Dietary behavior of home-living older adults: the role of environmental factors

by

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Summary

While many home-living older adults seem to consume a nutritionally adequate diet, the prevalence of malnutrition in older people living at home remains high and frequently overlooked. Malnutrition in older adults has been recognized as a challenging health concern associated with a decline in health, reduced physical and cognitive function, increased utilization of health services, slower recovery times, premature institutionalization, and increased mortality. The problems that exist in relation to malnutrition, coupled with the increased proportion of older adults in the population, will affect not only the older adults themselves but also has serious implications on health services, public finances, and welfare systems.

In response to these growing concerns, effort should be made to help older adults maintain their health. Research evidence increasingly supports the idea that an adequately nutritious sound diet is essential to the health of older adults. It is thus important to understand the dietary behavior of home-living older adults, particularly what factors impact this behavior. The recognition of the importance of understanding dietary behavior has sparked interest in research about these factors. That said, it often focuses solely on the individual-level determinants. Research focusing on environmental determinants of dietary behavior, on the other hand, is growing, but much still remains to be explored. For this reason, this dissertation centered on the environmental determinants of dietary behavior.

The main objective of this dissertation is to deepen our understanding of home-living older adults’ dietary behavior and advance the current state-of-art literature in this field. This objective is achieved by means of three small interrelated studies. Before proceeding with the studies, I would like to point out the rationale behind them.
Many empirical studies in dietary behavior research use in-depth individual interviews as the data collection method. Despite the benefits of in-depth individual interviews as a data collection method, using a single data source to investigate a complex dietary behavior is perhaps insufficient. Additionally, it can result in mono-method bias. To create a good foundation for the studies and improve the overall validity of the findings, I first draw my attention to the data collection method (study 1) before focusing on identifying the environmental factors that impact dietary behavior (study 2). In terms of study 3, the second study's findings guided this study. The paragraphs below describe the three studies.

The first study explored the suitability of data collection methods for use with home-living older adults in the context of food choice. The second study investigates environmental factors determining home-living older adults' eating behavior. The third study examines the role of situational factors and the extent to which they lead to the adoption of online grocery shopping.

The result of the first study shows that the dyadic interview is a viable method for collecting data from older adults when an alternative interview method is needed. It also indicated that both interview methods generated complementary information. Moreover, using multiple methods has provided greater insights and perspectives about the topic.

The findings of study two suggest that a social environment can help encourage healthy eating among home-living older adults. Additionally, participation in a senior center, ensuring access to food (grocery shopping), transportation and mobility aids can support home-living older adults in maintaining their diet and health.

The third study found that a combination of poor health, loss of mobility, and distance to the grocery store can create a complex process that hinders older adults' endeavors to obtain healthy food. While some older adults have already adopted online grocery shopping as part of their
routines, others are open to the idea as a coping strategy, but some are still hesitant.

Taken together, this dissertation contributes to unique insights into data collection methods for use with older adults when exploring food choice, deepens the knowledge of environmental factors associated with eating behavior, and enriches the understanding of situational factors that lead older adults to buy groceries online. The findings carry implications for methodology, theory, and practice within dietary behavior research of home-living older adults.
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Introduction

1 Introduction

The world's population is aging rapidly. By 2050, 1 in 5 people will be aged 60 years or over (Kehoe, Walton, & Flynn, 2019). Norway is no exception to this demographic transition. It is anticipated that in 2030 there will be more older adults than children and young people in the country (Statistics Norway, 2020). This demographic shift could put a strain on public finances, the welfare system and increase demand for health services. That said, the resources that will be needed for the aging population depends predominantly on older adults' health and their ability to work and live independently for longer (Keese, Hirsch, & Bednarzik, 2006).

Most older adults prefer to live independently at home because it enables them to maintain a sense of independence, autonomy, identity, and connection to social support (Wiles, Leibing, Guberman, Reeve, & Allen, 2012). Besides older adults' preference, living at home is considered less expensive than nursing home care (Marek, Stetzer, Adams, Popejoy, & Rantz, 2012). Essentially, living at home is seen as a cost-effective solution for the aging population (Sixsmith & Sixsmith, 2008). As would be expected, Norway's current social care policy is also aimed at helping older adults to live at home for as long as possible (Regjeringen, 2022). The aforementioned line of reasoning underlies the need for further research into supporting home-living older adults. A home-living older adult is an older person living independently in their home as opposed to being admitted to a nursing home or other care for the aged (Crichton et al., 2019).

To be able to continue living at home, home-living older adults need to be healthy. One factor that plays an important role in maintaining health and preventing disease is food and nutrition (Lumbers & Raats, 2006). An adequate food intake and a nutritious diet can positively impact the aging process, resulting in improved quality of life, prevention of chronic
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disease, and lower mortality rates (Kehoe et al., 2019; Lumbers & Raats, 2006).

While many home-living older adults seem to consume a nutritionally adequate diet, the prevalence of malnutrition among them remains high and often goes undetected (Kozáková & Zeleníková, 2014). Some authors suggest that the prevalence of malnutrition in home-living older adults ranges from 13 to 30% (Kozáková & Zeleníková, 2014; Söderhamn, Dale, Sundsli, & Söderhamn, 2012). Also, a recent study by Payne et al. (2020) concludes that approximately 14% of home-living adults aged 65 and over are at risk of malnutrition. The term "malnutrition" refers to inadequate nutritional status characterized by insufficient dietary intake to meet energy or protein requirements in old age (Posner, Jette, Smigelski, Miller, & Mitchell, 1994; Sullivan, Sun, & Walls, 1999).

Malnutrition in home-living older adults contributes to progressive decline in health, reduced physical and cognitive function, increased utilization of health services, slower recovery times, premature institutionalization, and increased mortality (Evans, 2005). As mentioned earlier, these unfavorable outcomes also have negative consequences on public finances and the welfare system (Dean, Raats, Grunert, & Lumbers, 2009; Poscia et al., 2018). In this regard, efforts should be made to better understand the dietary behavior of home-living older adults. Understanding dietary behavior can help develop effective strategies to promote healthy eating and improve diet quality among home-living older adults (Fostinelli et al., 2020).

Dietary behavior is a complex behavior driven by many interacting factors (Sobal & Bisogni, 2009). Considerable research related to dietary behavior has been conducted to identify these factors, but much of the research focuses on the individual-level determinants such as attitudes, beliefs, and preferences (Bukman, Ronteltap, & Lebrun, 2020; Kremers, De Bruijn, Schaalma, & Brug, 2004). However, the environmental
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determinants of dietary behavior are less researched and much remains to be explored (Symmank et al., 2017). Although there has been a growing recognition of the role of the environment in influencing dietary behavior, existing evidence regarding the importance of environmental factors in home-living older adults' dietary behavior remains fragmented. Hence, research centered on environmental factors that impact dietary behavior is warranted.

The primary objective of this dissertation is to deepen our understanding of home-living older adults' dietary behavior and advance the current state-of-art literature in this field. Given the complexity of dietary behavior, unpacking home-living older adults' dietary behavior is not a simple task. Traditionally, dietary behavior as a research field makes use of in-depth individual interviews to collect data about the constructs of interest. Despite the ubiquitous nature and benefits of in-depth individual interviews as an instrument for collecting data on dietary behavior, using one instrument to investigate a complex phenomenon is rarely enough. Moreover, the use of in-depth individual interviews as a single data source can result in mono-method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), which can potentially jeopardize the validity of research findings (Burton-Jones, 2009). Thus, it is important that the instruments used for data collection are subject to careful scrutiny.

Pursuing this knowledge, I started my investigation by contrasting in-depth individual interviews with dyadic interviews. I subsequently point out the environmental factors that play a role in home-living older adults' dietary behavior and further investigate the impact of one of these factors.

The chapter below presents the literature review related to home-living older adults' dietary behavior.
2 Literature review

This section provides an overview of the key concepts used throughout this dissertation. Thereafter, a brief glimpse is given into the underlying factors associated with dietary behavior among older adults. This is followed by a quick look at approaches to study dietary behavior. The literature specific to the individual studies of the project is presented in the respective papers.

2.1 Dietary behavior

After a thorough literature review on different aspects of dietary-related behaviors across different disciplines, it has come to my attention that various labels are used for the construct "dietary behavior." Thus, there is a need to clarify the term "dietary behavior." Although it is common to mix terms and labels in the behavioral literature (Larsen et al., 2017), a lack of clarity, consistency, and consensus in terminology may hinder the aggregation of knowledge and the ability to compare findings among disciplines (Stok et al., 2018).

Commonly, dietary behavior refers to food intake. To facilitate understanding and cooperation between disciplines investigating dietary behavior, Stok et al. (2018) developed three categories that represent various aspects of dietary behavior. The three categories are food choice, eating behavior, and nutrient intake (Stok et al., 2018).

This research project explores two categories of dietary behavior: food choice and eating behavior. Understanding food choice and eating behavior is crucial to changing dietary behavior (Shepherd, 2005). Consequently, the manifold nature of food choice and eating behavior sparked interest in researchers of different research traditions such as psychology, sociology, biology, anthropology, food science, and
marketing. The fact that quite a few disciplines address the issue of food choice and eating behavior demonstrates its complexity and importance (Falk, Bisogni, & Sobal, 1996).

2.2 Food Choice

Food choice represents behaviors and other factors occurring before food reaches the mouth (Stok et al., 2018). This behavior includes, for example, preferences, acquiring food products, and food preparation.

Selecting food seems to be one of the most common and mundane activities. However, food choice is an integral part of our daily lives. Generally, people eat to satisfy their hunger, and other reasons could be maintaining health and wellbeing (Finkelstein & Fishbach, 2010). It was reported in the literature that people are more aware of the connection between food and health nowadays; nevertheless, health is not the key factor in food choice (Sun, 2008). What people eat and why they eat it constitute more than a simple matter of nutritional value (Keane & Willetts, 1994).

