MOBILE APPS FOR HEALTHY LIVING: SEGMENTING AND PROFILING OFFER ACCORDING TO USER NEEDS

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ABSTRACT

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Living a healthy lifestyle is becoming increasingly relevant for contemporary society. As a result, health and lifestyle apps are on their way to become the dominant technological tool in supporting such a healthy lifestyle. For that reason, it becomes essential for app developers to understand what exactly consumers consider a healthy lifestyle, in order to design apps that satisfy user needs and ensure enduring success in the health and lifestyle app market.
The present study identifies the key activities and goals consumers associate with a healthy lifestyle and assesses to which degree the five health and lifestyle apps, MyFitnessPal, Runtastic, Seven, Sleep Better and Headspace facilitate them. To this end, primary data was obtained by conducting a survey, in which respondents, among other questions, were asked to provide their associations with a healthy lifestyle. The results were compared with qualitative secondary data about the five different health and lifestyle apps. In addition, the apps were matched with a taxonomy of behavioural change processes.
The results show that consumers' understanding of a healthy lifestyle is much more varied and complex than the literature suggests. Moreover, findings showed which parts of a healthy lifestyle are well matched by current apps and which are not. Also, it was seen that current apps should integrate more behaviour change techniques that enhance motivation.
In conclusion, these findings are relevant for app developers in designing successful health and lifestyle apps that meet different consumer needs in order to ensure engagement and retention.

Keywords: healthy lifestyle, health and lifestyle apps, app design, behaviour change technique, user engagement

SUMÁRIO

Viver um estilo de vida saudável é cada vez mais relevante para a sociedade contemporânea. Como resultado, as aplicações de saúde e estilo de vida estão a caminho de se tornarem a ferramenta tecnológica dominante no apoio a um estilo de vida saudável. Por essa razão, torna-se essencial que os desenvolvedores de aplicativos entendam exatamente o que os consumidores consideram um estilo de vida saudável, a fim de criar aplicativos que satisfaçam as necessidades dos usuários e garantam um sucesso duradouro no mercado de aplicativos de saúde e estilo de vida.

O presente estudo identifica as principais atividades e objetivos que os consumidores associam a um estilo de vida saudável e avalia até que ponto os cinco aplicativos de saúde e estilo de vida, MyFitnessPal, Runtastic, Seven, Sleep Better e Headspace os facilitam. Para isso, os dados primários foram obtidos por meio da realização de uma pesquisa, na qual os entrevistados, entre outras questões, foram convidados a proporcionar às suas associações um estilo de vida saudável. Os resultados foram comparados com dados secundários qualitativos sobre as cinco diferentes aplicações de saúde e estilo de vida. Além disso, as aplicações foram combinadas com uma taxonomia de processos de mudança comportamental.

Os resultados mostram que a compreensão dos consumidores sobre um estilo de vida saudável é muito mais variada e complexa do que a literatura sugere. Além disso, os resultados mostraram quais as partes de um estilo de vida saudável que são bem correspondidas pelas aplicações atuais e quais as que não o são. Além disso, verificou-se que as aplicações atuais devem integrar mais técnicas de mudança de comportamento que aumentem a motivação.

Em conclusão, estas conclusões são relevantes para os criadores de aplicações na conceção de aplicações bem-sucedidas de saúde e estilo de vida que satisfaçam as diferentes necessidades dos consumidores, a fim de garantir o seu envolvimento e retenção.

Palavras-chave: estilo de vida saudável, aplicações de saúde e estilo de vida, design de aplicativos, técnica de mudança de comportamento, engajamento do usuário

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TABLE OF CONTENTS

TABLE OF TABLES

TABLE OF ANNEXES

GLOSSARY

App:	Application
BCT**:**	Behaviour Change Technique
WTP:	Willingness to pay

CHAPTER 1: INTRODUCTION

This chapter presents the topic and aim of the dissertation. It starts by analyzing the background of mobile apps for healthy living and the problem statement that led to the aim of the dissertation, followed by the developed research questions. Next, the research methods applied, and the academic and managerial relevance of the topic are described. Lastly, the outline of the dissertation is detailed.

1.1. Background and Problem Statement

As the world becomes increasingly digital, the market for mobile applications is equally growing. By 2017, the share of people in emerging and developing countries owning a smartphone was 42%. Among developed economies, this share reached as much as 72% (Poushter, Bishop & Chew, 2018). At the same time, consumers are more and more concerned about their health and living a healthy lifestyle is becoming one of the biggest trends and hallmarks of contemporary society (Gil, Gracia, & Sanchez, 2000). This is fuelling the growth of the market for mobile health and lifestyle apps. Health and lifestyle apps assist their users to live healthier, eat better and exercise more often. Moreover, they help them achieve related goals by enabling them to visualize their performance with specific tools, such as graphics (Market Research Future, 2018).

In the past, leading a healthy lifestyle typically implied consumers had to get a membership at a local gym or club, to work out, or get access to information about nutrition and health through mass media. Today, mobile health is a constantly growing trend and the number of consumers using health and lifestyle apps is rapidly expanding. A recent report shows that the number of health apps in the most popular app stores exceeds 318.000 worldwide and that about 200 new health apps are launched every day (IQVIA, 2017). Another study reports that 58% of people owning a smartphone had already downloaded a health-related app by 2015 (Krebs & Duncan, 2015). Mobile apps are thus on their way to become the dominant technological tool in supporting a healthy lifestyle.

While these developments offer marketers and companies many opportunities to generate revenue in a fast-growing market, they also pose some major challenges. Due to the large amount of health and lifestyle apps now available, linked to the fast evolution of related technology and features, users face the challenge of selecting the app which best meets their specific needs and goals with scarce information about their usability and effectiveness in advance (Boudreaux et al., 2014). In addition, and in spite of huge technological and design

developments, lack of user engagement with health and lifestyle apps remains a big concern for marketers and brands (Laing et al., 2014). For instance, users frequently download apps that they then seldom use, if ever, and one study revealed that only 16% of people are willing to give an app another chance if it fails to provide a good first impression (Pramis, 2013). Importantly, most health and lifestyle apps are unable to retain users in the long run (Krebs & Duncan, 2015). On the other hand, providers of health apps operate in a highly competitive market and are, by and large, uncertain about the activities and goals different consumers associate to a healthy lifestyle, the motivations that drive their current and aspired behavior, or their willpower to engage in, and sustain significant changes in behavior. Gaining a better understanding of these variables is crucial to improve current app design, content and functionalities, in order to satisfy user needs and ensure enduring success in the health and lifestyle app market.

Past research has evaluated the effectiveness of mobile health apps in enabling users to achieve very specific health goals, like weight loss (Laing et al., 2014). Its findings reinforce the crucial role played by user engagement to ensure behavioural change and ultimately the success of apps. Still, little is known about users' perspective of a healthy lifestyle and which app functionalities increase their engagement, thereby helping them achieve their health and lifestyle goals in a sustained manner.

1.2. Aims and Scope

The general aim of this dissertation is to segment and profile extant health and lifestyle apps according to user needs. To this end, the key activities and goals consumers associate with a healthy lifestyle are first identified and the degree to which extant prototypical apps facilitate them is subsequently assessed. As a result, app functionalities and underlying behavioural change processes that may improve user engagement are identified. The specific research questions guiding this dissertation were:

1. What do consumers associate with a healthy lifestyle and how well is that matched by current health and lifestyle apps and their functionalities?
2. Which functionalities and underlying psychological processes could be integrated in health and lifestyle apps, in order to improve their ability to promote behavioural change and retain users in the long run?

Lifestyle is a social science construct describing how people try to express their identity through different means, such as activities, interests, and opinions (AIO) (Wells & Tigert, 1971). According to van Raaij and Verhallen (1994), a person's lifestyle does not need to be persistent across the various life domains; on the contrary, it can be limited to certain specific ones. Chief among these is the healthy lifestyle domain, encompassing different types of health-related interests, opinions and behaviors (Gil et al., 2000). This dissertation focuses thus on health and lifestyle apps only, that is, on apps that specifically aim to promote changes in the behavior of users leading them to live a healthier lifestyle. For this purpose, five of the most popular health & lifestyle apps currently available in the marketplace were selected: MyFitnessPal, Runtastic, Seven, Sleep Better and Headspace. Health apps that measure blood sugar and other indicators related to particular medical conditions were excluded. Regarding behavioural change processes, a specific taxonomy of behavioural change processes was employed (Abraham & Michie, 2008).

1.3. Research Methods

This thesis employed a descriptive research approach based on the use of both quantitative and qualitative data. An online survey (N = 411) was conducted in order to identify consumers' understandings and associations with a healthy lifestyle. Results were compared to qualitative information about the five selected apps (target, popularity, functionalities, design), collected from online sources. This same information was also used to match current app offer to a taxonomy of behavioural change processes (Michie et al., 2009) and identify potential gaps.

1.4. Relevance

From an academic perspective, this dissertation contributes to the scarce existing body of research about consumers' understandings of, and associations with a healthy lifestyle. Of further value is the matching of the functionalities of extant health and lifestyle apps to a taxonomy of known behavioural change processes used in the field of health psychology.

From a managerial perspective, the research presented in this dissertation should help marketers and app developers to better understand key activities and goals consumers associate with a healthy lifestyle, as well as identify which app functionalities better match user demand. Ultimately, the findings of this dissertation can serve companies as a basis for the development of existing and new apps with improved features.

1.5. Dissertation Outline

Chapter 2 presents an overview of mobile apps in general, as well as the most popular health and lifestyle apps. Moreover, the concept of a healthy lifestyle is explained and a taxonomy of behavioural change processes described. Chapter 3 describes thoroughly the research methods used, the data collected, and the statistical analyses performed, in order to assess to which degree existing health and lifestyle apps facilitate key activities and goals consumers associate with a healthy lifestyle and if these apps use suitable behavior change processes. In Chapter 4, the main results obtained from data analysis are reported and discussed. Lastly, Chapter 5 presents the main conclusions and implications of this dissertation, as well as its main limitations and avenues for future research.

CHAPTER 2: LITERATURE OVERVIEW

This chapter reviews available online information about health and lifestyle apps, as well as extant research on consumers' views and understandings about a healthy lifestyle and health-related behavior change techniques.

2.1. Mobile Applications

Mobile applications or 'apps' are software programs developed for a mobile device with a specific, well-defined aim (Wallace et al., 2012). These can be downloaded from different online platforms, such as the Apple App Store for iOS devices or the Google Play Store for Android devices. In contrast to system software on PC's, apps always have isolated functionalities, like, for instance, a game or a calculator. This allows users to choose a direct benefit for themselves (e.g. entertainment through simple games) (Techopedia, 2018). The continuous improvement of smartphones over the years is one of the main drivers that contributed to the rapidly growing numbers of mobile applications, as well as different mobile categories (Poushter, Bishop & Chew, 2018). As of 2018, there were 3.8 million mobile applications available for download on the Google Play store and 2 million ones available on Apple's App Store (Statista, 2018a).

