccan women (question 4). A general discussion in *chapter 7* summarizes the findings, discusses a few methodological considerations, reflects on the main findings and discusses the implications for research, public health and health promotion.

Table 1.1: Overview of the topics covered in each chapter

Chapter	Title	Health-related behaviour	Underlying determinants	Ethnicity, gender, age
2	Behavioural risk factors in two generations of non-Western migrants: do trends converge towards prevalence rates in the host population?	Smoking Alcohol Physical inactivity Overweight	Ethnic and generation differences	Turkish, Moroccan Dutch men and women (aged 15-30)
3	Overweight and physical inactivity among non-Western ethnic groups: associations with socioeconomic position, acculturation and religion	Physical inactivity Overweight	Gender differences Socioeconomic position Acculturation Religion	Turkish and Moroccan men and women (aged 15-30)
4	Why does prevalence of overweight differ between first and second generation ethnic groups? A study among young Turkish and Moroccan people in the Netherlands	Overweight	Sociodemographic Socioeconomic Acculturation Religion Migration related	Turkish and Moroccan men and women (aged 15-30)
5	Acculturation does not necessarily lead to increased physical activity during leisure time: a cross-sectional study among young Turkish people in the Netherlands	Physical activity during leisure time	Acculturation Contextual barriers (social and physical environment)	Turkish men and women (aged 15-30)
6	Which motivational factors mediate the association between acculturation and sport participation? A study among young Turkish and Moroccan women in the Netherlands	Sport participation	Acculturation Motivational factors	Turkish and Moroccan women (aged 15-30)

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2

Behavioural risk factors in two generations of non-Western migrants: do trends converge towards the host population?

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Abstract

Background: Migrant mortality does not conform to a single pattern of convergence towards prevalence rates in the host population. To understand better how migrant mortality develops, it is necessary to further investigate how the underlying behavioural determinants change following migration. We studied whether the prevalence of behavioural risk factors over two generations of Turkish and Moroccan migrants converge towards the prevalence rates in the Dutch population.

Methods: From a random sample from the population register of Amsterdam, 291 Moroccan and 505 Turkish migrants, aged 15-30, participated in a structured interview that included questions on smoking, alcohol consumption, physical inactivity and weight/height. Data from the Dutch population were available from Statistics Netherlands. By calculating age-adjusted Odds Ratio's, prevalence rates among both generations were compared with prevalence rates in the host population for men and women separately.

Results: We found indications of convergence across generations towards the prevalence rates in the host population for smoking in Turkish men, for overweight in Turkish and Moroccan women and for physical inactivity in Turkish women. Alcohol consumption, however, remained low in all subgroups and did not converge towards the higher rates in the host population. In addition, we found a reversed trend among Turkish women regarding smoking: the second generation smoked significantly more, while the first generation did not differ from ethnic Dutch.

Conclusion: In general, behavioural risk factors in two generations of non-Western migrants in the Netherlands seem to converge towards the prevalence rates in the Dutch population. However, some subgroups and risk factors showed a different pattern.

Introduction

Migration influences the health of migrants.[1] Studies that examined whether migrant mortality and morbidity converge towards the rates in the host population have shown that results do not conform to a single pattern of convergence. Instead, patterns are rather diverse and complex.[1-6] The effect of migration on a particular health outcome depends on the ethnic background of migrants, where they migrate to, and what health outcome is measured.[1]

To understand better how morbidity and mortality develop among migrants, it is necessary to investigate further how the underlying determinants, such as behavioural risk factors, develop following migration. Non-Western migrants living in Western countries partly adopt the so-called Western lifestyle which is characterized amongst others by a high prevalence of cigarette smoking, alcohol intake, physical inactivity and overweight.[7-9] In turn, these are important determinants of cardiovascular diseases, diabetes and certain types of cancer.[10;11]

Several studies that focused on changes in behavioural risk factors have either compared first generation (foreign born) and second generation (native born) migrants or have compared groups on the basis of their years of residence in the host country.[12-14] Changes in behavioural risk factors over generations are commonly understood in terms of differences in acculturation and perceived ethnic identity between first and second generation migrants.[15-17] First generation migrants are expected to adopt Western behavioral practices less readily than second generation migrants because of their stronger identification with their ancestral groups and less acculturated position. [16;18]

However, although these studies assume that the second generation is more similar to the Western majority population, they did not study this issue explicitly. Differentiation of migrant groups at this level may provide useful insight as to how behavioural risk factors across generations may develop in the future. This kind of information is necessary to decide whether ethnic specific public health prevention programs are needed in later generations.

Furthermore, most of the studies that assessed generation differences in behavioural risk factors were carried out among migrant populations in the US, while in Western-Europe, very few studies have focused on differentiation within ethnic groups according to generational status. Instead, most European studies have only assessed ethnic differences in behavioural risk factors by comparing first generation migrants with the host population.[6;19-23]

The aim of this study was to explore whether the prevalence rates of behavioural risk factors tend to converge towards the rates in the host population, within the time-span of two generations within two of the largest non-Western migrant populations in Western-European countries, the Turks and Moroccans.[24;25] The first generation in our study population consists mostly of persons who came for the purpose of family reunion with their family members (mostly fathers) who came as labour migrants during 1960-1980 or they came for the purpose of family formation. The second generation is mostly the offspring of the first generation labour migrants.[26;27]

In this study we compared the prevalence rates of behavioural risk factors among these two generations with the prevalence found in the comparable age and sex groups in the ethnic Dutch population.

Methods

Data were analyzed from the LASER-study (Lifestyle among young people in Amsterdam: Study among Ethnic gRoups) on behavioural risk factors among Turks and Moroccans living in Amsterdam, The Netherlands. In the LASER-study a random sample was drawn from the Amsterdam population registry that included people aged between 10 and 30 years, born in Turkey or Morocco or with at least one parent born in Turkey or Morocco. From this sample we only used the data of participants aged between 15 and 30, as the prevalence of the risk factors was very different among the group aged 10-14.

Face-to-face interviews were held from April 2003 until December 2004, by trained interviewers of the same ethnic background and sex. The total Turkish sample consisted of 1556 migrants. Approximately 13% of the sample could not be traced because of incorrect address information. Of the 1354 respondents that could be traced, 768 participated in the study (57 %). Most cases of 'non response' were refusals to participate (32 %) or they could not be reached after three attempts (12 %). The Moroccan sample consisted of 995 migrants of whom 12% had incorrect address information. Of the 872 persons that could be traced, 476 participated in the study (55%). Within the non-response group, 26% refused to participate and approximately 19% could not be reached after three attempts. For the current study this resulted in 505 Turkish and 291 Moroccan participants aged 15-30.

The study population is representative for the Turkish and Moroccan population aged 10-30 living in Amsterdam, according to sex, generational status (country of birth) and city district. Except for the Moroccan male population, among whom the age category 20-30 is underrepresented and participants from one city district were slightly overrepresented. A structured questionnaire was used that included questions about health-related behaviour. The questionnaire was forward and back-translated by professional translators. The results of these translations were discussed with the translators and researcher to make sure that the meaning of the questions did not change.

Generational status

Participants born in Turkey or Morocco were classified as first generation migrants. Second generation migrants were the participants who were born in the Netherlands and had at least one parent born in Turkey or Morocco.

Behavioural risk factors

Smoking: Participants were classified as smokers or never smokers based on their response to the question: "Which of the following (smoking related) statements is applicable to you?". Regarding the young age of the participants (15-30), we used a broad definition of being a

smoker, including triers and experimenters who smoked monthly or only tried once in a while.[28;29]. Two examples of the nine statements are: 'I try smoking once in a while' and 'I have never smoked, not even one puff'.

Alcohol consumption: Alcohol consumption was measured by asking the participant whether he/she drank one of the mentioned alcoholic beverages once in a while. If they mentioned one or more of the listed beverages they were categorized as 'drinkers'. People who indicated that they never drank alcohol or that they had quit drinking alcohol were classified as abstainers.

Physical inactivity: We used the validated *Short Questionnaire to Assess Health Enhancing Physical Activity* (SQUASH) to determine whether participants met the guidelines for physical activity.[30] The questionnaire included questions about transportation to work or school, occupational activity, household activities, participation in sport and other leisure time activities. Total minutes of activity were calculated by multiplying frequency (days/week) by duration (min/day). Activity scores for separate questions were calculated by multiplying total minutes of activity by the intensity score. All activities were coded according to the Compendium of Physical Activities of Ainsworth.[31] The intensity score was expressed in MET's (i.e. metabolic equivalent or number of times resting metabolic rate). For people aged younger than 18 years, the cut-off point for moderate activity was 5 MET or higher and 4 MET or higher for people aged 18 and older. Cut-off points were derived from the Dutch physical activity guidelines.[32] Participants were classified as *not* sufficiently active when they did *not* meet the recommendation of least 30 minutes (60 minutes for people under 18) of moderate activity for five or more days in a week.

Overweight: Participants were weighted and measured during the home visit. To assess the prevalence of overweight we calculated the *Body Mass Index* (BMI). For people of 18 years and older, overweight was defined as a BMI of 25 (kg/m^2) or higher. For people between 15 up to 17 years, we used the recommended sex and age-adjusted cut-off points.[33] Due to logistic problems not all participants could be weighted during the interview. In these cases weight and height were based on self- report. However, additional analyses indicated there was no difference in average BMI and prevalence of overweight between the group who was weighted and measured by the interviewer and the groups who had reported their own weight and height.

Data from the ethnic Dutch population

Data from the ethnic Dutch population, aged 15-30, were available from a national survey from Netherlands Statistics, which was held in the same period (2003-2004) as the LASER study.[34] Participants were randomly selected from the population registers. In this survey, data was collected on behavioural risk factors among the general Dutch population. For the purpose of our study, we only included the participants with an ethnic Dutch origin, which were representative for the national ethnic Dutch population. Definitions of the outcome measures were similar to the definitions used in the LASER-study. Except for smoking behaviour, the Dutch survey used a different question ('do you ever smoke?') than the LASER-study in which the prevalence of smoking behaviour was based on a self-perception item based on the

theory of the smoking uptake continuum by Flay and colleagues, which is considered to be an appropriate measure among relatively young age groups [28;29].
For overweight, the Dutch survey used self reported data on weight and height, which might have led to an underestimation of the actual prevalence of overweight [35;36]. Consequences of these differences for the results of this study will be discussed in the discussion section.

Analysis

Prevalence rates were calculated for all groups by ethnicity and sex and weighted for age. To assess whether the prevalence rates of behavioural risk factors in first and second generation migrants differed from the prevalence rates in the ethnic Dutch population, we calculated Odds Ratio's (OR) with 95% Confidence Intervals (CI) for the risk factors in each subgroup (by ethnicity and sex) separately with the ethnic Dutch as the reference group.

Results

Table 1 shows the characteristics of the Turkish and Moroccan participants by generational status, for men and women separately. One third to half of participants in all groups were born in Turkey or Morocco which means they were classified as first generation migrants. Second generation participants were more represented among the younger age groups, with a mean age varying from 18.8 to 20.2 years. Among first generation migrants, most participants were 25-30 years of age with a mean age varying from 21.0 to 25.0 years.
Among the first generation, more participants were married (or cohabiting) than among the second generation migrants. More than half of the participants in each subgroup (except for Turkish women) had a middle to high educational level, meaning they had followed intermediate vocational training or higher. Among the first generation migrants, at least one third in each subgroup had migrated before the age of 6 and approximately half of the participants had lived for longer than 12 years in the Netherlands.

Prevalence rates of behavioural risk factors

Table 2 shows the age-weighted prevalence rates of behavioural risk factors among first as well as second generation migrants and among the ethnic Dutch comparison groups. In most subgroups, second generation migrants had prevalence rates that were more similar to the prevalence rates among the ethnic Dutch compared to first generation migrants. This was particularly found for smoking and overweight. Among Turkish men, 45.6 % of the second generation were smokers, which was more similar to the prevalence found in Dutch men (36.2%) than the higher prevalence found in first generation Turkish men (54.9%). Similar declining trends were found for overweight in women: 38.9% of the first generation Turkish and Moroccan women were overweight, this percentage was much lower in the second generation, respectively 25.9% and 26.5%, which came closer to the prevalence in ethnic Dutch women (19%). Also the level of physical inactivity in second generation Turkish women (58%) seemed to approach the level among ethnic Dutch women (53%).

Table 1 Characteristics of the study population

	Turks				**Moroccans**			
	Men n=244		Women n=261		Men n=115		Women n=176	
	First generation n = 93 n (%)	Second generation n = 151 n (%)	First generation n = 129 n (%)	Second generation n = 132 n (%)	First generation n = 38 n (%)	Second generation n = 77 n (%)	First generation n = 73 n (%)	Second generation n = 103 n (%)
Age								
15-19	33 (35.5)	83 (55.0)	30 (23.3)	80 (60.6)	19 (50.0)	54 (70.1)	18 (24.7)	66 (64.1)
20-24	20 (21.5)	43 (28.5)	21 (16.3)	32 (24.2)	10 (26.3)	17 (22.1)	15 (20.5)	24 (23.3)
25-30	40 (43.0)	25 (16.6)	78 (60.5)	20 (15.2)	9 (23.7)	6 (7.8)	40 (54.8)	13 (12.6)
Mean age	23.0 (5.3)	20.2 (4.0)	25.0 (5.0)	19.5 (3.9)	21.0 (4.6)	18.8 (3.5)	24.3 (4.8)	19.3 (3.8)
Marital status								
Married or cohabiting	42 (45.2)	30 (19.9)	78 (60.5)	28 (21.2)	6 (15.8)	7 (9.1)	34 (46.6)	22 (22,4)
Not married or cohabiting	51 (54.8)	121 (80.1)	51 (39.5)	104 (78.8)	32 (84.2)	70 (90.9)	39 (53.4)	81 (78.6)
Education								
Low	36 (40.4)	54 (37.0)	72 (57.1)	50 (39.7)	12 (34.3)	25 (33.8)	29 (43.3)	36 (36.0)
Middle to high	53 (59.6)	92 (63.0)	54 (42.9)	76 (60.3)	23 (65.7)	49 (66.2)	38 (56.7)	64 (64.0)
Age at migration								
> 6th year	63 (68,5)	-	91 (71.7)	-	20 (57.1)	-	42 (58.3)	-
< 6$^{th/}$ year	29 (31.5)	-	36 (28.3)	-	15 (42.9)	-	30 (41.7)	-
Years of residence								
< 12 years	43 (46.2)	-	59 (45.7)	-	20 (55.6)	-	29 (39.7)	-
> 12 years	50 (53.8)	-	70 (54.3)	-	16 (44.4)	-	44 (60.3)	-

Different results were found for smoking among Turkish women: second generation women smoked much more (44.4%) than first generation women (35.1%), who did not differ from ethnic Dutch (32.8%). In addition, the difference in overweight between Turkish and ethnic Dutch men, was greater for second generation (43.2%) than for first generation men (34.7%).

Odds ratio's of behavioural risk factors in first and second generation

In figures 1-2 the Odds Ratio's (OR's) are presented of the two behavioural risk factors, in first and second generation migrants that show the most clear trends of convergence towards prevalence rates among ethnic Dutch. These figures mostly confirm the indications of convergence that were derived from table 2. This applies to smoking behaviour in Turkish

Table 2. Prevalence of behavioural risk factors among first and second generation Turkish and Moroccan men and women, compared with the prevalence in ethnic Dutch men and women. All percentages were weighted for age.

	Turkish women n= 261		**Moroccan women n= 176**		**Dutch women[1] n=1276-1666**
	First generation % (95%CI)	Second generation % (95%CI)	First generation % (95%CI)	Second generation % (95%CI)	% (95%CI)
Smoking	35.1 (26.9-43.3)	44.4 (35.9-52.9)	2.2 (-1.2-5.6)	3.2 (-0.2-6.6)	32.8 (30.6-35.1)
Alcohol intake	18.7 (11.8-25.6)	21.9 (14.7-29.1)	5.9 (0.5-11.3)	3.4 (-0.1-6.5)	86.3 (84.5-88.1)
Insufficiently physically active[2]	66.8 (58.7-74.9)	58.0 (49.6-66.4)	74.2 (64.2-84.2)	76.2 (68.0-84.4)	53.0 (50.3-55.7)
Overweight	38.9 (29.3-48.5)	25.9 (16.8-35.1)	38.9 (26.2-51.6)	26.5 (16.9-36.1)	19.0 (17.1-20.9)
	Turkish men n= 244		**Moroccan men n= 115**		**Dutch men[1] n= 1199-1677**
	First generation % (95%CI)	Second generation % (95%CI)	First generation % (95%CI)	Second generation % (95%CI)	% (95%CI)
Smoking	54.9 (44.4-65.4)	45.6 (37.1-54.1)	22.0 (8.7-35.4)	34.8 (24.0-45.7)	36.2 (33.9-38.5)
Alcohol intake	35.0 (25.0-45.0)	38.9 (30.9-46.9)	19.6 (7.0-32.2)	23.4 (13.9-32.9)	92.6 (91.2-94.0)
Insufficiently physically active[2]	56.4 (46.3-66.5)	56.4 (48.5-64.3)	57.1 (41.4-72.8)	54.6 (43.5-65.7)	51.2 (48.4-54.0)
Overweight	34.7 (24.9-44.5)	43.2 (34.9-51.5)	9.6 (0.02-19.2)	22.5 (12.5-32.5)	21.8 (19.8-23.8)

[1] Data for the ethnic Dutch population were available from Statistics Netherlands: POLS-survey 2003/2004
[2] Not meeting the guidelines of at least 30 minutes of moderate physical activity during 5 or more days in a week

men with an OR of 2.15 (CI: 1.41-3.27) among first generation and 1.48 (CI: 1.05-2.07) in second generation men. This trend was less clear among Moroccan men (first generation OR: 0.50, CI: 0.23-1.08 and second generation with OR: 0.79, CI:0.49-1.25). Regarding overweight, we found a converging trend in Turkish women (OR: 2.71, CI:1.98-3.72 in first generation and OR: 1.49, CI:1.06-2.10 in second generation). A similar trend was found among Moroccan women (OR: 2.71, CI:1.80-4.08) in first generation and OR: 1.54, CI:1.05-2.25 in second generation).

In contrast to the aforementioned indications of convergence, among Turkish women we found a clear reversed trend for smoking: among first generation women (OR: 1.11, CI: 0.80-1.54) the prevalence of smoking was similar to ethnic Dutch women, while among second generation significantly more women smoked (OR:1.64, CI: 1.20-2.23). Moreover, among Turkish men, the already significantly higher prevalence of overweight in the first generation compared to the ethnic Dutch reference group (OR:1.91, CI:1.22-2.97) was even greater in second generation Turkish men (OR: 2.73, CI: 1.94-3.84).

Regarding physical inactivity and alcohol intake (not shown in figures), the converging trends were less clear: we only found a trend in second generation Turkish women who approached the prevalence rate in the ethnic Dutch reference group (first generation OR:1.78, CI: 1.21-2.61, second generation OR: 0.82, CI: 0.56-1.17).

Figure 1. Odds ratio's with 95% Confidence Intervals for smoking among Turkish and Moroccan men and women of first and second generation compared to the reference group, ethnic Dutch men and women.

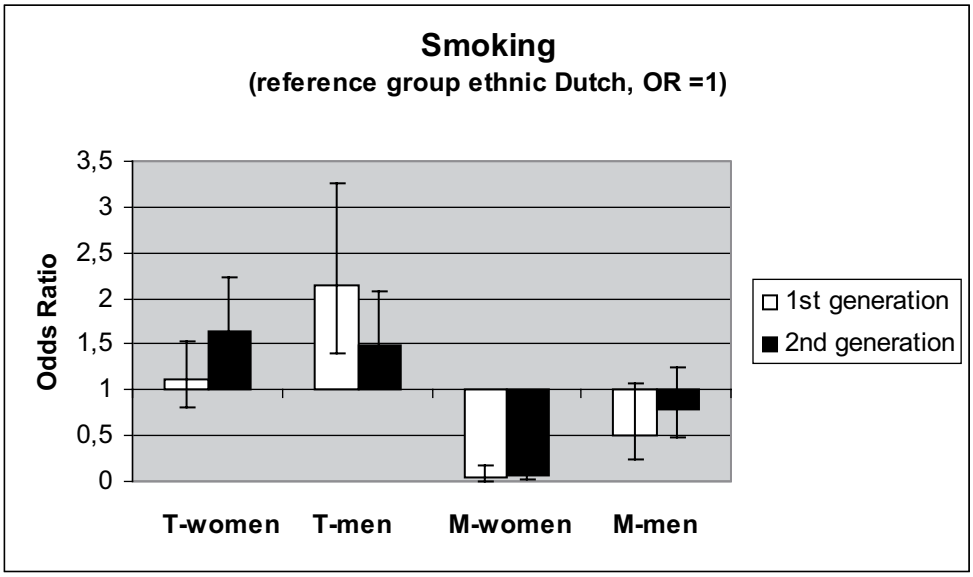
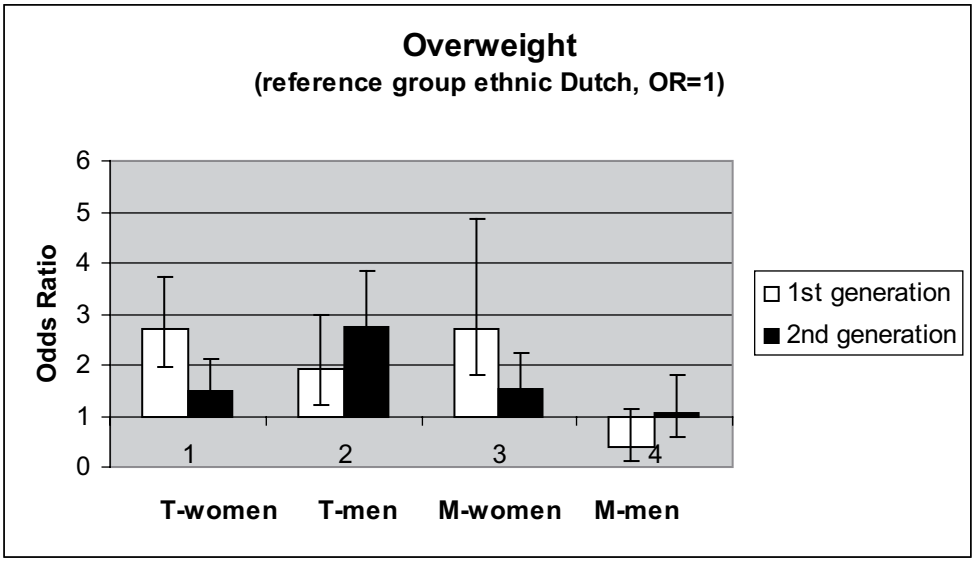


Figure 2. Odds ratio's with 95% Confidence Intervals for overweight among Turkish and Moroccan men and women of first and second generation compared to the reference group, ethnic Dutch men and women.



In addition, Moroccan women showed the least indications for convergence of risk factors towards the ethnic Dutch women: among both generations, significantly lower prevalence rates were found for smoking and alcohol consumption and a significantly higher prevalence of physical inactivity.

Discussion

We examined whether the prevalence of behavioural risk factors in Turkish and Moroccan migrants in the Netherlands tends to converge towards the prevalence rates in the host population with increasing generational status. Trends of converging risk factors were found for smoking (Turkish men), overweight (women) and physical inactivity (Turkish women). However, these trends were not found in all subgroups by ethnicity and sex. Some groups showed a trend in opposite direction: Turkish women of second generation smoked significantly more than ethnic Dutch women, while the first generation did not differ from ethnic Dutch. Among Turkish men we found that the difference with the ethnic Dutch men in prevalence of overweight is even greater in second generation compared to first generation men. The only risk factor that did not seem to differ between the generations within all four subgroups was the consumption of alcohol.

Limitations of the study

Before discussing the main results, a few limitations of the study need to be mentioned.
Firstly, as the LASER study did not include data of the ethnic Dutch population we compared our data of the Turkish and Moroccan population in Amsterdam with existing data among ethnic

Dutch from a national representative survey [37]. The Dutch national survey was held within the same period (2003-2004) as the LASER study and included similar outcome measures.
However, we must take into consideration the existence of regional differences in prevalence rates of the risk factors, in this case the difference between Amsterdam and The Netherlands. However, these regional differences were generally rather small for the younger age groups within the general Dutch population [38]. As a result we expect that the trends we found in this study would be similar when comparing our data with the ethnic Dutch living in Amsterdam.
A second limitation of the study concerns the self-reported data on weight and height within the national Dutch survey. This implies that the prevalence of overweight might be underestimated within the ethnic Dutch comparison groups. [35;36] However, we found extremely large differences in prevalence rates between the migrant populations and the ethnic Dutch, in particular among the Turkish and the Moroccan women of the first generation. Therefore, we expect that the trends of decreasing overweight across the generations would not be different when using measured data on weight and height.
A third limitation is the possible social desirability in answering the questions on alcohol consumption due to the fact that the consumption of alcohol is prohibited by Islam and therefore less accepted among Muslims, especially among women.[39] We tried to enhance the reliability of the answers by allowing the participant to fill in the questions on paper and by conducting the interview without the presence of other persons. In addition, prior research has indicated that the prevalence of alcohol consumption among second generation Turks and Moroccan is higher when using a postal survey or when interviews are held by ethnic Dutch interviewers instead of interviewers with the same ethnic background as the participants.[40] However, considering the large differences in percentage of alcohol users between ethnic Dutch and the Turkish and Moroccan participants, in line with other studies, we expect that different methods would not affect the main outcomes regarding alcohol consumption in this population.
Finally, we did not take into account the fact that behaviour in the Dutch population is also changing over time. To further investigate whether behaviour of migrants will change in the same direction, it will be necessary to compare the trends in behaviour with the trends in the host population.