Prior research suggests that food choice decisions are frequent, situational, dynamic, and complex (Sobal & Bisogni, 2009). In terms of frequency, a study has estimated that most people make over 220 food choice decisions per day (Wansink & Sobal, 2007). As far as the situation is concerned, food choice involves not only decisions about food but also other aspects of a situation in which the food behavior occurs, such as location and people present at the time (Bisogni et al., 2007). In terms of dynamics, food choice develops over time and changes throughout people’s lives (Sobal, Bisogni, Devine, & Jastran, 2006). Furthermore, it is complex because it involves many considerations about what, how, when, where, and with whom we eat (Sobal, Bisogni, Devine, & Jastran, 2006).
The complexity of food choice is apparent. Many researchers have used different theoretical and methodological approaches to understand food choice. Nevertheless, much still needs to be learned about home-living older adults' food choices. Understanding their food choices can help practitioners develop appropriate strategies that focus on their needs (Falk et al., 1996).

### 2.3 Eating behavior

Several studies have proposed definitions of eating behavior. Elsner (2002) suggests that eating behavior includes thoughts, actions, and intentions to ingest solids or liquids. Brombach, Landmann, Ziesemer, Bartsch, and Winkler (2017) described eating behavior as food-related actions, including shopping, storing, preparing, eating food, cleaning up afterward, and planning for the following eating occasions. A recent study suggests that eating behavior is related to the actual act of consumption, such as eating habits, eating occasions, portions, and dieting (Stok et al., 2018). Despite lack of agreement on the definitions, these studies support the notion that eating behavior is a complex behavior driven by many interacting factors (Bukman, Ronteltap, & Lebrun, 2020; Köster, 2009).

Like food choices, people engage in eating behavior every day. Many are able to do this successfully, yet some exhibit poor eating practices resulting in malnutrition (Meule & Vögele, 2013). Simply put, people's eating behavior has a decisive effect on their health (Stroebele & De Castro, 2004). Because of this, investigating determinants of eating behavior is warranted. Moreover, studying factors that impact eating behavior might contribute to understanding the overall dietary behavior of home-living older adults.
2.4 Food access

Literature pertaining to dietary behavior suggests that adequate access to healthy food can contribute to a healthier diet (Huang, Rosenberg, Simonovich, & Belza, 2012; Ishikawa et al., 2016; Wolfson, Ramsing, Richardson, & Palmer, 2019). On this account, older adults who experience difficulties in food access are the ones at nutritional risk (Herne, 1995). In this dissertation, food access refers to the location of the food supply (e.g., grocery stores) and the ease of getting to that location (Caspi, Sorensen, Subramanian, & Kawachi, 2012).

While most older adults have access to the food they need to stay healthy, food access remains a problem for many (Meneely, Strugnell, & Burns, 2009; Wilson, Alexander, & Lumbers, 2004). Changes associated with aging (e.g., reduced mobility) and declining health can make access to food more challenging for some older people (Huang et al., 2012). Aside from these challenges, the in-store environment can be an issue for older food shoppers (Lesakova, 2016). A combination of these barriers can negatively impact dietary behavior among older adults.

To deal with food access barriers, typically, older adults seek help from others (e.g., family, friends) to shop, using more convenient food, meals on wheels, and other home-delivery meal services. These coping strategies work well for some, but most older adults value being active by continuing with a familiar routine such as buying their own food to live independently (Sidenvall, Nydahl, & Fjellström, 2001). Because of this, an alternative strategy is needed. One of the alternatives is online grocery shopping. Online grocery shopping entails older adults purchasing grocery products via a retailer's website and the purchased groceries being delivered directly to their home (Morganosky & Cude, 2000). This can improve access to healthy food for older adults while enabling them to retain independence. To date, little focus has been given to online grocery shopping behavior among older adults in Norway. However, with online grocery services continuing to rise and the focus
on growing older at home, a thorough understanding of online grocery shopping behavior among older adults is needed, more specifically in which situations older adults buy their groceries online.

2.5 Underlying factors associated with dietary behavior among older adults

Factors associated with dietary behavior among older adults can be grouped into three broad domains (Host, McMahon, Walton, & Charlton, 2016). These domains are 1) physiological changes associated with aging, 2) psychosocial aspects, and 3) personal resources. Below is a brief overview of the domain and the factors in each domain.

2.5.1 Physiological changes associated with aging

Aging is a universal occurrence but is not a homogeneous process (Jaul & Barron, 2017; Shatenstein, 2008). That said, physiological changes are an inevitable part of normal aging (Jaul & Barron, 2017; Nigam, Knight, Bhattacharya, & Bayer, 2012). Even well-aging older adults experience age-related physiological changes (Shatenstein, 2008). Physiological changes that can influence older adults' dietary behavior include taste, poor dentition, loss of appetite, mobility, and health.

2.5.1.1 Taste change

A declining sense of taste is a common problem among older adults (Drewnowski, 1997; Glanz, Basil, Maibach, Goldberg, & Snyder, 1998). The changes in taste are typically caused by changes in taste receptor cells, difficulties in maintaining oral health, and reduced olfactory function (Sergi, Bano, Pizzato, Veronese, & Manzato, 2017). Additionally, the use of medications also impairs taste buds (Sergi et al., 2017). To date, in terms of which taste buds decline as a person ages, the
results are inconsistent (Methven, Jiménez-Pranteda, & Lawlor, 2016). Almost 15 years ago, Nordin et al. (2007) reported that acid taste is most affected by age. In contrast, Lampuré et al. (2015) proposed that the liking for savoury food increases with age, whereas the liking for sweet food declines.

2.5.1.2 Poor dentition

Advancing age is also often associated with changes in dentition (Sergi et al., 2017). Poor dentition, dentures, and difficulty chewing and swallowing can cause older adults to restrict their diet and eliminate certain foods. This self-imposed dietary restriction negatively affects older adults' nutritional status (Gil-Montoya, de Mello, Barrios, Gonzalez-Moles, & Bravo, 2015).

2.5.1.3 Loss of appetite

Poor appetite is a common problem in older people (Pilgrim, Robinson, Sayer, & Roberts, 2015). Changes that occur with normal aging, such as sensory changes (smell and taste) and the digestive system function, can make food less appealing for older adults (Amarya, Singh, & Sabharwal, 2015). These changes alter food and nutritional intake, leading to nutritional deficiencies and various health problems (Amarya et al., 2015).

2.5.1.4 Mobility

Mobility is the ability to move independently or by using assistive devices or transportation (Webber, Porter, & Menec, 2010). Age-related loss of muscle strength is a common reason for declining physical mobility in older people (Amarya, Singh, & Sabharwal, 2018). Declining mobility can compromise food choice, access, and preparation (Munoz-Plaza et al., 2013; Wylie, Copeman, & Kirk, 1999).
2.5.1.5 Health

Most older adults know that a healthy diet is critical for their well-being, but compromised health and chronic disease can affect their appetite and change their diet (Falk et al., 1996; Shatenstein, 2008). These dietary changes typically include eating less and making different food choices (Shatenstein, 2008). Furthermore, food-related activities such as grocery shopping, cooking, and eating meals can become burdensome because of health problems (Wolfe, Frongillo, & Valois, 2003).

2.5.2 Psychosocial aspects

In addition to the age-related physiological changes, older adults' dietary behavior is also affected by psychological and social factors (de Boer, Ter Horst, & Lorist, 2013). These factors include life course, living arrangement, motivation, self-perception of health, interest in health and nutrition, and desire to maintain independence.

2.5.2.1 Life course

People's food choices are constructed over time, but their current eating patterns are often attributed to their prior eating experiences (Falk et al., 1996). An example of this is childhood food. For many, childhood food remained important and unchanged for many years (Falk et al., 1996). Because of this, food habits are difficult to change (Amarya et al., 2015). This shows that life course is the backdrop that shapes people's food choices (Furst, Connors, Bisogni, Sobal, & Falk, 1996).

2.5.2.2 Living arrangement

A person's living arrangement can influence the type and variety of food consumed, thereby impacting health (Conklin et al., 2014). Studies have shown that older adults who live alone, have become widowed, or are socially isolated are prone to malnutrition risk (Sidenvall et al., 2001;
Vesnaver, Keller, Sutherland, Maitland, & Locher, 2016). While this is the case, some older adults continue to eat well and maintain their diet despite living alone (Vesnaver, Keller, Payette, & Shatenstein, 2012). It is also important to note that older people who live alone by no means make poorer food choices than those who live with companions; rather, they have a lower food intake (DeBruyne & Pinna, 2018).

With widowhood, losing a partner often leads to fewer regular meals, less enjoyment in mealtimes, and less attention to diet quality (Vesnaver et al., 2016). Social isolation is another factor associated with living alone and widowhood that affects food choices and eating behavior (de Boer et al., 2013). Older people that are socially isolated generally have limited contact or communication with their family, relatives, or friends (Smith, Holt-Lunstad, & Layton, 2010). Social isolation results in more meals eaten alone and a lower food intake, negatively affecting nutritional status (de Boer et al., 2013; Vesnaver et al., 2016). Then again, some older adults prefer to eat alone despite living with family and are comfortable with this practice (Takahashi et al., 2020).

2.5.2.3 Lack of motivation

As previously stated, motivation for food shopping, cooking, and eating meals generally declines among older adults who live alone and have been widowed or become socially isolated (Sidenvall et al., 2001; Vesnaver et al., 2016). These changes lead to a decline in food intake and risk of body weight loss (Donini, Savina, & Cannella, 2003).

2.5.2.4 Self-perception of health

Individuals' own perception of health is an important determinant of dietary behavior in older adults (Lesáková, 2018). An earlier study shows that those with a more positive health perception place more importance on choosing food that makes them physically healthier than those with a less positive view (Lesáková, 2018).
2.5.2.5 Interest in health and or nutrition

Similarly, older adults with a greater interest in health and nutrition place more importance on nutrition when choosing food products (Jeruszka-Bielak et al., 2018).