There are three main types of apps: Web Apps, Native Apps and Hybrid Apps. A Web App is a website that is tailored to work on a mobile device. Native Apps are those especially programmed for an operating system, e.g. iOS, and that thus run exclusively on iOS devices, i.e. iPhone and iPad. This ensures that all interfaces to hardware, such as the camera or the address book, function uniformly and that device resources are used optimally. In addition, some of these apps even work without an internet connection. Hybrid Apps display characteristics of both Web and Native Apps. They have cross-platform compatibility and work on iOS devices as well as Android devices, but are still able to access the phone's hardware. In sum, Hybrid Apps integrate a mobile website inside a Native App. The social media platform Instagram is a good example of a Hybrid App (Techopedia, 2018).

2.1.1. App Categories and Business Models

Apps can be categorized according to the type of user. They can be either business-to-business (B2B) or business-to-consumer (B2C) apps. B2B apps intend to help businesses improve processes such as supply chain management or customer relationship management (Mithas et

al., 2005). B2C apps are used by consumers to satisfy their individual needs and can be further grouped into marketing-, content-, or service-apps (Cortimiglia et al., 2011):

- *Marketing apps* are used to advertise and market offers. An example could be an app from a fashion brand that shows the current collection and offers discount codes.

- *Content apps* provide information, communication, entertainment, socialization or productivity to their users. Mobile apps in this category include instant messengers, social networks and email.

- *Service* apps enable users to do different tasks such as buying a train ticket, booking cinema tickets, checking a time schedule or shopping at a commerce platform.

App developers have different options to monetize B2C apps. A simple way is to charge a fixed amount for download of an app. App developers can also use a freemium strategy to encourage adoption. In this way, users can download a basic version of an app for free, but they will be charged a certain amount if they want to have improved functionalities. This is achieved through in-app billing mechanisms (Liu, Au, & Choi, 2012). Alternatively, companies have the option to sell premium content through their apps. This is often the case with gaming apps, in which players are able to buy additional scenarios or levels. Another model for monetizing B2C apps is to use advertising. Free apps that have a large user base sell their free ad space to other companies (Cortimiglia et al., 2011). A promising way to generate revenue that is becoming more popular among app developers is app data monetization. The identification, contact and digital behavioural data of app users can in this way be sold to other companies in the form of marketing databases. Through this method, revenue is generated without changing the user experience (Ewen, 2018).

2.1.2. App Demand

There were 175 billion app downloads worldwide and a total amount of $86 billion was spent in app stores in 2017 alone (Thubron, 2018). On average, people are reportedly using 10 apps every day, but there are also many apps which are just used once (O'Connell, 2016). Some of the reasons why people are using mobile apps more than web applications include faster speed, easier usage, better personalization, ability to use offline and better user experience. It is

expected that by 2021, spending on apps by mobile users will reach $139 billion in the app stores (Hill, 2018).

The time people spend on an app is a good measure for app engagement (Newgenapps, 2017). According to Xu et al. (2013), app engagement is driven by app community behavior, user preferences, historical patterns and context. Certain groups and communities display patterns of behavior that help to predict their members' app usage (Lane et al., 2011). For instance, someone who belongs to a gaming community is also likely to have prolonged gameplay app usage when he or she comes home (Xu et al., 2013). Moreover, studies have shown that people who do not belong to a smartphone app user community can have similar patterns regarding app usage as well. This is the case when they have a similar socio-economic status. For example, if people have similar job functions they often use the same apps (Rahmati et al., 2012). App usage, however, can also be influenced by individual preferences, interests and specific needs. For instance, a person with a long commute to get to work may be interested in casual gaming apps, even if these are not popular with others of the same background and occupation (Xu et al., 2013). Finally, context refers to factors like time, location and user activity. For instance, calendars are mostly used when people work, while run-monitoring apps (e.g. Runtastic) are used while doing sports. Findings from a study of 4000 app users showed that context is a good predictor of the frequency and duration of app usage (Böhmer et al., 2011).

2.2. Healthy Lifestyle

The term lifestyle is used to describe a way of life that is based on the interplay between the living conditions of an individual and his or her patterns of behaviour, which, in turn, are also influenced by personal characteristics and socio-cultural factors (Grimaldo, 2010). A healthy lifestyle entails thus a collection of activities driven by cultural, social and individual factors that aim to promote and protect the health status of individuals.

Variations in three broad types of behaviour – physical activity, nutrition (how to eat and what to eat) and life equilibrium – are expected to determine to what extent individuals can be considered to lead a healthy lifestyle (Chen, 2011; Gil et al., 2000). Life equilibrium refers to the psychological well-being of a person, which is also influenced by lifestyle factors such as work-life balance, level of stress and amount of sleep. In addition, physical health which refers to regularly doing health checks, for instance is also considered to be part of a healthy lifestyle (Gil et al., 2000). However, according to He et al. (2004), the absence of addictions, like the

consumption of alcohol, drugs and tobacco, must also be considered as being part of a healthy lifestyle.

Several theoretical models have identified motivation to improve health as the main reason for health-oriented behaviour (Newsom et al., 2005). In addition, health consciousness plays an important role. This construct assesses people's degree of readiness to engage in health-promoting behaviours (Schifferstein & Ophuist, 1998). People who are health conscious are concerned about and aware of their health status and have the motivation to engage in healthy activities that contribute to the improvement and/or maintenance of their health and quality of life (Chen, 2011).

2.3. Health and Lifestyle Apps

Apps have great potential to reach large numbers of people and help them lead a healthier lifestyle (Conroy et al., 2014; Yuan et al., 2015). The five most popular health and lifestyle apps currently available in the marketplace are MyFitnessPal, Runtastic, Seven, Sleep Better and Headspace (iTunes, 2018a).

2.3.1. MyFitnessPal

MyFitnessPal is a free smartphone app enabling users to accurately track calorie expenditure (e.g., during daily activities or exercising), in order to determine the optimal calorie and nutrient intake necessary to achieve desired health-related goals, such as weight loss or maintenance (Bay, 2018) (Annex 1). Since this app runs both on iOS and Android devices, it can be considered as a hybrid app. Users also have the option to scan product barcodes or manually search for their chosen product in an online database containing over six million different food items and their corresponding nutrition information (Moukheiber, 2018).

MyFitnessPal employs both a freemium strategy and an advertising-based business model. The app can be downloaded for free with a lot of different functions, but it can also be upgraded to a premium version for either 9.99 € per month or 49,99€ per year. The premium version is ad-free and offers additional functions such as priority customer service for app users and food analysis tools. The company is making revenue through both in-app advertising and the premium version of the app (MyFitnessPal, 2018).

2.3.2. Runtastic

Runtastic is an app that helps to record activity in a wide variety of sports. It is one of the most popular sports and fitness apps ever, with more than 100 million users worldwide, including beginners as well as passionate athletes (Franke, 2018). It is supported by the most common operating systems (iOS and Android) and is, therefore, a hybrid app (Runtastic, 2018a). This app is able to capture all the basic data related to physical activity such as distance covered, average speed, elevation, pace, duration and calories burned, in order to provide the user with comprehensive statistics about their level of exercise. In addition, it also plots the route covered during exercising on a map using GPS (iTunes, 2018b) (Annex 2).

Runtastic relies on a freemium business model as well as on an ad model. The app can be upgraded to a premium version with advanced functions, such as the audio coach or access to nutrition plans. Prices for the premium version vary depending on the duration of the subscription: 6,63€ per month for a three months subscription, 5,98€ per month for the six months subscription and only 4,15€ per month if a user chooses to subscribe for a whole year. Additionally, the company generates revenue by using in-app advertising (Franke, 2018).

2.3.3. Seven

The Seven app provides workouts that are based on scientific studies and only require seven minutes of exercise a day to achieve the benefits of regular workouts (Annex 5). The app has over 20 million users and requires people to exercise every day for 7 months. To use the app no equipment is needed and the exercises can be done anywhere and anytime. Seven provides illustrations, visual timers and voice cues to make the workouts easier (Perigee, 2018).

This hybrid app uses a freemium strategy and an ad model, working on both iOS devices and Android devices. Users can upgrade it to the premium version for $9.99 per month or pay $79.99 for a whole year. The premium version offers personalized workout plans, access to more than 200 exercises and support from certified personal trainers (Seven, 2018).

2.3.4. Sleep Better

Sleep Better is an app from the same developers of Runtastic, which allows users to track their sleep in terms of duration, cycles and efficiency (Annex 4). In order for it to work, users need to place their smartphone next to their pillow before going to sleep. By tracking movements in bed, this app can identify different sleep states of the user (Runtastic, 2018b). Sleep Better aims to help users get a better understanding of their sleep phases and of how much influence factors

like stress, caffeine consumption, as well as exercise, can have on their sleep quality. It also entails a smart alarm to wake people up at the ideal time (iTunes, 2018c). This app can be downloaded both from Apple App Store and Google Play Store (Runtastic, 2018b) and can thus be considered as a hybrid app.

Sleep Better employs a freemium strategy and an ad model. The full version of the app can be purchased for $1.99 and offers daily statistics of the user's sleep, overviews for longer time periods and additional alarm sounds (Wang, 2018).

2.3.5. Headspace

Headspace is an app teaching the fundamental techniques of meditation and mindfulness, in order for users to better manage their stress and anxiety levels, and also learn the ideal conditions to have a good night's sleep (Headspace, 2018) (Annex 3). This is a hybrid app available in both Apple App Store and Google Play Store. It covers six different areas of user activities: Foundation, Health, Sport, Relationships, Performance and Headspace Pro. Every area except for the Foundation offers different meditation tasks to complete. A subsection of the app is also targeted at children, offering short meditation sessions, ranging from one to five minutes, that are suitable for kids of all ages, from toddlers to preteens (Tanasoiu, 2018).

Headspace users have access to free content that they can use to do one meditation session every day for ten days. After that, they have the option to subscribe on a monthly or annual basis, or to continue using the free trial material. Headspace costs $12.99/month when billed monthly or $7.99 when billed yearly (Headspace, 2018).

2.4. Behaviour Change Processes

In order to change the health-related behaviour of people, complex interventions are usually necessary, which contain many interacting components (Craig et al., 2008). Because it is very difficult to characterize these interventions and identify the components they contain, a theory-based classification system for psychological processes, *i.e.*, a taxonomy of 26 Behaviour Change Techniques (BCTs) has been developed and validated (Abraham & Michie, 2008) (Annex 6). Grouping structures have the advantage of making a taxonomy more useable by, and more coherent to, those applying it (Stavri & Michie, 2012). Dixon and Johnston (2010) have therefore re-structured Abraham and Michie's (2008) taxonomy into three broad categories: motivation, action and prompts/cues.