Interpretation of the results

Our findings of a generally higher prevalence of overweight and physical inactivity in most of the subgroups compared to the host population, are in line with other studies among mostly Turkish and (to a lesser extent) Moroccan migrants in Western European countries such as in Sweden and the Netherlands.[19;21-23;41-43]
The same applies to the higher prevalence of smoking among first generation Turkish men, the lower smoking rates among women and the overall low prevalence of alcohol consumption.[6;23;40;44]
However, these studies either did not differentiate between the first and second generation, or they only reported about ethnic differences between first generation migrants (foreign

born) and the host population. In the US however, a growing number of studies have assessed generational differences in behavioural risk factors among migrants, but most of these studies only reported a positive or negative association with generational status without making an explicit comparison with the prevalence rates in the host population.[7-9;12-14;45-50] As a result these studies cannot demonstrate whether the pattern of convergence towards the prevalence rates in the host population was found.

Our study observed the assumed pattern of convergence most clearly for smoking, overweight and physical inactivity, but not within all ethnicity-sex subgroups. We also found two trends in the opposite direction. Firstly, among Turkish women the first generation did not differ from ethnic Dutch women, while second generation Turkish women smoked much more. This might be due to the fact that the second generation has a higher education level, which in turn has been shown to be related to a higher prevalence of smoking in Turkish women.[51] Secondly, the difference in prevalence of overweight between ethnic Dutch and Turkish men is even greater in second generation than in first generation.

Furthermore, it appeared that Moroccan women, showed the least trends of convergence. They had extremely low prevalence rates of smoking and alcohol consumption and a high prevalence of physical inactivity, with no differences between the generations.

Another finding was the very low prevalence of alcohol consumption within all subgroups (by ethnicity and sex) in both generations. This is probably related to the religious and cultural norms towards these behaviours in Islamic cultures, which might be of great influence in first as well as second generation migrants.[39;40] Most Turks and Moroccans seem to adhere to the Islamic rule of alcohol abstinence, especially when they are practicing Islam and adhering to their own cultural and religious traditions.[40] If religious norms or attitudes towards a behaviour are very strongly embedded in a culture, it might be that the behaviour does not converge or at least converges more slowly. This might also be an explanation for the absence of convergence of smoking among Moroccan women, because of the strong negative attitudes towards smoking, particularly among women in Moroccan culture. However, the prevalence of alcohol use does not give information about the drinking patterns, which might differ between the generations. Therefore, we suggest that a further exploration of drinking patterns is useful, within a study focusing on alcohol consumption in particular.

In addition to comparing prevalence rates among the generations with ethnic Dutch, we also explored whether there were significant generation effects (results not shown). We found that most generation effects confirmed the presented results, however, some of the expected differences were not statistically significant, probably due to a lack of power. When combining subgroups, for example Turkish and Moroccan women, significant effects of generation on overweight were found (OR of second generation: 0.53 (0.31-0.91). However, in contrast to other studies, generation effects per se were not the main issue in our study as the test of the convergence hypothesis required us to focus on the differences with the host population in particular.

Other studies have found that apart from generational status (based on country of birth), the age at which people migrate might influence the adoption of behavioural practices from the host country.[14;52] Unfortunately, in the LASER-study we were not able to analyse the influence of age at migration due to the small numbers of participants. We suggest this effect should be further explored.

In addition, several studies have explored the effect of number of years since migration on prevalence rates of behavioural risk factors. [41;42;47-49;53] Considering that our study population was young and age was limited to 15-30 years, it was less relevant to study this effect.

Overall, this study indicated that the prevalence of some of the behavioural risk in second generation Turkish and Moroccan migrants is more similar to the prevalence in the host population than among first generation migrants. We anticipate that the pattern of convergence we have found, as well as the opposite trends, might be found in these same ethnic groups living in other Western-European countries, such as in Germany, Sweden, France and Belgium.[24;25]

To understand why some risk factors converge within two generations and others do not, mechanisms that are associated with the changes in behavioural risk factors over generations need to be explored. These mechanisms are, among others, the process of acculturation and the changing socio-economic position of migrants.[1] Generally, higher acculturated migrants are, in contrast with the lower acculturated, more likely to be exposed to similar cultural stimuli and share the same environmental influences on their behaviour as the host population.[54] Assuming that second generation migrants will be more acculturated, it is expected that they will be more likely to adopt the attitudes and norms towards certain behaviour that is common in the host population.[15-18] It might be however, that some norms will change faster than others, such as cultural of religious norms about alcohol consumption.

Similarly, the changing socioeconomic position between generations might be related to their differences in behavioural risk factors. Higher educated migrants may be more likely to resemble the host population, as was observed in a study of (amongst other behaviours) smoking in Turkish women.[51]

In conclusion, our results indicated that the prevalence of behavioural risk factors in non-Western migrant populations does not necessarily converge across two generations towards the lower prevalence rates in the host population. We suggest therefore that it remains necessary for health promotion programmes to specifically target these high risk groups. Of particular concern are the trends in smoking behaviour among Turkish women, overweight in Turkish men and the high level of physical inactivity among Moroccan women. In order to develop ethnic specific preventive programs, further exploration of the mechanisms involved in the tendency of adopting (or not adopting) the behavioural risk factors of the host population is needed. In addition, this information might help to predict future development of behavioural risk factors (and related mortality) across generations of migrants.

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3

Overweight and physical inactivity among non-Western ethnic groups: associations with socioeconomic position, acculturation and religion

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Abstract

Background: Physical inactivity and overweight are highly prevalent among non-Western ethnic groups living in Western Europe. The objective of this study was to assess how socioeconomic position, acculturation and religion are associated with these risk factors among the young Turkish and Moroccan population in the Netherlands, and how these associations differ by gender.

Methods: Data from a cross-sectional study were used in which face-to-face interviews were conducted with 359 males and 437 females from Turkish or Moroccan origin aged 15-30 in Amsterdam, the Netherlands. Physical inactivity was defined as not meeting the recommendations for daily physical activity (> 30 minutes of moderate activity during 5 or more days in a week). Overweight was defined as a Body Mass Index ≥25 (kg/m^2) . Socioeconomic position was measured by level of education, position at the labour market and occupational status. Acculturation was indicated by cultural orientation and social contacts with ethnic Dutch. Finally, importance of religion was included as a possible determinant.

Results: Females with higher levels of education were overweight less often than those with lower levels of education. In addition, females who were following a course of study were overweight less often than unemployed women. However, occupational status nor acculturation were associated with overweight, despite the fact that we found women with higher levels of acculturation to be more frequently active. Besides acculturation, perceiving religion not as 'very important' was associated with less physical inactivity. Among males, however, hardly any associations were found.

Conclusion: Overweight and physical inactivity were strongly related to respectively socioeconomic position, level of acculturation or religion, but only among Turkish and Moroccan females, and not among males. This implies that preventive interventions should take the role of these determinants into account when targeting Turkish and Moroccan females, whereas for males both the lower and higher socioeconomic/acculturated groups should be targeted in order to reduce overweight in this population.

Introduction

Lack of physical activity and overweight are important risk factors for several kinds of diseases, including cardiovascular diseases and diabetes mellitus.[1-3] In Western European countries, these risk factors are generally more prevalent in non-Western ethnic groups than in host populations.[4-8] In the Netherlands, two of the largest non-Western groups are the Turks and Moroccans.[9] Within this population the prevalence of overweight in adults is high, about 67% of the Turkish and 57% of the Moroccan population, whereas 45% of the ethnic Dutch is overweight.[10] In addition, the number of people meeting the recommendations for physical activity is much lower in these populations than in ethnic Dutch, in particular in women.[11]

In order to better understand the development of these risk factors within the growing population of young people with a non-Western origin, insight is needed into the factors that underlie these high prevalent risk factors. Based on this information more appropriate prevention programs could be designed that target particular ethnic groups.

Studies mostly carried out among Latino or Hispanic ethnic groups in the US, have shown that overweight and inactivity among several ethnic groups are influenced amongst others by their socioeconomic position and by cultural influences of the both the country of destination as the country of origin. More specifically, these studies indicate that greater acculturation towards the majority population (often measured by language acculturation) generally has a positive influence on physical activity.[7;12-16] However, simultaneously greater acculturation is associated with an increased risk for being overweight in most ethnic groups, although this association seems to depend on the measures used.[12;17;18] For example, acculturation measured by nativity and years since migration is often associated with increased risk for being overweight, whereas English language use seems to have a protective effect in amongst others Hispanic ethnic groups in the US.[19-26] This protective effect seems to apply in particular to those ethnic groups with a high prevalence of overweight to begin with.

Apart from acculturation, strong associations have been found with socioeconomic position. In general a higher socioeconomic position is associated with lower prevalence rates of overweight, however, these associations seem to vary according to gender and ethnicity, with sometimes weaker associations in ethnic minority groups.[27-29] Associations between socioeconomic indicators and physical activity showed mixed results, but generally lower socioeconomic status is associated with increased risk for being physically inactive.[30-33]

In addition, in some of the non-Western countries where ethnic groups in Europe originally come from, reversed socioeconomic patterns have been found. Morocco might serve as an example, were higher socioeconomic positions have been associated with higher prevalence of overweight.[34] However, with increasing socioeconomic development and Westernization of these countries, the socioeconomic patterns in overweight start to resemble those of Western developed countries. For example, a more recent study among Turkish women in Turkey found similar associations with overweight as among women in Western European countries.[35]

Based on these previous studies, we may expect that the generally high prevalence of

overweight and physical inactivity among non-Western ethnic groups in Western Europe, will decrease with greater acculturation. The mixed and contra dictionary results for socioeconomic position, however, make it difficult to predict what the effect of these indicators will be in these populations.

The aim of this study is to provide insight into how socioeconomic position and acculturation are associated with overweight and physical inactivity in two of the largest non-Western ethnic groups in the Netherlands, the Turkish and Moroccan young people from 15 to 30 years. In addition to the acculturation and socioeconomic influences, we expect that religion is an important determinant in these populations as the majority of the Turks and Moroccans adhere to the Islam. Religion is seen as an important aspect of the Turkish and Moroccan culture and identity, and may be of influence on physical activity behaviour among Muslim women in partcular.[36;37] Therefore, we included religion as a possible determinant.

Finally, in assessing the underlying determinants, we will pay attention to possible gender differences. As a result of the cultural and religious background of these groups, we expect that the swift that women experience from a culture in which women are mainly mothers and family caregivers, to a culture were gender roles are less traditional, may lead to different effects of socioeconomic position, acculturation and religion on physical activity patterns and overweight than among men.[38;39]

We included first (foreign born) as well as second generation (Dutch born) individuals. The second generation consists mostly of the offspring of the older first generation labour migrants. The first generation within this young age category came mostly for the reasons of marriage, and to a lesser extent for family reunion or economic reasons (labour or education).[40] Turks and Moroccans in the Netherlands not only have a common religion, but also a similar migration history that began during 1960-1970 when most of them came as (invited) labor migrants to the Netherlands.[41;42]

Methods

We analyzed data from the LASER study (Lifestyle in Amsterdam: a Study among Ethnic gRroups); data was collected between 2003 and 2004. The aim of this study was to gain insight into health-related risk factors and underlying determinants among young Turkish and Moroccans living in Amsterdam, the Netherlands. Details of the study methods have been published elsewhere.[43] In short, a random sample was drawn from the Amsterdam population registry, which included people between 10 and 30 years of age who were born in Turkey or Morocco or had at least one parent who was born in Turkey or Morocco. During a home visit, trained interviewers of the same ethnic background and sex conducted face-to-face interviews. A structured questionnaire was used that included questions on health-related risk factors (smoking, alcohol, physical activity and weight/height). Participants could choose the language they preferred for the interview. To make this possible, the questionnaire was forward- and back-translated into Turkish and Moroccan-Arabic by professional translators. To

ensure the meaning of the questions did not change, the translations were discussed with the researcher and the translators.

The Turkish sample consisted of 1,556 people. Approximately 13% of the participants could not be traced because of incorrect address information. Of the 1,354 respondents that could be traced, 768 participated in the study (57%). Most cases of "non-response" were refusals to participate (32%) and some of them could not be reached after three attempts (12%). The Moroccan sample consisted of 995 people, 12% of whom had incorrect address information. Of the 872 persons who could be traced, 476 participated in the study (55%). Within the non-response group, 26% refused to participate and about 19% could not be reached after three attempts. For the current study we only included participants aged 15 to 30, which resulted in 437 women and 359 men. The main reason for excluding the participants aged 10 to 14, was the fact that physical activity patterns were different within this group of children with generally higher levels of activity due to participation in sports and spending time outside with peers. From the age of 15, activity patterns change towards more sedentary behaviour.[44]

This sample is representative according to sex, generational status and city district for the total Turkish and Moroccan population aged 15-30 living in Amsterdam with an exception for the Moroccan male sample in which slightly more young people were included (15-19 years) compared to the other subgroups by sex and ethnicity. We certify that all applicable institutional and governmental regulations concerning the ethical use of human volunteers were followed during this research.

Physical inactivity

Participants were classified as inactive if they did *not* meet the recommendation of at least 30 minutes of moderate activity at least five days a week (60 minutes for people under 18).

We used the validated *Short Questionnaire to Assess Health-Enhancing Physical Activity* (SQUASH) to determine whether participants met the Dutch guideline for physical activity.[45] This Dutch questionnaire is comparable with the International Physical Activity Questionnaire (IPAQ).[46] It includes questions on transportation to work or school, job-related physical activity, housework activities, participation in sport, and other leisure-time activities. Total minutes of activity were calculated by multiplying frequency (days/week) by duration (minutes/day). Activity scores for separate questions were calculated by multiplying total minutes of activity by the intensity score. All activities were coded according to Ainsworth's Compendium of Physical Activities.[47] The intensity score was expressed in METs (i.e., metabolic equivalent or number of times resting metabolic rate). For people younger than 18, the cut-off point for moderate activity was 5 MET or higher and 4 MET or higher for people 18 and above. Cut-off points were derived from the Dutch physical activity guideline.[48]

Overweight

Body mass index (BMI) was calculated as weight (kg) divided by height (m^2). For people of 18 years and older, overweight was defined as a BMI of 25 (kg/m^2) or higher. For people between 15

up to 17 years, we used the recommended sex and age-adjusted cut-off points.[49] Participants' weight and height were measured during the home visit in 57% of the cases (n=392). Weight was measured (using an electronic scale) to the nearest 0.1 kg after removal of shoes, jackets, heavier clothing and pocket contents. Height was measured twice without shoes in an upright position with a measuring tape and a lineal to the nearest 0.1 cm.

Due to logistical problems, not all interviewers had the equipment for measuring weight and height during the interview. In most of these cases (which were completely random), participants were asked to report their weight and height. On the remaining cases we had missing data, therefore the number of participants is smaller in the analyses on overweight. To assess whether the different methods of data collection influenced our results on overweight and average BMI between the measured and the self reported group we did additional analyses. Among both males and females we found no significant differences in overweight between the measured and the self reported group, although the prevalence rates among females were lower in the self reported group (29% versus 36% in the measured group, p = 0.110). In both the measured and the self reported group among males, 31% was overweight (p=0.532). Furthermore, we tested (with Mann-Whitney test for non-parametrical tests) whether average BMI differed between the measured and the self reported group. These analyses showed no significant difference for male participants (mean BMI =23.88 (SD 3.60)) and the self-reported males (mean BMI= 23.55 (SD 3.17) with p = 0.590). However, in females we found a significant higher BMI in the measured group (mean BMI =24.46 (SD 4.71)) compared to the self-reported data (mean BMI=23.38 (SD 4.29) with p=0.032).

Socioeconomic position

Socioeconomic position was measured by three indicators. Firstly, *level of education* was indicated by the highest level of education attained for people who finished their education. Students who were still following a course of study were categorized by their highest current level of education. Educational level was categorized as "low" when people had no education or primary school education only and "moderate" when people had lower- to intermediate-level vocational training. Participants were considered to have higher levels of education when they had completed (or were following) higher secondary school levels or professional education or university. Unlike in other European countries (such as the UK), the educational system in the Netherlands is characterized by the process of streaming. This implies that pupils from the age of 12 years start an educational program at a certain level. This starting position is a good predictor for the level of education they will finally achieve.[50]

Secondly, *position at the labour market* was measured by the current 'main activity' of participants in daily life. We divided the participants into four categories: 1) unemployed participants, 2) homemakers, 3) employed participants, and 4) students, who were currently following a course of study. Among men there was only one homemaker, therefore this category was left out within the logistic regression analyses.

Thirdly, we measured *occupational status* within the household, in which persons were

categorized according to the highest occupational status within the family. For adolescents who were still living with their parents we used the highest occupational position of father or mother. In cases that one or both parents were retired, we used the level of occupation they had before retirement. For young adults with their own household, we used the highest occupation of the participant and his/her partner. The following categories were distinguished: 1) manual occupation (i.e. cleaning jobs), 2) non-manual occupation (i.e. administrative work), 3) unemployed and 4) students.

Acculturation

The indicators of acculturation were based on Berry's approach whereby this position is considered in terms of orientation towards the majority culture versus culture of origin and social contacts with the host population versus contacts with people from culture of origin.[51] This resulted in the following components:

Firstly, *cultural orientation* was measured by 10 items about language use with family members and friends, use of media, difficulties with reading Dutch, shopping preferences and emancipation as example of Western norms and values.[52;53] The cultural orientation scale was constructed using principal component analysis and reliability analysis (alpha of the scale was 0.64).

Secondly, *social contacts* were measured by three questions about contacts with ethnic Dutch people during leisure time (i.e., How many of your best friends are ethnic Dutch?). The alpha for this was 0.84.

For both scales, the items in each scale were added and a mean substitution was made for cases where one item was missing. The scales were categorized in tertiles in order to denote an individual's cultural position, with subjects in the first tertile being the least oriented towards the Dutch culture (or having the least social contacts with ethnic Dutch) and those in the third tertile being the most oriented towards the Dutch culture (or having the most social contacts with ethnic Dutch).

Religion

In addition, we measured *the importance of religion,* which was measured with one item with a 4 point scale, ranging from very important to not important at all. Participants who indicated that religion was very important to them (score 4) were categorized as one group versus the people who indicated that religion was only slightly to moderately important to them (score 1-3). This categorization was based on the fact that the majority of the participants indicated that religion was *very important* to them (score 4). In order to have enough differentiation we distinguished this as one group.

Data analyses

We used logistic regression analyses to determine the associations between socioeconomic position, acculturation and religion on the one hand, and the outcome measures (physical inactivity and overweight) on the other hand. First, univariate analyses were carried out, with

adjustment for age and ethnicity, to determine the associations of each factor separately. Secondly, multivariate analyses were carried out to explore whether the significant associations disappeared after adjustment for all the other factors. This was done in particular to see whether the effect of socioeconomic position would disappear when adjusting for acculturation and vice versa, as these two factors might be strongly related to each other. In all analyses, men and women were analyzed separately and Turkish and Moroccan participants were grouped together. In both ethnic groups the socioeconomic, acculturation and religious factors were associated in a similar way.

Results

Characteristics of the study population are shown in Table 1. Among both males and females, about two-thirds of the participants were of Turkish origin. Less than half of the participants were born in Turkey or Morocco and considered to be first generation migrants. Most participants were unmarried and had no children. The majority had a moderate level of education and were either currently following a course of study or employed. Among women, there was a large number of homemakers (19%). More women than men were categorized as inactive and about a third of both men and women were overweight.

Table 2 presents the Odds Ratios (OR) with 95% Confidence Intervals (CI) of the prevalence of physical inactivity and overweight in men and women separately, according to socioeconomic position, acculturation and religion. In general, these determinants were more strongly related to respectively overweight and physical inactivity in women than in men. The odds of being overweight was lower among moderately (OR 0.29, CI: 0.14, 0.60) to more highly educated (OR 0.16, CI: 0.07, 0.37) women, compared to those with lower levels of education. In addition, students had a lower prevalence of overweight compared to the unemployed (OR 0.23, CI: 0.08, 0.60). However, occupational status (of the family), did not show any significant associations with overweight. Among men, none of the socioeconomic indicators were associated with being overweight.

For acculturation we found that women who were most strongly oriented towards the Dutch culture (3rd tertile) were less likely to be physically inactive (OR 0.45, CI: 0.26, 0.80) than women with a lower orientation (1st tertile). The same was true for women with more social contacts with ethnic Dutch (2nd tertile: OR 0.47, CI: 0.28, 0.78), with the strongest association for women within the 3rd tertile (OR 0.35, CI: 0.20-0.61). In men, only social contact with ethnic Dutch was related to physical inactivity (OR 0.45, CI: 0.26, 0.78).
In addition, women who indicated that religion was moderately important to them (OR 0.47, CI: 0.30, 0.75), were less often physically inactive compared to women for whom religion was very important. Again, no associations were found in men.

Table 1. Characteristics of the 15- to 30-year-old Turkish and Moroccan participants of the LASER study (2003-3004).

Socio-demographic factors	Men N=359 n (%)	Women N=437 n (%)
Ethnicity		
Turkish	244 (68.0)	261 (59.7)
Moroccan	115 (32.0)	176 (40.3)
Generational status		
First generation	131 (36.5)	202 (46.2)
Second generation	228 (63.5)	235 (53.8)
Marital status		
Married	85 (23.7)	167 (38.2)
Unmarried	274 (76.3)	270 (61.8)
Children		
1 or more	63 (17.5)	151 (34.6)
No children	296 (82.5)	286 (65.4)
Socioeconomic position*		
Educational level		
Low	30 (8.7)	59 (13.8)
Moderate	216 (62.6)	256 (60.0)
High	99 (28.7)	112 (26.2)
Position at the labour market (individual)		
Homemaker	1 (0.3)	80 (18.7)
Unemployed	25 (7.4)	45 (10.5)
Employed	115 (33.9)	97 (22.7)
Students (following a course of study)	198 (58.4)	205 (48.0)
Occupational status (family)		
Unemployed	97 (32.3)	123 (32.4)
Manual occupation	125 (41.7)	142 (37.4)
Non-manual occupation	56 (18.7)	103 (27.1)
Students (following a course of study)	22 (7.3)	12 (3.2)
Acculturation*		
Cultural orientation		
1st tertile (least oriented towards Dutch culture)	99 (28.2)	144 (33.6)
2nd tertile	123 (35.0)	130 (30.4)
3rd tertile (most oriented towards Dutch culture)	129 (36.8)	154 (36.0)
Social contacts		
1st tertile (least oriented towards Dutch culture)	138 (39.3)	190 (43.8)
2nd tertile	118 (33.6)	135 (31.1)
3rd tertile (most oriented towards Dutch culture)	95 (27.1)	109 (25.1)
Religion*		
Very important	210 (61.4)	312 (72.9)
Less important	132 (38.6)	116 (27.1)
Outcome measures		
Physically inactive[1]	206 (57.4)	301 (68.9)
Overweight (≥25 kg/m^2)	103 (30.8)	111 (32.7)

* Numbers do not always add to total number of participants due to missinga data on those variables. [1] Physical inactivity was defined as not meeting the Dutch guidelines of at least 30 minutes (or 60 minutes for people under 18) of moderate activity at least five days a week. [2] Overweight was defined as a Body Mass Index ≥ 25 (kg/m^2) with adjusted cut-off points for people under 18. Due to missing data on weight and height, the number of participants is smaller in the analyses on overweight (men: n=334, women: n=339).

Table 2. Associations of socioeconomic position, acculturation and religion with physical inactivity and overweight in Turkish and Moroccan men and women of the LASER-study (2003-2004).

	Physical inactivity[1]		Overweight (≥25 kg/m^2)	
	Men n= 359 OR (95% CI)	Women n= 437 OR (95% CI)	Men n= 331 OR (95% CI)	Women n= 326 OR (95% CI)
Socioeconomic status				
Educational level				
Low	1.00	1.00	1.00	1.00
Moderate	0.81 (0.36-1.83)	0.81 (0.42-1.55)	1.25 (0.52-3.01)	**0.29 (0.14-0.60)**
High	0.87 (0.37-2.06)	0.81 (0.41-1.64)	0.95 (0.37-2.44	**0.16 (0.07-0.37)**
Position at the labour market (individual)				
Unemployed	1.00	1.00	1.00	1.00
Homemaker	-	1.38 (0.64-2.99)	-	1.47 (0.63-3.44)
Employed	0.97 (0.39-2.42)	0.70 (0.34-1.47)	0.97 (0.39-2.44)	0.59 (0.25-1.37)
Students	1.03 (0.39-2.72)	1.85 (0.79-4.32)	0.61 (0.22-1.72)	**0.23 (0.08-0.63)**
Occupational status (family)				
Unemployed	1.00	1.00	1.00	1.00
Manual occupation	0.92 (0.53-1.61)	0.77 (0.42-1.41)	0.95 (0.49-1.84)	1.01 (0.53-1.92)
Non-manual occupation	1.42 (0.70-2.88)	0.78 (0.44-1.37)	1.25 (0.57-2.74)	1.03 (0.51-2.04)
Students	1.59 (0.58-4.40)	0.76 (0.19-3.13)	1.16 (0.36-3.76)	1.35 (0.25-7.35)
Acculturation				
Cultural orientation:				
1st tertile: least oriented towards Dutch culture)	1.00	1.00	1.00	1.00
2nd tertile	0.81 (0.47-1.40)	0.72 (0.41-1.27)	0.87 (0.46-1.62)	0.67 (0.37-1.23)
3rd tertile: most oriented towards Dutch culture)	1.02 (0.59-1.77)	**0.45 (0.26-0.80)**	0.99 (0.54-1.81)	0.86 (0.46-1.59)
Social contacts:				
1st tertile: least social contacts with ethnic Dutch	1.00	1.00	1.00	1.00
2nd tertile	0.88 (0.52-1.48)	**0.47 (0.28-0.78)**	1.02 (0.57-1.83)	0.58 (0.33-1.03)
3rd tertile:most social contacts with ethnic Dutch	**0.45 (0.26-0.78)**	**0.35 (0.20-0.61)**	1.13 (0.62-2.07)	0.80 (0.44-1.48)
Religion:				
Very important	1.00	1.00	1.00	1.00
Less important	1.04 (0.66-1.63)	**0.47 (0.30-0.75)**	1.18 (0.71-1.95)	0.71 (0.41-1.24)

All analyses were adjusted for age and ethnicity. [1] Physical inactivity was defined as not meeting the Dutch guidelines of at least 30 minutes (or 60 minutes for people under 18) of moderate activity at least five days a week. [2] Overweight was defined as a Body Mass Index ≥ 25 (kg/m^2) with adjusted cut-off points for people under 18.