2.5.2.6 The desire to maintain independence

Being independent is important to older adults (Payne et al., 2020). However, the effects of aging can make maintaining independence harder as time goes on. Previous studies have established that the desire to maintain independence can affect food choice (Nyberg et al., 2018; Sidenvall et al., 2001). Many are unwilling to accept help from others with food and meals as it indicates losing independence and control (VesnaVer et al., 2012). A strong will to remain independent has created self-imposed dietary restrictions that can compromise nutritional status (Winter, McNaughton, & Nowson, 2016).

2.5.3 Personal resources

Personal resources such as transportation, income, support from others, food preparation skills, and dietary resilience are important to achieving healthier diets (Dean et al., 2009; Falk et al., 1996; Radermacher, Feldman, & Bird, 2010).

2.5.3.1 Transportation

Transportation is crucial to older adults' independence (Rosenberg & Everitt, 2001). Of all the means of transport, a car is the most commonly used among older adults because it allows them to travel long distances independently (Böcker, van Amen, & Helbich, 2017; Negron-Poblete, Séguin, & Apparicio, 2016). That said, differences exist between older adults and available resources (Rosenberg & Everitt, 2001). Those losing their driving capacity often rely on public transport or being driven by
others (Negron-Poblete et al., 2016). The ability to drive oneself, be driven by others, or use public transport allows older adults to access food stores and other social visits (Negron-Poblete et al., 2016). It has been argued that greater access to transportation contributes to older people having a more varied diet (Dean et al., 2009).

2.5.3.2 Income

Previous studies have explored the relationship between income and diet quality. Having an adequate income ensures a more varied and balanced diet for older people (Drewnowski, Renderson, Driscoll, & Rolls, 1997). A higher income level equates to a greater ability to afford desired or needed food for maintaining a healthy diet (Host et al., 2016). In contrast, low income has been identified as a risk factor for poor diet in older adults (Guthrie & Lin, 2002).

2.5.3.3 Support from others

Support from others can benefit older adults’ dietary intake and decrease malnutrition risk (Edfors & Westergren, 2012). Older adults who receive support from others tend to have a more varied diet (Dean et al., 2009) and can live at home for longer (Locher, Burgio, Yoels, & Ritchie, 1998). That said, independence is highly valued among older adults. Perhaps the greatest fear of older adults is becoming dependent on others (Baltes, 1996; Clark, 1991; Portacolone, 2011). This fear can result in a reluctance to ask for assistance from others (Bell & Menec, 2015).

2.5.3.4 Knowledge and skills in food preparation

Cooking skills have been defined as a set of mechanical or physical skills used in meal preparation and conceptual skills related to understanding how food will react when cooked (Short, 2003). Although cooking is a common practice preceding eating daily, it can become harder during older adulthood (Tani, Fujiwara, & Kondo, 2020). Studies show that
cooking skills have an impact on dietary quality (Bostic & McClain, 2017; Tani et al., 2020). Those who lack either ability or desire to prepare and cook for themselves are more prone to nutritional risk (Bostic & McClain, 2017).

2.5.3.5 Dietary resilience

Dietary resiliency is the state of having an adequate diet despite facing dietary challenges (Vesnaver et al., 2012). Previous research suggests that resilient eaters will do everything possible to overcome dietary challenges (Vesnaver et al., 2012). It was reported in the literature that high resilience is associated with positive outcomes (MacLeod, Musich, Hawkins, Alsgaard, & Wicker, 2016). That said, dietary resilience may not always result in resiliency, and efforts to adapt may not always result in successful adaptation (Allen, Haley, Harris, Fowler, & Pruthi, 2011). The ability to adapt often depends on personal resources, willingness to draw on support from others, and available resources in the community (Vesnaver et al., 2012).

2.6 Approaches to studying dietary behavior

Over the past few decades, researchers from multiple disciplines contributed to dietary behavior knowledge. As a result, different psychological theories and models can be used to study dietary-related issues. Theories and models commonly seen in the literature and frequently utilized in present-day research are, for example, the theory of reasoned action, theory of planned behavior, health belief model, social cognitive theory, and socio-ecological model.

Dietary behavior has also been studied from different vantage points. Some disciplines focus on the variables related to the food itself, while others concentrate on the individual or the environmental factors (Edwards, Meiselman, Edwards, & Lesher, 2003). The disciplines contributing to the discussion of the food generally focus on sensory
properties such as texture, taste, odor, and other sensory perceptions. In the discipline that studies individual-related factors, the focus is usually on preferences, beliefs, nutrition knowledge, and attitudes, whereas studies addressing the environmental factors typically include social, physical, and societal factors. Perhaps the main difference between these disciplines is their assumption about the most effective ways to improve dietary quality that lead to better health.

Given this fact, it is hardly surprising that there is no single unified theory or framework to study dietary behavior. In an attempt to capture the complexity of home-living older adults' dietary behavior, I focus on how environmental factors can change dietary behavior in a desirable direction.
2.7 **Considerations guiding this research**

This dissertation is built on three small interrelated studies. In the following paragraphs, I will describe the two main considerations that inform my decisions about this research and how the three papers are interrelated.

The first consideration concerns the theoretical approaches to studying dietary behavior. Overall, the literature review shows that dietary behavior is complex, dynamic, and diverse among older adults. Various theories and frameworks can be used to study dietary behavior. Combining these approaches into one comprehensive, integrated model is challenging. Such a goal can only be achieved by the joint efforts of the scientific community.

Because no single theory, framework, or model can adequately capture the full complexity of dietary behavior (Sobal & Bisogni, 2009), instead of concentrating on one specific theory to explain dietary behavior, the theories I used in the studies were drawn on in an eclectic manner. As such, the phenomenon drives the research rather than the research being bounded by the limits of a specific theory (Schwarz & Stensaker, 2014). The presumption is that this approach allows me to come closer to the phenomenon and have more connections to the real world. By doing so, I can contribute to advancing knowledge in close relation to the phenomenon. And perhaps, the findings can be used to develop a pragmatic strategy in the real world and guide future theory development.

Apart from suggesting various theoretical lenses that are available to study dietary behavior, the literature review also points out that dietary behavior can be studied from three different vantage points: the food itself, the individual, and the environmental focus. Basically, these approaches attempt to explain dietary behavior by emphasizing one of these perspectives. Although the discussion about the food itself is a critical aspect of dietary behavior, it is beyond the scope of this research.
On the question of whether to concentrate on the individual or environmental context, I chose to focus on the environmental context.

Dietary practices involve an individual isolated choice, but what a person decides to eat and how they arrive at a decision are often affected by their environmental context (Delormier, Frohlich, & Potvin, 2009). If we suppose that dietary practices (e.g., food choice, eating) takes place in the environmental context, then it should be easier and more effective to bring about changes in dietary behavior in an environmental context than in an individual context (Belon, Nieuwendyk, Vallianatos, & Nykiforuk, 2016; Lewin, 1951). Furthermore, it has also been suggested that individual change is more likely to be facilitated and sustained if the environment within which choices are made supports healthy options (WHO, 2003). Thereby, it is rational to focus more attention on the environmental context.

At this stage, what to focus on has been decided but not how the data will be collected. Hence, the second consideration pertains to the methodological approach. In the same way as theoretical approaches, various methodological approaches can be employed to study dietary behavior. The challenge, therefore, lies in selecting appropriate data collection methods. One strategy is to rigidly follow a set of methodological prescriptions and ally with specific research customs (Clarke & Visser, 2019). Although this strategy gives researchers a feeling of "security", the particular methodology may not be suitable to answer a given research question (White, 2013). Another strategy is to focus on the research questions. Using this strategy, researchers choose the methods, techniques, and procedures that best meet their needs and purposes (Creswell & Creswell, 2017). In addition to having freedom of choice, this strategy encourages researchers to make deliberate, conscious choices that are not dictated by a set of methodological rules (Clarke & Visser, 2019). Additionally, emphasizing a research question-led approach may help avoid forming "mono-method" identities in the
Literature review

research community (White, 2013). These lines of reasoning underpin the choice of methods in my studies.

Furthermore, a closer look at the literature on dietary behavior research in which samples are made up of older adults reveals two shortcomings. First, the methods chosen in these studies are simply described in general and indicated at the end of a study as a strength or limitation. Rarely is the chosen method evaluated and reflected from start to finish. Second, within the repertoire of tools that dietary behavior researchers can use, the in-depth individual interview is a commonly used method. Despite the benefits of in-depth individual interviews as a data collection method, using a single data source can result in mono-method bias (Podsakoff et al., 2003). If this design issue is not addressed beforehand, the overall validity of the study will be undermined. Needless to say, before focusing on identifying the environmental factors that impact dietary behavior (study 2), I draw my attention to the methodological tool (study 1). Some researchers, notably Domarad and Buschmann (1995) and Weil (2015), have argued that focusing on the data collection process can lead to better data that accurately represents the views of the study's participants. As far as study 3 is concerned, the second study's guided this study.
Objective and research questions

3 Objective and research questions

As previously stated, the primary objective of this dissertation is to deepen our understanding of home-living older adults' dietary behavior and advance the current state-of-art literature on this field. To achieve this objective and address the shortcomings within the existing literature, I carried out three empirical studies.

Study 1 focuses on the data collection method. As indicated earlier, various methodological approaches can be employed to study the dietary behavior of home-living older adults. At the same time, the nature of the research topic determines whether or not the use of a method is advisable (Gubrium, Holstein, Marvasti, & McKinney, 2012). Understanding the complexity of home-living older adults' dietary behavior requires home-living older adults' multiple perspectives or viewpoints. Therefore, we need a method that can be used to explore various perspectives. Among the methods available, qualitative interviews allow the exchange of ideas and meanings, exploring multiple perceptions (Gaskell & Bauer, 2000). Thereby, a qualitative interview is likely an appropriate approach.

The most widely used method within the interview approach is the in-depth individual interview. Like any research technique, the in-depth individual interview has merits and demerits. Furthermore, to minimize the potential threat of mono-method bias (Campbell & Fiske, 1959; Podsakoff et al., 2003), I used two interview methods; in-depth individual and dyadic interviews.