The BCT taxonomy is based on six different behaviour change theories with application in the field of health psychology: the theory of reasoned action, the theory of planned behaviour, the information-motivation-behavioural skills model, the social cognitive theory, the operant conditioning and the control theory (Abraham & Michie, 2008). This taxonomy identifies and describes all the components of an intervention designed to redirect or alter the causal processes regulating behaviour. That is, it describes the replicable techniques considered to be the "active psychological ingredients" of an intervention, like providing feedback, giving positive reinforcement or enabling self-monitoring (Michie et al., 2011).

Past research has demonstrated the advantage of using BCTs to promote physical activity and healthy eating (Michie et al., 2009). The application of BCTs in fitness and nutrition apps has further been evaluated by different review papers (Bardus et al., 2016; Conroy et al., 2014; Direito et al., 2014; Middelweerd et al., 2014). These concluded that self-monitoring, prompting goal setting, provision of feedback and demonstration of behaviour were among the BCTs most widely employed by health and lifestyle apps. However, many other BCTs were rarely or never found to be used in this type of apps. Moreover, there was little research supporting the use of any BCTs in apps supporting meditation and sleep (Middelweerd et al., 2014).

2.5. Conclusions

The use of mobile applications to support people in changing their behaviour towards a healthier lifestyle has seen significant growth over the last decade. This development is not surprising as, due to their capabilities and ubiquity, mobile apps have great potential to help individuals in the process of choosing and maintaining healthy behaviour (Stawarz & Cox, 2015).

Past research has identified the importance of user engagement for the achievement of the healthy lifestyle goals intended and ultimately the success of the apps in the marketplace (Dinner, van Heerde, & Neslin, 2015; Laing et al., 2014). Motivating users to perform a particular action within health and lifestyle apps can be challenging, however, especially if the app wants the action to be performed regularly. Therefore, apps have to be designed in a way that sufficiently motivates users to continue using them.

Nevertheless, research investigating which design strategies and app functionalities provide the best results when it comes to keeping people engaged is scarce (Vaquero & López, 2016; Yoganathan & Kajanan, 2015). A few studies have shown that the use of behaviour change techniques in health and lifestyle apps has the potential to raise user engagement, but did not identify which of these techniques are most effective at that (Bardus et al., 2016; Conroy et al.,

2014). To the best of my knowledge, no studies have yet analysed extant health and lifestyle apps and compared their functionalities and underlying BCTs to what consumers associate to a healthy lifestyle and the motivations behind these associations. This may thus greatly contribute towards the improvement of app design and effectiveness.

CHAPTER 3: METHODOLOGY

The following chapter describes the methodology used to conduct the studies and consequently achieve the aim of this dissertation, as well as how data was collected and analysed.

3.1. Research Approach

There are three main types of research approaches: exploratory, descriptive and explanatory (Saunders, Lewis, & Thornhill, 2009). Exploratory research is used to clarify the research topic. The purpose of this approach is not to provide definite answers, but rather to generally describe and better understand the phenomena under study, typically through the gathering and analysis of qualitative data. Explanatory research, typically experimentation, is used to determine a cause-effect relationship between two variables, for which there are enough theoretical insights. If the aim is just to describe the characteristics of a population or a phenomenon instead, typically through some form of survey research, a descriptive research approach is usually employed (Hyman & Sierra, 2010).

This thesis employed a descriptive research approach based on the use of both quantitative and qualitative data. An online survey (N = 411) was conducted in order to identify consumers' understandings and associations with a healthy lifestyle. Results were compared to qualitative information about the five selected apps (target, popularity, functionalities, design), collected from online sources. This same information was also used to match current app offer to a taxonomy of behavioural change processes (Abraham & Michie, 2008) and identify potential gaps.

3.2. Survey of Consumers' Understandings of a Healthy Lifestyle

3.2.1. Population and Sample

The average frequency of app usage is highest for millennials aged 18-34 (Statista, 2018b). Therefore, this was the targeted population. A random sample of 411 subjects aged between 18 and 34 years, and belonging to an international social science study respondent panel (PROLIFIC), was sent a link to an online survey in Qualtrics. Six did not complete the survey yielding a final sample size of N = 405. Average respondent age was 26 with a standard deviation of 7.2, 55% were female and 44% Portuguese. Nevertheless, respondents from 37 different countries, mainly from Europe, North-America and Asia, answered the survey.

3.2.2. Survey Design

The survey started by asking respondents to describe what, in their opinion, defined a healthy lifestyle. Answers were provided in an open-ended format, which specifically instructed respondents to write down five keywords or short sentences about what a healthy lifestyle represented to them. Next, a psychometric measure with nine items, adapted from the Health Motivation (Moorman, 1990; Moorman & Matulich, 1993) and Health Consciousness (Schifferstein & Oude Ophuis, 1998) scales, was administered to respondents to assess their orientation towards healthy eating. Answers were provided on a 9-point, Likert-type scale (1 = Totally disagree to 9 = Totally agree; $\alpha = .77$) and mean scale scores per respondent computed. Then, respondents' willingness to pay (WTP) for an organic food basket and a one-month gym membership were measured by asking respondents to provide an amount in euro they would be willing to pay for each. Answers were provided in a continuous slider scale format, ranging between €1-99 for the organic food basket and between €9-199 for the gym membership. Resulting values were therefore standardized prior to further analysis. Finally, respondents were asked to provide some socio-demographic information, namely gender, age and nationality.

3.3. Data Analysis

The content-analysis and classification of qualitative data into different categories is used to reduce the multitude of ideas expressed and simplify their analysis and interpretation (Saunders, Lewis & Thornhill, 2009). In order to analyse respondents' understandings of a healthy lifestyle, the five definitions they provided were thus first content-analysed and independently categorized by two coders (dissertation author and supervisor) into five main dimensions, according to the literature reviewed about this topic (Chen, 2011; Gil et al., 2000; He et al., 2004). These were Physical Activity, General Diet, Specific Diet, Addictions and Life Equilibrium. Analysis of the output of this process by the two coders led to the subsequent division of the Life Equilibrium category into two narrower categories, Mental Health and Personality & Motivation. Moreover, it also led to the creation of two additional categories to comprise definitions more related to Social & Lifestyle Habits and Physical Health. In total, eight categories were therefore necessary to adequately cover all the definitions provided by respondents. Residual divergences in classification between coders were solved by consensus at the end of the coding process.

The number of times each of the eight categories created were mentioned first, second, third, fourth or fifth by respondents was tallied, to identify if certain healthy lifestyle categories were

more top of mind than others. The number of times each respondent provided content matching each of the eight categories of healthy lifestyle meanings defined was also tallied and corresponding frequencies analysed.

The strength of associations between healthy lifestyle understandings, age, gender, healthy eating orientation and demand for products enabling a healthier lifestyle was investigated by computing Pearson correlations between corresponding variables.

3.4. Analysis of Health and Lifestyle Apps

3.4.1. Population and Sample

Worldwide there are more than 318.00 health apps in the most popular app stores (IQVIA, 2017). The five different health and lifestyle apps that were analysed within this dissertation were MyFitnessPal, Runtastic, Seven, Sleep Better and Headspace. The selection of apps was based on different criteria. First, the selected apps cover the different areas which, according to the literature, are to be understood as part of a healthy lifestyle. Second, the apps have a different focus in relation to the target group they are intended to reach. While some of the apps focus on a specific aspect of a healthy lifestyle, others take a holistic approach and try to cover several areas. A further criterion for the selection of the apps was the popularity of the app in terms of rating and ranking in the Apple App Store or Google Play Store. Only apps that had at least a rating of four out of a maximum of five achievable points and also had a high ranking in the app charts were selected. This selection criterion has also been used in other studies (Bardus et al., 2016; Cowan et al., 2013).

3.4.2. Framework for the Collection of Information

App analysis entailed the following dimensions: app rating, app scope, specific functionalities, user engagement strategies, number and type of BCTs used. Past studies have shown that such factors are important determinants of app success (Bardus et al., 2016; Vaquero & López, 2016; Yoganathan & Kajanan, 2015). The analysis of the apps was done by using secondary data from the Apple App Store and Google Play Store, as well as from the apps themselves. Given that no program was available to automatically extract these data, this was done manually.

3.5. Data Analysis

The analysis of the five different health and lifestyle apps was done by downloading each app and testing it. The apps were used for a period of one week to accurately assess app content, functionality and features. In addition, information from the Apple App Store and Google Play Store was used for the analysis. The data hence compiled were qualitatively compared

CHAPTER 4: RESULTS AND DISCUSSION

4.1. Survey of Consumers' Understandings of a Healthy Lifestyle

The results of the process of coding and classifying respondents' definitions of a healthy lifestyle are summarized in a Glossary Table (Annex 7). Physical Activity, General Diet and Specific Diet categories accounted for about 90% of the definitions of healthy lifestyle provided first or second by survey respondents (Annex 8a & 8b). The proportion of the first two categories decreased strongly by the third definition, fourth and fifth definitions, with the corresponding increases of definitions mentioned in the Social and Lifestyle Habits, Mental Health and Motivation & Personality categories (Annex 8c, 8d & 8e). Nevertheless, Special Diet definitions increased from first to later mentions. This shows that Physical Activity and Diet are by far the most top of mind, commonly shared understandings of a healthy lifestyle, indicating that consumers are generally likely to mention first and foremost associations that are socially construed in regards to a healthy lifestyle. However, when required to think deeper, other associations emerge which also exhibit greater variance across individuals.

About 83% of respondents had an association with the "Physical Activity" category. It is striking that the content of associations provided by different respondents is relatively similar. Most respondents associated it to exercise in general and did not mention any particular sport. Another aspect mentioned by many respondents in the Physical Activity category was walking.

About 76% of respondents stated at least one association from the category General Diet. A large proportion of respondents associated a balanced diet with a healthy lifestyle. In addition, many stressed the importance of eating several meals or snacks at regular times throughout the day.

The category Specific Diet was mentioned at least once by ca. 54% of respondents. Most of those who had an association with this category mentioned the intake of specific foods, such as fruits and vegetables. In addition, many of them also mentioned nutrients such as protein, fat, carbohydrates and vitamins. This shows that the most important thing for these respondents is what ingredients they eat. They seem to be more concerned with nutrition and differ from respondents who have only associated a healthy lifestyle with food intake in general.

Over half of respondents (52%) provided at least one association from the category Social and Lifestyle Habits. Sleep and especially the duration of sleep were areas that individuals seemed to consider essential for a healthy lifestyle. Other aspects from this category that seemed to be relevant for respondents were spending time outdoors and with social relationships and friends.

Associations from the category Mental Health were mentioned by ca. 31 % of the respondents. The areas that were particularly discussed were stress avoidance, mindfulness and meditation, relaxation and fun. This result is not surprising as the majority of respondents were Millennials. Past studies have already shown that it is particularly important for Millennials to have a work-life balance. In addition to a stress-free work life, they want to have enough time to relax and do things they enjoy (Kultalahti & Viitala, 2014).

The category Personality and Motivation was mentioned at least once by about 20 % of respondents. The individual associations were very different and entailed mainly positivity, continuity, discipline, enjoyment, self-esteem and self-love.