Table 3. Multivariate associations between socioeconomic and acculturation and physical inactivity and overweight in Turkish and Moroccan men and women of the LASER-study (2003-2004).

	Physical inactivity[1]		Overweight (≥25 kg/m^2)	
	Men n= 359 OR (95% CI)	Women n= 437 OR (95% CI)	Men n= 331 OR (95% CI)	Women n= 326 OR (95% CI)
Socioeconomic position				
Educational level:				
Low	1.00	1.00	1.00	1.00
Moderate	0.90 (0.32-2.55)	0.87 (0.39-1.95)	1.30 (0.41-4.09)	**0.32 (0.13-0.76)**
High	0.74 (0.26-2.08)	0.86 (0.39-1.90)	1.96 (0.62-6.20)	**0.16 (0.06-0.46)**
Position at the labour market (individual)				
Unemployed	1.00	1.00	1.00	1.00
Homemaker	-	1.66 (0.64-4.29)	-	1.32 (0.46-3.74)
Employed	0.89 (0.29-2.69)	1.26 (0.51-3.09)	1.28 (0.39-4.16)	0.86 (0.29-2.54)
Students	0.80 (0.23-2.81)	**6.37 (2.15-18.93)**	0.85 (0.21-3.45)	0.33 (0.09-1.18)
Occupational status (family)				
Unemployed	1.00	1.00	1.00	1.00
Manual occupation	0.85 (0.46-1.57)	0.70 (0.36-1.36)	1.23 (0.59-2.54)	0.82 (0.34-1.75)
Non-manual occupation	1.30 (0.59-2.86)	0.76 (0.38-1.56)	1.37 (0.57-3.28)	1.06 (0.48-2.36)
Students	1.57 (0.51-4.89)	0.36 (0.08-1.60)	0.87 (0.21-3.66)	1.71 (0.30-9.85)
Acculturation				
Cultural orientation				
1st tertile (least oriented towards Dutch culture)	1.00	1.00	1.00	1.00
2nd tertile	1.02 (0.52-1.98)	0.82 (0.40-1.69)	0.66 (0.32-1.38)	0.87 (0.39-1.95)
3rd tertile (most oriented towards Dutch culture)	1.49 (0.72-3.09)	**0.46 (0.22-0.97)**	0.85 (0.38-1.91)	1.43 (0.61-3.35)
Social contacts				
1st tertile: least social contacts with ethnic Dutch	1.00	1.00	1.00	1.00
2nd tertile	1.07 (0.58-2.00)	**0.47 (0.25-0.88)**	0.90 (0.44-1.82)	0.64 (0.31-1.30)
3rd tertile: most social contacts with ethnic Dutch	**0.49 (0.25-0.96)**	**0.31 (0.16-0.63)**	1.16 (0.54-2.49)	1.22 (0.57-2.63)
Religion				
Very important	1.00	1.00	1.00	1.00
Less important	1.21 (0.65-2.23)	**0.45 (0.27-0.74)**	1.08 (0.61-1.91)	0.96 (0.50-1.82)

All analyses were adjusted for age and ethnicity. [1] Physical inactivity was defined as not meeting the Dutch guidelines of at least 30 minutes (or 60 minutes for people under 18) of moderate activity at least five days a week. [2] Overweight was defined as a Body Mass Index ≥ 25 (kg/m^2) with adjusted cut-off points for people under 18.

Table 3 shows the results of the adjusted (multivariate) model. When all factors were taken into account in one model most associations were still significant, except from position at the labour market, in which the association between being a student and having a lower prevalence of overweight disappeared. Those who were moderately (OR: 0.32, CI: 0.13-0.76) and more highly educated (OR: 0.16, CI: 0.06-0.46) were still less often overweight than those with lower levels of education. Remarkable is the association between being a female student and greater risk for being physically inactive (OR: 6.37, CI: 2.15-18.93), although it should be mentioned that the confidence interval was rather broad. The associations between the acculturation indicators and religion and physical inactivity did not change and were still significant. These analyses provide indicate that these effects are independent of each other.

Discussion

The findings of this study indicate that physical inactivity and overweight in Turkish and Moroccan young females are strongly related to their socioeconomic position, level of acculturation and perception of religion, but these associations were not found in Turkish and Moroccan males.

More specifically, we found that females who were more culturally oriented towards the Dutch population, who had more social contacts with the ethnic Dutch or who were less religious were less often physically inactive, however, these determinants were not associated with overweight. In addition, although women with higher to moderate levels of education or who were students, were less often overweight than their counterparts with respectively lower levels of education or who were unemployed, these socioeconomic indicators were not associated with physical inactivity.

Limitations of the study

There are limitations to this study. Firstly, we analysed cross-sectional data. This implies that we have to consider the possibility that the associations we found between socioeconomic position and overweight and the associations between acculturation and physical inactivity could be interpreted differently than we expected. For example, greater participation in physical activity might result in greater cultural orientation towards the majority culture or more social contacts with ethnic Dutch, instead of the other way around. However, as we included many different kind of activities, also those that do not necessarily involve contacts with ethnic Dutch people, we assume that our findings largely indicate a causal effect of acculturation on physical activity. In addition, our findings on the relationship between socioeconomic position and overweight, might be due to a negative effect of being obese on opportunities in education and employment and as a result lead to a less favourable socioeconomic position among overweight people.[54] However, this pathway is less likely as also results of longitudinal studies have indicated that changes in socioeconomic position have consequences for body weight.[55]

Secondly, due to logistical problems during data collection, we were not able to measure

height and weight of all participants during the home visits, which might have affected our conclusions. Generally, it is assumed that self reported measures lead to an underestimation of the actual prevalence rates of overweight.[56] Nevertheless, our additional analyses showed no significant differences between the measured and the self-reported group in prevalence of overweight in both males and females (see method section). The numbers of measured versus self-reported data were also equally divided by all the socioeconomic and acculturation indicators (using chi-square tests).

Finally, within the measure of occupational status, we categorized people who were retired according to the level of occupation before retirement. This applied to approximately 10% of the fathers (n=51) and 2% (n=12) of the mothers. It is possible that the socioeconomic position of the family with retired parents might be less favourable than that of families with parents who are still participating at the labour market. Maybe this could partly explain our finding that occupational status showed no associations with overweight or physical activity.

Interpretation of the results

The finding that a better socioeconomic position (in terms of educational level and position at the labour market) was associated with a lower prevalence of overweight in women, but not in men, is in line with the results of two important review studies. These reviews concluded that that socioeconomic factors, are generally stronger associated among women and less consistent in men in the general population of many countries.[57;58] Also the migrant studies in the U.S. that took gender differences into account, found that the association between socioeconomic position and obesity is generally stronger in women than in men.[27;59]

Explanations for this generally stronger negative association in women are often looked for in the greater associations in women between socioeconomic position and dietary restraint and leisure-time physical activity.[57] Sobal and Stunkard suggested that women with higher socioeconomic position might have increased knowledge about nutrition and dieting. Furthermore, they may be more committed to the view that slimness is desirable and may be more personally motivated to attain slim figures.

In contrast to other studies, we found no associations between the indicators of socioeconomic position and physical inactivity. So it seems that the higher educated women are less often overweight, but they are not more physically active than lower educated women. This is an indication that the lower prevalence of overweight among the higher educated might be related to differences in nutritional intake between lower and higher educated women. However, it should be mentioned that this lack of association between socioeconomic position and physical inactivity might be a result of the broad measure we used for physical (in)activity (including occupational, transport, household and leisure-time activities). It is, for example, likely that lower education is associated with increased occuptional- or houshold- physical activity, but with decreased physical activity during leisure time.[32;60]

The finding that greater acculturation is associated with lower rates of physical inactivity, is in line with many other studies.[7;12-16] However, these studies did not indicate whether this effect

was different for men and women, because they had been carried out among women only or took gender into account as a possible confounder. Furthermore, we did not find studies that assessed the role of religion in physical activity behaviour. Although, a qualitative study on Muslim women, found that religion was not seen as restricting exercise, but it does advocates adherence to specific mores and codes that might be regarded as barriers to participation in exercise. Most importantly, women emphasized the importance that religion places on the separation of genders in certain contexts and the maintenance of dress codes, which implies that women prefer to cover their bodies.[37] The women that perceive religion as very important, most likely adhere more strictly to these codes than women who are less religious.

The influence of acculturation and religion are most likely understood a result of changes in the underlying attitudes towards physical activity. Most women who come from (Arabic-) Muslim cultures (i.e. Turkey and Morocco) generally have a traditional role as caregiver and homemaker for whom it is less acceptable to be physically active in their leisure time.[36;37] Therefore, sports and exercise are perceived mainly as male activities. Following migration, the position of these women changes and they come into contact with a culture in which it is much more common for women to participate in leisure time physical activity. With increasing orientation on the Dutch culture (language, media, and emancipation) this will most likely lead to more positive attitudes towards those kind of activities as walking, cycling or exercise during leisure time. Further study is necessary to reveal the underlying determinants of this acculturation effect on physical activity behaviour.

In contrast with other studies, no significant associations were found between overweight and acculturation among the Turks and Moroccans.[14;17;24-26] Although, the trend is in expected direction: with greater acculturation being associated with lower levels of overweight. This would indicate that the finding of increased physical activity among the higher acculturated, also leads to a lower prevalence of overweight.

An explanation for the lack of significance might be related to our use of socio-cultural indicators of acculturation, which included cultural orientation (language, media, emancipation) towards the host country and social contacts with ethnic Dutch. These indicators are not stable, but dynamic. It is less likely that recent changes in cultural orientation, are associated with risk factors that develop slowly over time, as is the case for overweight. Longitudinal studies would be necessary to explore whether the sociocultural aspects of acculturation might effect overweight across the life span.

The fact that acculturation had hardly an effect on physical inactivity among men, might be understood when taking into account the fact that young Turkish and Moroccan men are already as active as ethnic Dutch men, whereas Turkish and Moroccan women are much more inactive compared to ethnic Dutch women.[43] Assuming that acculturation leads to an adaptation to the health behaviour of ethnic Dutch, it is not strange that acculturation was not clearly associated with physical inactivity among men.

In conclusion, this study indicated that among Turkish and Moroccan women overweight is related to socioeconomic position (i.e. level of education) and physical inactivity is strongly

related to level of acculturation and the importance of religion. Among men however, hardly any associations were found. Based on our results we suggest that gender differences in the role of these underlying determinants should be taken into account when targeting health promotion programs to these ethnic groups. More specifically, our study findings indicate that prevention programs that aim to reduce overweight in Turkish and Moroccan women might benefit from focusing on women with low socioeconomic position and a low degree of orientation towards the culture of the host population. Among men, however, both lower and higher socioeconomic groups should targeted as overweight is highly prevalent regardless of their socioeconomic position. Further research is needed to understand the underlying mechanisms of the associations we found. We suggest that the moderating role of factors such as gender should be considered in these studies.

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4

Why does prevalence of overweight differ between first and second generation ethnic groups? A study among young Turkish and Moroccan people in the Netherlands

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Abstract

Background

Overweight appears to vary between first and second generation ethnic groups, with sometimes increasing and sometimes declining rates across generations. To better understand these patterns, we tested which social determinants underlie these differences.

Methods

We used cross sectional data from the LASER-study in which information on health related behaviour was gathered among first and second generation Turkish and Moroccan men (n=334) and women (n=339) aged 15-30. Participants were interviewed during a home visit. Overweight was defined as a Body Mass Index (kg/m^2) ≥ 25. Using a logistic regression model, we tested whether sociodemographic, socioeconomic, acculturation, religious or migration related factors could account for differences in overweight between first and second generation ethnic groups.

Results

Second generation women were less often overweight than first generation women, and this association was accounted for by the better socioeconomic position (e.g. higher level of education) of second generation women. Among men, none of the potential determinants were associated with overweight and as a result these factors could not account for the higher prevalence of overweight in second generation men.

Conclusion

These results seem to indicate the importance of improving the socio-economic position of women belonging to ethnic minority groups for the reduction of overweight in these groups. Further research is necessary to understand the higher prevalence of overweight in second generation men compared to first generation men. We suggest that early childhood conditions (parental socioeconomic position and cultural environment) should be taken into account.

Introduction

Non-Western populations living in Western European countries generally have higher rates of overweight and obesity compared to host populations.[1-3] Several studies have shown that there appears to be a large variation in overweight according to generational status of ethnic groups.[4-9] Most studies compare persons who are foreign born (first generation) with persons who are born in the host country while one of both parents was born abroad (second generation). The changes in overweight across these two generations do not show a consistent pattern. In some ethnic groups the already higher rates of overweight in first generation increase even further in the second generation, whereas in other groups it converges towards the lower rates in the host population.[4-6;9]

To better understand these differences in overweight between generations, we need insight into the mechanisms that underlie these patterns. Previous studies have shown that second generation ethnic groups are generally higher educated, have better positions at the labour market and are more socially and culturally integrated in the host culture, compared to first generation ethnic groups.[10;11] Other studies have shown that these processes are also associated with body weight. Generally, a better socioeconomic position leads to lower rates of overweight in several ethnic groups, although the strength of the association varies by ethnicity and gender.[12-15] Mixed results have also been found for the influence of acculturation, when measured by language use or cultural orientation. Greater preference for English language has often been associated with lower prevalence of overweight among groups with already high rates of overweight such as Mexican Americans in the US.[16-19]

Given these results of generally lower rates of overweight in higher socio-economic groups and in acculturated groups, we expect the lower rates of overweight in second generation ethnic groups to be partly the result of greater acculturation and improvements in socioeconomic position. We will test this hypothesis in the present study. This could not explain, however, why in some groups the prevalence of overweight increases instead. Does this imply that in these groups the well-known negative association between socio-economic status and overweight, for example, is lacking? And if so, which explanations might play in role instead? Additional explanations might be found in sociodemographic or migration-related factors, such as marital status and region in the country of origin were families come from.[20-22] Furthermore, in particular among Muslim ethnic groups their adherence to the Islam might be related to health related behaviours as diet and physical activity and may therefore play a role in changes in weight across generations. Religion may pose barriers, for example, for physical activity behaviour. This might reflect higher rates of overweight among persons who perceive religion as very important.[23;24]

The objective of this study is to assess to what extent the described social determinants could account for the differences in overweight between first and second generation ethnic groups. We focussed on two large ethnic groups in the Netherlands, Turkish and Moroccan young men and women (aged 15-30). They make up the largest portion of non-Western population in

several other European countries as well (i.e. Germany, Sweden, France), and their number will increase in the next decennia.[11;25;26] This underlines the need for understanding the processes that can explain the differences in overweight across generations.
More specifically, we will answer the following research questions: 1) How does prevalence of overweight differ between first and second generation young Turks and Moroccans? 2) Which social determinants are related to overweight and generation within these groups? 3) To what extent do these social determinants account for differences in overweight between the two generations? The results will be presented for men and women separately.

Methods

We analyzed data collected in 2003-2004 in the LASER study (Lifestyle among young people in Amsterdam: a Study among Ethnic gRoups). The aim of this study was to gain insight into health-related risk factors and its determinants among young Turks and Moroccans living in Amsterdam, the Netherlands. For this study, a random sample was drawn from the Amsterdam population registry, which included people between the ages of 10 and 30 years of age who were either born in Turkey or Morocco or had at least one parent who was born in one of those countries. During a home visit, trained interviewers with a similar ethnic background and sex as the participant, conducted face-to-face interviews using a structured questionnaire. This questionnaire was forward- and back-translated into Turkish and Moroccan-Arabic by professional translators. To ensure the meaning of the questions did not change, the translations were discussed with the researcher and the translators.
The Turkish sample consisted of 1,556 persons. Approximately 13% of the participants could not be traced because of incorrect address information. Of the 1,354 persons that could be traced, 768 participated in the study (57%). Most cases of "non-response" were refusals to participate (32%) and some of them could not be reached after three attempts (12%). The Moroccan sample consisted of 995 persons, 12% of whom had incorrect address information. Of the 872 persons who could be traced, 476 participated in the study (55%). Within the non-response group, 26% refused to participate and about 19% could not be reached after three attempts. For the current study we only included participants aged 15 to 30, which resulted in 437 women and 359 men. Due to missing or invalid data on weight and height, the total number of participants used in analyses were 339 women and 334 men. The reason for excluding the 10-14 years olds is firstly, the fact that 90% of this group belongs to the second generation, which would lead to less reliable assessment of generational differences. In addition, we assume that the influence of socioeconomic and cultural determinants of overweight might be less visible within this young age group .

Overweight

Body mass index (BMI) was calculated as weight (kg) divided by height (m^2). For people of 18 years and older, overweight was defined as a BMI of 25 or higher. For people between 15 up

to 17 years, we used the recommended sex and age-adjusted cut-off points.[28] Participants' weight and height were measured during the home visit in 57% of the cases (n=392). Weight was measured (using an electronic scale) to the nearest 0.1 kg after removal of shoes, jackets, heavier clothing and pocket contents. Height was measured twice without shoes, standing in an upright position with a measuring tape and a lineal to the nearest 0.1 cm.

Due to logistical problems, not all interviewers had the equipment for measuring weight and height during the interview. In most of these cases (which were completely random), participants were asked to report their weight and height. On the remaining cases we had missing data, therefore the number of participants is smaller in the analyses on overweight. To assess whether the different methods of data collection influenced our results on overweight and average BMI between the measured and the self reported group we did additional analyses. Among both males and females we found no significant differences in overweight between the measured and the self reported group, although the prevalence rates among females were lower in the self reported group (29% versus 36% in the measured group, p = 0.110). In both the measured and the self reported group among males, 31% was overweight (p=0.532). Furthermore, we tested (with Mann-Whitney test for non-parametrical tests) whether average BMI differed between the measured and the self reported group. These analyses indicated there was no significant difference for male participants (mean BMI =23.88 (SD 3.60)) and the self-reported males (mean BMI= 23.55 (SD 3.17) with p = 0.590). However, in females we found a significant higher BMI in the measured group (mean BMI =24.46 (SD 4.71)) compared to the self-reported data (mean BMI=23.38 (SD 4.29) with p=0.032). Consequences of this measurement issue for the results of the study are discussed in the limitations section of this paper.

Generational status

Participants born in Turkey or Morocco were classified as first generation. The second generation consists of participants who were born in the Netherlands and had at least one parent born in Turkey or Morocco.

Sociodemographic factors

Age and ethnicity were treated as confounders in the relationship between overweight, generational status and the potential determinants. Marital status and having children were considered as potential explanatory factors in the association between overweight and generational status.

Socioeconomic position

Firstly, *educational level* was indicated by the highest level of education attained for people who finished school. For people who were currently following a course of study we used the current level of education. Educational level was categorized as "low" when people had no education or only a primary school education and "moderate" when people had lower- to

intermediate-level vocational training. Participants were considered to have higher levels of education when they had completed higher professional education or university.
To justify this categorisation for students as well as non-students, we like to refer to the fact that, unlike in other European countries (such as the UK), the educational system in the Netherlands is characterized by the process of streaming. This implies that pupils from the age of 12 years start an educational program at a certain level. This starting position is a good predictor for the level of education they will finally achieve and is also associated with their future position at the labour market.[28]
Secondly, *position at the labour market* was measured by the current 'main activity' of participants in daily life. We divided the participants into four categories: 1) unemployed participants, 2) homemakers, 3) participants in paid employment, and 4) students, who were currently following a course of study. Among men there was only one homemaker, therefore this category was left out within the logistic regression analyses in men.
Thirdly, we measured *occupational status* in which persons were categorized according to the highest occupational status within the family. For adolescents who were still living with their parents we used the highest occupational position of father or mother. In cases that one or both parents were retired, we used the level of occupation they finally had before retirement. For young adults with their own household, we used the highest occupation of the participant and his/her partner. The following categories were distinguished: 1) manual occupation (e.g. cleaning jobs), 2) non-manual occupation (e.g. administrative work), 3) unemployed and 4) students.

Migration related factors

Region of origin was measured by asking participants if they (themselves or their family) originally came from a small village/city or from a big city in the country of origin.
In addition participants were asked what was the *main reason for migration* to the Netherlands. First generation participants answered this question for themselves and second generation were asked to indicate the main reason for migration of their parents. The reasons were divided in: came with parents, family reunion/marriage or economic reasons (education or employment).

Acculturation

The indicators of acculturation were based on Berry's approach whereby this position is considered in terms of orientation towards the majority culture versus culture of origin and social contacts with the host population versus contacts with people from culture of origin.[30] This resulted in the following components:
Firstly, *cultural orientation* was measured by 10 items about language use with family members and friends, use of media, difficulties with reading Dutch, shopping preferences and emancipation as example of Western norms and values.[30;31] The cultural orientation scale was constructed using principal component analysis and reliability analysis (alpha = .64).

Secondly, *social contacts* were measured by three questions about contacts with native Dutch people during leisure time (e.g., How many of your best friends are ethnic Dutch?) (alpha = .84). For both scales, the scores on the items in each scale were summed up and a mean substitution was made for cases where one item was missing. The scales were categorized in tertiles in order to denote an individual's cultural position, with subjects in the first tertile being the least oriented towards the majority culture (or having the least contacts with ethnic Dutch) and those in the third tertile being the most oriented towards the majority culture (or having the most contacts with ethnic Dutch).

Religion

In addition, we measured the perceived importance of religion which was scored on a 4-point scale ranging from not important at all (1) to very important (4). Participants who indicated that religion was very important were categorized as one group versus the people who indicated that religion was only slightly to moderately important to them (score 1-3).

Analyses

Firstly, to assess to what extent the potential determinants differed between the generations, we calculated unweighted percentages by gender and generational status using cross tabulations with Chi-square tests. Secondly, of all the potential determinants we selected the ones that showed a p-value of less than 0.250 and assessed whether these factors were associated with overweight using logistic regression analyses. Thirdly, to test which factors could account for the generational differences in overweight, we added the factors (independently) to a model with generational status to see whether the significant association disappeared when including the potential mediators. All logistic regression analyses were adjusted for age and ethnicity. Results are presented in Odds Ratio's (OR) with 95% Confidence Intervals (CI).

Results

Table 1 shows the characteristics of the sample by gender and generational status. First generation ethnic groups were generally older, more often married and more frequently had children compared to the second generation. Approximately two third of the first generation migrated after the age of 6 to the Netherlands, Among women, we found more significant generational differences in socioeconomic position than among men, with second generation women being higher educated than first generation women. Among women, the first generation came more often because of marriage of family reunion, while the second generation (or their family) came mostly for economic reasons (education or employment). Also the cultural and religious factors generally differed between the generations with lower cultural orientation, with fewer social contacts and religion being more important among the first generation. These associations were slightly stronger in women compared to men.

Table 2 presents the associations between the factors from Table 1 that showed a trend of differentiation between the generations ($p < 0.250$). Overall, the sociodemographic (marital status and having children) and socioeconomic factors (level of education, position at the labour market) were significantly associated with overweight among women, but not in men. Unmarried women were less often overweight than married women with odds of 0.19 (CI: 0.09-0.39) among unmarried women. Women without any children showed a trend, with odds 0.54 (CI: 0.29-1.00). In addition, women with a moderate to high level of education were less often overweight (OR respectively: 0.29, CI: 0.14-0.60 and OR: 0.16, CI: 0.07-0.37 than those with a low level of education (primary education only or no education). Also position at the labour market was associated with overweight: women who were following a course of study (students) were less often overweight than the unemployed or homemakers (OR: 0.23, CI: 0.08-0.63). Among men, ethnicity was significantly associated with overweight, with Turkish men being overweight more often than Moroccan men (OR: 2.02, CI: 1.14-3.59). The migration related factors and the cultural and religious factors were not significantly associated with overweight nor among women, nor among men.

Table 1. Characteristics of study population by gender and generational status

	Turkish and Moroccan men N = 334			Turkish and Moroccan women N = 339		
	1st generation N= 126 % (n)	2nd generation N= 208 % (n)	p-value men	1st generation N= 160 % (n)	2nd generation N= 179 % (n)	p-value women
Overweight (BMI ≥ 25)	27.8 (35)	32.7 (68)	.210	45.0 (72)	21.8 (39)	.000
Sociodemographic factors						
Age			.000			.000
15-19	39.7 (50)	60.1 (125)		21.9 (35)	60.3 (108)	
20-24	22.2 (28)	25.5 (53)		16.9 (27)	23.5 (42)	
25-30	38.1 (48)	14.4 (30)		61.3 (98)	16.2 (29)	
Ethnicity			.225			.031
Turkish	71.4 (90)	66.8 (139)		63.1 (101)	52.5 (94)	
Moroccan	28.6 (36)	33.2 (69)		36.9 (59)	47.5 (85)	
*Age at migration of 1st generation**						
> 6th year	63.9 (78)	-		67.1 (106)	-	
< 6th year	36.1 (44)	-		32.9 (52)	-	
*Years of residence- 1st generation**						
<12 years	46.8 (58)	-		42.5 (68)	-	
> 12 years	53.2 (66)	-		57.5 (92)	-	
Marital status (married)	35.7 (45)	15.9 (33)	.000	60.0 (96)	22.3 (40)	.000
Having children living at home	26.2 (3)	12.5 (26)	.001	56.3 (90)	19.6 (35)	.000
Socioeconomic factors*						
Educational level			.281			.000
Low	11.7 (14)	6.9 (14)		28.4 (44)	3.4 (6)	
Moderate	58.3 (70)	64.9 (131)		50.3 (78)	67.6 (119)	
High	30.0 (36)	28.2 (57)		21.3 (33)	29.0 (51)	
Position at labour market (individual)			.002			.000
Unemployed	10.4 (12)	6.0 (12)		12.7 (20)	7.3 (13)	
Homemaker	-	-		35.7 (56)	7.9 (14)	
Employed	44.3 (51)	28.4 (57)		24.2 (38)	18.6 (33)	
Students	45.2 (52)	65.7 (132)		27.4 (43)	66.1 (117)	
Occupational status (family)			.052			.433
Unemployed	26.2 (28)	37.2 (64)		28.1 (39)	35.6 (57)	
Manual occupation	47.7 (51)	37..8 (65)		38.8 (54)	37.5 (60)	
Non-manual occupation	22.4 (24)	16.3 (28)		29.5 (41)	25.0 (40)	
Students	3.7 (4)	8.7 (15)		3.6 (5)	1.9 (3)	
Migration related factors*						
Region of origin			.138			.116
Big city	41.3 (50)	34.6 (71)		35.8 (57)	57.1 (100)	
Small city/village	58.7 (71)	65.4 (134)		64.2 (102)	42.9 (75)	
Reason for migration			.619			.000
Came with parents	8.1 (10)	10.7 (22)		11.3 (18)	13.6 (24)	
Family reunion/mariage	13.7 (17)	11.2 (23)		37.5 (60)	15.8 (28)	
For economic reasons	78.2 (97)	78.0 (160)		51.3 (82)	70.6 (125)	
Acculturation*						
Cultural orientation			.042			.016
1st tertile: least oriented towards Dutch culture	37.6 (47)	22.7 (46)		56.8 (88)	14.1 (25)	
2nd tertile	31.2 (39)	38.4 (78)		24.5 (38)	38.4 (68)	
3rd tertile: most oriented towards Dutch culture	31.2 (39)	38.9 (79)		18.1 (29)	47.5 (84)	
Social contacts			.014			.000
1st tertile:least contacts with ethnic Dutch	48.0 (60)	34.3 (70)		49.4 (79)	36.5 (65)	
2nd tertile	30.4 (38)	35.8 (73)		31.9 (51)	32.6 (58)	
3rd tertile: most contacts with ethnic Dutch	21.6 (27)	29.9 (61)		18.8 (30)	30.9 (55)	
Religion *very important**	68.0 (83)	56.1 (110)	.022	72.9 (113)	70.5 (124)	.356

* Numbers do not exactly add to total number of participants due to missing cases on these variables.