The dyadic interview was selected for three reasons. First, the dyadic interview is well suited to eliciting knowledge from individuals who need additional time to process or recall information (Morgan, Ataie, Carder, & Hoffman, 2013). This implies that dyadic interviews allow researchers to explore older adults' perspectives while accounting for the unique characteristics of this population. Second, dyadic interviews can extend the content beyond what might have been possible in individual
Objective and research questions

interviews (Morgan, 2016). Third, it allows researchers to observe the interactions between the dyad.

Aside from the above considerations, I also took the nature of the research topic into consideration. As previously stated, food choice involves an isolated choice, but what a person decides to eat and how they arrive at a decision is often a form of collaborative decision with others in everyday life, for example, significant others or families (Delormier, Frohlich, & Potvin, 2009). It has been suggested that the use of dyadic interviews in exploring research topics related to collaboration can contribute to the co-creation of new knowledge (Klevan, Jonassen, Sælør, & Borg, 2020).

Considering that little is known about the suitability of dyadic interviews as a data collection method for older adults, I seek to fill this knowledge gap by empirically comparing dyadic interviews with the most commonly used method, which is in-depth individual interviews. This leads to the first research question:

RQ1: Is the dyadic interview a suitable method for collecting data from home-living older adults in the context of food choices?

Study 2 focuses on the construct (dietary behavior) itself. As explained earlier, the approach taken in this research will focus on environmental influences in home-living older adults' dietary behavior. To this end, the endeavor has been made to identify which environmental factors impact home-living older adults. Thus, the following research question was developed:

RQ2: What environmental factors determine the home-living older adults' eating behavior?

Having recognized that various environmental factors (see result from study 2) play a role in home-living older adults' eating behavior, I attempt to further explore one of these factors in my third study. Based on the
existing literature, food access is a promising area to focus on. Providing convenient and adequate access to healthy food can support home-living older adults in maintaining a healthy diet (Huang et al., 2012; Ishikawa et al., 2016). For this reason, in the third study, I focused my attention on food access, specifically online grocery shopping. This leads to the third research question:

RQ3:

a) What situational factors drive older adults to buy groceries online?

b) Which factors are considered most important when older adults are deciding whether to buy groceries online?
4 Methodological considerations

This research project employs various methods. Each method was chosen based on the sample characteristics, nature of the research topic, suitability to meet research objectives, cost, and practicality. The methods applied in each study are described in detail in the corresponding papers. This section focuses on the overall rationale underpinning the methodological choices.

4.1 Research design and approach

To help make sense of the complex social world and predictions based on the findings, I use abductive reasoning. Using this approach allows me to go back and forth between the data and theory, enabling creativity and intuition in understanding the generalizable and the specific characteristics of the observed phenomena (Dubois & Gadde, 2002).

With regards to the research design, the selection of the research design in my studies is based on the nature of the research problem. Study 1 was designed to explore the suitability of dyadic interviews for use with older adult samples. Considering that little is known about the relative merits of dyadic methods for use with older adults, I employed the exploratory design. The exploratory design is necessary when the topic has never been investigated before, never in that particular context, or little is known about the topic (Blaikie & Priest, 2019). The qualitative research approach is applied in this study.

In terms of study 2, the aim was to identify the environmental factors that may influence the eating behavior of home-living older adults. To get a better idea of what is going on and develop an initial understanding, it was also necessary to use the explorative design in this study. For this study, I also employed a qualitative approach.
Methodological considerations

As far as study 3 is concerned, the aim was twofold. Firstly, it attempts to identify situational factors that drive older adults to buy groceries online. Secondly, it seeks to describe which situational factors are considered most important when older adults are deciding whether to buy groceries online. Given these aims, a sequential design would seem appropriate for this study. Consequently, I used the exploratory design in the first stage to discover how older adults view online grocery shopping. To further refine the understanding obtained in the first stage and describe some patterns of the adoption of online grocery shopping, the descriptive design was employed in the second stage. To help answer the research questions in this study, I used both the qualitative and quantitative approaches.

4.2 Recruitment

Various recruitment strategies were used across the three studies to recruit sufficient participants that adequately represent the target population. These strategies include placing flyers in mailboxes, community outreach (presentation of our project in senior activity centers), street-intercept recruitment, snowball sampling, and online panel. The details of the recruitment strategy employed in each study are described in the corresponding papers. The paragraph below offers reflections on the recruitment process during the time of the three studies.

A considerable amount of time and attention were devoted to the recruitment strategy. Despite that, I had to make a few changes to the recruitment plan throughout the research project. These changes were made because of low participation rates, participants' illness, and the COVID-19 pandemic. Using multi-recruitment strategies, I was able to recruit the sample within a reasonable time and cost. One important lesson learned is that having alternative recruitment strategies helps avoid delays and improves participant recruitment.
4.3 Sample

The sample of the studies is Norwegian older adults living at home in different parts of Norway. The sample characteristics, sampling criteria (inclusion/exclusion), and achieved sample are described in the corresponding papers. Given the fact that the term "older adult" is repeatedly mentioned in this dissertation, I suppose there is a need to be explicit about what I mean by "older adult."

The term "older adult" is used inconsistently in the literature since this group is made up of individuals with different characteristics. The most common way of defining an older person is using chronological age. At the same time, we know that chronological age in itself is an "empty" variable (Settersten Jr & Mayer, 1997). Furthermore, it is rarely assumes that age itself causes behavior (Settersten Jr & Mayer, 1997).

Despite these problems, chronological age is an indispensable index (Neugarten & Hagestad, 1976). Age is often a powerful piece of information about an individual (Schroots & Birren, 1988). In my studies, chronological age is used to indicate the population from which a sample was drawn and set the inclusion criteria. In studies 1 and 2, older adults are defined as people aged 60 and over, whereas, in study 3, an older adult is determined by the retirement age in Norway (age 62+).

4.4 Data collection

Data collection for studies 1 and 2 took place between October 2019 and January 2020 in a district of Western Norway. For study 3, the interviews were conducted in June 2021 with participants from different districts in Norway, and the online survey was launched in August 2021 to reach older adults nationwide.

As for the instrument for data collection, in studies 1 and 2, data were collected using dyadic and in-depth individual interviews. The interview design and details of how the interviews were conducted are described
in detail in studies 1 and 2. With regard to study 3, I used in-depth individual interviews to collect data in the exploratory phase and a conjoint experiment in the descriptive phase. The conjoint design is described in detail in study 3.

4.5 Analytical approaches

The qualitative data collected in my studies were analyzed using content analysis. As such, content analysis is used to make sense of textual data through the systematic classification process of coding and identifying themes or patterns (Hsieh & Shannon, 2005). The goal is to provide new insights, knowledge, and understanding of the phenomenon under study (Downe-Wamboldt, 1992; Krippendorff, 2018).

In terms of analytical method, either an inductive or a deductive approach can be applied to qualitative content analysis (Elo & Kyngäs, 2008). Additionally, both inductive and deductive reasoning modes are also often used simultaneously in qualitative content analysis (Armat, Assarroudi, Rad, Sharifi, & Heydari, 2018). This type of analysis can be seen in studies 1 and 2.

With regards to the conjoint experiment (study 3), the conjoint module SPSS 26.0 was used for all the analyses. A summary of the data analysis approaches for the three studies is presented below in Table 1.
### Methodological considerations

<table>
<thead>
<tr>
<th>Study</th>
<th>Article</th>
<th>Type of analysis</th>
<th>Phase</th>
<th>Descriptions of the analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dyadic Interviews versus In-Depth Individual Interviews in Exploring Food Choices of Norwegian Older Adults: A Comparison of Two Qualitative Methods</td>
<td>Content analysis</td>
<td>Phase 1</td>
<td>A within-study content analysis (inductive mode).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Content analysis</td>
<td>Phase 2</td>
<td>A within-study content analysis (deductive mode).</td>
</tr>
</tbody>
</table>
|       |                                                                         | Cross study analysis using four criteria from Steenkamp and Van Trijp (1997) | Phase 3 | The comparison of the two methods was divided into two parts.  
1) number of attributes elicited and attribute variability.  
2) efficiency in data collection and participants' feedback. |
| 2     | Environmental factors that impact the eating behavior of home-living older adults | Content analysis | Phase 1 | Deductive content analysis                                                                  |
|       |                                                                         | Content analysis | Phase 2 | Inductive content analysis                                                                   |
| 3     | Understanding the role of situational factors on online grocery shopping among older adults | Content analysis | Phase 1 | Directed content analysis                                                                   |
|       |                                                                         | Conjoint analysis | Phase 2 | Conjoint module (SPSS 26.0)                                                                 |

Table 1 Data analysis approaches for studies 1, 2, and 3.
4.6 The quality of research

There is widespread agreement that it is necessary to evaluate the quality of research. Additionally, there is an ongoing discussion on how the quality of research can be evaluated. Traditionally, such evaluation centered on assessing reliability and validity (Long & Johnson, 2000). In a broader perspective, reliability describes consistency within the employed analytical procedures, while validity refers to the integrity and application of the methods undertaken and the precision of the findings in reflecting the data (Long & Johnson, 2000).

Since reliability and validity are rooted in positivist perspectives, the use of these terms has been an ongoing debate, and their use in qualitative work has been questioned (Long & Johnson, 2000; Noble & Smith, 2015). Nevertheless, reliability and validity are appropriate concepts for attaining rigor in qualitative research (Morse, Barrett, Mayan, Olson, & Spiers, 2002). On the other hand, if qualitative methods are inherently different from quantitative methods in terms of philosophical positions and purpose, then alternative frameworks for establishing reliability and validity are considered appropriate (Sandelowski, 1993).

For the qualitative studies, I adopted the verification strategies proposed by Lincoln and Guba (1986). These verification strategies are credibility, transferability, dependability, and confirmability (Lincoln & Guba, 1986). It is worth mentioning that these strategies were applied during the study instead of at the end of the study in order to manage the threats to reliability and validity (Morse et al., 2002). The strategies adopted are illustrated in Table 2.