Only about 14% of respondents had an association in the fourth category, Addictions. These mentioned mainly the avoidance of alcohol, cigarettes and drugs. The low number of associations in this category could be due to the fact that it is generally known in society that these addictions are harmful to health. In addition, respondents had to name the things they associate with a healthy lifestyle, not the things that were not part of it.

Lastly, associations from the Physical Health category were the least prevalent among respondents. Only 7% of them mentioned something related to this area, typically the need to have regular health checks.

Table 1 presents the Pearson correlation coefficients between the healthy lifestyle categories and their significance.

Table 1: Pearson correlations between healthy lifestyle categories (N = 405).

	Physical Activity	General Diet	Specific Diet	Addictions	Mental Health	Social & Lifestyle Habits	Physical Health
Physical Activity	---						
General Diet	-.22***	---					
Specific Diet	-.16**	-.35***	---				
Addictions	.11*	-.11*	-.08	---			
Mental Health	.17**	-.20***	-.28***	-.06	---		
Social & Lifestyle Habits	.23***	-.13*	-.45***	-.08	.06	---	
Physical Health	.07	-.06	-.17**	-.03	.05	-.09^{t}	---
Personality & Motivation	.08	-.08	-.37***	-.13*	.07	.01	.11*

***$p < .001$; **$p < .01$; *$p < .05$; $^{t}p < .10$

The results show that the three most mentioned categories, Physical Activity, General Diet and Specific Diet, are negatively correlated with each other, meaning that survey respondents who mentioned associations from one of these categories generally did not mention any associations from the other two. For app developers, this indicates that people are very different with regards to what they associate to a healthy lifestyle and hence what they expect from an app. Respondents mentioning Physical Activity associations also often mentioned associations in

the category Social and Lifestyle Habits, such as being outdoors and getting fresh air. These individuals seem to want to exercise outdoors, rather than at a gym, meaning that there is potential for them to use an app that supports physical activity, especially if these activities can be done outside. In addition, they are the ones that want to have fun and less stress as indicated by the positive correlation with Mental Health. Therefore, exercise apps such as Runtastic and Seven need to make sure that they are entertaining and able to reduce stress. Both Apps do that by providing blog posts about how to reduce stress. Moreover, Runtastic offers competitions and Seven uses Gamification to make the app usage more entertaining. Physical Activity was positively correlated to Addictions. This may indicate that people who exercise are especially aware of the negative effects of alcohol and tobacco.

Regarding Specific Diet, it can be seen that this category was negatively correlated to all other dimensions except for Addictions. This implies that people who mentioned Specific Diet probably consider it to be the single, most important aspect of a healthy lifestyle. In turn, Mental Health was negatively correlated to both General Diet and Specific Diet. This result shows that these people still consider aspects such as meditation and low stress as the most important components of a healthy lifestyle. Regarding Personality and Motivation, it can be seen that this category was negatively correlated to Addictions. An explanation could be that survey respondents may have had the same thought about healthy lifestyle, but some were more general and mentioned aspects such as self-care and abstinence, and were therefore assigned to the Personality and Motivation category. In contrast, others may thought the same, but were more specific and provided concrete examples such as not drinking alcohol and were therefore assigned to the Addictions category. Finally, Personality and Motivation was positively correlated to Physical Health. Respondents that mentioned self-care were also the ones that want to do regular health check-ups.

Table 2 shows the correlations between the healthy lifestyle categories and the sociodemographic variables (age, gender, nationality), the attitude variable (healthy eating orientation) and the behavioural variables (WTP for organic food basket and a one-month gym membership).

Table 2: Pearson correlations between healthy lifestyle categories and sociodemographic, attitudinal and behavioural variables (N = 405).

	Age	Gender (1 = Male; 2 = Female)	Nationality (1 = Other; 2 = Portuguese)	Healthy Eating Orientation[1] (α = .77)	WTP for organic food basket (€ 1- 99)	WTP for 1-month gym membership (€ 9 - 199)
Physical Activity	.07	-.01	-.10^{t}	.06	-.03	-.11*
General Diet	-.01	.08^{t}	-.05	-.06	.00	.15*
Specific Diet	.10*	.08	.10*	.09^{t}	.01	-.03
Addictions	.04	-.10*	-.06	-.06	-.07	-.09
Mental Health	.11*	-.01	-.03	.12*	.13*	.00
Social & Lifestyle Habits	.07	-.03	-.03	.08	.02	-.10^{t}
Physical Health	.07	-.06	-.01	.01	.07	.06
Personality & Motivation	-.05	-.13**	-.01	-.10*	.00	.01

$^{**}p < .01$; $^{*}p < .05$; $^{t}p < .10$

[1] Moorman (1990), Moorman & Matulich (1993), Schifferstein & Oude Ophuis (1998)

Results show that survey respondents who mentioned definitions associated to the Physical Activity category were also the ones least willing to pay for a gym membership. This somewhat counter intuitive finding is explained by the fact that these respondents were more keen to exercise outdoors and practice sports than to do workouts at the gym. In contrast, General Diet was positively correlated to willingness to pay for a gym. In addition, there was no relation between General Diet and healthy eating. This result could indicate that people who associate General Diet with a healthy lifestyle are watching their weight and therefore want to go to the gym to lose it. However, they are not invested in healthy eating, meaning that they are also not ready to invest time in self-monitoring their nutrition intake. Respondents that mentioned Specific Diet, on the other hand, appeared to care more about what they ate. They could be interested in apps like MyFitnessPal because they are really focused on healthy eating. This finding was also shown by the analysis of the glossary.

In addition, the results show that there is a correlation between age and Specific Diet. Young respondents are the ones who have more associations within the Specific Diet category. Therefore, it could make sense for nutrition apps like MyFitnessPal to focus on a younger target group. The analysis also shows that there was a positive correlation between Specific Diet and Portuguese nationality. Moreover, age and Mental Health were positively correlated, meaning that the older a respondent was, the more concerned he or she appeared to be about issues related to Mental Health, such as level of stress, getting relaxation or doing meditation. A possible explanation for this could be that older respondents are likely to already have a steady job and are therefore exposed to more stress. For apps like Headspace, this could indicate that it makes sense to target older people who already started working. Mental Health was positively

correlated to WTP for organic food and healthy eating orientation. This seems to indicate that people associating a healthy lifestyle to a more relaxed, stress-free and balanced life are also mindful of the impact that food quality and diet might have on their health status. Moreover, they were the ones that mentioned associations like routine or diligence, which could indicate that they rather want to exercise than worry about what they eat. Regarding gender, the analysis revealed that women consider aspects from the Personality and Motivation category not as important for a healthy lifestyle as men do. In addition, the results show that women mention Addictions less often than men. This could be because women usually drink less than men, as past studies have already shown (Erol & Karpyak, 2015).

4.2. App Evaluation

Table 3 provides an overview of the different apps studied and their characteristics. The comparison of the five health and lifestyle apps shows that there are some similarities as well as differences in strategy, functionalities and target group of the apps. While Runtastic targets people who are more ambitious in sports and want to have a lot of data, Seven is for people who want to stay fit in general, but do not want to spend too much time on it. The same applies to Headspace and Sleep Better. The former is more holistic and tries to cover more areas of the general well-being of users, such as stress, sleep, anxiety and productivity. Sleep Better, on the other hand, focuses only on sleep and is aimed at people who only want to improve this dimension of a healthy lifestyle. MyFitnessPal focuses mainly on nutrition but also covers other areas such as exercise to a certain extent. With regard to the effort required to use the apps, one can clearly say that it is the lowest when using the Sleep Better app. However, this is mainly due to the fact that the app has the fewest functions compared to the other apps. MyFitnessPal is the one that requires the most effort, as users have to log all meals individually.

In terms of app strategies to engage users, all five apps have common features. Each app tries to ensure easy onboarding and offers Facebook login to save the users time. Furthermore, each app sends push notifications to its users. These serve, on the one hand, to remind the user to use the app and, on the other hand, to inform him about reached goals or activities of friends.

Table 3: Overview of the five health and lifestyle apps analysed and their characteristics (iTunes, 2018a; Google Play Store, 2018).

App Name	App Type	Business Model	Functionalities	Avg. User Ratings	Behavior Change Techniques (BCTs)	BCT Type: Motivation, Action, Prompts/Cues
MyFitnessPal	Hybrid App - Nutrition	Freemium + Ad Model	Tracking calorie expenditure and intake Barcode scanning of food Database with 6 mio. items Warning when calorie limits are reached Connecting with other devices (Fitbit, Garmin) Setting goals Creating recipes Sharing progress with friends Food analysis tools Providing graphs and pie charts	More than 150 mio. users Apple App Store (US): 4,7 (492k ratings) Google Play Store 4.5 (1.932.832 ratings)	1. Information about behavior- health link 2. Information on consequences 3. Information about others' approval 4. Intention formation 5. Barrier identification 8. Provide instruction 10. Goal setting 11. Review of behavioural goals 12. Self-monitoring 13. Feedback 18. Follow-up prompts 19. Social comparison 23. Relapse prevention	4. Motivation 7. Action 2. Prompts/Cues
Runtastic	Hybrid App - Exercise	Freemium + Ad Model	Tracking distance, avg. speed, elevation, pace, duration, calories burned of workouts Audio feedback about distance etc. Tracking workouts in real-time with GPS Monitoring of personal running diary Sharing location, receiving messages & cheers Challenging other users Integrated music player Post-activity details entry (surface, weather) Setting running goals Tracking personal records Running Leaderboard: who runs the furthest	More than 245 million downloads and 130+ million registered users Apple App Store (US): 4,5 (1.8k ratings) Google Play Store 4.5 (846k ratings)	2. Information about behavior- health link 2. Information on consequences 3. Information about others' approval 4. Intention formation 5. Barrier identification 6. General encouragement 7. Graded tasks 8. Provide instruction 10. Goal setting 11. Review of behavioural goals 12. Self-monitoring 13. Feedback 17. Prompt Practice 18. Follow-up prompts 19. Social comparison 24. Stress Management	4. Motivation 7. Action 5. Prompts/Cues
Seven	Hybrid App - Exercise	Freemium	Workouts without equipment Workout challenges Competing with friends Earning achievements Creating tailored workouts Instructors to motivate Personalized workout plans Support from certified personal trainers 3D Animations with instruction for exercises	More than 20 mio. users Apple App Store (US): 4,7 (38k ratings) Google Play Store 4.5 (77k ratings)	1. Information about behavior- health link 2. Information on consequences 3. Information about others' approval 4. Intention formation 5. Barrier identification 6. General encouragement 7. Graded tasks 8. Provide instruction 9. Demonstrate behavior 10. Goal setting 11. Review of behavioural goal 12. Self-monitoring 13. Feedback 14. Contingent rewards 15. Teach to use prompts/cues 17. Prompt Practice 19. Social comparison 24. Stress Management	4. Motivation 8. Action 6. Prompts/Cues
Sleep Better	Hybrid App – Sleep & Rest	Freemium + Ad Model	Tracking sleep duration, cycles and efficiency Smart Alarm to wake up at ideal time Dream diary Monitoring of moon phases Entering daily habits (caffeine, stress, exercise) Sleep History with statistics and overviews Different alarm sounds	Apple App Store (US): 4.0 (765 ratings) Google Play Store 4.0 (113k ratings)	2. Information on consequences 8. Provide instruction 10. Goal setting 12. Self-monitoring 13. Feedback	1. Motivation 4. Action
Headspace	Hybrid App - Meditation	Freemium	Guided meditations Sleep Sounds for better sleep Process Tracking Meditation for kids and toddlers SOS sessions for moments of anxiety Different areas of meditation: Health, Sport, Relationships, Performance, Headspace Pro	31 million downloads, more than 1 million paying subscribers Apple App Store (US): 4,9 (387k ratings) Google Play Store 4.5 (87k ratings)	1. Information about behavior- health link 2. Information on consequences 3. Information about other's approval 4. Intention formation 5. Barrier identification 6. General encouragement 7. Graded tasks 8. Provide instruction 10. Goal setting 11. Review of behavioural goals 12. Self-monitoring 13. Feedback 14. Contingent rewards 15. Teach to use prompts/cues 17. Prompt Practice 18. Follow-up prompts 19. Social comparison 20. Social support/change 21. Role model identification 22. Prompt self-talk 23. Relapse prevention 24. Stress Management 25. Motivational interviewing 26. Time Management	8. Motivation 8. Action 8. Prompts/Cues