Table 2. Potential determinants of overweight among Turkish and Moroccan men and women (aged 15-30yr). Presented are the odds ratio's (OR) with 95% Confidence Intervals (CI), adjusted for age and ethnicity.

	Men N= 334 OR (95%CI)	p-value	Women N = 339 OR (95%CI)	p-value
Sociodemographic factors				
Age		.000		.000
25-30	1.00		1.00	
20-24	0.64 (0.33-1.21)		**0.45 (0.24-0.83)**	
15-19	**0.31 (0.17-0.55)**		**0.24 (0.14-0.41)**	
Ethnicity		.016		.905
Moroccan	1.00		1.00	
Turkish	**2.02 (1.14-3.59)**		1.03 (0.63-1.67)	
Marital status		.786		.000
Married or cohabiting	1.00		1.00	
Not married or cohabiting	0.90 (0.43-1.91)		**0.19 (0.09-0.39)**	
Children		.757		.051
Children (living at home)	1.00		1.00	
No children (living at home)	0.90 (0.45-1.79)		**0.54 (0.29-1.00)**	
Socioeconomic position				
Educational level		.616		.000
Low	1.00		1.00	
Moderate	1.25 (0.52-3.01)		**0.29 (0.14-0.60)**	
High	0.95 (0.37-2.44)		**0.16 (0.07-0.37)**	
Position at labour market (individual)				
Unemployed	1.00		1.00	
Homemaker	-		1.47 (0.63-3.44)	
Employed	0.97 (0.39-2.44)		0.59 (0.25-1.37)	
Students	0.61 (0.22-1.72)		**0.23 (0.08-0.63)**	
Occupational status (family)				
Unemployed	1.00	.891	1.00	.989
Manual occupation	0.95 (0.49-1.84)		1.01 (0.53-1.92)	
Non-manual occupation	1.25 (0.57-2.74)		1.03 (0.51-2.04)	
Students	1.16 (0.36-3.76)		1.35 (0.25-7.35)	
Migration related factors				
Region of origin		.274		.331
big city	1.00		1.00	
small city/village	1.37 (0.78-2.39)		1.28 (0.78-2.10)	
Reason for migration		.517		.435
came with parents	1.00		1.00	
family reunion/mariage	0.81 (0.27-2.44)		1.43 (0.61-3.36)	
for economic reasons (work/education)	1.24 (0.52-2.99)		1.00 (0.46-2.19)	
Acculturation				
Cultural orientation		.877		.425
1st tertile: least oriented towards Dutch culture	1.00		1.00	
2nd tertile	0.87 (0.46-1.62)		0.67 (0.37-1.23)	
3rd tertile: most oriented towards Dutch culture	0.99 (0.54-1.81)		0.86 (0.46-1.59)	
Social contacts		.917		.175
1st tertile:least contacts with ethnic Dutch	1.00		1.00	
2nd tertile	1.02 (0.57-1.83)		0.58 (0.33-1.03)	
3rd tertile: most contacts with ethnic Dutch	1.13 (0.62-2.07)		0.80 (0.44-1.48)	
Religion				
very important	1.00	.518	1.00	.229
normally/less important	1.18 (0.71-1.95)		0.71 (0.41-1.24)	

The base model in Table 3 shows the significant association between overweight and generational status for both men and women. Second generation women are less often overweight than first generation women (OR: 0.53, CI: 0.19-0.90), whereas among men, the second generation is more often overweight than the first generation (OR: 1.89, CI: 1.09-3.24).
When adding the different factors separately into this model, we found that among women the socioeconomic factors seem to account for the association between generation and overweight. The odds decreased from OR: 0.53 (CI, 0.19-0.90) to OR: 0.77 (CI: 0.40-1.46) and became non-significant. However, among men, none of the models contributed to the explanation of the generational differences found, due to the fact that none of the potential determinants was associated with overweight in men.

Table 3. Associations between generational status and overweight for Turkish and Moroccan men and women (aged 15-30 yr) within 5 different models. All models are adjusted for age and ethnicity.

	Men N= 334 OR (95%CI)	Women N = 339 OR (95%CI)
Base Model (BM): Generational status, age, ethnicity		
First generation	1.00	1.00
Second generation	1.89 (1.09-3.24)	0.53 (0.19-0.90)
Model 1: BM + Sociodemographic factors		
First generation	1.00	1.00
Second generation	1.90 (1.10-3.28)	0.56 (0.32-0.97)
Model 2: BM + Socioeconomic position		
First generation	1.00	1.00
Second generation	2.29 (1.19-4.42)	0.77 (0.40-1.46)
Model 3: BM + Migration related factors		
First generation	1.00	1.00
Second generation	1.92 (1.08-3.40)	0.59 (0.34-1.01)
Model 4: BM + Acculturation and religion		
First generation	1.00	1.00
Second generation	2.03 (1.15-3.60)	0.50 (0.28-0.90)

Discussion

In this study we tested which factors underlie the differences in overweight between first and second generation Turkish and Moroccan young people in the Netherlands. Of all the potential factors, it appeared that the socioeconomic factors accounted for the lower prevalence of overweight in second generation women. No explanations were found for the higher prevalence found in second generation men due to a lack of associations between the potential determinants and overweight in this group.
The results of this study should be interpreted with the following cautions in mind. Firstly, we used cross sectional data which implies that no causal inferences could be made about the

social determinants of overweight that were included in the study. The association between socioeconomic position and overweight, might be due to a negative effect of being obese on opportunities in education and employment and as a result lead to a less favourable socioeconomic position among overweight people.[32] However, there is also evidence from longitudinal studies that changes in socioeconomic position have consequences for body weight.[15]

Secondly, due to logistical problems during data collection, we were not able to measure height and weight of all participants during the home visits. Therefore, when no equipment for measurement was available, we asked participants to report their weight and height. Generally, it is assumed that self reported measures lead to an underestimation of the actual prevalence rates of overweight in a population.[33;34] However, additional analyses, showed that there were no significant differences between the measured and the self-reported group in prevalence of overweight, nor in men nor in women (see method section). Although, among women the average BMI was higher in the measured group. This would had affected the associations found in this study when the number of measured versus self-reported participants would not be equally divided according to the variables used in this study (i.e. generational status, socioeconomic and cultural factors). However, it appeared that the different methods were equally represented within the used variables (tested with chi-square tests), implying that associations with overweight were unlikely to be affected by the difference in weight/height measurement.

Finally, the finding that among males overweight was significantly higher in Turkish than in Moroccan males, might indicate that we should have conducted separate analysis for both groups. However, in both groups the associations with generation and the determinants of overweight all pointed out in the same direction. Therefore, we assume that this difference in prevalence rates would not have affected our main results.

The finding that the socioeconomic factors were associated with overweight in women and not in men is in line with results from other studies.[14] Among women, in particular level of education seemed to explain the overweight differences between the generations, whereas young Turkish and Moroccan men of the second generation seem to have no health benefits as a result of higher educational levels. The lack of this beneficial effect might even be considered the cause of the increasing rate of overweight. Further research is necessary to understand why a higher education in these groups does not 'protect' against overweight.

Due to a lack of associations between the acculturation indicators and overweight in both women and men, we did not find indications that a process of acculturation underlies the generational differences in overweight. Some studies suggest that when understanding acculturation as a bidimensional process with different types of acculturation patterns, it might be hypothesized that bicultural individuals have the lowest risk for adapting to unhealthy behaviours such as sedentary behaviour and unhealthy diet, whereas the marginalized individuals may be the most vulnerable for taking over unhealthy aspects of the 'Western

lifestyle'.[19;35] This might possibly explain the high prevalence of overweight in second generation young Turkish and Moroccan men in our study, as they may be less bicultural oriented. Therefore, we suggest that in further research, a more differentiated measure of acculturation should be used in order to explore whether certain acculturation patterns can explain differences in health related risks between generations.

Furthermore, the additional determinants of overweight that we assessed (migration-related and religious factors), were not associated with overweight and could therefore not explain the generational differences. Regarding a lack of associations between these potential determinants and overweight we assume that generation (country of birth) reflects also other phenomena that are related to the development of overweight, that were not included in our study. For example, there is growing evidence that socioeconomic conditions across the life course can influence current health. For example, *childhood* socioeconomic status may be more predictive for adulthood obesity than socioeconomic position during adulthood.[36] The childhood experiences of first generation groups are most likely to be different from those of second generations considering their different migration history.[37-39] The importance of the conditions during childhood and across the life span, might also explain why most of our measures of *actual* socioeconomic position could not account for the differences between generations of Turkish and Moroccan young men.

Conclusions

In this study we explored the mechanisms underlying generational differences in overweight between first and second generation Turkish and Moroccan men and women. The higher prevalence in second generation men could not be explained by the potential determinants of overweight. This was due to the fact that none of these determinants were associated with overweight in men. To better understand these generational trends, in particular among men, we suggest further research that focuses on a multidimensional measurement of acculturation, on the measurement of circumstances during early childhood (socioeconomic, cultural), and on the factors that explain why a higher socio-economic position in these groups does not 'protect' against overweight. Among women, the higher prevalence of overweight in second generation was accounted for by socioeconomic factors. These results thus seem to indicate the importance of improving the socio-economic position of women belonging to ethnic minority groups for the reduction of overweight in these groups.

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5

Acculturation does not necessarily lead to increased physical activity during leisure time: a cross-sectional study among young Turkish people in the Netherlands

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Abstract

Background

Non-Western migrant populations living in Western countries are more likely to be physically inactive during leisure time than host populations. It is argued that this difference will disappear as they acculturate to the culture of the host country. We explored whether this is also true for migrants who experience contextual barriers such as having children, living in a less attractive neighbourhood, or having occupational physical activity.

Methods

Cross-sectional data were obtained from the LASER-study (2003-2004) on health related behaviours in first and second generation Turkish young people living in the Netherlands. For this study we included 485 Turkish participants aged 15-30 years, who participated in a structured interview during a home visit. Acculturation was indicated by level of 'cultural orientation towards the Dutch culture' and 'social contacts with ethnic Dutch' with persons being low oriented towards the Dutch culture and having few social contacts with ethnic Dutch as reference group. The measured barriers were 'having children', 'occupational physical activity' and 'living in a less attractive neighbourhood'. Logistic regression analyses were used to assess the associations between acculturation and physical activity during leisure time, stratified by these contextual barriers.

Results

Greater cultural and social integration was associated with increased physical activity during leisure time. Odds ratio's were 1.85 (CI: 1.19-2.85) for 'cultural orientation' and 1.77 (CI: 1.15-2.71) for 'social contacts with ethnic Dutch'. However, these associations were not present or less strong among people who had children, or who were living in a less attractive neighbourhood or who engaged in occupational physical activity.

Conclusions

Physical activity during leisure time increased with greater acculturation, however, this relationship was found only among participants without children, living in a attractive neighbourhood and having no occupational activity. Interventions aimed at migrant populations should not only focus on the least integrated. Instead, effectiveness might be enhanced when interventions are sensitive to the contextual barriers that might inhibit physical activity behaviours during leisure time.

Introduction

Physical inactivity is currently acknowledged to be a serious public health burden in the industrialized world.[1;2] A large body of evidence shows that regular physical activity reduces the risk of death from several conditions including coronary heart disease, hypertension, obesity and diabetes type II.[3-7] Despite the known beneficial health effects of physical activity, two- thirds of the population living in Europe does not achieve the minimum recommended amount of physical activity.[8] While the level of inactivity among the general population is high, non-Western migrants living in Western countries have an even greater risk of being physically inactive.[9-12] This applies, amongst others, to the Turkish migrants in Western European countries, such as the Netherlands and Sweden.[13-16]

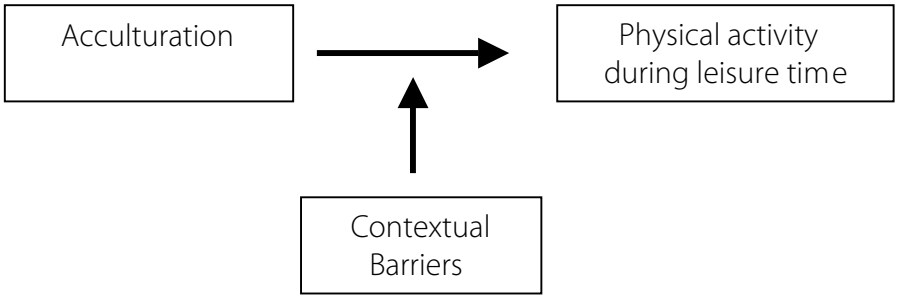
Previous studies have indicated that the level of physical activity among migrant populations converges towards the level in the host population with greater language fluency, increasing numbers of stay in the host country or with increasing generational status.[17-20] These factors are considered to be indicators of the level of 'integration' into the host society, which is often referred to as the process of acculturation.[21] One of the earliest definitions of acculturation is as follows: "Culture change that is initiated by the conjunction of two or more autonomous cultural systems. Its dynamics can be seen as the selective adaptation of value systems, the process of integration and differentiation (..)".[21]

Parallel to the studies on acculturation, attention has increasingly focused on barriers for physical activity resulting from the social and environmental context, as is often embedded in ecological models.[22-24] It has, for example, been shown that people living in neighbourhoods with few sidewalks, a high volume of traffic, no aesthetic attributes or high crime, i.e. a less attractive neighbourhood, are less likely to engage in physical activity than those who live in more attractive and more exercise-supportive areas.[24-31] Moreover, having children can function as a time-barrier for physical activity. Child care, often in combination with household activities, decrease the opportunities to be physically active, in particular during leisure time.[32-34] Furthermore, engaging in physical activity at work has also been found to have a negative influence on leisure time activity.[35]

However, the studies on the association between acculturation and physical activity have largely neglected the effect of contextual barriers. This might be seen as an omission in these studies, as most contextual barriers are in general even more prevalent among migrant than among host populations, due in part to the lower socioeconomic status of most migrant populations.[11;36]

Therefore, the objective of our study was to gain insight into how the association between physical activity during leisure time and acculturation, measured by cultural and social integration, might be modified by the following contextual barriers: having children, occupational physical activity or living in a less attractive environment. Figure 1 illustrates the associations we studied. We analysed this among the Turkish population in the Netherlands, one of the largest ethnic minorities in several other Western European countries as well.[37;38]

Figure 1



Methods

Cross-sectional data were obtained from the LASER study (Lifestyle in Amsterdam: Study among Ethnic gRoups) on prevalence and determinants of health-related behaviour among two non-Western migrant populations in the Netherlands, including the Turkish migrants. Data collection took place from April 2003 until December 2004. This study has been approved by the Medical Ethical Commission of the Academic Medical Centre in Amsterdam, the Netherlands. A random sample was drawn from the Amsterdam population registry which included people born in Turkey or people who were born in the Netherlands, but have one of both parents being born in Turkey. This implies that the term 'migrants' as used in this study, includes individuals of the first as well as of the second generation. Participants received a letter of invitation, including a translated version in Turkish. Interviewers of Turkish origin and of the same sex as the participant, visited the participants' homes and requested their cooperation for an interview. A written informed consent was obtained from each participant in the study. A structured questionnaire was used that included questions about health-related behaviour and determinants, among which socio-economic position, migration history and acculturation. Prior to the study, the questionnaire had been forward and back-translated by professional Turkish translators. Translations were discussed with the researcher and the translators to ensure that the meaning of the questions did not change.

The total sample consisted of 1556 persons with a Turkish origin, aged 10-30 years. Approximately 13% could not be traced because of incorrect address information. Of the 1354 respondents that could be traced, 768 participated in the study (57 %). Most cases of 'non response' were refusals to participate (32 %) or the persons could not be reached after three attempts (12 %).

For the current study we only included participants of 15-30 years of age, resulting in 236 men and 249 women. We used 15 years as our lower age cut-off point because we expected acculturation to have less effect on physical activity among children below this age.[39] In addition, the greatest decline in physical activity is generally found in adolescence between 13-16 years of age.[40;41]

Physical activity during leisure time

Physical activity during leisure time was assessed using one component of the Short QUestionnaire to ASsess Health enhancing physical activity (SQUASH) which includes questions about sports and other leisure time activities like walking, cycling, gardening and doing odd jobs during leisure time.[42] This instrument is comparable with the International Physical Activity Questionnaire (IPAQ).[43] Dancing was added to the questionnaire since it is a common activity among Turkish girls and women. Total minutes of activity were calculated by multiplying frequency (days/week) by duration (min/day). Activity scores for separate questions were calculated by multiplying total minutes of activity by the intensity score. All activities were coded according to the Compendium of Physical Activities of Ainsworth.[44] The intensity score was expressed in MET's (i.e. metabolic equivalent or number of times resting metabolic rate). Subjects were classified as being active *during leisure time* when they undertook at least 30 minutes (or 60 minutes for people under the age of 18) of moderate activity per session at least one day a week. The main reason for this definition is the fact that more than half of the participants were not participating in any leisure time physical activity. Therefore, we considered the distinction between any activity versus none relevant for this population.
For people aged younger than 18 years, the cut-off point for moderate activity was 5 MET or higher and 4 MET or higher for people aged 18 and older.[45]

Indicators of acculturation

The indicators of acculturation were based on Berry's approach whereby acculturation is considered in terms of orientation towards the majority culture versus culture of origin and social contacts with the host population versus contacts with people from culture of origin.[46] This resulted in the following two components:
'Cultural orientation' was measured by 10 items about language use with family members and friends, use of media, difficulties with reading the Dutch language, shopping preferences and emancipation as an example of Western norms and values.[47;48] The cultural orientation scale was constructed using principal component and reliability analysis (alpha = 0.64).
'Social contacts with ethnic Dutch' were measured by three questions about contacts with ethnic Dutch people during leisure time (alpha = 0.84).
The scores on the items in each scale were summed and a mean substitution was made for cases where one item was missing. To distinguish between the lower and the higher acculturated persons, the upper third was categorized as being high acculturated and the remaining two third as being low acculturated. Using this categorization we had large enough numbers of participants within the different subgroups to perform stratified analyses.

Contextual barriers

Physical environment of the neighbourhood was assessed by a 19-item list containing neighbourhood characteristics on which participants could agree or disagree on a 4-point scale.[49] The variables included availability of sidewalks, availability of cycle lanes, neighbourhood

aesthetics, perceived safety from crime and perceived safety from traffic. People who scored negatively on 8 or more items were categorized as living in a less attractive environment.
Occupational physical activity was measured by one question about how many hours a week people were engaging in physical activity at work such as walking a lot or carrying heavy loads. Participants were categorized as being active at work when they participated for at least 30 minutes a day (5 days a week) in occupational activities with moderate intensity (≥4.0 MET).[44]
Children under 16: Participants were asked if they had children under the age of 16 living with them.
Exercise inhibiting or supportive context: we added one overall measure of contextual barriers by dividing the participants into people who experienced at least one of the mentioned barriers (exercise inhibiting context) versus people who experienced none of the mentioned barriers (exercise supportive context).

Analysis

Logistic regression analysis (SPSS 12.0.1 for windows) was used to assess the association between both indicators of acculturation and leisure time physical activity. All analyses were adjusted for age, sex, education and marital status. To assess whether these associations differed by the presence of contextual barriers (having children, occupational physical activity, less attractive neighbourhood), we conducted stratified analyses.[50]

Results

Description of the sample

Of the total study population 44% was born in Turkey (first generation) and 56% in the Netherlands with at least one parent born in Turkey (second generation). Regarding the contextual barriers, approximately one-third of the participants perceived their neighbourhood environment as less attractive or had children under the age of 16. The barrier of occupational physical activity was found among only 16% of the participants (Table 1). Approximately 45% of all participants did not participate in any physical activity during their leisure time.
Table 1 also shows the characteristics according to the participants' level of activity. As expected, the participants with a greater orientation towards the Dutch culture or having more contacts with ethnic Dutch were more often physically active during leisure time than the participants who were less oriented towards the Dutch culture. Participants living in an attractive neighbourhood and the participants without children were more often physically active during leisure time than the participants who did have these barriers. For the overall measure of contextual barriers we also found that the participants with one or more of the mentioned barriers were less often physically active during leisure time than the participants with none of these barriers. For occupational physical activity we found no significant associations.

Table 1 Characteristics of the study population with percentage of the participants who are physically active during leisure time for each characteristic

	Total number of participants N=485 n (%)	**Physically *in*- active participants n (%)**	**Physically active participants n (%)**
Sex			
Men	236 (48.7)	87 (40.3)	149 (55.4)*
Women	249 (51.3)	129 (59.7)	120 (44.6)
Age			
15-19 years	221 (45.6)	99 (45.8)	122 (45.4)
20-24 years	113 (23.3)	44 (20.4)	69 (25.7)
25-30 years	151 (31.1)	73 (33.8)	78 (29.0)
Mean age (sd)	21.6 (5.0)	21.8 (5.2)	21.5 (4.8)
Country of birth			
Born in Turkey	212 (43.7)	105 (48.6)	107 (39.8)*
Born in the Netherlands	273 (56.3)	111 (51.4)	162 (60.2)
Marital status			
Married or cohabiting	167 (34.4)	89 (41.2)	78 (29.0)*
Not married/not cohabiting	318 (65.6)	127 (58.8)	191 (71.0)
Educational level			
Low	226 (46.6)	107 (49.5)	119 (44.2)
Moderate to high	259 (53.4)	109 (50.5)	150 (55.8)
Acculturation indicators[a]			
Cultural orientation			
Low	304 (65.8)	151 (72.2)	153 (60.5)*
High	158 (34.2)	58 (27.8)	100 (39.5)
Social contacts with ethnic Dutch			
Few	346 (72.2)	169 (79.0)	177 (66.8)*
Many	133 (27.8)	45 (21.0)	88 (33.2)
Contextual barriers			
Neighbourhood environment[a]			
Attractive neighbourhood	299 (64.7)	120 (58.5)	179 (69.6)*
Less attractive neighbourhood	163 (35.3)	85 (41.5)	78 (30.4)
Children under 16			
Having no children	322 (66.4)	134 (62.0)	188 (69.9)*
One or more children living at home	163 (33.6)	82 (38.0)	81 (30.1)
Occupational physical activity[a]			
No activity at work	345 (83.9)	204 (94.4)	241 (89.6)*
Activity at work	66 (16.1)	12 (5.6)	28 (10.4)
Overall measure of contextual barriers[b]			
Exercise-supportive (no barriers)	197 (40.6)	73 (34.9)	116 (44.3)*
Exercise-inhibiting (≥1 barrier)	288 (59.4)	136 (65.1)	146 (55.7)
Physical activity during leisure time			
Physically active (≥ once a week)	269 (55.5)		
Physically *in*active	216 (44.5)		

[a] Numbers do not add up to total number of sample due to missing data.
[b] When none of the three barriers (children, less attractive neighbourhood, occupational physical activity) were present, people were categorized as living in an exercise-supportive context. When one or more barriers were present, people were categorized as living in an exercise-inhibiting context.
* P-value <.05

Associations of the acculturation indicators with physical activity during leisure time

Table 2 shows the associations between acculturation and physical activity during leisure time expressed in Odds Ratio's (OR) with 95% Confidence Intervals (CI). These associations are adjusted for age, sex, education and marital status. Both indicators of acculturation were positively associated with physical activity during leisure time. The odds for 'cultural orientation' was 1.85 (CI: 1.19-2.85) and 1.77 (CI: 1.15-2.71) for social contacts (Table 2).

Table 2 Associations[a] of the indicators of acculturation with physical activity during leisure time

	Physical activity during leisure time N=485 OR (95% CI)
Acculturation indicators	
Cultural orientation towards Dutch culture	
Low cultural orientation	1.00
High cultural orientation	1.85 (1.19-2.85)
Social contacts with ethnic Dutch	
Few social contacts with ethnic Dutch	1.00
Many social contacts with ethnic Dutch	1.77 (1.15-2.71)

Table 3 Associations[a] of the acculturation indicators with being physically active during leisure time stratified by the contextual barriers. Presented are the Odds Ratio's (OR) of the higher acculturated groups compared to the lower acculturated groups (reference group).