Together, all these verification strategies contribute to and build reliability and validity, thus establishing the rigor of the studies. However, I acknowledge that even though great effort has been made to implement these verification strategies, no knowledge can be counted as certain.
## Methodological considerations

<table>
<thead>
<tr>
<th>Rigor criteria</th>
<th>Purpose</th>
<th>Original strategies</th>
<th>Strategies applied in our study</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Credibility</strong></td>
<td>To establish confidence that the results (from the perspective of the participants) are true, credible and believable.</td>
<td>Prolonged engagement; lengthy and intensive contact with the phenomena (respondents)</td>
<td>Before the scheduled interview, we met or called all of our participants (except street-intercept) to introduce ourselves and engage participants in an informal conversation. We called our participants to verify some things mentioned after the interview to get the correct interpretation if we were unsure about something.</td>
</tr>
<tr>
<td><strong>Triangulation</strong></td>
<td></td>
<td>We used method triangulation, investigator triangulation, and data source triangulation</td>
<td></td>
</tr>
<tr>
<td><strong>Interviewing process and techniques</strong></td>
<td>Interviewing protocol tested at pilot interviews with older adults from a different region of Norway</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Negative case analysis</strong></td>
<td>We include a wheelchair user and parent-child dyad</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Member checks</strong></td>
<td>Member checking was conducting during data collections to check between participants. We asked our participants: &quot;Other people tell me this, how is this for you?&quot;</td>
<td></td>
<td></td>
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</tbody>
</table>

| **Dependability and Confirmability** | To ensure the findings of this qualitative inquiry are repeatable if the inquiry occurred within the same cohort of participants, coders and context. To extend the confidence that the results would be confirmed or corroborated by other researchers. | Rich description of the study methods | A detailed description of the research procedures was provided, allowing others to conduct follow-up studies |
| | | Establishing an audit trail | We have a detailed track record of the data collection process and all signed informed consent. Audio files, transcripts, field notes writing, and reflection notes |
| | | Reflexivity | Most of the time, two of the authors present during the interview process. We keep reflection notes for each interview, allowing us to reflect not only on what happened at a particular interview but also on how we as researchers feel that day |
Methodological considerations

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Transferability</td>
<td>The degree to which the results can be generalized or transferred to other contexts or settings.</td>
<td>Sampling</td>
<td>We use maximum variation sampling in terms of participants’ characteristics (see Table 1 &amp; 2). The result of the study is limited to the selected participants and their experience related to eating practices.</td>
</tr>
<tr>
<td>Data saturation</td>
<td>With dyadic interview, we can learn about individual and collective perspectives, which add dimensions to the data collected. Furthermore, our sampling strategy allows us to identify more perceptions and variations. This way, the picture becomes broader and deeper to the point of saturation (Patton, 2002).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 Strategies adopted from Lincoln and Guba (1986)

In terms of validity in a quantitative study, typically, there are four types of validity: statistical conclusion validity, internal validity, construct validity, and external validity (Cook & Campbell, 1979).

*Statistical conclusion validity* is the degree to which conclusions about the relationship between independent and dependent variables are reasonable. To reduce issues that would threaten statistical conclusion validity, I applied three strategies. Firstly, through the consideration of the experimental design, secondly, by taking into account the cognitive burden of these designs on the respondents, and thirdly by pilot testing the study.

In terms of design, the easiest way to organize the stimuli in a conjoint experiment is with a full factorial design, because this simply requires all possible level and factor combinations (Huertas-García, Nunez-Carballosa, & Miravitlles, 2016). With that said, this statistical design
Methodological considerations

poses a problem because it can result in an unrealistically high number of profiles (scenarios) that need to be evaluated by respondents.

To remedy this issue, I use an orthogonal design, which contains a fraction of a full factorial design (Huertas-García et al., 2016). Doing so reduces the number of alternatives that each respondent has to assess. Like any design, orthogonal design is not superior to other designs. By using orthogonal design, researchers have to sacrifice the ability to estimate certain interaction effects (Huertas-García et al., 2016). In some cases, interaction effects are essential, but in this case, orthogonal design is ideal because I was interested in the main effects. Another important aspect of my conjoint design is that each level of each factor is repeated the same number of times in the overall experiment, which suggests the design is balanced (Huertas-García et al., 2016). Overall, the experimental design is orthogonal and balance enables valid inferences about the behavior (Vieira Jr, Sanchez, Kienitz, & Belderrain, 2013).

As discussed above, a number of alternatives generated from a full factorial design can overwhelm the cognitive ability of any respondent (Green & Srinivasan, 1990). To reduce the cognitive load for my sample (older adults), attention was also paid to the length of the scenario. Doing this reduces the cognitive demand from the respondent (Wang & Li, 2002), thereby improving the validity of the data (Wang & Li, 2002).

Lastly, before the questionnaire was launched, a pilot study was conducted. The focus of the pilot study was to identify any issues that may arise during the study. Consequently, it enhances the reliability and validity of the study (Malmqvist, Hellberg, Möllås, Rose, & Shevlin, 2019).

Internal validity refers to the degree of confidence that the study findings are the result of an association between treatment (manipulated variables) and outcome and not due to chance or other confounding variables. It is well known that experiments are commonly high in internal validity since researchers are the ones who purposely alter or
manipulate the independent variables and control other confounding variables. One potential source for lower internal validity in my study would be that the sample was drawn exclusively from an online panel. Previous work has suggested that recruitment through panel providers may lead to the over-representation of some groups and under-representation of others (Willems, Brown, Van Ossenbruggen, & Vonk, 2006). For instance, the sample may under-represent the non-internet savvy or less computer literate older adults. With that said, selecting participants with no internet experience may result in a low prevalence of online grocery shopping. All things considered, online recruitment is justifiable.

Another type of threat to internal validity in my study can be derived from common rater bias (Podsakoff, MacKenzie, & Podsakoff, 2012). More specifically, the impact of the task on the respondents. Suppose that the raters are cognitively overwhelmed; they are likely to employ heuristics to answer the questions. To reduce the cognitive load of the raters, a few strategies have been applied in the design phase. Please refer to earlier paragraphs.

A different form of rater bias is social desirability. Respondents may want to please the researcher and tell them what they want to hear and modify their responses to be consistent with their perceptions of the researcher's expectations (Podsakoff et al., 2003). As such social desirability can bias answers and produce spurious relationships between the variables (Podsakoff et al., 2003). To control for social desirability bias, the respondents in the study were recruited using an online panel administrated by a third party via a digital distribution system. This way, respondents can maintain their anonymity.

*Construct validity* indicates how accurate a measure is; whether it successfully measures what it was designed to measure. Threats to construct validity in conjoint experiments can come from, for example, the inadequate definition of constructs (Cook, Campbell, & Shadish,
Methodological considerations

2002), however a clear operational definition of the construct consistent with existing literature was provided within the study.

External validity asks the question of generalizability, to what populations, settings, treatment variables, and measurement variables can this effect be generalized? Bracht and Glass (1968) proposed two types of external validity: population validity and ecological validity. Population validity refers to how study results from a sample can be generalized to the population. The degree of confidence an experimenter can generalize to the population is unknown because hardly any experimenter can sample randomly from the true target population (Bracht & Glass, 1968). Thus, generalization is often restricted to a smaller population. Furthermore, how the treatment variables interact in the target population should be considered instead of the absolute differences between target populations (Bracht & Glass, 1968).

Ecological validity refers to the extent to which the findings of a study can be generalized to real-life settings. Firstly, I used a conjoint experiment because it presents a reasonably straightforward task that more closely resembles a real-world decision (Green & Srinivasan, 1978). Also, when designing the scenarios, efforts are made to simulate real-world scenarios. Consequently, the insights gained from this study may be of assistance to online grocery retailers and potentially to other online retailers. Furthermore, replication of the study can update the strength of the external validity.

Turning now to consider reliability. Reliability refers to the accuracy of an instrument. In other words, the extent to which a research instrument consistently has the same results if it is used in the same situation on repeated occasions (Heale & Twycross, 2015). To test the internal consistency of the survey, the same survey was administered twice (2 or 3 days between each time) to 7 respondents in the pilot study. The scenarios tested are the same both times, but the order of the scenarios
presented is changed. The same result was produced both times, thereby demonstrating reliability.

4.7 Ethical considerations

Ethical approval was granted by the Norwegian Centre for Research Data (2019/502106) in May 2019 and updated October 2019. The project protocol also follows the guidelines for research ethics in the social sciences. Written and verbal consent were obtained from the study participants before the start of data collection. Study participants were thoroughly informed about the nature of the research project and their right to withdraw from the study at any time.
5 Results of the empirical studies

This section will briefly present the findings of the three studies included in the dissertation. A more detailed presentation of the findings can be found in the respective papers written for each study.

Study 1: Dyadic interviews versus in-depth individual interviews in exploring food choices of Norwegian older adults: A comparison of two qualitative methods

Aim

The aim of this study was to explore whether a dyadic interview is a viable method for collecting data from home-living older adults by comparing dyadic interviews with in-depth individual interviews in the context of food choice.

Main findings

A direct empirical comparison of these two different interview methods shows that more attributes were elicited from dyadic interviews than from in-depth individual interviews. However, the results also indicated that the content of the two methods overlapped. Additionally, participants were more willing to disclose private information in the in-depth individual interviews than in dyadic interviews. When the same questions were asked in the dyadic interviews, participants would discuss and shift the discussion into broader topics.
Based on these results, we proposed three things. First, the dyadic interview is a viable method for collecting data from older adults when an alternative interview method is needed. Second, the two qualitative interview methods generated complementary, not substitute information. Third, using multiple methods would provide a greater range of insights and perspectives and permit triangulation, improving the overall validity of the results.