Headspace also uses push notifications to send the user recommendations for a certain behaviour, or to send mindful statements that make him or her think. Runtastic also makes use of push notifications to send its users tips on how to live a healthy life or to send motivational statements. Of all five apps, Sleep Better sends the fewest push notifications.

Another strategy used by two of the five apps to keep users engaged is gamification. A study by Yuan et al. (2015), found out that gamification has a positive effect on the user's intention for continued use of health apps. Headspace has an interface that is inspired by mobile games and which shows the users progress towards a happier and healthier mind, in the form of symbols on a process map. Users cannot preview more advanced sections before they have completed all sessions up to that point (Tanasoiu, 2018). The app Seven uses gamification by giving user rewards for a particular achievement or behaviour, such as working out many days in a row. However, if users skip a workout they lose one of their three lives. If all three lives are lost within one month the user's progress resets to zero (Perigee, 2013).

The analysis also showed that there are significant differences in the number of BCTs each app contains. Sleep Better uses the fewest BCTs with a total number of five. In the midfield are Seven, Runtastic and MyFitnessPal with eighteen, sixteen and thirteen BCTs respectively. Headspace has the most BCTs of all five apps with a total number of twenty-four. The re-classification of BCTs of Dixon and Johnston (2010) was used to group BCTs into Motivation, Action or Prompts/Cues categories. Headspace uses the same amount of BCTs from each of the three categories. All the other apps use mostly BCTs from the "action" category. For MyFitnessPal and Sleep Better, this is followed by BCTs for "motivation". BCTs from the "prompts/cues" category are the least used. Sleep Better does not use any "prompts/cues" BCTs. Seven and Runtastic use more BCTs from the "prompts/cues" category than from the "motivation" category. Even though all five apps vary considerably in the number of BCTs included, goal setting, provision of feedback and self-monitoring were the most frequently identified types of behaviour change techniques. This is consistent with similar reviews on apps for physical activity (Conroy et al., 2014; Middelweerd et al., 2014) and literature on weight management interventions (Tang et al., 2014).

Except for Headspace, all other Apps are lacking functions that prompt self-talk or motivational interviewing. These are BCTs that enhance self-efficacy. Self-efficacy refers to "people's judgment of their ability to organize and accomplish necessary courses of action to attain the desired types of performance or outcome" (Bandura, 1986). Studies have shown that designing apps that promote the self-efficacy of users can have a positive impact on, for instance, physical

activity behaviour and may increase the success of apps in changing behaviour (Yoganathan & Kajanan, 2015). The Glossary (Annex 7) shows that survey respondents who had an association from the Motivation & Personality category were also the ones who liked to exercise and who mentioned that factors like motivation, positivity and self-esteem played an important role in a healthy lifestyle. Therefore, it could make sense, especially for apps like Seven and Runtastic, to make use of these BCTs in order to increase those factors. For apps like Sleep Better, BCTs like motivational interviewing or prompting self-talk could be less important because the app requires low effort from the user to be used.

Studies found out that apps that are considered to have a higher quality are the ones that use a greater number of behaviour change techniques. This reinforces the need for app developers to design apps to include functionalities that use change mechanisms, in order to have an app with higher overall quality (Bardus et al., 2016).

4.3. Match to Consumer Understandings

Regarding Physical Activity, it can be seen that both Runtastic and Seven do not concentrate on a specific sport. Runtastic can be used for a variety of activities such as running, surfing or even golfing. The same applies to the app Seven, which can be used for many different physical activities that do not require any equipment. Thus, both apps could correspond to the associations of survey respondents, as they help to encourage physical activity in general. In addition, many of these attached particular importance to exercising regularly. This result indicates that apps that support physical activity need to keep their users engaged and also remind them to exercise. In a study by Stawarz and Cox (2015), it has already been found that push notifications are a useful tool to keep people engaged and to help to repeat a certain behaviour. Both Runtastic and Seven make use of push notifications to remind their users to do their workout. Seven sends them daily and Runtastic several times a week. However, Seven always sends the same reminder, whereas Runtastic uses different ones. Seven should generally try to use more push notifications to encourage users and make sure that these push notifications are different from each other so that users really feel addressed.

Runtastic and Seven, both use a lot of BCTs and cover almost all aspects that consumers associate with the Physical Activity category. However, both apps could add other BCTs. Namely, stress management and motivational interviewing, as the study has shown that these areas are also relevant to users. Both apps could implement push notifications that give users tips on how to fit in a workout even if they have little time, or that inform users on the stress-

reducing benefits of working out. Regarding motivational interviewing, the apps could send push notifications such as “If you continue working out, how would your life be different from what it is today?”. Another aspect mentioned by many survey respondents in the Physical Activity category was walking. This area is not covered by the App Seven. With Runtastic, the user can track walking in the same way as other activities. Moreover, the app provides blog posts about the positive effects of walking. These are features that Seven could also implement. Regarding General Diet, it can be seen that it is important for nutrition apps like MyFitnessPal to remind their users to eat regularly. MyFitnessPal makes use of push notifications for this purpose. In addition, respondents often mentioned fresh and natural foods, as well as a wide variety of foods. Also, the right portion size and cooking for oneself were often associated. Within the app, MyFitnessPal offers its users a variety of healthy recipes as well as tips and information about nutrition. However, these cannot be accessed quickly in the app, as the main focus is on logging meals. MyFitnessPal provides a much more detailed approach to healthy eating. The user must take time to log in his or her meals, with app focusing more on what is eaten than on how much is eaten. Therefore, this app could be less suitable for people who only associate general diet with a healthy lifestyle. A suitable app would be much simpler than MyFitnessPal and would offer the user a variety of recipes that can be accessed quickly. In addition, it would also send push notifications reminding the user to eat.

Regarding the improvement of the MyFitnessPal, there are some features that the app could add. For example, it could make use of the Behaviour Change Technique "General Encouragement" and send the user push notifications with feedback and encouragement several times a week, to increase self-efficacy. This would encourage the user to continue to record meals every day. In addition, the app could try to prepare new users for the needed time commitment of using the app, by assessing a user’s readiness for self-monitoring upfront. Also, MyFitnessPal could send push notifications that inform users about the advantages of self-monitoring. As other studies have found out, Gamification is also an effective strategy to promote the continued use of an app (Yuan et al., 2015). Therefore, MyFitnessPal could implement this strategy by rewarding users with trophies for a specific behaviour, such as using the app many days in a row. Although the app covers parts of General Diet, it could be much more suitable for consumers from the Specific Diet category. MyFitnessPal would have some possibilities to add or change functions to be more suitable for people who are only interested in General Diet. However, the study has shown that for these people it is not important at all what they eat in terms of nutrients and calories. This is the main focus of MyFitnessPal and it

should therefore continue to target people who are worried about Specific Diet and who need an accurate overview. Overall, none of the five apps analysed fits the General Diet Category well. The same applies to the Addictions category.

Regarding Mental Health, Headspace fits almost all associations in this category. This is mainly due to the large selection of meditations that cover many topics relevant to this category. The fact that the app meets the requirements of the users is also reflected in the high app rating of 4.9 in the Apple App Store (iTunes, 2018d). Regarding Social and Lifestyle Habits, it can be seen that the Sleep Better app covers many important areas and serves not only as an alarm clock, but also allows users to record and monitor sleep. Since the functions of Sleep Better are limited and the app is mainly used to analyse sleep behaviour, BCTs are not so important to it. However, the app should add a feature that allows users to set a time at which they want to go to sleep. Sleep Better should then send the user a reminder at this time in the form of a push notification. In this way, the user can be sure to get enough sleep. Other apps, such as Headspace, offer meditations and audio to help improve sleep. Users can also set the time at which they want to go to bed. The app then sends a push notification to remind the user. The Headspace app also offers its users guided meditations on various topics, such as stress and relaxation. In addition, the meditations do not take up much time and can even be done on the go. The app also uses gamification which covers the desire of users for fun.

Another important aspect of Social and Lifestyle Habits is being outdoors. Neither of the two analyzed exercise apps really includes this point. Headspace is the only app that sometimes sends push notifications asking the user to go out and get some fresh air. When using Runtastic most sports activities are done outside anyway. But this is not the case with Seven. Therefore, the app should encourage users to do exercises outside.

The other important area in the Social and Lifestyle Habits category is social contacts. Applied to the apps, this means that they need to have social functions that allow users to interact with friends and motivate each other within the app. A study by Ahtinen (2015) found out that sharing data with friends or members of a community within an app helps to increase motivation. Runtastic, Seven, MyFitnessPal and Headspace all use social features. With all apps it is possible to add friends, see their progress and motivate each other. Especially MyFitnessPal stands out with a huge and very active community. Furthermore, users of Runtastic, Seven and MyFitnessPal can share their progress on social media. At Headspace the friend function is hidden and there is no social media sharing option. The app could also implement a sharing feature that allows users to share their progress on social media. In addition, the function to add

friends should be easier to find. Sleep Better does not use social features. However, this is of benefit, as studies have shown that the use of social media leads to poorer sleep quality (Woods & Scott, 2016).

Regarding Physical Health, it can be seen that this area is not covered by any of the apps. However, this does not seem to be very important for most respondents. Many associations from the Personality and Motivation category are covered by all 5 apps using behaviour change techniques. BCTs are a way to incentivize people to achieve these parts of a healthy lifestyle. The respondents' associations indicate that apps should include BCTs, such as Prompt Self-talk and Motivational Interviewing, which primarily help users to motivate themselves and become aware of their abilities which then might lead to continuity and discipline.