	Indicators of acculturation	
	Cultural orientation towards the Dutch culture[b]	Social contacts with ethnic Dutch[b]
Contextual barriers[c]	OR (95% CI)	OR (95% CI)
Having no children	**2.18 (1.29-3.71)**	**1.87 (1.11-3.14)**
Children	1.28 (0.52-3.13)	1.85 (0.79-4.33)
No occupational physical activity	**1.76 (1.04-2.96)**	**1.83 (1.08-3.10)**
Occupational physical activity	2.21 (0.69-7.10)	0.95 (0.32-2.87)
Attractive neighbourhood	**2.17 (1.22-3.85)**	**1.76 (1.04-2.99)**
Less attractive neighbourhood	1.24 (0.59-2.58)	1.22 (0.55-2.73)

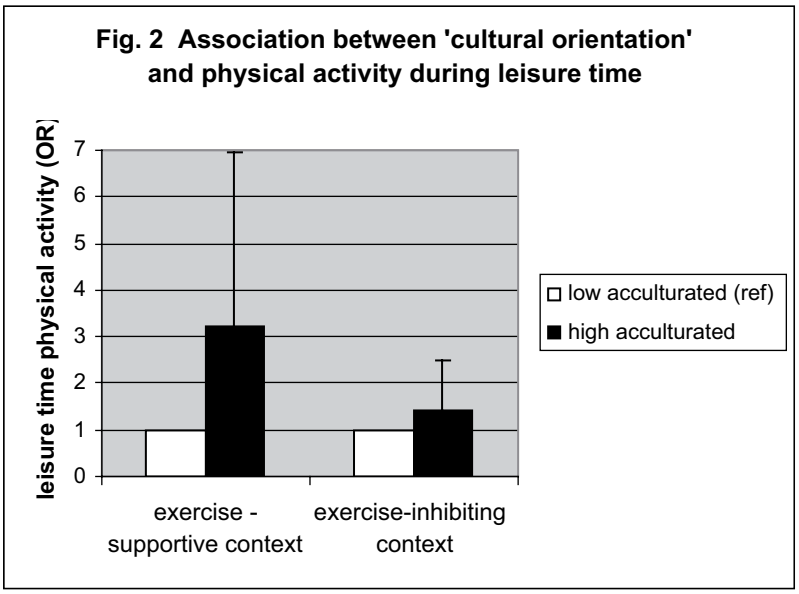
[a] All associations are adjusted for age, sex, education and marital status.
[b] The reference groups are respectively the participants with a *low* cultural orientation towards the Dutch culture and *few* social contacts with ethnic Dutch.
[c] Figures in bold are the groups without the barrier.

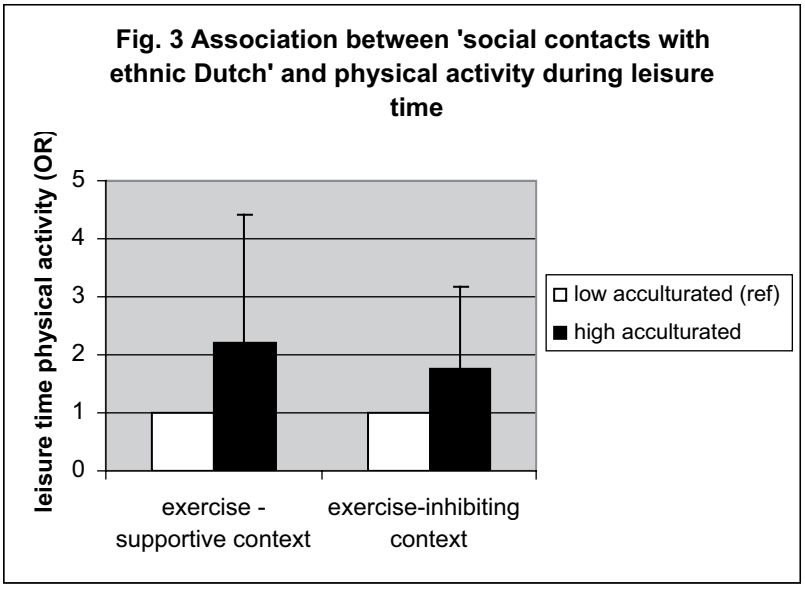
Stratification by the contextual barriers

Table 3 shows the adjusted associations of the acculturation indicators with physical activity during leisure time stratified by 1) having children, 2) occupational physical activity and 3) attractiveness of the neighbourhood. Both indicators of acculturation had a significant influence on physical activity during leisure time among the participants without children, without occupational physical activity and among participants who perceived their neighbourhood as attractive. The odds of 'Cultural orientation' were 2.17 (CI:1.22-3.85) for participants who perceived their neighbourhood as attractive, 2.18 (CI: 1.29-3.71) for the participants without children and 1.76 (CI: 1.04-2.96) for participants without physical activity at work. For 'social contacts with ethnic Dutch' we found similar associations with odds of 1.76 (CI: 1.04-2.99) for the participants who perceived their neighbourhood as attractive, 1.87 (CI: 1.11-3.14) for participants without children and 1.83 (CI: 1.08-3.10) for the participants without occupational physical activity (Table 3). In contrast, among the participants who did experience the mentioned barriers, we found no significant associations between acculturation and physical activity during leisure time. However, in some cases the odds were on a similar or even higher level than within the group without the barrier, though not significant. This was found amongst others for the effect of cultural orientation within the group with occupational physical activity.

In figures 2 and 3, the associations between acculturation and physical activity during leisure time are shown for the participants in an "exercise-inhibiting context" (having at least one of the barriers) versus participants in an "exercise supportive context" (persons without any of the three barriers). This measure was calculated based on the sum score of all three barriers. Cultural orientation was significantly associated with physical activity during leisure time among the participants who did not experience any of the barriers (exercise supportive context: OR 3.24, CI: 1.51-6.96). This association was not found in the group who did experience at least one of the mentioned barriers (exercise inhibiting context: OR 1.40 (CI: 0.79-2.50). A similar, somewhat less strong, result was found for 'social contacts with ethnic Dutch' with Odds of 2.22 (CI: 1.11-4.41) within the exercise supportive context and 1.77 (CI: 0.99-3.18) within the exercise-inhibiting context.

Figures 2-3: Associations of the indicators of acculturation with physical activity during leisure time stratified by the presence of contextual barriers (exercise-supportive versus exercise-inhibiting context).





Discussion

This study explored how the association between acculturation and physical activity during leisure time is modified by the presence of the following contextual barriers: 'having children', 'participating in occupational physical activity' and 'living in a less attractive neighbourhood'. We found that persons with a Turkish background who were more culturally orientated towards the Dutch society and who had more social contacts with ethnic Dutch (i.e. highly acculturated), were more physically active during leisure time than persons who were less acculturated. This pattern, however, appeared to exist in particular among people without children, without participation in occupational physical activity and living in an attractive neighbourhood environment.

Limitations

Before drawing conclusions, some limitations must be mentioned. Firstly, as in many other studies we used cross-sectional data, which implies that no causal relationship between the acculturation indicators and the outcome measure could be demonstrated. For example, the influence of social contacts with ethnic Dutch people on physical activity during leisure time could perhaps be explained by the fact that people who participate in sport have more contacts with ethnic Dutch people. In the current study however, leisure time activities also included activities that were not organized, such as cycling, walking, running in the park or doing exercises at home, which do not necessarily involve more opportunities for contact with ethnic Dutch people. In addition, the main purpose of this study was to investigate the role of the contextual factors in the association between physical activity and acculturation, therefore the cross-sectional study design will not affect our main conclusions.

Secondly, the questionnaire for assessing physical activity during leisure time, was only validated for ethnic Dutch people.[42] To minimize the chance of misinterpretation or difficulties with understanding the questions we tested the questionnaire in a pilot study among young Turkish people and we adjusted the questionnaire to include dancing as a leisure time activity as this is a popular activity among Turkish women in particular. In addition, we used trained Turkish bilingual interviewers to help in cases of difficulties answering the questions.

Interpretations

The finding that more acculturated migrants were more physically active during their leisure time, is in line with results from other acculturation-studies among several ethnic minority populations, such as the Latino-, and Asian Americans in the US.[17;18;20;51;52] This positive association is often explained by the greater exposure to health promotion campaigns by people who speak the native language and who have many contacts with the host population. As a results their attitudes and norms towards physical activity become more similar to those in the host population. These people might also be better informed about the opportunities for physical activities, for example, how and where they can obtain access to sport facilities.

In addition to these studies, the results of the present study indicate that under certain conditions this positive effect of acculturation is not present. We illustrated that barriers such as having children (e.g. time barrier), living in al less attractive environment and participation in occupational physical activity modify the association between acculturation and physical activity during leisure time. Although several social cognitive theories that aim to explain behavioural practices, incorporated 'perceived barriers' in their model, this is often indirectly.[53;54] According to these theories, behaviour will only be performed when a person perceives no barriers that could inhibit his/her behaviour. However, none of the acculturation studies we found paid attention to the role of barriers in the association between acculturation and physical activity. This is in line with the conclusion of Hunt et al. (2004) and Salant et al. (2003), who found, in their review-study, that acculturation-studies in general, do not include contextual factors.[55;56] We suggest further study is necessary to unravel more of the potential contextual barriers that moderate the effect of acculturation on physical activity.

In contrast to most other studies we used a broader measure of acculturation than language use or language proficiency alone, instead we included items on shopping preferences, media use, and emancipation as well, in an attempt to cover a more general 'cultural orientation'. The use of 'language proficiency' or 'language use' as indicators of acculturation has been criticized by others as it would not necessarily reflect the migrants' adherence to the values and norms within the majority culture.[57] However, the majority of studies on acculturation use these indicators as they seem to be strongly related to several health related outcomes.[58] Nevertheless, we suggest that measuring different domains in which people acculturate might be a better reflection of the process of acculturation, than measuring only language use or language proficiency.

We assume that the pattern of varying influence of acculturation depending on the presence of contextual barriers, might also apply to other migrant populations. The positive association of acculturation with physical activity (during leisure time) has already been observed among different ethnic minorities and the barriers we included are acknowledged as important constraints for being physically active.[17;18;20;33;34;51;52] We further expect that our results could be generalized to older populations than those included in our study, as the barriers that we studied are in general more prevalent among adults. The majority of the older migrant adults, belong to the first generation and have on average a greater number of children and a lower socioeconomic position (e.g. more job related physical activity and living in less attractive neighbourhoods) than the young population that we studied.[59]

Implications for health promotion

Our findings provide indications to suggest that the level of physical activity during leisure time in non-Western migrant populations will not necessarily increase as a consequence of greater 'integration' in the host society among people with children, who participate in occupational physical activity or who are living in a less attractive neighbourhood. Therefore, we suggest that interventions aimed at specific ethnic groups with high prevalence rates of physical inactivity

remain necessary. More specifically, our findings might imply that interventions aimed at promoting physical activity among migrants, should not only focus on the least integrated. Instead, effectiveness will probably be enhanced when interventions are sensitive to the social and environmental barriers, especially among low-income migrant populations.

Conclusions

In conclusion, our study suggest that the influence of cultural factors, such as acculturation, might be minimized because of more dominating contextual barriers that inhibit a particular behaviour, which we illustrated with regard to physical activity during leisure time. Therefore, we recommend that in exploring the effect of the process of acculturation on physical activity, it might be necessary to take the social and physical environment into account.

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6

Which motivational factors mediate the association between acculturation and sport participation?

A study among young Turkish and Moroccan women in the Netherlands

Karen Hosper, Vera Nierkens, Irene van Valkengoed, Karien Stronks

In revision

Abstract

Background: Ethnic minority women from non-Western origin are generally less physically active compared to women in host populations in Western countries. However, increasing cultural integration (acculturation) has been associated with greater participation in physical activity among these women, including participation in sports. We tested which motivational factors mediate this positive association.

Methods: Data were available from a cross-sectional study on health-related behavior among Turkish and Moroccan ethnic groups in Amsterdam, The Netherlands. In total, we included 258 Turkish and 170 Moroccan women (aged 15-30) who participated in a structured interview including questions on sport participation, acculturation (measured by the level of "cultural orientation towards Dutch culture"), and motivational determinants including attitudes, social influences, and self-efficacy.

Results: Acculturation was strongly associated with sport participation among Turkish women, but not among Moroccan women. Greater participation in sports among the higher acculturated Turkish women was accounted for "culturally specific beliefs" and to a lesser extent by "perceived disadvantages" and "self-efficacy."

Conclusion: These results emphasize that in order to stimulate sport participation among low acculturated (Turkish) women, the culture specific beliefs and barriers should be taken into account when developing a culture sensitive interventions. The factors that underlie the low participation in sports among Moroccan women should be further explored.

Keywords: acculturation, ethnic groups, physical activity, participation in sports, motivational factors

Introduction

Non-Western populations in Western parts of the world are generally less physically active compared to host populations.[1-4] This is found particularly among non-Western migrant women with regard to physical activity during leisure time, such as participation in sports.[5-7] However, the level of physical activity seems to increase towards the level found in the host population with increasing integration into the host culture.[6;8-13] This process cultural integration is referred to as the process of acculturation, which in turn refers to all the changes that take place over time when two cultures come into continuous contact.[14] Most used indicators of acculturation are language spoken at home or with important others or years since migration.[6;8;9;13;15]

It is assumed that the influence of acculturation on health-related behavior can be explained by changes in more proximate motivational factors as people acculturate to the majority culture. These motivational factors include the beliefs, values, and social norms regarding a behavior. The role of these motivational factors in explaining differences in acculturation has been studied for smoking behavior in particular.[16-18] Regarding physical activity, it is to our knowledge, largely unknown which motivational factors underlie the positive influence of acculturation on the level of physical activity.

Nevertheless, many studies that proceeded from social cognitive models such as the Theory of Planned Behavior have found evidence of the role of motivational factors in physical activity behavior among several ethnic groups, including host populations.[19] These studies have shown the importance of attitudes (such as perceived benefits) as well as self-efficacy and the social influences of parents and friends in predicting physical activity levels. [5;20-26]

To better understand how the process of acculturation influences physical activity during leisure time (i.e., sport participation) among ethnic minority women insight is needed into which motivational factors can actually explain this relationship. This information can provide insight into the particular beliefs and barriers that should be addressed in interventions aimed at less acculturated women in order to develop a culturally appropriate intervention.

In this study we focus on sport participation in young Turkish and Moroccan women (aged 15-30) in the Netherlands. These ethnic groups belong to the largest non-Western groups in several European countries.[27;28] The objective is to assess which motivational factors account for the association between level of acculturation and sport participation and secondly to assess which particular beliefs or barriers *within* these factors differ between women with low and high levels of acculturation and can therefore be considered as most relevant beliefs in explaining the association between acculturation and sport participation.

Methods

Data collection

We analyzed data from the LASER study (Lifestyle in Amsterdam: a Study among Ethnic gRoups) which was collected between 2003 and 2004. The LASER study's aim was to gain insight into prevalence and determinants of health-related behaviour among young Turks and Moroccans living in Amsterdam, the Netherlands. For this study, a random sample was drawn from the Amsterdam population registry, which included people between 10 and 30 years of age who were born in Turkey or Morocco or who had at least one parent born in one of those countries. During a home visit, trained interviewers of the same ethnic background and sex conducted face-to-face interviews using a structured questionnaire. Participants could choose the language they preferred for the interview. To make this possible, the questionnaire was forward- and back-translated into Turkish and Moroccan Arabic by professional translators. To ensure the meaning of the questions did not change, the translations were discussed with the researcher and the translators.

Study population

The Turkish sample consisted of 1,556 men and women 10 to 30 years of age. Approximately 13% could not be traced because of incorrect address information. Of the 1,354 persons who could be traced, 768 participated in the study (57%). Approximately 32% refused to participate and others could not be reached after three attempts (12%). The Moroccan sample consisted of 995 persons, of whom 12% had incorrect address information. Of the 872 persons who could be traced, 476 participated in the study (55%), others were not willing to participate (26%), and about 19% could not be reached after three attempts. For the current study we only included women aged 15 to 30, which resulted in 176 Moroccan and 261 Turkish women. Due to some missing data on acculturation and sport participation, we included 170 Moroccan and 258 Turkish women in our data analysis.

The main reason for including participants from the age of 15 is that physical activity levels are generally more favorable during early adolescence (10-14 years of age) and decline before the age of 15.[29;30]

Focus group interviews

Prior to the quantitative study, we conducted focus group interviews (n=2) with Turkish and Moroccan female adolescents who were recruited at a secondary school. The aim was to gather information on the salient beliefs among Turkish and Moroccan young women regarding physical activity (i.e., sport participation). On the basis of the results from the focus group interviews we developed a questionnaire that included questions on attitudes, social influences and norms, and self-efficacy with regard to physical activity. Draft versions of the questionnaire were discussed with experts in the field of physical activity, health education research, and physical education teachers. In a pilot study among 50 adolescents, we tested whether they had

any difficulties in answering the questions and whether the motivational factors were reliable. The final questionnaire was adapted according to the results of the pilot study.

Questionnaire

Sport participation

Participants were asked whether they participated in any sporting activities including unorganized activities such as running in the park or playing basketball in their neighborhood. Sport participation was defined as being active at least once a week for at least 30 minutes in an exercise activity rated 3 MET (i.e., metabolic equivalent or number of times resting metabolic rate) or higher, according to Ainsworth's Compendium of Physical Activities.[31]

Acculturation

"Cultural orientation" was used as an indicator of acculturation based on Berry's approach, whereby this orientation is considered in terms of orientation towards the majority culture versus the culture of origin.[32] It was measured using 10 items about language use with family members and friends, use of media, difficulties with reading Dutch, shopping preferences, and emancipation as examples of Western norms and values.[33;34] The cultural orientation scale was constructed using principal component analysis and reliability analysis (alpha = 0.70 for Turkish and 0.68 for Moroccan women).

The scores on the items in each scale were summed and a mean substitution was made for cases where one item was missing. To distinguish between the lower and the higher acculturated persons, the upper third was categorized as being high acculturated and the remaining two third as being low acculturated.

Motivational factors

The scales used to measure the motivational aspects of sport participation were based on the Integrated Change Model, which is closely related to the Theory of Planned Behavior.[35-37] We conducted reliability analyses for each factor separately to assess whether, based on the model, the beliefs would load in the same scales as expected.

Attitudes towards physical activity were measured by three separate scales: 14 items reflected the positive outcomes of being physically active, referred to as the perceived advantages (Turkish women $\alpha = 0.76$ and Moroccan women $\alpha = 0.84$), 11 items referred to the negative outcomes (perceived disadvantages) of being physically active (Turkish women $\alpha = 0.77$ and Moroccan women $\alpha = 0.85$) and 8 items consisted of attitudes that seemed to be linked to the cultural background of the participants, with beliefs such as "I only exercise where no men are allowed" or "I don't feel at home in a Dutch sports club" (Turkish women $\alpha = 0.75$ and Moroccan women $\alpha = 0.83$). Most of these items were derived from the focus group interviews.

Social influences were measured by three components: subjective norms towards physical activity (four items), perceived behavior of important others (five items), and social support

for being physically active (four items). These questions were asked about the participant's parents, brothers, sisters, and friends. The item about the participant's partner was left out because the majority had no partner. The reliability of the scales varied between $\alpha = 0.65$ for perceived behavior and $\alpha = 0.88$ for social norms.
Self-efficacy was measured with eight items in which the participants were asked to indicate whether they thought they would be able to participate in physical activities under difficult circumstances, such as "if the weather is bad," "if there is a lot of housework" or "if my parents did not allow it" (Turkish women $\alpha = 0.80$ and Moroccan women $\alpha = 0.67$).

Data analyses

First, we used logistic regression analyses to assess how acculturation (cultural orientation) was associated with sport participation.
Second, we assessed which motivational factors were associated with participation in sports. We performed univariate logistic regression analyses using the mean scores on the scales as variables in the analyses.
In a third step we assessed to what extent the motivational variables could account for the association between acculturation and sport participation. This contribution was indicated by the decrease in odds ratio (OR) of acculturation after adjusting for each of the motivational scales.
Finally, for motivational scales that seemed to contribute to explaining the association between acculturation and sports, we compared the mean scores between the less acculturated group and the more acculturated group. Differences between these groups were tested using Student's t test. In this last step we were able to identify which particular beliefs and barriers (within the relevant motivational scales) differed between the less acculturated group and the more highly acculturated group and therefore played a significant role in the difference in sport participation between these groups.

Results

Table 1 gives the characteristics of the study population. About half of both the Turkish and Moroccan women were born in the Netherlands and therefore considered to be second-generation migrants. Most first-generation migrants migrated after the age of six. About one third of the participants were married. The orientation towards the Dutch culture was somewhat higher among Moroccan women (45.9%) than among Turkish women (29.5%). About one third of the Turkish women participated in sports; about one fifth of the Moroccan women did so.

Table 2 shows the association between acculturation and participation in sports for Turkish and Moroccan women separately. Among Turkish women, a higher cultural orientation towards the Dutch culture was associated with greater participation in sports (OR: 2.06, confidence interval (CI): 1.14-3.74). However, this relationship was not found among Moroccan women.

Table 1. Characteristics of the study population: Turkish and Moroccan women aged 15-30.

	Turkish women N=258 n (%)	Moroccan women N=170 n (%)
Age		
15-19	110 (42.6)	82 (48.2)
20-24	52 (20.2)	38 (22.4)
25-30	96 (37.2)	50 (29.4)
Marital status		
Married or cohabiting	105 (40.7)	58 (34.1)
Not married/not cohabiting	153 (59.3)	112 (65.9)
Generation and age at migration		
First generation, migrated after sixth year	88 (34.4)	39 (23.2)
First generation, migrated before sixth year	36 (14.1)	29 (17.3)
Second generation (born in the Netherlands)	132 (51.6)	100 (59.5)
Acculturation		
Low	182 (70.5)	92 (54.1)
High	76 (29.5)	78 (45.9)
Participation in sports (at least once a week)		
Yes	81 (31.4)	43 (25.3)
No	177 (68.6)	127 (74.7)

Table 2. Association of acculturation and motivational factors on the one hand and participation in sports on the other hand, among Turkish and Moroccan women aged 15-30 (adjusted for age).

	Turkish women N=258 OR (95%CI)	Moroccan women N=170 OR (95%CI)
Acculturation		
Cultural orientation	2.06 (1.14-3.74)	1.06 (0.52-2.16)
Motivational factors		
Attitudes, pros	3.32 (1.53-7.23)	5.55 (2.29-13.46)
Attitudes, cons	0.31 (0.16-0.59)	0.32 (0.15-0.67)
Attitudes, culturally specific	0.26 (0.14-0.48)	0.40 (0.21-0.79)
Social norm	1.17 (0.84-1.63)	1.51 (0.98-2.32)
Behavior of others	1.23 (0.79-1.89)	3.07 (1.47-6.41)
Social support	1.30 (0.96-1.76)	1.64 (1.11-2.42)
Self-efficacy	3.02 (1.98-4.61)	3.14 (1.67-5.88)

Table 2 also presents the associations that were found between the motivational scales and participation in sports. Turkish and Moroccan women who agreed more with the advantages of sport and who agreed less with the disadvantages and culturally specific attitudes and who perceived higher self-efficacy participated in sports more often compared to women who scored in the opposite direction on these factors. In addition, among Moroccan women, higher perceived social support and positive behavior of others was related to participation in sports.

Table 3 presents the OR of the associations of acculturation with participation in sports when including the individual motivational scales in the model (models 2-8). Results showed that the *culturally specific attitudes* had the strongest influence on the association between cultural orientation and sport participation (among Turkish women only). After these had been included in the model, the association was no longer significant (OR: 1.32, CI: 0.69-2.50). A similar result was found when the perceived disadvantages (OR: 1.81, CI: 0.98-3.33) or the self-efficacy scale (OR: 1.66, CI: 0.89-3.12) was included, but these scales had a less of an effect on the association between acculturation and sport participation than the culturally specific attitudes. The other factors had no clear influence on the association between cultural orientation and sport participation. Because we found no association between acculturation and sport participation among Moroccan women, there was no need to explain the influence of acculturation.

Table 3. Association between acculturation and participation in sports among Turkish and Moroccan women aged 15-30 without (model 1) and with adjusting for the different psychosocial variables separately (models 2-8).

	Turkish women N=258 OR 95% CI	Moroccan women N=170 OR 95% CI
Model 1 (age + cultural orientation)	2.06 (1.14-3.74)	1.06 (0.52-2.16)
Model 2 (attitude, pros)	2.00 (1.10-3.66)	0.95 (0.45-2.01)
Model 3 (attitude, cons)	1.81 (0.98-3.33)	1.03 (0.50-2.13)
Model 4 (attitude, culturally specific)	1.32 (0.69-2.50)	1.00 (0.49-2.06)
Model 5 (social norm)	2.23 (1.22-4.07)	1.55 (1.02-2.35)
Model 6 (behavior of others)	2.08 (1.14-3.79)	1.24 (0.57-2.63)
Model 7 (social support)	2.08 (1.14-3.81)	1.92 (1.29-2.84)
Model 8 (self-efficacy)	1.66 (0.89-3.12)	0.92 (0.44-1.94)

Table 4 presents the mean scores for each factor and for each single item within those factors for the less acculturated group and the more highly acculturated group separately. The motivational scale with the "culturally specific attitudes" and every single item within that scale differed significantly between the less acculturated and highly acculturated groups in the expected direction. The less acculturated women agreed more often with attitudes like "I only exercise where no men are allowed" ($p < .0001$) and "I don't feel at home in a Dutch sports club" ($p < .0001$). In addition, they experienced more barriers such as "I don't know where I can exercise" ($p < .0001$).

The less acculturated group also agreed more with some of the disadvantages, including "… I wouldn't feel comfortable" ($p < .0001$) and "... I'm afraid I won't be good enough (at sports/exercise)" ($p = <.0001$). Furthermore, they perceived lower self-efficacy, particularly when their "... partner would rather they didn't exercise" ($p = .005$) and when they "... are feeling stressed" ($p = .003$) or when "the weather is bad" ($p = .001$).

Table 4. Mean scores on the psychosocial variables by level of acculturation among Turkish women.