**Study 2: Environmental factors that impact the eating behavior of home-living older adults**

**Aim**

The aim of this study was to identify the environmental factors that may have the greatest influence on the eating behavior of home-living older adults.

**Main findings**

The findings from our study suggest that various environmental factors determined the eating behavior of older adults living at home. Those factors can be organized into three levels of influence: interpersonal influence (food habits of significant others, household composition, and social relationships), community influence (senior centers and food access), and public policy influence (health information and transportation/mobility aids). Furthermore, an approach is needed to address these factors in order to bring positive change in the eating behavior of home-living older adults.
Results of the empirical studies

Study 3: Understanding the role of situational factors on online grocery shopping among older adults

Aim

The third study aims to identify situational factors that drive older adults to buy groceries online and determine which factors are considered most important when older adults are deciding whether to buy groceries online.

Main findings

The findings of the explorative qualitative study indicate that the situational factors driving the adoption of online grocery shopping among older adults are health, mobility, price, distance to a store, delivery time, and social interaction. Based on the conjoint experiment, of these six situational factors, health, mobility issues, and distance to a store are the most important situational factors driving older adults to buy groceries online. Moreover, the findings confirm that the adoption of online grocery shopping among older adults is a result of a complex trade-off of situational variables.
6 General discussion of the findings

This chapter summarizes and discusses the overall findings. I start by discussing the three research questions, then proceed to research implications and recommendations for future research.

6.1 RQ1: Is dyadic interview a suitable method for collecting data from home-living older adults in the context of food choices?

The goal of study 1 is not to establish that one interview method is superior to another but to start a discussion about the suitability of dyadic interviews for use with the sample of older adults. The aim was also to examine whether dyadic interviews provide us with the information we are searching for in the context of food choice.

Choosing an appropriate research method to collect data is not a simple task. A wide range of approaches and techniques can be used in a study, which means that the researcher is often faced with the challenge of identifying viable tools for data collection and how best to use these tools. All data collection methods have drawbacks, and we should be aware of the methodological and practical concerns associated with the chosen method. It is argued that to make the "right" choice, the researcher needs to make deliberate, conscious choices (Clarke & Visser, 2019), and reflect on and consider the methodological issues that are associated with the chosen method. That said, more often than not, we select the most familiar and widely applied methods in our research field to gather evidence. In doing so, we increase research efficiency, for example, in time and cost (Johnston, 2014). Although improving efficiency is essential, we should choose the research method that can help answer our proposed research question.
The results of study 1 demonstrate that the dyadic interview is a suitable method for collecting data from older adults in the context of food choices. We therefore proposed that the dyadic method can be used as an alternative interview method when the researcher needs another interview method to collect data from older adults. Furthermore, the result also suggests that using the two interview methods allows for a broadened understanding of the topic and the potential use of the findings. Furthermore, it becomes clear that by using multiple methods for exploration, certain things were discovered or noted that would not have been otherwise.

Study 1 provides a glimpse into methodological and practical concerns central to research that is often overlooked. Therefore, it was worth a deep discussion. Undertaking study 1 as a novice has helped me understand the importance of choosing research tools based on what I am trying to accomplish and what benefits can be gained from using multiple methods.

As was pointed out earlier, my goal was to start a discussion about the suitability of a method for use with the sample of older adults. The complexity of other research topics and questions requires different research tools (Alvesson & Sköldberg, 2017). Therefore, we should be open to various research tools and give the research question precedence over one’s methods preferences.

6.2 **RQ2: What environmental factors determine the home-living older adults' eating behavior?**

Literature pertaining to dietary behavior has emphasized that environmental factors influence home-living older adults' dietary behavior. It would thus be reasonable to assume that the degree to which older adults are able to choose a diet with sufficient quality to meet the daily requirement for nutrients is restricted or enhanced by environmental factors. Thus, identifying these factors is pivotal if we are
General discussion of the findings

to help today's home-living older adults establish healthier eating behavior.

Our findings in study 2 suggest that socio-environmental factors (the food habits of significant others, household composition, and social relationships), community factors (senior centers and food access), and societal factors (health information and transport/mobility aids) play an important role in the eating behavior of home-living older adults. While these environmental influences are perhaps true among the home-living older adults, it is important to note that neither these factors nor home-living older adults are constant. It can also be presumed that the amount of support they need from their environment differs depending on their situation. Those with limited individual resources will probably require more support from their environment than others with enough resources.

The evidence from this study makes clear that certain environmental factors can promote healthier eating behavior among home-living older adults. While these factors are observable, designing environmental interventions and policies that are acceptable and effective is still challenging (Sawyer et al., 2021). Ideally, increasing all types of environmental-based support identified in an empirical study can lead to positive outcomes.

In practice, this recommendation is by no means feasible. Such extensive programs will require relatively many resources, and resources are often scarce. To make the best use of resources, the evidence from empirical studies should therefore be evaluated parallel to real-world programs and policies (Ogilvie et al., 2020).

This study advances our understanding of the role of environmental factors in home-living older adults' dietary behavior. The findings can be used as a sounding board in designing and developing relevant community-level interventions for supporting the adoption of healthy eating behaviors of home-living older adults.
6.3 **RQ3: What situational factors drive older adults to buy groceries online? Which of these factors are considered most important when older adults are deciding whether to buy groceries online?**

Prior research suggests that adequate access to healthy food can support home-living older adults in maintaining a healthy diet (Huang et al., 2012; Ishikawa et al., 2016; Wolfson et al., 2019). While many older adults continue to visit grocery stores, those in poorer health may experience difficulties accessing grocery stores to meet their nutritional needs. One alternative to improving food access among older adults is online grocery shopping. Therefore, the objective of the third study is to make a preliminary assessment of older adults' online grocery shopping behavior, focusing on situational factors.

The findings of study 3 show that health, mobility, price, distance to a grocery store, delivery time, and social interaction are the situational factors that older adults take into consideration when deciding whether to buy groceries online. Of these situational factors, health, mobility, and distance to a grocery store are indicated to be the most important situational factors driving older adults to buy groceries online. Moreover, the findings confirm that the adoption of online grocery shopping among older adults is a result of a complex trade-off of situational variables.

On the question of online grocery shopping as a possible solution to food access barriers, the result shows that nearly half of the respondents were reluctant to buy groceries online despite circumstances. This discrepancy could be attributed to the habits of shopping in a brick-mortar shop and inexperience with online grocery shopping. On the other hand, some respondents hint that they are open to the idea of buying groceries online or are already incorporating online grocery shopping into their regular shopping routines. Furthermore, those willing to consider online grocery shopping stated they had never shopped for groceries online before.
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The evidence from this study suggests two things. First, certain situational factors that disrupt individuals' lives, such as health and mobility, can lead to changes in grocery shopping behavior. Second, people rarely make their shopping decision based on one piece of information (Hansen & Solgaard, 2004). Despite these promising results, questions remain. Whether online grocery shopping has the potential to reduce food access barriers for older adults is still unclear. Further work is required to investigate to what extent online grocery shopping can reduce food access barriers among older adults.

It is worth noting that the study was conducted during the COVID-19 pandemic, during which time, it is anticipated that online grocery purchases among older adults will increase. However, this does not appear to be the case in the current study. As the online grocery market continues to grow, the challenge for retailers is perhaps designing marketing campaigns that appeal to older adults.
6.4 Research implications

The empirical findings from the studies conducted in this PhD project have theoretical, methodological, and practical implications.

6.4.1 Theoretical implications

It is well established that individual factors are not the only factors driving dietary behavior. Dietary behavior takes place in the environment in which an individual lives (Brug, Kremers, Van Lenthe, Ball, & Crawford, 2008; Delormier et al., 2009; Larson & Story, 2009), and efforts to bring about change must, therefore, take environmental factors into consideration.

Environmental factors have been explored in prior studies; however, findings from other contexts can only be used as a starting point. To shed light on the environmental factors that influence the eating behavior of home-living older adults, I conducted two studies (studies 2 and 3). My studies are conducted with older adults in Norway; doing so offers a new perspective to understanding the environmental factors that impact home-living older adults' dietary behavior in the Norwegian context.

Study 2 was carried out to identify environmental factors that play an important role in home-living older adults' eating behavior. I have identified these factors and carefully described them in detail. Understanding these environmental factors helps us pinpoint current and future measures that are potentially effective in facilitating healthy eating among home-living older adults and what led to their eating behavior in the first place.

Furthermore, to form a more holistic picture of the dietary practices of home-living older adults, I used research methods that involve not only older adults themselves but also their significant others or others connected to them. Consequently, this can also help generate new knowledge.
Study 3 was conducted to identify situational factors that drive the adoption of online grocery shopping among older adults. To the extent of my knowledge, research on online grocery shopping behavior among older adults in the Norwegian context is still limited. Consequently, this study can add perspectives to the existing literature on older adults and online grocery shopping.

The findings of this study provide us with two pieces of information. First, a particular situation leads older adults to use online grocery shopping. This suggests that the adoption of online grocery shopping is perhaps driven by circumstances rather than by a cognitive elaboration and decision process. This finding is in line with findings reported by Hand, Riley, Harris, Singh, and Rettie (2009). Second, the adoption of online grocery shopping is a result of a complex trade-off of situational factors.

Together, the findings from studies 2 and 3 confirm that environmental factors impact the dietary behavior of home-living older adults. It becomes evident that whether it is a decision about what food to eat or where to buy groceries, people's behavior is complex, and their immediate environment often influences how they behave or act. Overall, these studies have provided a deeper insight into the dietary behavior of home-living older adults and advanced the current literature on older adults' dietary behavior.

6.4.2 Methodological implications

A closer look at the literature on dietary behavior research revealed two shortcomings. First, the descriptions of the methods chosen in these studies lack clarity. Second, most studies use mono-method, in-depth individual interviews.

To remedy this shortcoming, I conducted study 1 to investigate whether the dyadic interview is a viable method for collecting data from home-
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living older adults when exploring their food choices. To the best of my knowledge, no previous studies have explicitly and empirically compared dyadic and in-depth individual interviews using home-living older adults as a sample.