CHAPTER 5: CONCLUSIONS AND LIMITATIONS

5.1. Conclusion

This dissertation analyses data on consumers' associations with a healthy lifestyle and the motivations behind them. Moreover, it identifies popular health and lifestyle apps and evaluates them against user demand in order to provide suggestions for improved and new functionalities. First, it was seen that consumers' understandings of a healthy lifestyle are much more varied and complex than expected. There is still not a lot of knowledge about the different aspects consumers understand by a healthy lifestyle. In addition, only a few researchers have studied this topic, which in turn underlines the importance of this thesis and the need for further research.

Now after studying what consumers associate with a healthy lifestyle, one can see that these associations can be divided into a total of 8 different categories. These are Physical Activity, General Diet, Specific Diet, Addictions, Mental Health, Social and Lifestyle Habits, Physical Health and Personality and Motivation. The categories Physical Activity, Specific Diet, as well as Mental Health are well matched by the reviewed apps. General Diet is not well matched by any of the analysed apps. Furthermore, Social and Lifestyle Habits and Personality and Motivation are only partially covered. This is mainly due to the fact that associations from these two categories are very diversified. As a result, it is more difficult for apps to cover all associations while still maintaining a certain focus. The categories Addictions and Physical Health are not covered by any of the apps. From a managerial perspective, this implies that app developers should improve existing apps by adding new functionalities to better match the wide range of consumers' understandings of a healthy lifestyle.

With regard to the second research question, and in addition to the functions already proposed in Chapter 4, health and lifestyle apps could integrate push notifications that function as a reminder for users to spend some time outdoors during the day or to regularly drink water. This would better cover the area of Social and Lifestyle Habits. In addition, apps could send notifications that remind users to go to the doctor regularly to do health check-ups. As a result, Physical Health would also be better covered. To also cover Addictions, health and lifestyle apps could provide articles that inform users about the bad consequences of alcohol and drug use. Also, some apps are missing out on increasing user's motivation, while Personality and Motivation plays an important role in the consumers' opinion. Therefore, health and lifestyle apps should make use of BCTs such as "Prompt Self-talk" and "Motivational Interviewing" in the form of push notifications. These BCTs primarily help users to motivate themselves and to

become aware of their abilities which then might lead to higher engagement and retention of the apps.

5.2. Limitations

The study is not without limitations. Firstly, this work focused only on popular apps that are available in both the Apple App Store and the Google Play Store and that were highly rated and downloaded. This served mainly to improve the comparability of currently available apps. Due to the systematic selection of apps, it remains unclear whether less popular apps have the same functions. In addition, thresholds were set for the feasibility of the study (e.g. minimum app rating of 4.0) and only a small sample of apps was used. This might have excluded apps that were wrongly classified or whose rating was below the threshold. Furthermore, the evaluation of the five different apps was done over a time period of one week and the researcher may has overlooked some techniques and features, as some of the apps integrated new content during the time of the evaluation. Moreover, app ratings and the level of popularity of the apps could have changed during the time span of the study.

There are also some limitations with regard to the survey. It is not possible to determine whether respondents' data are merely the aspects they associate with a healthy lifestyle, or whether they themselves consider these aspects to be really important for a healthy lifestyle. In addition, respondents may have mentioned some associations only because they thought they are expected to do so by the socially construed understanding of a healthy lifestyle. Also, the survey respondents are relatively young. Older people may have had other associations with a healthy lifestyle. Moreover, the classification of the associations into different categories and the resulting interpretations are subjective to some degree and the results depend on the quality of the researcher's interpretation skills.

5.3. Future Research

Future research should investigate further what consumers consider healthy or not about their lifestyle. This has a lot of important implications for their behaviour and the overall market for health and lifestyle apps. This dissertation suggests improved app functionalities that cover areas of a healthy lifestyle that are not well matched or not matched at all by current health and lifestyle apps. Therefore, future research could test these different app functionalities in order to see which are most effective in retaining consumers.

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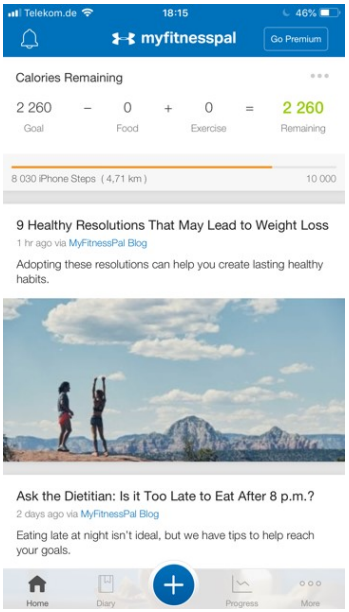
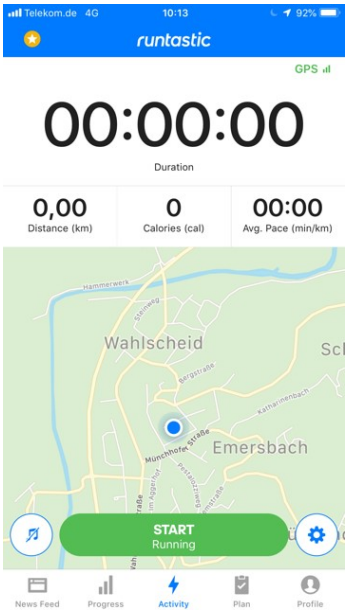
APPENDICES

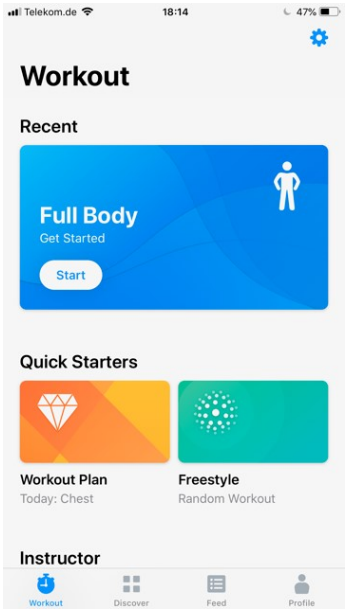
Annex 1: Main screen of the MyFitnessPal App



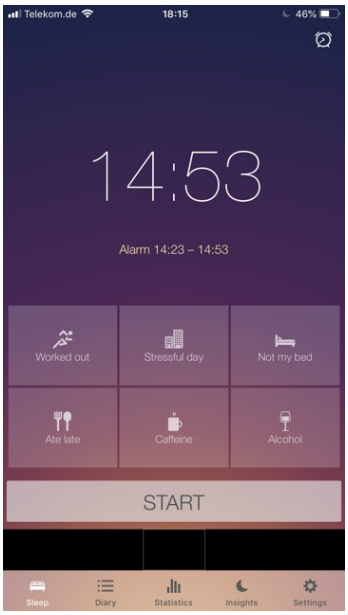
Annex 2: Main screen of the Runtastic App



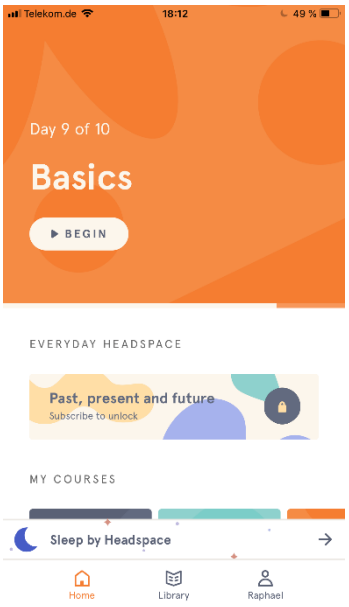
Annex 3: Main screen of the Seven App



Annex 4: Main Screen of the Sleep Better App



Annex 5: Main screen of the Headspace App



Annex 6: The Behaviour Change Technique Taxonomy (Abraham & Michie, 2008).

Technique	**Definition**
1 Information about behaviour- health link	General information about behavioural risk, for example, susceptibility to poor health outcomes or mortality risk in relation to the behaviour
2. Information on consequences	Information about the benefits and costs of action or inaction, focusing on what will happen if the person does or does not perform the behaviour
3. Information about others‘ approval	Information about what others think about the person’s behaviour and whether others will approve or disapprove of any proposed behaviour change
4. Intention formation	Encouraging the person to decide to act or set a general goal, for example, to make a behavioural resolution such as “I will take more exercise next week.
5. Barrier identification	Identify barriers to performing the behaviour and plan ways of overcoming them
6. General encouragement	Praising or rewarding the person for effort or performance without this being contingent on specified behaviours or standards of performance
7. Graded tasks	Set easy tasks, and increase difficulty until target behaviour is performed
8. Provide instruction	Telling the person how to perform a behaviour and/or preparatory behaviours
9. Demonstrate behaviour	An expert shows the person how to correctly perform a behaviour, for example, in class or on video
10.Goal setting	Involves detailed planning of what the person will do, including a definition of the behaviour specifying frequency, intensity, or duration and specification of at least one context, that is, where, when, how, or with whom
11. Review of behavioural goals	Review and/or reconsideration of previously set goals or intentions
12. Self-monitoring	The person is asked to keep a record of specified behaviour(s) (e.g., in a diary)
13. Feedback	Providing data about recorded behaviour or evaluating performance in relation to a set standard or others’ performance, i.e., the person received feedback on their behaviour
14. Contingent rewards	Praise, encouragement, or material rewards that are explicitly linked to the achievement of specified behaviours
15. Teach to use prompts/cues	Teach the person to identify environmental cues that can be used to remind them to perform a behaviour, including times of day or elements of contexts.
16. Behavioural contract	Agreement (e.g., signing) of a contract specifying behaviour to be performed so that there is a written record of the person’s resolution witnessed by another
17. Prompt Practice	Prompt the person to rehearse and repeat the behaviour or preparatory behaviours
18. Follow-up prompts	Contacting the person again after the main part of the intervention is complete
19. Social comparison	Facilitate observation of nonexpert others’ performance for example, in a group class or using video or case study
20. Social support/change	Prompting consideration of how others could change their behaviour to offer the person help or social support, including “buddy” systems and/or providing social support
21. Role model identification	Indicating how the person may be an example to others and influence their behaviour or provide an opportunity for the person to set a good example
22. Prompt self-talk	Encourage use of self-instruction and self-encouragement (aloud or silently) to support action
23. Relapse prevention	Help identify situations likely to result in readopting risk behaviours or failure to maintain new behaviours and help the person plan to avoid or manage these situations
24. Stress Management	May involve a variety of specific techniques (e.g., progressive relaxation) that do not target the behaviour but seek to reduce anxiety and stress
25. Motivational interviewing	Prompting the person to provide self-motivating statements and evaluations of their own behaviour to minimize resistance to change
26. Time Management	Helping the person make time for the behaviour (e.g., to fit it into a daily schedule)