If I am physically active on a regular basis,	Low cultural orientation N=155	High cultural orientation N=103	Mean difference	p value (t test)
Attitudes, pro	3.68	3.62	.60	.259
my health will improve.	3.82	3.95	-.13	.186
my physical condition will improve.	3.83	4.03	-.21	.013
my weight will remain stable.	3.53	3.49	.03	.795
I will look better.	3.79	3.54	.24	.037
my muscles will become stronger.	3.82	3.57	.24	.025
I will become more self-confident.	3.77	3.57	.20	.067
it will help me relax.	3.82	3.87	-.05	.639
I'll think less about my problems.	3.48	3.28	.20	.123
I'll feel good.	3.84	3.97	-.14	.156
I'll meet new people.	3.28	3.05	.22	.070
I'll see my friends more often.	3.26	2.95	.31	.011
I'll find it pleasant.	3.70	3.62	.08	.414
I'll enjoy it.	3.75	3.83	-.09	.384
I'll be proud of myself.	3.95	4.04	-.09	.203
Attitudes, con	2.65	2.41	.24	.000
I'll suffer from injuries.	2.35	2.13	.21	.027
I'll sweat a lot.	3.07	2.88	.19	.141
I'll get tired.	3.16	2.99	.16	.183
I'll feel bad.	2.35	2.00	.35	.000
I'll have to make a lot of effort.	2.73	2.47	.25	.036
I'm afraid I won't be good enough.	2.61	2.14	.47	.000
I'll feel embarrassed.	1.95	1.68	.27	.002
it will take too much time.	2.90	2.64	.26	.029
it will be too expensive.	2.57	2.32	.25	.032
I won't enjoy doing it.	2.55	2.24	.31	.003
I'll have muscle pain.	2.91	2.96	-.05	.711
Culturally specific attitudes	2.45	1.94	.51	.000
Exercise is for young people.	2.15	1.88	.26	.010
I don't feel at home in a Dutch sports club.	2.68	2.03	.64	.000
Exercise is more for men than for women.	2.03	1.61	.42	.000
Exercise is only for people who are really good at it.	2.02	1.76	.25	.002
I only exercise where no men are allowed.	3.32	2.29	1.03	.000
I don't exercise for religious reasons.	2.07	1.76	.31	.001
I prefer to exercise in places where many of my Moroccan/Turkish peers also come.	2.75	2.15	.60	.000
I don't know where I can exercise.	2.48	2.00	.47	.000
Social norm	3.11	3.03	.08	.500
My parents think I should exercise regularly.	3.10	3.23	-.13	.388
My brother(s) think I should exercise regularly.	3.03	2.99	.03	.833
My sister(s) think I should exercise regularly.	3.19	2.95	.24	.123
My friends think I should exercise regularly.	3.08	2.84	.23	.099
My partner thinks I should exercise regularly.	3.32	3.15	.17	.407
My parents think my school performance will suffer if I start exercising regularly.	2.26	2.01	.25	.034
Behavior of others	3.26	3.40	-.14	.127
How physically active is your mother?	2.87	3.06	-.19	.237
How physically active is your father?	3.05	3.36	-.31	.061
How physically active is/are your brother(s)?	3.73	3.86	-.13	.388
How physically active is/are your sister(s)?	3.43	3.50	-.07	.666
How physically active are your friends?	3.24	3.28	-.05	.668
Social support	2.33	2.56	-.23	.072
Do your parents encourage you to exercise more often?	2.44	2.73	-.28	.101
Do your brother(s) encourage you to exercise more often?	2.11	2.42	-.31	.095
Do your sister(s) encourage you to exercise more often?	2.48	2.47	.01	.975
Do your friends encourage you to exercise more often?	2.33	2.50	-.17	.230
Does your partner encourage you to exercise more often?	2.61	2.83	-.22	.354
Self-efficacy: Do you think you could exercise if:	2.91	3.25	-.34	.001
your parents did not allow it	3.68	3.84	-.17	.324
your friends think you should do something else.	3.85	4.07	-.22	.127
the weather is bad.	2.72	3.31	-.59	.001
you're tired.	2.24	2.46	-.22	.133
you don't have much time.	2.22	2.42	-.19	.176
you don't have anyone to exercise with.	3.25	3.64	-.39	.021
you have a lot of housework	2.46	2.75	-.30	.065
you're feeling stressed.	2.87	3.36	-.49	.003
your partner would rather you didn't exercise.	3.24	3.88	-.65	.005

Discussion

Consistent with results of previous studies, we found that a higher level of acculturation (measured by the "cultural orientation towards the Dutch culture") was associated with greater physical activity (e.g., participation in sports).[1;6;9;38;39] In addition to other studies, we identified the potential mediators that might explain this relationship. Our results showed that the "culturally specific attitudes" and to a lesser extent the level of "self-efficacy" and the "perceived disadvantages" of physical activity seem to underlie the influence of acculturation on physical activity, such as participation in sports.
More specifically, our results showed that women with a higher level of acculturation agreed less with attitudes such as "I only exercise where no men are allowed" or " I don't feel at home in a Dutch sports club." In addition, these women agreed less with disadvantages such as "… I wouldn't feel comfortable" and "... I'm afraid I won't be good enough (at sports/exercise)." Furthermore, they perceived lower self-efficacy in particular when their "... partner would rather they didn't exercise" and when they were "..feeling stressed". The findings illustrates that as migrant women become more culturally oriented towards the culture in the host country, their attitudes towards physical activity also become less "traditional" – they perceive fewer disadvantages and greater self-efficacy, which in turn has a positive influence on participation in sports.

Before interpreting our findings, it should be mentioned that the motivational factors included in this study consisted of items that were derived mainly from studies that investigated the role of these factors in relation to "regular physical activity".[19;40] This implies that most items did not refer directly to participation in sports. It is generally assumed that in studies using social cognitive models, the outcome measure should be closely related to the measured motivational correlates.[41] However, considering the clear relationships we found between these factors and sport participation in both Turkish and Moroccan women, we concluded that these factors apply to sport participation as well.
A few studies have explored the underlying factors of acculturation on health behavior in a similar way or assessed differences in motivational factors between migrants with low or high levels of acculturation. Most of these studies focused on smoking behavior. [17;18;42] However, regarding physical activity we found no studies that explored which mechanisms underlie the influence of acculturation on physical activity behavior.
One surprising finding in our study was that acculturation was *not* associated with sport participation among Moroccan women, while among Turkish women there was a clear association. A possible explanation for the absence of this association might be that the indicator of acculturation we used was not an adequate measure for the level of integration of Moroccan women, at least not when exploring physical activity behavior. Another explanation could be that social influences might be more relevant in predicting physical activity levels among Moroccan women than level of acculturation. This is illustrated by the fact that social support and behavior of others were related to sport participation among Moroccan women regardless of their level of

acculturation. It could be that Moroccan women are much more likely to change their behavior as a result of the influence of close friends and relatives and less because of their individual cultural orientation towards Dutch culture. Further research is needed to assess why acculturation leads to positive changes in sport participation in some ethnic groups and not in others.

We assume that, in general, our finding that motivational factors underlie acculturation differences in physical activity can be generalized to other ethnic groups. However, we suggest it would be useful to first explore the culturally salient beliefs among the target population, for example, by conducting focus group discussions. In turn, these beliefs can be included in more quantitative studies in order to test which specific beliefs underlie the influence of acculturation on health-related behavior.

Implications for health promotion

First, the results of this study indicated that prevention programs aimed at stimulating physical activity among women with a non-Western background, such as the Turkish women in the Netherlands, should give priority to those women with a low cultural orientation towards the host culture (less acculturated). Physical activity level appeared to be the lowest in this group. Second, our findings imply that interventions aimed at increasing sport participation among less integrated Turkish women should focus on the perceived barriers and cultural beliefs in that particular ethnic group. Among other things, this implies that creating more opportunities for women to exercise in places where no men are allowed and where they can meet other women from the same ethnic background might enhance participation in sporting activities. In addition, interventions should pay attention to the more common belief among low acculturated women that sports are for young people of for men only. Furthermore, improving feelings of capability (self-efficacy) might be an effective way of increasing physical activity among the less acculturated women. Conversely, our results indicate that a sole focus on perceived advantages or social norms regarding physical activity would not be as effective because these factors did not differ between the less acculturated and the more acculturated groups and could therefore not account for the association between acculturation and sports.

Conclusion

In conclusion, this study indicated that acculturation has a positive influence on sport participation among Turkish women, but not among Moroccan women. Culturally specific attitudes and to a lesser extent perceived disadvantages and self-efficacy seem to mediate this association. This finding implies that preventive interventions aimed at Turkish migrant women should address these specific attitudes and barriers in order to develop culturally sensitive programs that will stimulate physical activity among the less acculturated and inactive migrant women. Furthermore, we suggest it should be explored why acculturation does not lead to increased participation in sports among all ethnic groups, which was illustrated by the absence of an association among the Moroccan women in this study.

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7

General discussion

7 General discussion

The main objective of this thesis was to gain insight into the mechanisms underlying health-related behaviour in young first and second generation Turkish and Moroccan people (15-30 years) living in Amsterdam, the Netherlands. We included smoking behaviour, alcohol use, physical inactivity and overweight as these are major risk factors for several kinds of diseases. This information will be useful in identifying the high risk subgroups likely to develop unhealthy behaviour and who therefore have an increased risk for related diseases. Furthermore, the knowledge about motivational determinants might help to tailor preventive interventions directed at culture-specific beliefs among the young Turkish and Moroccan population in the Netherlands. This could help to reduce the levels of unhealthy behaviour in this population.

The following research questions were addressed in this thesis:

1. Are second generation young Turks and Moroccans (15-30 year) in the Netherlands more similar to ethnic Dutch people in regard to prevalence of smoking behaviour, alcohol use, physical inactivity and overweight, than the first generation Turks and Moroccans of the same age? (chapter 2).

2. a) How are predisposing factors (i.e. socioeconomic position, acculturation and religion) associated with physical inactivity and overweight among young Turkish and Moroccan men and women, and b) to what extent are differences in overweight between the first and second generation accounted for by these predisposing factors? (chapter 3 and 4).

3. Is the influence of predisposing factors (i.e. acculturation) on physical activity during leisure time dependent on the presence of contextual barriers (e.g. unattractive neighbourhood)? (chapter 5).

4. To what extent does acculturation affect health behaviour, more specifically, physical activity, through motivational factors? (chapter 6)

In this chapter, the main findings of the study as well as some methodological limitations will be discussed. Furthermore, we will reflect on the results and make recommendations for future research. We will conclude this chapter with a discussion of the implications of the findings for public health policy and health promotion activities aimed at the Turkish and Moroccan population in The Netherlands.

7.1 Summary of the findings

1. Health related behaviour of young Turkish and Moroccan people does not always converge towards rates among the ethnic Dutch population across two generations

Before discussing the trends of convergence, we will first make a global comparison of the overall prevalence rates between the young Turkish, Moroccan and ethnic Dutch population. Table 1 gives an overview of the prevalence rates according to gender, ethnicity and generation. Overall, Turkish men and women compared less favourably to Moroccan and ethnic Dutch people. Both Turkish men and women were more often overweight and had higher rates of smoking. In contrast, Moroccan men and women seemed to compare most favourably in regard to smoking and alcohol use than Turkish and ethnic Dutch people. However, among both Moroccan and Turkish women, overweight and physical inactivity were much more common than among ethnic Dutch women. Moroccan men hardly differed from ethnic Dutch men in regard to these risk factors.

These findings are difficult to compare with previous studies among Turks and Moroccans in the Netherlands. This is mainly because of differences in age range of the studied groups, or because only the first generation participants were included or because the numbers of Turkish and Moroccan participants were too small.[1-5] A few studies on smoking and alcohol use have been carried out among similar age groups (young adults) and some of these studies found similar rates and some slightly higher prevalence of smoking and alcohol use.[6-10] However, these differences could be due to different methods of data collection (i.e. street interviews) or because the sample included only second generation ethnic groups, which is not a valid comparison. In regard to overweight and physical inactivity, most studies were either conducted among a broader age range or among children, but they generally indicated similar ethnic differences as were found in our sample of 15-30 years olds, i.e. higher prevalence of overweight and physical inactivity among Turkish and Moroccan participants compared to ethnic Dutch people.[8;11-13]

By conducting our study in a young population, we were able to include a large number of first as well as second generation Turkish and Moroccan people in order to explore the differences between these two generations. Table 2 summarizes the results and indicates whether the rates among the second generation were higher or lower than among the first generation (indicated by arrows). In addition, the black spots indicate a higher prevalence within the first generation compared to ethnic Dutch people and the white spots a lower prevalence.

Contrary to what is often assumed, we found no consistent pattern of convergence towards the ethnic Dutch population across the two generations, instead the patterns varied by gender, ethnicity and by risk factor. The following exceptions to the assumed pattern were found. Firstly, remarkably we found that second generation Turkish women smoked significantly more than ethnic Dutch women, while first generation Turkish women did not differ from ethnic Dutch women. Secondly, a similar pattern was found for overweight in Turkish men. The difference with ethnic Dutch men is larger among second generation men than for first generation men.

Table 1. Prevalence rates (age adjusted) of health-related behaviour in young Turkish and Moroccan people by gender and generation, compared with ethnic Dutch and the population in country of origin.

	Turkish	**Moroccan**	**Ethnic Dutch[1]**	**Population in country of origin**	
	15-30 yr	**15-30 yr**	**15-30 yr**	**Turkey**	**Morocco**
	N= 505	**N=291**	**N= 1199-1677**		
Smoking %				**Age 20+[a]**	**Age 20-24[b]**
Men	**42.0**	**24.2**	36.2	50.9 / 60-65	31.4
First generation	54.9	22.0			
Second generation	45.6	34.8			
Women	**32.3**	**2.9**	32.8	10.9 / 20-24	0.6
First generation	35.1	2.2			
Second generation	44.4	3.2			
Current alcohol use %				**Age 15-20[c]**	**Age 18-24[d]**
Men	**38.1**	**23.6**	92.6	39-55	16.6
First generation	35.0	19.6			
Second generation	38.9	23.4			
Women	**20.1**	**4.0**	86.3	32-52	0.6
First generation	18.7	5.9			
Second generation	21.9	3.4			
Physical inactivity[2] %					
Men	**56.4**	**55.1**	51.2		
First generation	56.4	57.1			
Second generation	56.4	54.6			
Women	**61.2**	**74.3**	53.0		
First generation	66.8	74.2			
Second generation	58.0	76.2			
Overweight BMI≥25 %				**Age 20-29[e]**	**Age 18+[f]**
Men	**39.7**	**18.4**	21.8	35.5	28.8
First generation	34.7	9.6			
Second generation	43.2	22.5			
Women	**32.9**	**33.3**	19.0	36.8	50.2
First generation	38.9	38.9			
Second generation	25.9	26.5			

[1] Data from the ethnic Dutch population (aged 15-30) were made available from a national survey conducted by Statistics Netherlands (CBS, POLS-enquete 2003/2004).
[2] Physical inactivity is defined as not meeting the Dutch recommendations of daily physical activity (≥ 30 minutes a day, at least 5 days a week)
[a] Satman et al. 2002, Turkish Diabetes Epidemiology Study (TURDEP, 97-98), nation wide, population based survey / WHO
[b] Tazi et al. 2003, national survey Morocco (2000)
[c] Alikasifoglu et al. 2004, Turkish high school students, Istanbul, Turkey.
[d] World Health Survey. WHO Global Status Report on Alcohol 2004.
[e] Yumuk et al. 2005, prevalence rates in Konya, Central Anatolia, Turkey (data from 2001)
[f] Mokhtar et al. 2001, nation wide study, Morocco (data from 1997)

Thirdly, in Moroccan women, both first and second generation women were highly physically inactive with no trend of convergence observed towards the lower rates found in ethnic Dutch women. Finally, alcohol use was low in all subgroups compared to ethnic Dutch people with no differences between the generations.

We did, however, find that overweight in both Turkish and Moroccan women and physical inactivity in Turkish women, was *significantly* higher among the first generation, while second

generation women did *not differ* from ethnic Dutch women. Although this is a positive finding, these rates are still relatively high from a public health perspective. A similar trend was found for smoking among Turkish men: second generation men approximate the lower prevalence of smoking found in the ethnic Dutch population.

Overall, these findings imply that the general assumption that health-related behaviour will converge across generations of ethnic groups towards rates found in the ethnic Dutch population does not hold for all risk factors and varies by ethnicity and gender.

Unfortunately, we cannot easily compare our results with other European studies among immigrant populations as these studies often included older and only first generation immigrants.[14-21] Although in the US a growing number of studies has assessed generational differences in health-related behaviour, most of these studies reported a positive or negative association without making explicit comparison with the host population.[22-27] The few studies that did make such a comparison, found that overweight and smoking in US (or Canadian) born ethnic groups approximates the higher prevalence within the US general population. Also with additional years in the host country these rates seemed to converge towards native born levels.[28;29]

Table 2. Prevalence of health-related behaviour across two generations of young Turkish and Moroccan people in relation to ethnic Dutch people.

	Turkish men	Turkish women	Moroccan men	Moroccan women
Smoking	⇩ ●	⇧ ●	– ●	– ○
Alcohol	– ○	– ○	– ○	– ○
Physical inactivity	– ●	⇩ ●	– ●	– ●
Overweight	⇧ ●	⇩ ●	– ●	⇩ ●

⇧ : higher rates in second generation compared to first (not tested for statistical significance)
⇩ : lower rates in second generation compared to first (not tested for statistical significance)
– : no difference between first and second generation
● : higher prevalence in first generation compared to ethnic Dutch people (significant)
○ : lower prevalence in first generation compared to ethnic Dutch people (significant)
● : no difference in prevalence between first generation Turks/Moroccans and ethnic Dutch people

2a. Socioeconomic position, acculturation and religion are important predisposing determinants of overweight and physical inactivity in women, but not in men.

Apart from ethnic and generational differences, we found that physical inactivity and overweight vary by socioeconomic position, level of acculturation and religion (see Table 3). However, this was found most noticeably among women. Both Turkish and Moroccan women were less often overweight when they had a high or moderate level of education compared to women with no or only primary education. These associations were not found among men. This gender difference is in line with findings among host populations in most industrialized countries.[30;31] Also immigrant studies in the U.S. that take gender differences into account, indicated that the association between socioeconomic position and obesity is generally

stronger in women than in men.[32-34] However, remarkably, the higher educated women did not differ in level of physical inactivity from the lower educated women. This may indicate that a lower prevalence of overweight among the higher educated women might be more a result of differences in nutritional intake between lower and higher educated women than of greater participation in physical activity.

Table 3. Overview of the associations between predisposing factors and physical inactivity and overweight in Turkish and Moroccan men and women aged 15-30 years.

	Physical inactivity		Overweight	
	Men	Women	Men	Women
Socioeconomic position				
Educational level	0	0	0	-
Position at labour market (individual)	0	0	0	-
Occupational status (family)	0	0	0	0
Acculturation				
Cultural orientation towards ethnic Dutch people	0	-	0	0
Social contacts with ethnic Dutch people	-	-	0	0
Religion (importance)	0	+	0	0

+ : positive association, - : negative association, 0 : no association

In addition, greater acculturation was associated with less physical inactivity and showed a trend for lower rates of overweight, again only among women. In other words, women who were more culturally orientated towards the Dutch culture and who had more social contacts with ethnic Dutch people were less physically inactive. The same was found for women who indicated that religion was not very important to them. The positive influence of acculturation has been found in other studies as well, in particular among ethnic minority women in the US.[35-42]

2b. Socioeconomic position accounted for the lower prevalence of overweight in second generation women, but no explanations were found for the higher prevalence in second generation men

An additional objective was to unravel which of the predisposing factors underlie the generational differences in health-related behaviour. In other words, why does behaviour differ between persons who were born abroad (in Turkey or Morocco) and those who were born in the Netherlands but having a similar ethnic background? The generational differences were most clearly found for overweight, therefore, we chose to study the mechanisms that underlie overweight differences. We tested whether sociodemographic, socioeconomic, acculturation, religion or migration-related factors could account for the differences found. It appeared that a higher socioeconomic position of women (i.e. level of education) accounted for the lower prevalence of overweight in second generation women. All other potential

mediators could not explain the differences found among women or men. Among men this was because none of the potential determinants were associated with overweight. This might probably be explained by the fact that generation (country of birth) reflects other phenomena that are related to development of overweight that were not included in our study. In the paragraph "recommendations for future research" we will elaborate on possible alternative explanations.

3. Acculturation does not necessarily lead to increased physical activity during leisure time

Although many studies found a positive effect of acculturation on physical activity, it is unclear under what 'conditions' this effect appears. In this study we assessed whether acculturation was also positively associated when people perceived contextual barriers for being physically active. Results showed that acculturation had a positive influence on physical activity during leisure time only among participants living in *exercise supportive conditions* (attractive neighbourhood, having no children and no occupational physical activity). This indicates that barriers in the physical or social environment might inhibit the positive influence of acculturation. Therefore, we concluded that acculturation per se does not necessarily lead to increased physical activity during leisure. The contextual barriers should also be taken into account when assessing associations with level of acculturation. This is supported by other researchers who criticized acculturation studies for not paying attention to the social and cultural context in which this process takes place.[43-45]

4. Predisposing factors (acculturation) are mediated by motivational factors

In this thesis we tested which motivational factors mediated the association between acculturation and participation in sport among young Turkish and Moroccan women. Results in Table 4 show that women perceived less advantages, more disadvantages and had more cultural specific beliefs and needs with regard to participation in sport. They agreed more often with (amongst others) the idea that sport is only for young people, and more often expressed a preference for exercising with their Moroccan and Turkish peers, or exercising at locations were no men were allowed, or indicated that they would 'not feel at home' in a Dutch sports club. In addition, they scored lower on perceived self-efficacy. These culture related beliefs and needs have also been found among other non-Western ethnic groups as well.[46;47]

Level of acculturation was only associated with participation in sports in Turkish women, not in Moroccan women. We found that 'culture specific beliefs' and to a lesser extent 'perceived disadvantages' and 'self-efficacy' mediated the association found in Turkish women. In other words, compared to the more highly acculturated women, the lower acculturated women agreed more often with the above mentioned cultural beliefs and needs. They also had less confidence that they would be able to participate in sports under certain conditions (self-efficacy) and they agreed more often that there were negative consequences of exercising (disadvantages). These differences in motivation appear to underlie the differences in

participation in sport by level of acculturation. The results imply that increasing cultural orientation towards the Dutch culture (acculturation) most likely leads to changes in beliefs and needs and perceived self-efficacy, which in turn have a positive influence on participation in sport. However, with regard to our results on acculturation in relation to leisure time physical activity, we may assume that this applies only to people who do not perceive particular barriers for becoming more physically active (see previous section).

Table 4. Associations between motivational factors and participation in sport among Turkish and Moroccan women.

	Turkish women	Moroccan women
Motivational factors		
Advantages of PA	+	+
Disadvantages of PA	-	-
Culture specific attitudes	-	-
Social norm	0	0
Social support	0	+
Behaviour of others	0	+
Self-efficacy	+	+

+ : positive association, - : negative association, 0 : no association

The role of motivational factors in understanding acculturation effects has also been illustrated in a study on smoking behaviour. This study found that smoking-related psychosocial variables, such as perceived consequences and the effect of friends' smoking underlie the association between acculturation and smoking in Hispanic and Asian adolescents.[48] This suggest that this approach is useful in understanding differences in health related behaviour by level of acculturation and could be used in relation to other behaviours as well.

7.2 Methodological considerations

Before discussing the main findings of the study, a few methodological issues regarding the internal and external validity of the data should be discussed.

Non-response

The overall response rate in the LASER study was 57% (54.6% among Moroccans and 56.7% among Turks) implying that 43% of the approached participants did not want to participate in the study or we were not able to contact them after three attempts. This response rate is higher compared to most other studies conducted in the Turkish and Moroccan population in the Netherlands, in particular when comparing with national health surveys for Municipal Health organizations.[7;11;49;50] The response and non-response group did not significantly differ according to age, gender, neighbourhood and generational status. When comparing the

characteristics of the responders with the total representative sample from the population registry (N=9000), we found no difference in these variables. However, we did find that young Moroccan males (15 to 19 year) were slightly overrepresented. As a result the Moroccan male subgroup slightly differed from the other subgroups as they were less often married, more often second generation and still following a course of study. This made a comparison within Moroccan males between generations and according to socioeconomic position less reliable due to small numbers of participants within some subcategories. Except for Moroccan males, we believe that the study population in LASER was representative for the Turkish (male and female) and Moroccan (female) population (aged 15-30) living in Amsterdam.

Furthermore, fewer Moroccan than Turkish participants were included in the study due to difficulties in recruiting interviewers and keeping them involved in the study. This delayed the process of data collection in the Moroccan sample. Difficulties with data collection within the Moroccan population were also reported by other studies.[49;50]

Cross-sectional design

The findings in this study were based on cross-sectional data implying that no causal inferences can be made with certainty. In particular, regarding the associations we found between indicators of acculturation (e.g. "social contacts with ethnic Dutch people") and (leisure time) physical activity, the direction of the association could be questioned. Greater participation in sport might lead to increased orientation towards Dutch society or increased contacts with ethnic Dutch people. However, similar associations were found in many previous studies in different ethnic groups. In addition, participation in sports included all kinds of activities, including those sports that do not necessarily involve contact with ethnic Dutch people or are not particularly associated with Dutch culture (individual sports, jogging in the park etc). Therefore, we believe that our findings on acculturation broadly indicate a causal effect of acculturation on increased physical activity.

In addition, our findings on the relationship between socioeconomic position and overweight, might be due to a negative effect of obesity on educational and employment opportunities leading to a less favourable socioeconomic position among overweight people. [51] However, longitudinal studies have also indicated that changes in socioeconomic position have consequences for body weight.[31]

Finally, the cross-sectional character of our data might have had consequences for the associations with motivational factors (attitudes, social influences, self-efficacy). However, many previous studies have shown that these factors are important correlates of physical activity and many interventions are based on these determinants.[52]

Ethnic Dutch comparison group

The LASER-study did not include ethnic Dutch participants. This was decided because of the availability of existing data on similar health-related behaviour. We used data from a national survey carried out by Netherlands Statistics (CBS) within the same period as the LASER-study (2003-2004)

among ethnic Dutch men and women in the same age category (15-30 years).[53] The outcome measures in this survey were generally similar to the measures used in the LASER study. Except for the data on weight and height and smoking behaviour there was a difference in measurement. Within the CBS data, weight and height were self-reported, which could imply that actual rates of overweight are higher among ethnic Dutch people. Within the LASER we used a combination of self-reported and measured data (see explanation in next paragraph). Considering the large variations in the prevalence of overweight between the Turkish, Moroccan and ethnic Dutch population, we believe that the main findings on overweight are not affected by this difference in measurement.
In regard to smoking behaviour, the Dutch survey based the prevalence on the question 'do you ever smoke?', whereas the LASER-study used a self-perception item based on the theory of the smoking uptake continuum by Flay and colleagues, which is considered to be an appropriate measure among young age groups.[54;55] It includes people who experiment with smoking or smoke once in a while (see also chapter 2). Additional analyses indicated, however, that when using a more strict definition the differences compared to ethnic Dutch people were similar.
Another limitation regarding the Dutch comparison group was that we compared data at a national level with data from Amsterdam. However, differences between ethnic Dutch people in Amsterdam and the Netherlands seemed to be rather small for the younger age group (aged 18-34).[8;56] As a result we expected that the ethnic differences we found between the general ethnic Dutch population and the Turkish and Moroccan population in Amsterdam would not be different when compared with the ethnic Dutch population in Amsterdam.