Although the findings should be interpreted with caution and more empirical research is needed on the dyadic method, study 1 shows concrete methodological implications. This study contributes insight that can guide future exploration of the dyadic method. More importantly, this study extends methodological knowledge for use with older adult samples in dietary behavior context.

6.4.3 Practical implications

The research evidence accumulated in this dissertation has implications for multiple stakeholders. Such stakeholders include policymakers, practitioners, food retailers, and others interested in fostering a healthy diet for home-living older adults. The next part of this section describes the implications contained in each study.

Demographic transition has led to growing interest in research on older adults. To understand the needs and improve the quality of life of this population, researchers and practitioners continuously collect older adults' views, opinions, and standpoints (Doseděl & Vidovićová, 2018). Various methods have been used to collect data from older adults; however, little is known about the suitability of methods for use with this sample.

In an attempt to remedy this shortcoming in the literature, I conducted study 1. This study provides two take-home messages for researchers and practitioners. First, we should be more conscious of the methodological choices in our studies. This includes assessing the suitability of methods to be used with a specific population and to what extent the selected method meets the needs of the research question. Second, as researchers
or practitioners, we should move past the single method philosophy and be open to using multiple methods in performing our research tasks. A simple analogy would be carpenters; they can't only bring a hammer to fix a house because it is their favorite tool. Having more than one tool allows us to be more strategic about our research work (Stoecker & Avila, 2021).

Let us now turn to study 2. The evidence from this study indicates that older adults' social environment influences their eating behavior. This finding is consistent with Higgs and Ruddock (2020), who suggested social influences on eating behavior are powerful and pervasive. Guided by this understanding, socio environmental factors should be used to promote healthy eating in home-living older adults.

The evidence also clearly indicates that senior centers can help reduce older adults' loneliness, develop a social network, and provide access to healthy meals. This finding corroborates the findings reported by Marquet et al. (2020). Accordingly, more resources are needed to support senior centers nationwide. In Norway, care of the elderly is primarily a municipal responsibility (Holm, Mathisen, Sæterstrand, & Brinchmann, 2017). Thus, the local authorities are in charge of senior centers. How each local authority organizes this and the extent of resources available are unclear. As a result, the services provision for older adults in larger municipalities may vary considerably from that of smaller municipalities. The message for the government is that they should support local authorities to maintain operations of senior centers by providing resources that the local authorities are lacking.

Similarly, access to food, transport support, and mobility aids are fundamental elements of home-living older adults' dietary behavior. Again, the local authorities determine the types of support and amount of assistance older adults require (Holm et al., 2017). The participants from the studies stated that the allocation of the aid is insufficient, therefore reducing their ability to access a food supply and have activities
outside of the home (e.g., grocery shopping, trips to doctors, senior centers, and other social activities). The advice is that local authorities should revisit the individual decision of these recipients.

Furthermore, a significant amount of conflicting health information about proper diet and nutrition confuses older adults and undermines the success of the healthy eating promotion. This finding was also reported by Nagler (2014). More effort should be directed toward developing effective strategies to deal with conflicting health information. Sadly, this is a growing problem worldwide, and I am not well-positioned to help with any recommendations on managing this problem.

As a whole, the knowledge about these environmental factors can be used as a sounding board by policymakers in Norway when planning, implementing, following up, and developing programs or measures to promote a healthier diet aimed at home-living older adults.

Moving on now to consider study 3. The findings of study 3 indicate that situational factors influence older adults' adoption of online grocery shopping. Consistent with the work of Hand et al. (2009), I accede that adoption of online grocery shopping among older adults is driven by circumstances rather than by a cognitive elaboration and decision process. Regarding which situational factors are considered important when older adults decide whether to buy groceries online, the findings suggest that health, mobility issues, and distance to a store are the most important situational factors driving older adults to buy groceries online. Moreover, the findings confirm that the adoption of online grocery shopping among older adults is a result of a complex trade-off of situational factors.

Although these situational factors are beyond the control of online grocery retailers, knowledge about such factors can still benefit online grocery retailers. For example, understanding the importance of health and mobility issues when older adults are deciding whether to buy groceries online, would enable online grocery retailers to, for example,
offer a delivery service in which the groceries are delivered to the kitchen counter instead of just to the front door. Also, if online grocery retailers were aware that some older adults are open to online grocery shopping, they could devise marketing campaigns that incentivize online grocery shopping. I am aware that the long-term effect of this kind of sales promotion is ambiguous (Badgaiyan & Verma, 2015).

Ultimately, the suggestion I presented above can be used to inform and develop a practice that can help reduce malnutrition risk in home-living older adults and promote healthier dietary behavior. That said, the suggestions are based on the probabilistic evidence from my studies. Admittedly, the results are informative but not conclusive. There remains a need for more explicit specifications on how to put this newly acquired knowledge to practical use.

### 6.5 Future directions

This dissertation has contributed to a deeper understanding of home-living older adults' dietary behavior by means of three studies that raise a number of opportunities for future research.

With regard to research topics, I center my attention on three aspects. First, I explored the efficiency and efficacy of the dyadic interview method for home-living older adults in the context of food choice. This study can be used as a point of departure; future studies should scrutinize the efficiency and efficacy of the dyadic interview using a different type of sample in a different context. Additionally, future studies should investigate the benefit of using multiple methods.

Second, I investigated environmental factors that impact the eating behavior of home-living older adults. Identifying these factors is necessary if we are going to make headway in mitigating malnutrition and helping home-living older adults establish healthier eating patterns. The data for this study were collected before the COVID-19 pandemic;
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an interesting inquiry would be to reexamine the role of these factors today and post COVID-19. Further research can also be conducted to assess the impact of these factors on the dietary behavior of home-living older adults during the pandemic lockdown.

Third, I looked into situational factors that drive the adoption of online grocery shopping among older adults and went on to test these situational factors. Future studies can extend this study by adding other situational factors to broaden the scope of research. Further research can also be undertaken to assess the impact of these situational factors in different online contexts.

As far as methodological choices are concerned, I argue that the methods and approach chosen are suitable for my studies and adequate to answer the research questions. That said, these studies were limited in terms of design. All the studies included in this dissertation are based on the cross-sectional design. Cross-sectional studies are helpful for establishing preliminary evidence in planning advanced studies (Wang & Cheng, 2020). This design, however, does not allow for causal inferences. Future studies can overcome this shortcoming by adopting the longitudinal design.

Lastly, these studies were conducted in the Norwegian context with Norwegian samples; future studies need to be conducted with home-living older adults in different contexts. In doing so, we can continually share and build our knowledge on dietary-related behavior of home-living older adults and gradually turn research evidence into actionable evidence.
Concluding remarks

7 Concluding remarks

The main objective of this study was to deepen our understanding of home-living older adults' dietary behavior and advance the current state-of-art literature in this field. This objective was achieved by conducting three studies. The first study explored the suitability of data collection methods for use with home-living older adults in the context of food choice. The second study investigates environmental factors that can influence home-living older adults' eating behavior, and the third study examines the role of situational factors and the extent to which they lead to the adoption of online grocery shopping.

The findings of these studies lead to the following conclusions: a) the dyadic interview is a suitable alternative interview method when collecting data from older adults. Moreover, using multiple methods to study dietary behavior can broaden our understanding of dietary behavior, b) a social environment, such as significant others, family, and others connected to the older adults, can help modify home-living older adults' dietary behavior in a desirable direction through spending meal time together, helping with cooking and support in grocery shopping. The availability of community resources, such as senior centers and grocery stores, improves older adults' access to healthier food. An additional resource that can support older adults in maintaining their diet and health is transportation and mobility aids. And c), a combination of declining health and mobility and the distance to grocery stores can create a complex process for obtaining healthy food that impacts the healthy diet of older adults. Furthermore, some older adults have already incorporated online grocery shopping into their regular shopping routine; others stated they are open to this idea as a coping strategy to obtain healthy food. However, some were still reluctant to buy groceries online despite the circumstances.
Overall, this shows that all home-living older adults have unique needs that must be accommodated by their surrounding environment to maintain their health and remain independent in the community. Thereby, predicting what can change dietary behavior is neither obvious nor common sense. It requires careful, well-conducted research that leads to a deep understanding of what motivates people to change and of how their surrounding environment can support them in achieving the desirable dietary behavior.

Conclusively, this dissertation has advanced our understanding of the dietary behavior of home-living older adults. That said, it only covers a very limited aspect of dietary behavior. Undoubtedly, more research is needed to capture comprehensive knowledge on home-living older adults' dietary behavior. Additionally, the collaborative efforts of colleagues from different disciplines can give us an even broader perspective on this behavior.

Lastly, my ambition in this doctoral journey was to give back to the community and make a difference to the lives of older people in the community. However, after three long years on this journey, the research contribution I made is nothing more than just a small drop in the ocean. Nevertheless, I am hopeful that I have contributed to the research community through my three papers.
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Paper 1

Paper 2

Paper 3
Dyadic interviews versus in-depth individual interviews in exploring food choices of Norwegian older adults: A comparison of two qualitative methods.
Dyadic Interviews versus In-Depth Individual Interviews in Exploring Food Choices of Norwegian Older Adults: A Comparison of Two Qualitative Methods

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Abstract: The term “dyadic interview” refers to interviewing two participants together. Although there has been an increase in the use of dyadic interviews as a data collection method in qualitative studies, the literature on the use of this method with older adults is limited. This study was designed to explore the suitability of dyadic interviews as a method of data collection among older adults living at home. The study involved a direct comparison of the data obtained from dyadic interviews and in-depth individual interviews concerning older adults’ food choices. The study sample consisted of eight dyads for the dyadic interviews and six participants for the in-depth individual interviews. The dyads were composed of pairs who share a pre-existing relationship as well as pairs of strangers. We also discussed the role of participant selection and pairing in dyadic interviewing and how the interactions between the dyads may affect the result. Our results indicate that dyadic interviews can be used as an important data collection tool for home-living older adults, particularly when exploring a topic that often involves a dyadic decision. Our findings can be useful for researchers to make more informed choices when choosing qualitative data collection methods, particularly when interviewing older people.