Annex 7: Glossary of respondents' healthy lifestyle associations

0. Undetermined	don't know, life, eyes – coded as missing values
1. Physical Activity	active, active every day, active holidays, activity, being active, be active: sports, being able to exercise regularly, be a fit person, active lifestyle, choose the stairs instead of the elevator, constant workout, daily physical exercise, dancing, do exercise, do sports, do sports at least 4 times a week, doing sports 2 times a week, doing exercise, do some activity, don't sit all day, don't spend too much time seated, do sports moderately, do some jogging, exercise, exercise regularly, fitness, frequent exercise, getting exercise, exercising, exercise at least 3 times a week, going to the gym, go to the gym weekly, going to the gym and dance, going to the gym every day, gym member, high activity level, jogging, lots of sports, make exercise, moderate exercise, more exercise, moderate sports, moving, move, non-sedentarism, no couch-potato habits, physical activity, physical activity every day, physical exercise, practice a sport, playing sports, plenty of exercise, practice exercise (open spaces or gym), practice sport activities, practice sports at least 2 times per week, posture, regular exercise, regular sports, regularly working out, running, simple exercise, sports, sport activity, surfing, swimming, take long walks, taking the bicycle, train, training/gym, turn off tv and make activities, walking as much as possible, walk every day, walk in natural environments, walk outside, walk to work, walk instead of driving, work out
2. Diet - General	A balanced diet, a diversified alimentation, a bit of everything without going over board, a well-rounded diet, appropriate amount of food, awareness about ingredients, balance, balanced, balanced eating habits, balanced meals, balanced nutrition, balanced food, buying fresh stuff, buying healthy stuff, being able to cook, cooking meals, cooking from scratch, cooking for yourself then you know what is inside, cook for yourself, clean food, clean diet, complete, a plate with color is a healthy meal, color, clean eating, cheaper, cost, cook, cooking at home, coziness, home cooking, cooking by your own, correct eating, correct nutrition, diet, diversity of food, diverse food, diverse, diversified, diversity, do not eat much of the same thing, do not eat fast food, eating, eat 'real' food, eat a bit of everything, eat balanced, eat balanced diet - foot pyramid, eat clean, eat fresh, eat fresh foods, eat healthy, eat healthy food, eat healthy foods, eat healthy meals (even if it is only complementary), eat a variety of products which allow your body to get the needed nutrients, eat various things, eat less, eat regularly, eat taking into consideration proportions, eat more than 5 times a day, eat 3 times a day a nutritious meal, eat more than just 3 times per day, eat well, eat correctly, eat good, eat once out, eat once with friends, eating with friends, eat several times a day, eat many times during the day but small portions, eat a lot of times, eat in 2 to 2 hours, eat regularly, every 3 hours, instead of spending a lot of time with nothing on the stomach, eat everything in small portions, eat in small proportions but with less time between them, eating habits, eating healthy, eating healthy food, eating healthily, eating well, eating responsibly, eating fresh, eating natural, eating right, eating together, eating fresh food, eating a balanced diet, eating frequently but with small meals, eating things you enjoy every so often, equilibrium in food, food, food habits, family time meals, family meal instead of for 1, follow a balanced diet, fluids, fresh food, fresh ingredients, fresh products, fresh, freshness, freshly prepared food, fresh cooked, fresh meals, good diet, good eating habits, good food, good food choices, good food habits, good nutrition, good and regular nutrition, good quantity, have a balanced diet, have healthy meals, diversified and well organized, having 4 to 5 meals a day, having smaller meal sizes, health nutrition, health food, healthy, health, healthier, healthy aliments, healthy diet, healthy eating, healthy food, healthy food habits, healthy food plan, home cooked meals, homemade healthy foods, homemade, homemade food, kind of food, knowing where food come from, knowledge about food and nutrition, hydration, include every type of food, low cost, local, natural, natural food, natural foods, natural ingredients, nicer, no

	contaminants, no skipping meals, not cutting important foods from your diet, not too much quantity, not exaggerate in some foods, nutritive, nutrients, nourishing, nutritious, nutrient rich, nutritious food, nutrition, others, plan meals, pleasure, preferring healthy food, proper nutrition, proportional eating, proper timely meals, quality time meals, quality food, quality food ingredients, quality, to eat healthy, right food, right amount, regular meals, sometimes cheat on the diet we follow, short meals, safety, safety of contagion, safer, safe, self-made food, steamed cooking, stay hydrated, less snacks – more structured food timing, servings, small quantities, supplements, timing, tasty, tastier, timeless, take into consideration macronutrient ratio, take time to prepare your own meals, to cook at home every day, varied diet, variety food, variety- not eating the same thing, varied, variety, vary the meals you cook, variety in nutrients, varied in nutrients, variety of ingredients, 1 day of the week to eat less healthy, 5 a day
3. Diet- Specific	A few carbohydrates, avoid eating fried food, avoid fast food, avoid junk foods, avoid food and drinks with too much sugar, avoid pre prepared meals, avoid pre-packed meals (frozen pizza, already prepared meals), avoid snacks from supermarket, avoid big amounts of sugar, avoiding eating fast food, avoiding eating too much fat, sugar and salt, almost no fast food, a lot of fruit, a lot of water, balance meat/fish days with vegetable days, balanced diet (meat, vegetables), balanced low fat diet, being careful with carbohydrates, being careful with sugar, be consistent with what you eat, being vegan, buying fresh vegetables and fruits, biologic food, biologic, buying less fast food, brown bread, caloric intake, carbs, calories, carrot, chicken, rice, broccoli, control carbs, control sugar, cut back on sugar, cutting down on fatty snacks, cutting down on sugar, counting calories, cooking/eating lots of fruits & vegetables, diversity (vegetables, fruits), drink at least 1.5L of water, drink lots of water, drink a lot of water, drink water, drinking enough water, drink plenty of water, drinking 1.5 l of water per day, drinking 2 L of water per day, drink when you are thirsty, do not try to drink more or less - when you need water, your body will tell you, drinking water, don't eat fried food, don´t eat overly processed food, don't eat fast food, don´t eat too much salt or sugar, don't eat too much sugar, do not drink coca-cola or any other drink with gas, don't buy too much processed food, eat fruit, eat fruits moderately, eat vegetables, eat vegetables and fruits, eat 5 different veg/fruit a day, eat soup every day, eating at least 1.5L of water a day, enough water, eat a lot of vegetables, eat fruits and vegetables, eat healthy and no meat food, eat healthy food (cooked by yourself) - meals with vegetables, meat/fish and rice/potatoes, eating vegetables, eating vegetables and fruits, eating fast food less than once a month, eating fast food only once a month, eating few fats, but good ones, complex carbs and loads of veggies, eat fewer snacks, eat more white meat, eat white meat, eat fish, eat more vegetables and fruits than carbs, eat more fruits, eat more fruits and vegetables, eat more vegetables, eating plenty of fruits and vegetables, eat lots of fruit and vegetables, eat a lot of fruits and vegetables, eat balance meals with soup and fruit, eat some desserts, but not every day, eat low fat foods, eat non-fat, eat green and meat, eat healthy food such as cereals, vegetables, eat healthy: vegetables, enough fruits and vegetables, eating fruit daily, eating salad and vegetables, eating fruits and vegetables, eating fresh, self-made and low fat type of food, eating 3 types/pieces of fruit per day, eating fruits and vegetables regularly, eating fruits, eating fruits and vegetables every day, eating vegetables daily, eating carbs and protein food (sweet potato / chicken /etc), exclude fat and sugar, fresh fruit and veg, fruit and fresh vegetables, eating healthy (biological food whenever possible), eating healthily - low fat foods, fresh fruit and veg, eating lots of unprocessed foods, few meat/sweets/fats, few sugar/fat ingestion, fibers, fruits, fat free, fresh fruit, fruit every day, few red meat, fresh vegetables, food with a high micronutrient content, fruits, fruit & veg, fruit, green food, green, good diet with fruits and vegetables, have soup, having vegetables, having treats in moderation, healthy and preferentially organic food (lot of vegetables, fruit, fish, water), high protein, intake of fresh

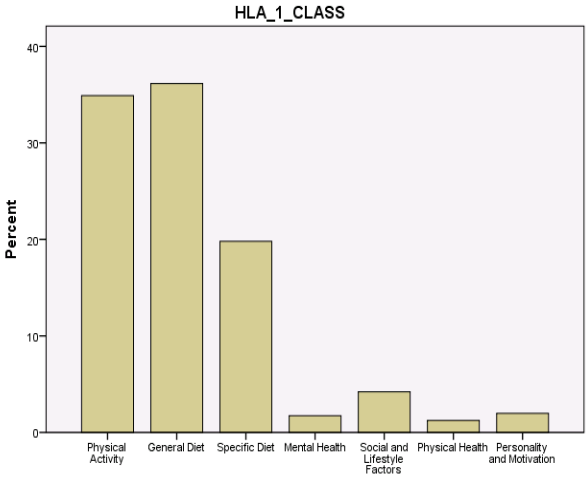
	fruit and vegetables, lactose and gluten free, less sugar, less meat more fish, less sugar/fat, less sugar and carbs, less bread, rice, pasta and potatoes possible, less carbohydrates, lean meat, lots of fruits, lots of veggies, lots of water, lots of vegetables/fruit, lots of vitamins, low carbs, low carb intake, low-carb food, low-fat, low fat, low meat, low seasonings, low calories, low sugar, less sugar, light, little sugar, less sugar and unhealthy fat, limiting treats/snacks, limiting sugar, low salt, Mediterranean diet, meat, meat free, milk, minerals, mineral water, no carbs at dinner, no chips, no fast-food, no fat/sugar, no fat, no carbs, no fries, no short-chain carbs, no fried meals, no fried food, no instant food, no cookies or chocolates, no processed food, no sauce, no soft drinks, no sodas, no soda canned beverages, no sugar, no sugars, no sweets, no caffeine, no additional sugar, not abusing fast food, no fast food, no oil, no salt, no skip meals, no eating too much meat and sweets, not drinking sodas, not too much salt, not too much sugar, not too much fat, not too much bread, non-processed food, not eating fast food, not eating animal products, not eating too much sugar, not over eat, not going to fast food every week, not going to fast food restaurants, not eat fast food, nothing fry, nuts, occasional treats, organic, organic foods, organic products, own vegetables, meat and fruit, plenty of water, plant based diet protein, presence of fruit, veggies and water, protein, protein and carbs, protein intake, proteins, plenty of fruit & veg, plenty water, quality meat, ready-made foods in measures, reduced sugar and fat, reduced level of fat, sugar low, self-cooked (home or restaurant) - but not prepared food, self-cooked meals, soup, superfoods, sugar-free, salads, salads and fruits, salt-free, tomato, trans-fat free, treats in moderation, try to avoid eating processed food/fast food as much as possible, try to avoid junk food, using fresh produce, using less fatty ingredients, vegan, vegetables, vegetables and lots of fruits, vitamins, water, white meat, without too much salt
4. Addictions	Alcohol in moderation, avoid drug use, avoid drinking alcohol, do not drink alcohol, drink no alcohol but rarely, don't go to discos and get drunk, don't drink too much alcoholic drinks, don't consume drugs or smoke, don't have drugs, don't smoke, don't smoke or take drugs, drinking alcohol only sparingly, don't drink alcohol too often, don't drink too much, drinking in a moderate frequency, drinking in moderation, drink enough, moderate alcohol consumption, don't have multiple sex partners, healthy choices (no smoke, no alcohol, no fast-food or prepared meals...), limited alcohol, low or no alcohol consumption, not smoking, not smoking cigarettes, no alcohol, no smoke, no drugs/alcohol, no smoking, no smoking/drugs, no smoking cigarettes, no bad habits, no addictions (smoke, drugs, alcohol), no drugs, alcohol, cigarettes etc., no drinking, no drinking every day, no excessive drinking, no tobacco, no drugs, no dependence habits, not drinking excessively, not drinking alcohol, not alcoholics, not drinking too much alcohol, not smoking and drinking, not too much alcohol or smoking, not smoking or taking drugs, reducing alcohol, intake, stopping bad habits
5. Mental health	Anger management, awareness, avoid stress, avoiding stress, avoiding too much stress, balance, balanced, being stress free, being happy, be happy, breath, breading slowly, brain stimulation, calm, do mindfulness, do mediation, yoga or pray, do not feel stressed often, don't stress, don't stress too much, doing brain exercise, emotional spiritual balance, emotional equilibrium, emotional issue in equilibrium, feeling loved/appreciated, good mental health, good stress management, happy, have some kind of sexual activity - which is rather important for emotional balance as well, having a good mental state, having fun and relaxing, have fun, having fun, have inner peace, have a spiritual life, emotional balance, emotional well-being, having a good mindset - healthy mind, healthy mind - looking after mental health, health mental, healthy mind, healthy mindset, intellectual work, keeping your mind sharp, laugh, laughter, laugh often, laughing and having fun, little stress, low stress, low stress levels, low levels of stress, long enough breaks from stress, mental balance, mental stability, mental fortitude, mental well-being, mental exercises, mindful, mindfulness, minimizing stress, meditating, meditation, meditation