Self-reported behaviour

The results of this study were based on self-reported data. Regarding smoking behaviour and alcohol consumption, it was assumed that this behaviour would be underreported by Muslim populations, in particular by women.[7;57] We tried to enhance the reliability of the answers by allowing the participant to fill in the questions on paper (instead of by oral communication) and by conducting the interview without the presence of other persons.
Previous research has indicated that the prevalence of alcohol consumption among second generation Turks and Moroccan is reported to be higher when using a postal survey or when interviews are held by ethnic Dutch interviewers instead of interviewers with the same ethnic background as the participants. This probably also applies to smoking behaviour.[58] In particular among Moroccan women, we expected that actual smoking behaviour would be higher than the 3% indicated in this study. However, considering the large differences in percentage of smokers and alcohol users between ethnic Dutch people and the studied ethnic groups, in line with other studies, we concluded that a different methodology had not affected our main findings regarding alcohol consumption and smoking behaviour.
Data on weight and height were self-reported in 43% of the cases. This was due to logistical problems with the measurement equipment. Additional analyses showed that there were no significant differences in prevalence of overweight between the measured and the self-reported group. However, when comparing the mean Body Mass Index (BMI) between the measured

and self-reported group (Mann-Whitney test) we found no difference in average BMI for male participants, but in women the measured group had a higher BMI (mean BMI =24.46 (SD 4.71)) than the self-reported group (mean BMI=23.38 (SD 4.29) with p=0.032). This could have consequences for the associations found in women if the two methods were not equally divided according to the variables used in this study (i.e. ethnicity, sex, generational status, socioeconomic and cultural factors). However, it appeared that the different methods were equally represented within the used variables (tested with chi-square tests), implying that associations with overweight were unlikely to be affected by the difference in weight/height measurement.

Generalization of the results

We assume that the results of this study can be generalized to the 15 to 30 year old Turkish and Moroccan population within urban regions in the Netherlands. The sample was representative according to age, sex, generational status and city district for this population living in Amsterdam. Except for Moroccan males, the sample included slightly more young men (15-19 years) than 20-30 year olds, therefore the results among Moroccan men should be interpreted more cautiously.

Furthermore, we anticipate that some of the converging trends in behaviour across generations might be found in the young Turkish and Moroccan population in other Western-European countries, such as in Germany, Sweden, France and Belgium.[59;60] However, this will depend on whether the underlying determinants such as socioeconomic position and acculturation have similar effects within different national contexts. This needs further exploration.

Considering the different trends across generations we found for the Turkish and Moroccan population we assume that these patterns cannot be generalized to other ethnic groups such as African or other Mediterranean ethnic groups.

7.3 Reflection on the results

This paragraph reflects on the findings in this study. Firstly, the prevalence rates of health-related behaviour within young Turkish and Moroccan people in the Netherlands will be compared to findings from similar populations in their countries of origin. Secondly, possible explanations will be discussed for the lack of a consistent pattern of convergence towards ethnic Dutch people and how the presented conceptual framework should be adjusted as a result of these findings. Thirdly, attention will be paid to the diversity within first generation ethnic groups. Finally, we will reflect on the role of gender in understanding the influences on health-related behaviour among women in particular.

Comparison with countries of origin

When comparing the Turkish and Moroccan population in the Netherlands with corresponding populations in the country of origin, we can conclude that the *first* generation Turkish men in the Netherlands do not differ much from the population in Turkey with regard to overweight

and smoking (see Table 1).[61;62] For Turkish women in the Netherlands, however, the prevalence of smoking was higher compared to women in Turkey. Alcohol use seemed to be more common among people in Turkey (aged 15-20 years), but less common than among the Turks in Amsterdam.[63] This might be an indication of participants giving more socially desirable answers regarding alcohol use within the LASER study. In Morocco even lower prevalence rates of alcohol use were found among both women and men.[63] However, results were difficult to compare due to the difference in age range of the groups studied. Furthermore, in Turkey and Morocco, large regional differences exist. For example smoking among women is higher in Istanbul (42.7%) than in other (mostly rural) regions (3.9-31.9%).[64] Due to a lack of data for the Moroccan population and the different age groups (i.e. 18+ years) that were studied (see overweight figures), we could not compare these data.[65] For smoking, we could conclude that Moroccan men in the Netherlands seemed to smoke less than men in Morocco (aged 20-24 years) but this might be due to the difference in age range as well.[66] Among Moroccan women the low smoking rate in the Netherlands seems to reflect the 'no smoking' behaviour of women in Morocco.

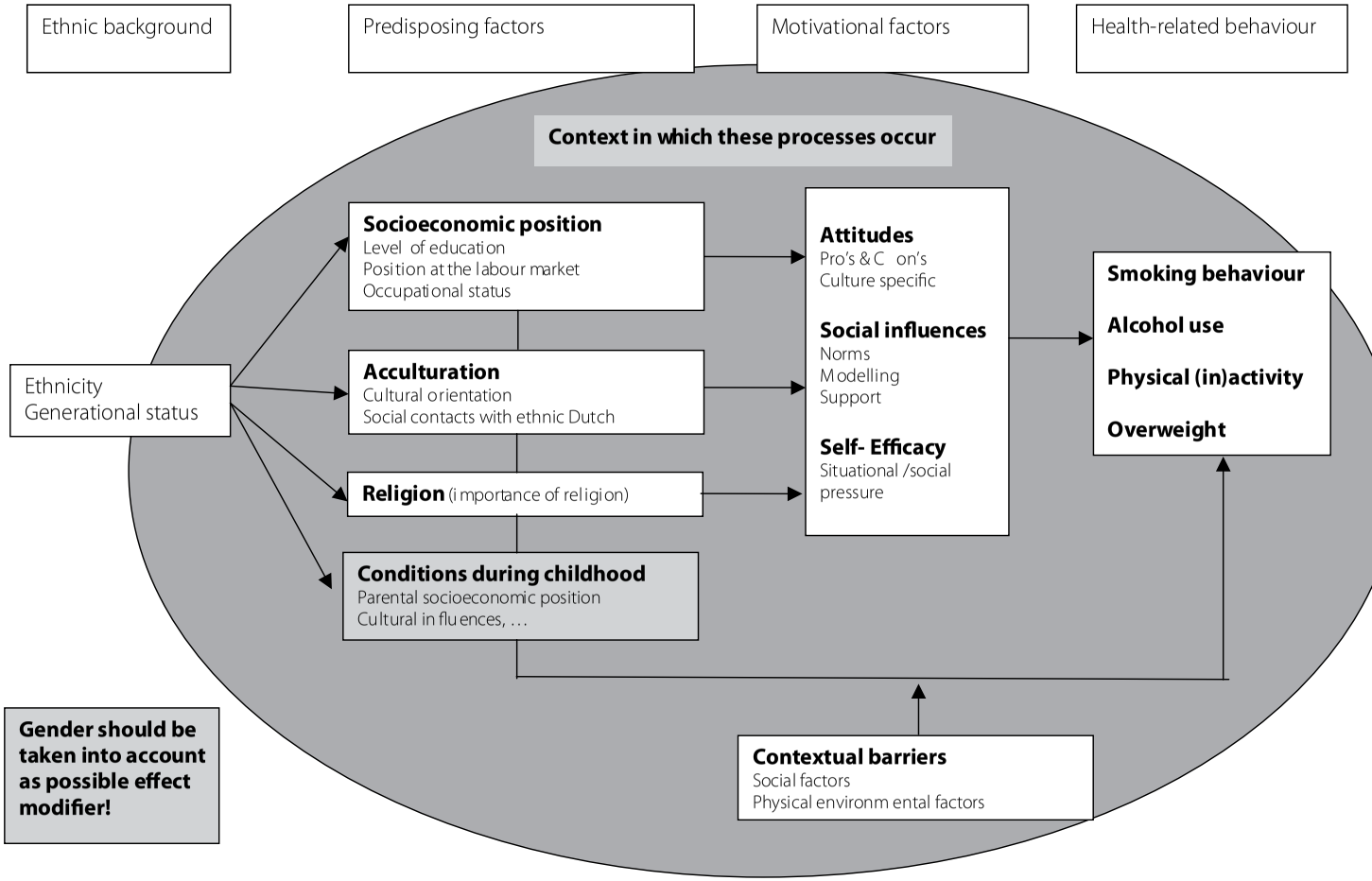
Overall, this comparison shows that positive as well as negative changes occur following migration and across generations. Thus, the general idea that migration to a Western European country will result in adopting the unhealthy Western lifestyle is too simplistic. Some of the risk factors that we studied are even more prevalent within the countries of origin and seem to decrease towards the lower rates found among the ethnic Dutch population. This applies in particular to smoking behaviour among Turkish men and overweight in Turkish and Moroccan women. This illustrates the fact that as a result of economic development and Westernization, some aspects of the so called 'Western lifestyle' are highly prevalent in these countries.

Convergence to what?

In this study we compared two generations of Turks and Moroccans with the 'average' ethnic Dutch population. Based on this comparison we assessed whether a pattern of convergence was found across these generations towards ethnic the Dutch population. The results did not show a consistent pattern across the different risk factors and subgroups by gender and ethnicity. There are several possible explanations for this. With regard to alcohol use in both ethnic groups and smoking in Moroccans, we assume that adherence to Islam might have a protective effect within these groups.[67;68] In our study population among first as well as second generation Turks and Moroccan, the majority perceives religion as very important. This might underlie the lack of convergence towards rates of alcohol use (and smoking among Moroccans) towards the ethnic Dutch population.

However, another more important reason for the lack of a converging pattern, might be related to the fact that we did not study whether the Turks and Moroccans converge to a particular 'subculture' within the majority population. For example, the reason that we did not find a converging trend in overweight within Turkish men, might be because they do not 'acculturate' to the "mainstream" Dutch culture, but to an environment were the majority of their peers

Figure 7.1 Adjusted conceptual framework of the dynamics underlying health-related behaviour that were examined within this thesis



are overweight. This is most likely related to the general lower socioeconomic position of the majority of these populations. This phenomenon of 'acculturation' to different socioeconomic layers within the general population, is referred to within the sociological literature as 'segmented assimilation'.[69;70] The process of assimilation of ethnic groups has been criticized because of its assumption of a linear progress towards a fixed target, whereas the reality is much more complex. Some groups may adopt the straight line theory of assimilation towards the white middle class majority, but other groups may acculturate towards an underclass or alternatively become upwardly mobile (because they start from a different socioeconomic position). For example, there is much diversity in the initial cultural, social, economic and educational characteristics between and within ethnic groups and the possible effect of these initial differences on culturally linked health behaviour is often overlooked.[71] Taking this into account, we should be more cautious when assessing patterns of convergence, as an important question is not fully answered: from what and to which (reference) group do particular ethnic groups acculturate? Moreover, we should take into account the fact that health-related behaviour among the host population is changing as well, these trends should ideally be taken into account when assessing trends of convergence towards the rates in the host population.

The findings in chapter 5 of this thesis may serve as an example of how a particular context might influence the effect of acculturation. We illustrated that cultural and social integration (acculturation) had a positive effect on physical activity during leisure time, but only among persons who perceived their neighbourhood as attractive, had no occupational physical activity and no children. The presence of these barriers partly reflects the socioeconomic context in which people live. Therefore, it might indicate that people within the lower socioeconomic neighbourhoods are less likely to take over the more healthy behavioural practices as these are less common (and less 'available') within that particular context (or subculture). One other Dutch study found similar indications with regard to smoking behaviour. The effect of acculturation on increased smoking behaviour was found only among lower educated women, whereas among the higher educated women acculturation was not associated with smoking.[72]

These findings suggest that research on acculturation should take into account the context in which this process occurs. This would also apply to studies on convergence of health behaviour towards host populations across generations of ethnic groups. We therefore adjusted the conceptual framework by visualizing the socioeconomic and cultural context (see Figure 7.1).

Diversity within the first generation

We compared foreign born (first generation) with native born (second generation) persons, and based on this definition of generational status, we found indications for trends across generations. Several other immigrant studies, however, focused on how health-related behaviour developed *within the first generation* with increasing length of time since migration. Generally, these studies found that with increasing years of residence more aspects of the Western lifestyle were adopted.[17;25;28;29;73-76] These results imply there is much variation within

first generation immigrants. However, regarding the young age of our study population, it was less relevant to study the influence of years of residence while this is very much related to age. Age at migration is another indicator used in several studies (often as a proxy for acculturation) as a determinant of health-related behaviour in immigrant populations.[25] In our data, the first generation participants mostly came to the Netherlands after the age of 6 years, which is considered to be a critical age because it is the age at which children start primary school in most countries. Arriving after that age implies that they had followed their education partially in the country of origin which could lead to a stronger orientation towards the country of origin. In our data, we found indications that the group who migrated before the age of 6 was fairly similar to the group who migrated after the age of 6. Due to small numbers of participants in each cell, we were not able to test for significant differences. We suggest, however, that when studying first generation immigrants over a broader age range in particular, it is important to pay attention to variation within the first generation according to years since migration and age at migration.

A matter of gender?

Our results showed remarkable gender differences in the role of socioeconomic position, acculturation and religion. Higher socioeconomic position, greater cultural and social integration in the Dutch culture, and perceiving religion as not very important, were associated with respectively lower prevalence of overweight and physical inactivity, but only among women. A possible explanation for this gender difference might be related to the different impact that migration to a Western country might have for men and women. Women in the countries of origin generally have a traditional role as a mother and caregiver for whom it is less acceptable to be physically active in their leisure time.[77-79] In addition, this is partly related to the importance that religion places on such issues as gender separation in certain contexts and the maintenance of dress codes (implying that women prefer to cover their bodies).[79;80] When these women achieve an improved socioeconomic position and become more oriented towards the Dutch culture, the cultural distance in attitudes (from the host population) might lessen partly as a result of changes in traditional gender roles. In contrast among men, the cultural distance in beliefs and norms regarding physical activity are much smaller to begin with. This might be illustrated by the finding that level of physical activity in young Turkish and Moroccan men is generally comparable with ethnic Dutch men.

Similarly, also regarding overweight, the stronger negative perception of being overweight among women might partly explain the gender differences in the role of socioeconomic position. In most developed Western societies, overweight is perceived as negative, in particular among women with higher socioeconomic status. In contrast, in developing societies, being fat is within some subcultures a symbol of prestige and of sexual attractiveness, particularly in women.[30] As a result, following migration, women are confronted much more with negative attitudes towards overweight than men, and this is even more so among women with a higher socioeconomic status.

Further insight into the socioeconomic and cultural influences on the health behaviour of women from non-Western origin, and how this may be related to changes in traditional gender roles, might help to better understand the health status of these women. In turn, this information is relevant for developing targeted health promotion programs towards women with a non-Western background. Based on these findings we recommend that gender should be taken into account as an effect modifier in research on health-related behaviour, in particular when studying overweight and related behaviour (physical activity) among ethnic groups with a non-Western origin (see Figure 7.1).

7.4 Recommendations for future research

A life course approach in understanding generational differences in overweight

In this thesis we tried to understand the generational differences in overweight by differences in predisposing factors among which socioeconomic position and level of acculturation. For women we found that a better socioeconomic position of second generation ethnic groups partly explained why they are less often overweight than first generation women. However, none of the other predisposing factors could account for the generational differences in women, nor men. This could be caused by inadequate measurement of the potential determinants (see limitations of measurement of acculturation below), but another possibility is that we did not include the most relevant factors.

For example, several studies have found evidence that causes of overweight might be found in particular in a diversity of early life circumstances, such as parental social class, health-related behaviour and rapid growth in infancy.[81;82] These studies recognized the usefulness of a life course perspective in understanding social inequities in health. Some studies have shown that socioeconomic position in *childhood* may be more predictive of adulthood obesity than actual socioeconomic position in adulthood.[83] This early socioeconomic environment shaped their physical activity and dietary patterns that continued to influence weight status during adulthood. Considering the different socioeconomic and cultural environment in which first and second generation grew up, as a result of their different migration history, these circumstances could help to understand overweight differences between generations of ethnic groups.[84;85] Therefore we added these concepts to the framework (see adjusted framework in Figure 7.1). These factors most likely precede the motivational determinants. In addition, longitudinal data would provide more certainty of the direction of the associations and will provide insight into the changes over time within generations of ethnic groups.

Measurement of acculturation

Although we proceeded from Berry's model of acculturation and used scales that included different domains (language, emancipation, media use and social contacts), by summing up the scores across items, we may not have fully captured the multidimensional character of the

acculturation process.[86;87] Instead, it assumes a linear process from a 'lower' level of acculturation to a 'higher' level of acculturation, with the latter being more strongly oriented towards Dutch culture. In the public health literature there is much debate and controversy regarding these kinds of measurements as they seem to suggest that there is only one way of integration into the majority culture.[43;44] However, these linear assimilation models continue to dominate public health research despite the availability of more complex acculturation theories.[45;87]

Several researchers have suggested that successful adaptation might imply a bicultural orientation, with the ability to participate effectively in both cultures.[71;88;89] In relation to health behaviour, it has been hypothesized that *bicultural* individuals might have the lowest risk for adapting to unhealthy behaviour such as a sedentary lifestyle and unhealthy diet, whereas the marginalized individuals may be the most vulnerable for taking over unhealthy aspects of the 'Western lifestyle'. A few studies found that a bicultural orientation (cultural orientation towards both cultures with regard to language, media, identity) had positive effects on smoking behaviour and overweight among subgroups of Hispanic and Asian ethnic groups in the US.[88;90] Acculturation should then be treated as a "latent variable" with various underlying indicators, This view might do more justice to the complex nature of acculturation.[45] A more differentiated measure of acculturation might also help to understand differences in health-related behaviour between generations of ethnic groups.

Finally, as mentioned earlier, theories of segmented assimilation have argued that when measuring acculturation, it should be defined clearly what the starting position of ethnic groups is (e.g. socioeconomic factors) and to which 'reference' group they acculturate. We recommend that these topics should be taken into account in future research on acculturation in relation to health behaviour.

Combining social epidemiology with social psychology

Several studies on the influence of predisposing factors (i.e. socioeconomic position and acculturation) have suggested that the underlying mechanisms of these influences need to be explored in order to understand how the predisposing factors affect health and health-related behaviour.[45;91] By combining a social epidemiological approach with a social psychology (or health education) perspective, we provided insight into how the effect of a predisposing factor, acculturation, on physical activity can be explained by underlying motivational factors, such as underlying cultural beliefs or norms. To better understand the role of socioeconomic position in relation to overweight among women of a non-Western origin, we suggest that a similar approach might provide more insight into the specific determinants that underlie this association. In turn, this knowledge can be useful in designing preventive interventions targeted to the specific beliefs or barriers within a high risk ethnic group taking into account their socioeconomic position.[92] We suggest that, also in relation to other health behaviours, this approach would be useful in understanding the underlying mechanisms of socioeconomic or acculturation influences on behaviour.

Study population in future research

To further test the hypothesis of convergence of health-related behaviour across generations it might be interesting to include third generation ethnic groups in future studies. This is currently being undertaken among US ethnic groups.[93] Third generation persons are those who are born in the Netherlands and have at least one foreign born grandparent. The current third generation is mainly below the age of 10 years and is slowly increasing.[94] Unfortunately, it will be very difficult to identity this generation as the country of birth of their grandparents is not registered within the population registry. Therefore alternative ways of including this generation should be considered, such as the recruitment of participants through their second generation parents.

Furthermore, we suggest that the study population in future research should ideally include ethnic Dutch people with similar socioeconomic backgrounds in order to be able to test whether the earlier mentioned assumption of segmented assimilation (towards a particular socioeconomic group) can be confirmed.

The role of diet

Unfortunately, the LASER study did not include questions on diet or dietary patterns. Healthy diet is of great importance as it reduces the risk of becoming overweight as well as several kinds of diseases (e.g. heart diseases).[95] Only a few studies have explored the dietary habits of Turkish and Moroccan people in the Netherlands.[96-98] These studies indicate that some aspects of the diet among Turks and Moroccans are more favourable than the diet of ethnic Dutch people, whereas other aspects are less healthy. We have little information about how eating habits develop across generations, neither is it known whether these communities adopt the unhealthy aspects of Western lifestyle such as consumption of soft drinks or fast food for example. Studies among other ethnic groups found conflicting results. For example, the generally more favourable fruit and vegetable consumption among Latino- and Asian Americans remained stable in second and third generation Asian Americans, but worsened among Latino Americans.[93] We recommend that these patterns be explored among the Turkish and Moroccan population in particular in relation to the high prevalence of overweight and related diseases such as diabetes within these groups.

7.5 Implications for prevention

1. Health promotion should target specific 'high risk' ethnic groups

The most important, and more general, implication that follows from the results, is that some of the high prevalent risk factors among the Turkish and Moroccan population are not necessarily less prevalent in the second generation. Instead, we found higher rates among the second generation with regard to smoking (Turkish women) and overweight (Turkish men). Furthermore, physical inactivity is high prevalent among Moroccan women in particular, with no differences between the first and second generation. Besides these negative trends,

we found that, although the prevalence of overweight among women was lower in the second generation, rates were still relatively high from a public health perspective.

Based on these findings and considering the large and increasing proportion of young Turkish and Moroccan people in the urban areas in the Netherlands, we suggest that in order to further reduce these risk factors in the general population, it is necessary to target health promotion programs towards these high risk (sub)groups.

Within the current national public health policy, however, no specific attention is paid to these high risk ethnic groups. Two of the priority area's (main objectives) of prevention policy are reducing the number of smokers to 20% by 2010 and turning around the increasing trend in overweight (VWS nota "Kiezen voor Gezond Leven"). Although smoking is much more common among young Turkish people (47% men and 38% women) compared to ethnic Dutch people (resp. 36% and 33%) there is no mention of the need to target these specific ethnic groups. The same applies to overweight, which is much more common in young Turkish and Moroccan women (36%) compared to ethnic Dutch women (19%). As almost 45% of the babies born today in the big cities are of non-Western origin, the need to pay attention to ethnic differences in risk behaviour in order to meet the goals of the current policy is unavoidable. Targeting the lower socioeconomic groups might not be enough, as our results have shown that the association between health-related behaviour and socioeconomic position is not always similar to those found in host populations. For example, overweight in Turkish men seems to be not only limited to the lower socioeconomic groups. In addition, a study on smoking in Turkish women showed that this is more common among the higher educated women than among the lower educated.[99]

Thus, an important implication of our findings on generational differences, is that in order to reduce the prevalence of overweight and smoking (and related diseases) within the young Turkish and Moroccan population, we recommend that it might be necessary to develop structural interventions in second and perhaps third generations that specifically target these high risk ethnic groups.

2. Structural changes by improving the socioeconomic and physical environment

One way of influencing health and health-related behaviour in a more structural way is by improving the socioeconomic position and social and physical environment of people. This applies in particular to non-Western ethnic groups, who generally have lower levels of education, lower positions in the labour market and live in less attractive neighbourhoods compared to ethnic Dutch people. With regard to overweight in Turkish and Moroccan women, we suggest that improvement in educational level might lead to favourable changes as overweight was strongly associated with this factor in women. It is assumed that higher education leads to increased knowledge and awareness of the relationship between behaviour and health.[100] In addition, an improved socioeconomic position increases the possibilities for making healthy choices.

Furthermore, we recommend that the physical environment should be addressed in order to improve health behaviour particularly as the majority of the Turks and Moroccans in the Netherlands live in less attractive and more deprived neighbourhoods. Our study showed that people who perceived their neighbourhood as less attractive (e.g. less safe) did not profit from the positive influence that cultural and social integration can have on physical activity during leisure time. In other words, physical activity levels do not increase 'by themselves' with greater integration into the majority culture. For example, increased proficiency of the Dutch language (as an indicator of cultural integration) will not automatically lead to increased participation in leisure time activities if barriers (such as an unattractive neighbourhood) prevent this. This implies that environmental changes in, for example, infrastructure (safe walking areas) or providing more safe playgrounds or more greenery might have a positive influence on daily as well as leisure time physical activity behaviour. This is supported by studies indicating that living in a safe and less deprived neighbourhood is independently associated (adjusted for e.g. individual factors such as socioeconomic indicators) with a lower prevalence of smoking, physical inactivity and overweight.[101-103]

We suggest that the current initiative of the Dutch minister of "Wonen, Wijken en Integratie" (living, neighbourhoods and integration) to improve the social and physical environment of 40 deprived neighbourhood in the Netherlands, provides an opportunity to improve the health status of the young Turkish and Moroccan population as they are well represented in many of these neighbourhoods. In addition, this is an opportunity to further study the effects of 'interventions at a neighbourhood level' on important health outcomes, such as overweight and related behaviour.

To conclude, improving both the socioeconomic position and the contextual aspects of the neighbourhood, in addition to changing individual behaviour, may have greater impact on health-related outcomes than focusing solely on individuals.

3. Differentiation in preventive strategies: "one size fits all" will not be effective

As mentioned above, apart from the contextual influences on health, changes on an individual level remain necessary in order for the contextual improvements to have an impact on individual behaviour. The results in this study regarding the motivational determinants of participation in sports showed that culture specific attitudes and needs were strongly related to participation in sport. These attitudes seemed to be more prevalent in women with a low orientation towards the Dutch culture. This implies that regular prevention programs based on the beliefs of ethnic Dutch women, may not be as attractive for women with a different cultural background. In particular when targeting the least integrated women, the culture specific beliefs and needs should be addressed in order to reach out to these women and stimulate physical activity.