	and relax, meditate, meditate - practice awareness, not being anxious, not being stressed, no stress, non stress, not too much stress, peace of mind, practice meditation, mental health, minimal stress, moderate stress, rest and relaxation, relaxation time, relaxation, relax, relaxing, relaxed, reducing stress, sane mine, smiling, spend some time with people you love, stress release, stress relief, stress-free, stress-free life, stress-free environment, stress management, taking care of mental health as well as physical, to relax, tranquillity, try to reduce stressing situations, try not to stress all the time, yoga, well-being
6. Social and lifestyle habits	A good night's sleep, adequate sleep, balanced lifestyle, balance life (work vs social vs familiar), balanced work life, balance work with social life, balanced schedules, balance work/pleasure, be outside in fresh air, be outside a lot, being outdoors, be around family and friends, be with my friends, be with friends, be with others, family and the ones we love, being socially involved (having friends, family etc.), breaks, balance work time with pleasure time, being outdoors, being social, being employed, bread fresh air - having contact with the Nature (sea, gardens), clean air, clean living, catch at least some sun every day, contact with nature, close relationships, connecting with friends and family, do outside activities, downtime, don't go to bed very late, enjoyable career, enjoying outdoors, enough sleep, enough money, enough rest, enough free time, expensive, environment, family, fresh air, friends, friends and family, family, fun times, get some rest, getting outside as much as possible, getting enough sleep, go outside, going outside, going out, going outdoors once a day, getting outdoors - fresh air regularly, good sleep, good work-life balance, good sleeping habits, good sleeping and resting habits, good rhythm, good financial health, good finances, good friends, good friends around yourself, good social relationships, good relationships, good support system, going out with friends, hanging out with your friends, hanging out with friends/family, healthy relationships, have family, have supportive families, have friends, having work, having time to relax, have regular sex, have sex, have enough hours of sleep, having social ties, hobbies, hobby, healthy work environment, happiness improving activities, hygiene, interaction, keep contact with your friends, leisure time with friends, limited screen time, living conditions, luck, money, music, meeting friends and family, nature, nature – fresh air, non-stress job, non-stressful job, not working too much, not staying at home - going out for a walk/coffee/drink at day/night, outside – air, outdoor, outdoors, outdoor activities, participate in social events, plenty of sleep, plenty of fresh air, progress, proper sleep cycle, proper rest, quality family time, quality time, regular fresh air, regular sleep, relationships with others, relationships, relationships (love/friendship), reading, rest, rest 8h, rhythm, study/work, relaxation time, see friends, sleep, sleep/rest, sleep at least 6 hours, sleep 6h+, sleeping, sleep 8h, sleep (8h/night), sleep 8h a day, sleep 8 hours per night, sleep between 8 to 10 hours, sleep well, sleep well and enough, sleeping, sleeping well, sleeping enough, sleeping the right amount of time, sleeping enough hours every day, sufficient amount of sleep, space, spending time outside-fresh air, some sun every day, spending time with friends, spend time with others(friends and family), socialize, spend time with family and friends, socializing, socialization, socializing in groups of friends and family, social relationships, social contacts, social surroundings that make one feel home, social contact, social interaction, social activities, social events, social life, social life/work balance, sound social contacts, social time, stable family, sufficient social contacts, supportive love relationship, spending time with people, take time outdoors, take breaks, to sleep at least 7-8 hours, time, time spent in nature, time spent outdoors, take time to relax, time for education, try to be in contact with the outdoors at least once a week, try to sleep around 7/8 hours per night, travel, time for hobbies, time to socialize, wake up early, wake up early 7 p.m. and go to bed early like 11 p.m., good balance work-life, work balance, work-life balance, work (not exaggerated time)
7. Physical health	Disease-free, energy, getting checked at the doctor's, go to the doctor, good wellbeing, health, healthy, health physical, health care, know your body,

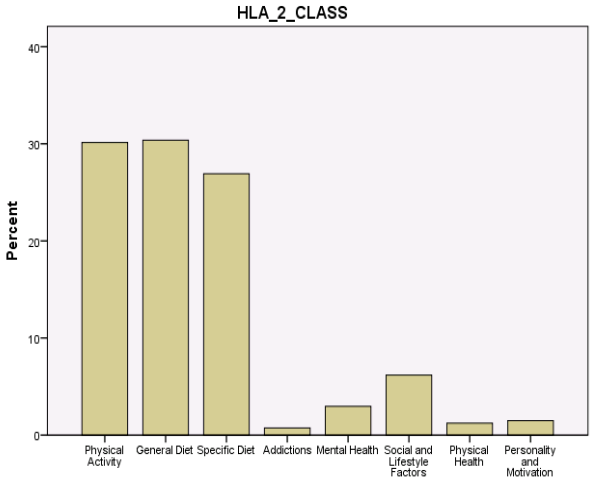
	listening to your body, medical exams, medical reviews, more energy, normal in weight, physical health, power, preventative, preventative care, reasonable BMI, regular check-ups, skin care, strong, taking care of yourself
8. Personality & Motivation	A positive attitude, a peaceful life, a sense of purpose, ambition, abstinence, balanced life, be in love, be positive with everyone and everything, be social, be ourselves, being positive, being passionate about your job, buy more experiences than objects, conscious, curiosity and exploring, communication, consistency, continuity, contentment, concern about health and physical appearance, diligence towards my tasks, disciplined, discipline, do things we like, doing things that make you happy, do what you like, do what you love (whether it is reading, writing, painting, playing music or simply stay at home doing absolutely nothing) - however, in my opinion, it should be something productive which betters yourself, do not be a workaholic, enjoyment, fun (pleasurable), enjoyment in life, enjoy life, enjoying life - appreciating what you have and not always looking for more, enjoy each moment, enjoy the little things, enjoying your job, enjoying work, excitement, effort, focus, good, good choices, habits, having goals, happiness, health orientation, human connection, impact, interact, integrity, kind, live others: talk with others, help others, hear others, respect others - we are social beings and we should know how to live in community love, learn to love, love, liking life, loving your work, lifelong learning, long term thinking, meaning for life (e.g. job or similar), mental preparation, mentality, moderation, not exaggerate, no excess, organization, open, pleasure, professional fulfilment, repeat, rationality, recognition, relaxed, routine, self-fulfilling, self-esteem, self-love, self-care, social engagement, social to community, social, success, spiritual development, stimulating, stimulation, temperance, tidiness, think positive, understand the science behind the practice, value, variety, work hard

Annex 8: Distribution of the healthy lifestyle associations

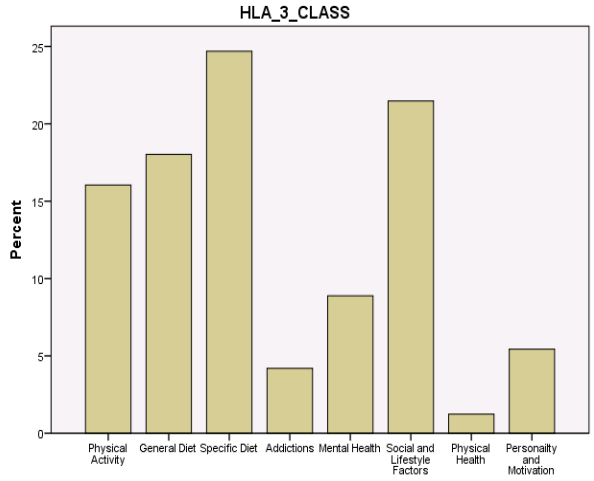
Annex 8a: Distribution of the first associations



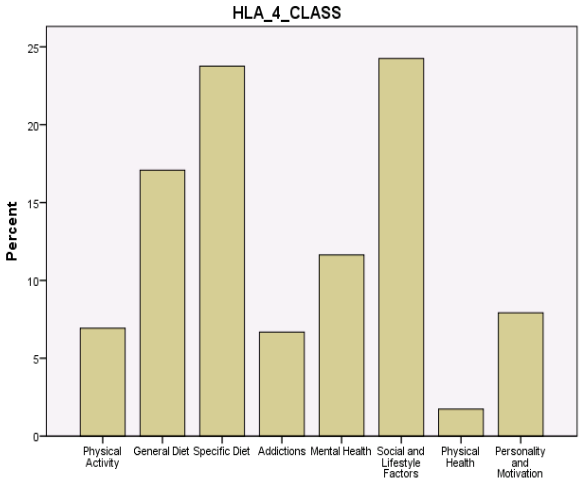
Annex 8b: Distribution of the second associations



Annex 8c: Distribution of the third associations



Annex 8d: Distribution of the fourth associations



Annex 8e: Distribution of the fifth associations