An example of how such a 'culture sensitive' approach might work is illustrated by the apparently successful current intervention "exercise on prescription" that takes into account ethnic-specific determinants. This is an 'exercise referral scheme' which offers supervised exercise to people

who are inactive or who have a medical condition. Instructors work closely with clinicians to support ongoing rehabilitation of those referred with health conditions.[104-107] This program helped to overcome some of the practical barriers that immigrant women experience. For example, participants were closely guided through a program of exercise activities without the presence of men at nearby locations. Costs of the program were also low.[46]

Another example is "Lady Fit", an initiative in a deprived neighbourhood in the Netherlands (Kanaleneiland, Utrecht), where women are offered aerobic, fitness, fighting sports and soccer. This initiative seemed successful mostly because they addressed the needs of Muslim women to exercise in a 'safe environment', which also implies locations were only women are allowed.

In the Netherlands, however, separate sports facilities for men and women are not encouraged; neither is a policy of offering activities for a particular ethnic or religious group. Based on the results in our study and the above-mentioned successful initiatives we suggest that exceptions might be made in order to stimulate a healthier lifestyle among these groups of women. This may not only improve their physical and mental health status, but may also lead to greater social participation and even emancipation of women who would otherwise stay at home.[108]

7.6 General conclusions

This thesis has provided insight into the prevalence and determinants of health-related behaviour in two generations of Turkish and Moroccan young people in the Netherlands. By studying a relatively young age group (15-30 years) we were able to include a large number of both first and second generation ethnic groups which enabled us to assess differences in prevalence rates across generations and compare them with ethnic Dutch people. In addition, we explored associations with predisposing as well as motivational factors and tested which of these factors could underlie the generational differences.

The following main conclusions can be drawn: 1) the general assumption that health-related behaviour will approximate rates among ethnic Dutch persons across generations was not confirmed. Instead, some health-related behaviours were highly prevalent in the young second generation, this applied to Turkish men (overweight) and women (smoking) in particular. 2) Gender differences were found with regard to the role of socioeconomic position, acculturation and religion. These factors were strongly associated with respectively overweight and physical inactivity in women, but not in men. In addition, an improved socioeconomic position of second generation women seemed to account for their lower prevalence of overweight compared to first generation women.

3) The positive effect of acculturation on physical activity during leisure time should be interpreted more cautiously as we found that this effect was only present when people did not perceive contextual barriers, such as a less attractive environment. This finding indicates that adapting to more healthy behaviour does not always occur as contextual barriers

prevent people from changing their behaviour 4) Finally, the positive effect of acculturation on participation in sports among Turkish women seemed to be mediated in particular by culture specific beliefs towards physical activity.

In conclusion, this study unravelled some of the mechanisms underlying health-related behaviour in two generations of young Turkish and Moroccan people in the Netherlands. As this population will increase during the next decade, in particular in urban areas, we recommend that in order to improve the health status of urban populations in general, the high risk groups identified in this study need to be targeted. We suggest that this might be undertaken by both structural improvements in the socioeconomic and environmental context of these ethnic groups and by simultaneously providing health promotion activities aimed at changing individual behaviour.

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Summary & Samenvatting

Summary

Health damaging behaviour is an important cause of many diseases such as cardiovascular diseases, diabetes and several forms of cancer. Despite the increasing ethnic diversity of many Western populations, there are few preventive interventions that specifically aim to reduce health damaging behaviour among ethnic groups from a non-Western background. More insight is needed into the prevalence of healthy and unhealthy behaviours and their underlying causes within these ethnic groups. This information is important as it can shed light on whether targeting these groups, through the use of more ethnic-specific health promotion programs, is necessary.

The main objective of this thesis was to provide insight into the prevalence and underlying determinants of smoking, alcohol use, physical (in)activity and overweight among first and second generation Turkish and Moroccan young people (15-30 years) in Amsterdam, the Netherlands. The focus was specifically on those risk factors that are high prevalent in both ethnic groups i.e., physical inactivity and overweight.

In the introduction (**chapter 1**) we discussed a conceptual framework that described the dynamics underlying health related behaviour that were examined in this thesis. The following concepts were distinguished. Firstly, *ethnic background and generation*, which are based on country of birth. The first generation consists of persons who are born in Turkey or Morocco while the second generation refers to persons born in the Netherlands with at least one of both parents born in Turkey or Morocco. Secondly, we assumed ethnic and generational differences in health-related behaviour are partly a result of differences in *predisposing factors* including socioeconomic position, level of acculturation and religion. Thirdly, the influence of these predisposing factors was assumed to affect health behaviour through *motivational factors*, which include beliefs and norms towards a particular behaviour. Furthermore, we added *contextual barriers* to the framework which refers to barriers within the social and physical environment in which people live. In this thesis we explored whether this framework is useful in understanding health related behaviour of the young Turkish and Moroccan population in the Netherlands. The following questions were addressed:

1. Are second generation young Turks and Moroccans (aged 15-30 years) in the Netherlands more similar to the ethnic Dutch population in regard to prevalence of smoking behaviour, alcohol abuse, physical inactivity and overweight, compared to first generation Turks and Moroccans of the same age? (chapter 2).

2. a) How are predisposing factors (socioeconomic position, acculturation and religion) associated with physical inactivity and overweight among Turkish and Moroccan young men and women, and b) to what extent are differences in overweight between the first and second generation accounted for by these predisposing factors? (chapter 3 and 4).

3. Is the influence of predisposing factors (i.e. acculturation) on physical activity during leisure time dependent on the presence of contextual barriers (e.g. unattractive neighbourhood)? (chapter 5)

4. To what extent does acculturation affect health behaviour, more specifically, physical activity, through motivational factors? (chapter 6)

We used data from the LASER study, which stands for: *Lifestyle among young people in Amsterdam: Study among Ethnic gRoups*. For the present study we included participants aged 15 to 30 years, with a Turkish or Moroccan background, which were randomly selected from the Amsterdam population registry. This resulted in 505 Turkish and 291 Moroccan young people who participated in a structured interview conducted by an interviewer with similar sex and ethnic background as the participant. Data of the ethnic Dutch population were obtained from a national survey, "Periodiek Onderzoek Leefsituatie" from Statistics Netherlands (CBS, POLS-enquête 2003-2004). In addition to the quantitative data collection, we conducted focus group interviews to explore the salient culturally beliefs regarding physical activity.

In **chapter 2** we assessed whether second generation Turks and Moroccans were more similar to ethnic Dutch than the first generation, which would indicate a pattern of convergence of health related behaviour towards ethnic Dutch. Contrary to what is often assumed, we found no consistent pattern, instead the pattern varied by gender, ethnicity and by risk factor. Remarkably, we found that Turkish women of the second generation smoked significantly more than ethnic Dutch women, while first generation women did not differ from ethnic Dutch. A similar pattern was found for overweight in Turkish men. Among Moroccan women both first and second generation women were highly physically inactive with no trend of convergence towards the lower rates in ethnic Dutch women. Finally, the use of alcohol was low in all subgroups compared to ethnic Dutch with no differences between the generations. We did, however, found a pattern of convergence for overweight in both Turkish and Moroccan women and for physical inactivity in Turkish women. With the second generation being more similar to ethnic Dutch, and therefore having lower prevalence rates, than the first generation women. Although this is a positive finding, these rates are still relatively high from a public health perspective. A similar trend was found for smoking among Turkish men: second generation men approximate the lower prevalence of smoking in the ethnic Dutch men.

Chapter 3 describes the association between socioeconomic, acculturation and religious indicators with physical inactivity and overweight. Women who were more culturally orientated towards the Dutch culture and who had more social contacts with ethnic Dutch (higher acculturated) or who perceived religion as not very important were less physically inactive. However, acculturation and religion were not significantly associated with overweight, but showed a trend in expected direction. In addition, we found that higher educated women or students were less often overweight than respectively lower educated or unemployed women. However, these same indicators were not associated with physical inactivity, which

suggests that differences in nutritional intake might be more important than level of physical activity in understanding the overweight differences between lower and higher educated women. Among men, however, hardly any associations were found. Explanations for this gender differences are discussed in the discussion section.

In **chapter 4** we tested which determinants (i.e. socioeconomic, acculturation, religion) accounted for the differences in overweight between first and second generation men and women. It appeared that a higher socioeconomic position of women (i.e. level of education) accounted for the lower prevalence of overweight in second generation women. All other potential mediators could not explain the found differences among women nor men. Among men this was a result of the fact that none of the potential determinants were associated with overweight. To better understand the generational trends, in particular among men, we suggest further research that focuses on a multidimensional measurement of acculturation, on the measurement of circumstances during early childhood (socioeconomic, cultural), and on the factors that explain why a higher socio-economic position of men does not 'protect' against overweight.

In **chapter 5** we assessed whether acculturation was also positively associated with physical activity during leisure time when people perceived contextual barriers for being physically active. Results showed that only among participants living in *exercise supportive conditions* (attractive neighbourhood, having no children and no occupational physical activity) acculturation had a positive influence on physical activity during leisure time. This indicates that barriers in the physical or social environment might inhibit the positive influence of acculturation. This implies that we cannot assume that greater integration (i.e. use of the Dutch language) will also lead to increased physical activity, because barriers in the social or physical environment may prevent this.

In **chapter 6** we tested which motivational factors mediate the association between acculturation and sport participation among Turkish and Moroccan young women. Results showed that in particular the cultural specific beliefs and needs with regard to physical activity could explain the low participation in sport among low acculturated women. These women agreed more often with amongst others the idea that sport is only for young people, they had more often a preference for exercising with Moroccan and Turkish peers, or a preference for exercise at locations were no men are allowed and often indicated that they would 'not feel at home' in a Dutch sports club. In addition, they scored lower on perceived self-efficacy. The results imply that increasing cultural orientation towards the Dutch culture (acculturation) leads to changes in beliefs and needs and perceived self-efficacy, which in turn have a positive influence on participation in sport. These beliefs and needs should be addressed when developing a culture sensitive intervention aimed at increasing sport participation among the low acculturated women in particular.

Finally, in **chapter 7** we gave a summary of the main findings, reflect on those findings and discussed the implications for prevention programs. In addition we discussed some limitations of the study and gave a few recommendations for future research. In short, three main

conclusions and related implications can be drawn from this study. Firstly, we found that some high prevalent health related risk factors within the Turkish and Moroccan population, will not necessarily approximate lower rates among the ethnic Dutch population. This implies that also in second generation young people with a Turkish and Moroccan background, it remains necessary to target prevention programs towards high risk groups within this population. Secondly, with regard to overweight among Turkish and Moroccan women, we found that improvement in socioeconomic position might lead to lower prevalence of overweight. In addition to socioeconomic influences, we found that the physical and social environment (neighbourhood) might inhibit the positive effects of acculturation on physical activity behaviour. These findings indicate that structural improvement of both the socioeconomic and physical context, might have favourable consequences for health related behaviour in this population. Thirdly, we found that culture specific beliefs accounted for differences in participation in sports between lower and higher acculturated women. This indicates that in order to effectively reach these women and stimulate physical activity behaviour, it might be necessary to tailor interventions to the specific beliefs and needs that are salient within this group. Therefore, we recommend that in addition to more contextual improvements, changes on an individual level remain necessary in order for the contextual changes to have an impact on individual behaviour.

Samenvatting

Ongezond gedrag is een belangrijke oorzaak van ziekte, waaronder hart-en vaatziekten, diabetes en verschillende vormen van kanker. Preventie van ongezond gedrag is daarom een belangrijke doelstelling binnen het volksgezondheidsbeleid. Verschillende preventieve activiteiten (interventies) beogen het gezonde gedrag te stimuleren en ongezond gedrag te voorkomen of verminderen. Dit beleid wordt gecompliceerd door het feit dat de bevolking in toenemende mate bestaat uit groepen met uiteenlopende etnische achtergronden, met name in de grote steden. Dit roept de vraag op of het nodig is bij de ontwikkeling van dergelijke gezondheidsprogramma's rekening te houden met de diverse etnische achtergronden. Om deze vraag te kunnen beantwoorden is meer kennis nodig over het voorkomen (en de oorzaken) van bepaalde risicofactoren onder allochtone groepen.

Het hoofddoel van dit onderzoek was inzicht te krijgen in de prevalentie en de onderliggende oorzaken van rookgedrag, alcohol gebruik, (on)voldoende lichaamsbeweging en overgewicht onder de eerste en tweede generatie Turkse en Marokkaanse jonge mensen (tussen de 15 en 30 jaar oud) in Nederland. Deze groepen behoren tot de grootste allochtone bevolkingsgroepen in Amsterdam. De nadruk in dit onderzoek lag op de risicofactoren die het meest voorkomen in zowel de Turkse als de Marokkaanse doelgroep, namelijk overgewicht en onvoldoende beweging.

In de introductie (**hoofdstuk 1**) wordt een conceptueel model beschreven waarin de onderliggende oorzaken van (on)gezond gedrag onder allochtone groepen worden benoemd die onderzocht zijn in dit proefschrift. De volgende concepten worden daarin onderscheiden. Allereerst, *etnische achtergrond en generatie*. Beide zijn bepaald op basis van geboorteland. De veronderstelling is dat het (on)gezonde gedrag verschilt naar etniciteit en generatie. Tot de eerste generatie worden personen gerekend die zijn geboren in Turkije of Marokko. De tweede generatie bestaat uit personen die in Nederland zijn geboren waarvan tenminste één van beide ouders geboren is in Turkije of Marokko. Ten tweede veronderstelden we dat etnische- en generatieverschillen in gezondheidsgedrag deels een gevolg zijn van verschillen in *predispositionele kenmerken* (oftewel sociaaldemografische kenmerken) waaronder de sociaal-economische positie, de mate van acculturatie en de beleving van religie. Ten derde, is de veronderstelling dat de invloed van deze predispositionele factoren gezondheidsgedrag beïnvloeden via *motivationele factoren*, zoals opvattingen en normen ten aanzien van een bepaald gedrag. Tot slot, werd verondersteld dat *barrières* in de sociale en fysieke omgeving van mensen hun gedrag kunnen beïnvloeden. In dit proefschrift is onderzocht of dit conceptueel raamwerk bruikbaar is om het gezondheidsgedrag onder allochtone groepen beter te begrijpen. De volgende onderzoeksvragen staan daarbij centraal:

1. Lijken tweede generatie jonge Turken en Marokkanen (15-30 jaar) in Nederland méér op de autochtone Nederlandse populatie met betrekking tot rookgedrag, alcoholgebruik, lichaamsbeweging en overgewicht, dan de eerste generatie Turken en Marokkanen van dezelfde leeftijd? (hoofdstuk 2)

2. a) Hoe hangen predispositionele kenmerken (sociaal-economische positie, acculturatie en religie) samen met onvoldoende lichaamsbeweging en overgewicht onder Turkse en Marokkaanse jonge mannen en vrouwen, en b) in welke mate worden verschillen in overgewicht tussen de eerste en tweede generatie verklaard door deze predispositionele factoren? (hoofdstuk 3 en 4)

3. Is de invloed van predispositionele kenmerken (acculturatie) op beweeggedrag in de vrije tijd afhankelijk van de aanwezigheid van contextuele barrières (o.a. onaantrekkelijke buurt, fysieke activiteit op het werk)? (hoofdstuk 5)

4. In welke mate beïnvloedt acculturatie gezondheidsgedrag (meer specifiek beweeggedrag) via de motivationele factoren? (hoofdstuk 6)

Data zijn afkomstig uit de LASER–studie, wat staat voor: *Lifestyle among young people in Amsterdam: Study among Ethnic gRoups*. Voor de onderhavige studie includeerden we deelnemers tussen de 15 en 30 jaar oud met een Turkse of Marokkaanse achtergond. Deze personen waren afkomstig uit een willekeurige steekproef uit de Gemeentelijke Basis Administratie (GBA) van Amsterdam. Dit resulteerde in 505 Turkse en 291 Marokkaanse jonge mensen bij wie een gestructureerd interview is afgenomen door een interviewer met dezelfde etnische achtergrond en sekse als de deelnemer. Data van de autochtone Nederlandse bevolking waren verkregen via een landelijke survey "Periodiek Onderzoek Leefsituatie" uitgevoerd door het Centraal Bureau voor de Statistiek (CBS, POLS-enquete 2003-2004). Voorafgaande aan de kwantitatieve dataverzameling zijn er focusgroepsdiscussies gehouden om de relevante culturele opvattingen ten aanzien van beweeggedrag in kaart te brengen.
In **hoofdstuk 2** onderzochten we of de tweede generatie Turkse en Marokkaanse jonge mensen meer gelijk zijn aan hun autochtone Nederlandse leeftijdsgenoten dan de eerste generatie, wat een indicatie zou zijn dat gezondheidsgedrag 'convergeert' richting het gedrag van de autochtone bevolking over deze twee generaties heen. In tegenstelling tot wat vaak verondersteld wordt vonden we geen consistent patroon, maar veel variatie naar sekse, etniciteit en naar risicofactor. Opvallend was de hogere prevalentie van roken onder Turkse vrouwen van de tweede generatie in vergelijking met Nederlandse vrouwen, terwijl de eerste generatie vrouwen niet verschilde van de autochtone vrouwen. Een vergelijkbaar patroon werd gevonden voor overgewicht onder Turkse mannen. Marokkaanse vrouwen waren het meest lichameijk inactief en dit beeld was niet gunstiger onder de tweede generatie vrouwen. Tot slot, het gebruik van alcohol was laag in alle subgroepen naar sekse en etniciteit in vergelijking met autochtone Nederlanders, dit gold zowel voor de eerste als tweede generatie. Een patroon van convergentie werd daarentegen wel gevonden voor onder andere overgewicht onder Turkse en Marokkaanse vrouwen en voor beweging onder Turkse vrouwen. Onder de tweede generatie was de prevalentie in beide gevallen lager dan onder de eerste generatie vrouwen, waardoor de tweede generatie meer lijkt op de groep

autochtone Nederlandse vrouwen. Ondanks deze positieve 'trend' zijn deze prevalenties nog steeds hoog gezien vanuit het perspectief van de publieke gezondheid. Tot slot, werd een vergelijkbare 'convergentie trend' gevonden voor roken onder Turkse mannen: de tweede generatie mannen naderen de lagere prevalentie van rokers onder de autochtone Nederlandse mannen.

Hoofdstuk 3 beschrijft de verbanden tussen sociaal-economische positie, acculturatie en religie met het voorkomen van onvoldoende beweging en overgewicht. Vrouwen die sterker op de Nederlandse cultuur waren georiënteerd, die meer sociale contacten hadden met Nederlanders of die aangaven dat religie voor hen niet 'erg belangrijk' was, waren lichamelijk actiever dan vrouwen die in tegenovergestelde richting op deze onderdelen scoorden. Acculturatie en religie waren daarentegen niet significant geassocieerd met overgewicht, maar lieten wel een trend zien in de verwachte richting. Daarnaast vonden we dat hoger opgeleide vrouwen en vrouwen die nog een opleiding volgden minder vaak overgewicht hadden dan vrouwen met een lage opleiding of vrouwen die werkzoekend waren. Echter, opleiding vertoonde geen verband met beweeggedrag, wat een aanwijzing zou kunnen zijn dat verschillen in voeding een grotere rol spelen dan beweeggedrag in het verklaren van de verschillen in overgewicht tussen de lager en hoger opgeleide vrouwen. Onder mannen bleek overgewicht en onvoldoende beweging niet of nauwelijks samen te hangen met sociaal-economische positie, acculturatie of religie. Verklaringen voor dit gender verschil zijn besproken in de discussie sectie van dit hoofdstuk.

In **hoofdstuk 4** werd getoetst welke determinanten het verschil in overgewicht tussen de eerste en tweede generatie mannen en vrouwen kan verklaren. Een betere sociaal-economische positie (met name opleiding) bleek onder vrouwen de belangrijkste verklaring te vormen voor de lagere prevalentie van overgewicht in de tweede generatie vrouwen. Alle andere potentiële mediatoren konden de gevonden generatie-verschillen niet verklaren, dit gold voor zowel mannen als vrouwen. Onder mannen was dit vooral een gevolg van het feit dat geen van de potentiële determinanten een verband had met overgewicht. Om de trends in overgewicht over de twee generaties beter te begrijpen, met name onder mannen, suggereren we dat verder onderzoek zich moet richten op een multidimensionale meting van acculturatie, het meten van de omstandigheden tijdens de vroege kindertijd (sociaal-economisch en cultureel), en op de factoren die kunnen verklaren waarom een betere sociaal-economische positie onder mannen niet beschermt tegen overgewicht.

In **hoofdstuk 5** onderzochten we of acculturatie ook een positieve invloed heeft op beweeggedrag in de vrije tijd wanneer bepaalde barrières om te gaan bewegen aanwezig zijn in de sociale of fysieke omgeving van mensen. Resultaten lieten zien dat alléén onder mensen die zich in een zogenaamde beweegvriendelijke context bevonden (aantrekkelijke buurt, geen fysieke activiteit op het werk, geen kinderen) acculturatie een positieve invloed had op bewegen in de vrije tijd. Dit is een aanwijzing dat barrières in de fysieke of sociale omgeving als het ware belemmeren dat de positieve invloed van acculturatie z'n werk doet. Dit betekent dat we niet zonder meer mogen aannemen dat een sterkere oriëntatie op de Nederlandse cultuur

leidt tot meer bewegen, omdat een groot deel van de allochtone groepen in een omgeving woont die beweeggedrag belemmert.

In **hoofdstuk 6** testten we via welke motivationele factoren de relatie tussen acculturatie en sportgedrag onder Turkse en Marokkaanse verloopt. De lage sportdeelname onder de minder geïntegreerde vrouwen bleek vooral te maken te hebben met cultuur specifieke opvattingen en behoeften ten aanzien van bewegen. Deze vrouwen waren het vaker eens met onder andere het idee dat sport alleen voor mannen en voor jonge mensen is, ze hadden een sterkere voorkeur voor sporten met andere Turkse en Marokkaanse leeftijdsgenoten en een voorkeur voor sporten op locaties waar mannen niet zijn toegestaan. Verder gaven deze vrouwen vaker aan dat zij zich niet thuis zouden voelen bij een Nederlandse sportclub. Tot slot ervoeren deze vrouwen een lagere mate van eigen-effectiviteit (overtuiging dat je een bepaalde handeling kunt uitvoeren). Deze resultaten zijn een aanwijzing dat een sterkere culturele oriëntatie op Nederland ook leidt tot veranderingen in de opvattingen, de behoeften en de eigen-effectiviteit ten aanzien van bewegen en sporten, welke op hun beurt een positieve invloed hebben op het sportgedrag onder deze vrouwen. Bij het ontwikkelen van interventies gericht op de minder geïntegreerde vrouwen in het bijzonder, zou daarom rekening gehouden moeten worden met de cultuur specifieke opvattingen en behoeften.

Tot slot, wordt in **hoofdstuk 7** een samenvatting gegeven van de belangrijkste resultaten, er wordt gereflecteerd op deze bevindingen en er worden implicaties voor preventie besproken. Daarnaast wordt een aantal kanttekeningen geplaatst bij het onderzoek en suggesties gedaan voor verder onderzoek. Kort samengevat, zijn er drie hoofdconclusies getrokken met daaraan gerelateerde implicaties. Allereerst werd gevonden dat een aantal van de risicofactoren die vaak voorkomen onder de Turkse en/of Marokkaanse bevolking niet vanzelf 'afnemen' over twee generaties heen. Dit betekent dat ook onder tweede generatie jonge mensen met een Turkse of Marokkaanse achtergrond het nodig zal blijven om preventie programma's te richten op de specifieke risicogroepen in deze populatie. Ten tweede, onder jonge Turkse en Marokkaanse vrouwen vonden we aanwijzingen dat overgewicht afneemt met een betere sociaal-economische positie. Daarnaast vonden we dat de fysieke en sociale omgeving barrières kan opwerpen die de positieve invloed van acculturatie (integratie) op beweeggedrag tegenwerken. Op basis van deze bevindingen is de verwachting dat structurele verbetering van de zowel de sociaal-economische context als de fysieke en sociale omgeving een gunstige invoed zal hebben op het gezondheidsgedrag onder deze bevolkingsgroepen. Ten derde, vonden we dat cultuur bepaalde opvattingen deels konden verklaren waarom de minder 'geïntegreerde' vrouwen minder sporten dan de meer 'geïntegreerde' vrouwen. Dit betekent dat het nodig is om interventies af te stemmen op de cultuur bepaalde behoeften en opvattingen die van betekenis zijn in deze groep. Alleen op deze wijze kunnen vrouwen op een effectieve manier bereikt worden en gestimuleerd worden tot meer lichaamsbeweging. In aanvulling op de meer structurele verbeteringen in de omgeving, wordt daarom aanbevolen om ook in te zetten op veranderingen op individueel niveau.

Met dank aan

Met dank aan

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Over de auteur

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Tijdens het eerste jaar van de studie psychologie raakte Karen Hosper (Wageningen, 23 oktober 1972) geïnteresseerd in de rol die cultuur en migratie spelen in het begrijpen van menselijk gedrag. Zij koos daarom voor de richting Cross-culturele psychologie met als afstudeervariant 'interculturele relaties'. De onderwerpen van haar leeronderzoek, afstudeeronderzoek en literatuurscriptie hadden als gemeenschappelijk thema de problematiek van een multi-culturele samenleving. Na haar afstuderen in 1996 deed zij praktijkervaring op in haar werk bij de Stichting Vluchtelingenwerk Utrecht (begeleiden van nieuwkomers) en het toenmalige AZC. In 1998 begon haar onderzoekscarrière als junior-onderzoeker bij het Trimbos-instituut, waar zij een aantal jaren onderzoek deed naar de hulpvragen en het hulpaanbod voor allochtone jongeren in de geestelijke gezondheidszorg. In 2001 begon zij aan haar promotieonderzoek bij de afdeling Sociale Geneeskunde van het Academisch Medisch Centrum, Universiteit van Amsterdam. Op dit moment werkt zij tevens binnen de Academische Werkplaats van de GGD Amsterdam/UvA aan een onderzoek dat zich richt op de aanpak van overgewicht in een multi-etnische bevolking. Daarnaast start ze binnenkort met een onderzoek waarin het effect van het programma "Bewegen-Op-Recept" wordt geëvalueerd onder allochtone vrouwen in Den Haag.