Keywords: dyadic; in-depth; individual interviews; qualitative method; older adult; food choices

1. Introduction

As a result of demographic changes, research involving older adults is becoming more important. While research carried out on older adults is feasible, it also presents many challenges. Features of old age, such as physical and cognitive characteristics, often influence the process and outcomes of interview data [1,2] and can pose a threat to the validity of a study [1,3].

Interviews are typically seen as the “gold standard” in qualitative research [3]. Today, the most commonly used interviewing methods are in-depth individual and focus group interviews [4,5]. In reality, these two methods seem to be the default choice when setting up qualitative studies.

Due to the unique characteristics of an older population, special attention should be paid to data collection methodologies [6]. Even through there is comprehensive literature on how to conduct interviews with older adults [7], little is known about the relative merits of alternative data collection methods for older adults [8]. Therefore, research exploring data collection methods beyond the simple traditional approach is needed.

Multiple authors have discussed the potential advantage of dyadic interviews; for example, dyadic interviews allow participants to stimulate ideas that might not have been either recognized or remembered [9,10]. A number of studies employing dyadic interviews have been published in health studies and family research. However, little attention has been paid to the dyadic interview as an alternative data collection method for older adults. Hence, more research is needed to yield structured knowledge of the merits of dyadic...
interviews as a data collection method with older participants. Our study seeks to fill this knowledge gap by empirically comparing dyadic interviews with the most commonly used method, which is in-depth individual interviews.

Aside from the above consideration of the sample characteristics, we took the nature of the research topic into consideration. Food choice involves an isolated choice, but what a person decides to eat and how they arrive at a decision is often a form of collaborative decision with others in everyday life, for example, significant others, family members, or work [11]. It has been suggested that the use of dyadic interviews in exploring research topics related to collaboration can contribute to the co-creation of new knowledge [12].

The aim of this study is to explore whether a dyadic interview is a viable method for collecting data from home-living older adults when exploring their food choices. This study draws on a subset of data collected as part of an exploratory investigation into home-living older adult’s food choices.

The study was not set out to establish the optimum research method. Instead, we are interested in comparing the ability of the two methods to elicit information in the context of food choice and analyzing each method’s benefits and drawbacks. To the best of our knowledge, there are no prior studies reporting findings on food choice with older adults as a sample that uses the dyadic interview as a data collection method.

2. Background

The growth of the older population worldwide is inevitable. There are about one billion people aged 60 and over today, and this will double by 2060 [13]. This rapid growth of the older population will have profound implications for each of us and the communities we live in [14].

Much has been written about how the aging population will put a strain on public finances and the welfare system. The main concern is the increasing demands placed on the healthcare system to care for this aging section of the population. It is common knowledge that most older adults prefer to continue living independently in their own homes [15]. For example, more than 75 percent of older adults in Australia, New Zealand, Europe, and Northern America live independently at home [16]. Having older adults remain in their own homes for as long as possible has a positive effect on public finances, welfare systems, and older people themselves [17].

Most older adults can continue to live independently in their own homes as long as they stay healthy. An important factor in improving healthy aging is adequate food and a nutritionally sound diet [18,19]. Thus, the role of food in maintaining health in older adults living at home is an important area of concern today’s research.

Older adults may view food, nutrition, and health very differently from experts in food and nutrition [20]. Understanding how older adults choose foods and conceptualize a healthy diet offers important perspectives that can inform public policy makers and practitioners to support home-living older adults in healthy aging through their food intake.

The research in this area has shown that multiple factors influence why older adults choose one food type over another [21,22]. In this study, we will use a framework proposed by Host, McMahon, Walton and Overton [22] to evaluate the attribute variability between the dyadic and in-depth individual methods. Based on this framework, three domains influence the food choice of older adults. These domains are the changes associated with aging, psychosocial aspects, and personal resources.

The changes associated with aging refers to the physiological changes related to age, including taste, poor dentition, loss of appetite, mobility or functional limitations, and illness or medical conditions. The psychosocial aspects refer to life course, living arrangement, self-perception of health status, desire for independence, lack of motivation or energy, and interest in health or nutrition. Personal resources are listed as transportation, income, personal support, food preparation skills, access to quality products, and dietary resilience to overcome barriers.
As described above, food choice is a multi-faceted phenomenon; therefore, we chose two interview methods to explore and shed light on this phenomenon. In the section below, we will present the two data collection approaches.

2.1. Data Collection Approaches

For this exploratory study, we chose to apply two data collection approaches, the dyadic [9] and in-depth individual [23] interviews.

The first approach is the dyadic interview [9]. The term dyadic interview refers to interviewing two participants together to collect useful data for a research project [9]. Although the dyadic interview has appeared in studies since the 1970s under the label “joint interview” [34], the current literature on the dyadic interview is still fragmented and incomplete. Typically, in dyadic interviews, a researcher is primarily interested in the interaction between the two participants because the interaction in the dyadic interview is what produces the data [35].

Dyadic interviews commonly involve two participants that share a pre-existing relationship, such as married couples and caregiver-patient relationships [10,26]. Very little has been written to date about dyadic interviewing with pairs of strangers [9]. There is, however, reason to believe that a similar result may be yielded from strangers who share a common experience [27]. We, therefore, decided to include stranger pairs in this study.

Prior research has described the unique advantages of the dyadic interview as a tool for collecting data from a specific group of people, for example, people with early-stage dementia. It has been suggested that people with dementia are often overwhelmed when facing new groups of people. Dyadic interviews can eliminate this drawback by carefully pairing two participants, which promotes a sense of safety [9]. Dyadic interviews also allow participants to have more time to process what has been said and to formulate their responses [9]. This claim, however, has not been tested empirically with older adults living at home.

We chose the dyadic interview method for three reasons. First, it allows the researchers to observe interactions between the pair of interests [28]. Second, dyadic interviews allow the content to be extended beyond what might have been possible in individual interviews [25].

Third, the dyadic interview is well suited to eliciting knowledge from individuals who need additional time to process or recall information [3]. The literature shows that changes in cognition often occur with normal aging [9]. Thus, dyadic interviews allow researchers to explore older adults’ perspectives while accounting for the older population’s unique characteristics.

While there are many advantages, there are some drawbacks to using the dyadic interview. One potential drawback is the problem of domination [24]. Within a dyad, one person might dominate the interview by constantly talking and dismissing the other participant [34,29]. Other drawbacks reported are potential conflicts triggered within a dyad [24] and interpersonal bias in a relationship where power is not distributed equally within a dyad [36].

In the in-depth individual interview, the second approach, the dynamic within the interview is fundamentally different. The in-depth individual interview typically involves one on one interaction between a participant and a researcher [23]. Unlike the dyadic interview, the interaction in the in-depth individual interview is a way of building rapport between the participant and the researcher rather than being part of the data itself [25]. This approach requires a researcher to engage with a participant in seeking “deep” information and knowledge [31].

The in-depth individual interview was selected because it represents the most widely used data collection method in qualitative studies [3]. In addition, the in-depth individual interview permits and encourages the participant to tell his or her own story, which allows researchers to explore a phenomenon from an individualistic perspective [32]. Therefore, this method enables us to grasp and articulate individual participants’ multiple views [27].
In depth individual and dyadic interviews each have their own merits and drawbacks. Nevertheless, it has often been argued that individual interviews tend to reveal more detailed information than other methods [39].

2.2. Comparison Framework

To compare the two data collection methods, we draw on four criteria from Steenkamp and Van Trijp [34]. These criteria are the number of attributes elicited, the variety of attributes elicited, the efficiency of data collection, and the participants’ reactions to elicitation methods.

The purpose of attribute elicitation is to uncover attributes, a data collection method that elicits more attributes may, therefore, be considered better [35]. However, the attributes need to represent unique pieces of information [35]. This leads to our first research question, which is as follows:

RQ1: Which methods generate a higher number of unique attributes?

In addition to the number of attributes, we focus on the type of information the methods produce. This shapes our second research question, which is as follows:

RQ2a: Do the methods produce different types of information and, if so, what types of information?

RQ2b: Which attributes and how many are captured based on the three domains for the determinants of food choice in older adults [23].

From a practical standpoint, the ability to effectively collect and analyze data is increasingly important, especially in a study where speed and cost are a priority, for example, marketing research [34]. This leads to our third question, which is as follows:

RQ3: How demanding is each data collection method in terms of the time needed to collect and analyze the data?

One other key aspect to consider in attribute elicitation is the participant. A failure to give consideration to the participants may reduce the accuracy of the responses [36], which results in a less valid response [36]. This leads to the final research question, which is as follows:

RQ4: How suitable are the applied methods for the target sample?

RQ5: How do participants respond to and perceive the interview methods?

3. Materials and Methods

3.1. Participants

The term “older adults” has been defined differently in the literature. One way of measuring old age is using a fixed chronological age without regarding how healthy a person is, how a person functions, or whether a person is actively working or retired [37]. For the purpose of this study, we have defined an older adult as a person aged 60 and over. Although we agree that chronological age is not the best predictor variable, it is the most common way to measure age [38].

With that said, we also consider “older adults” based on their characteristics, for example, health and physical strength [37]. In this respect, one wheelchair user (58 years old) who is a member of the senior activity center was included in the study sample.

What follows is the nature of the research topic. Food choice is a complex construct that often involves other people connected to us [39]. To examine food choice as a construct and its variation, we also included younger participants in our parent-child dyad.

3.2. Interview Design

For the purpose of this study, we used the general interview guide approach [40] to gather data from all the participants. With this approach, we can ask or change questions based on participant responses to previous questions [39]. Both the dyadic and in-depth individual interviews were identical in terms of the topics and questions. The purpose of making the topics and questions identical was to ensure the comparability of the data [41,42].
In terms of the questions’ sequence, we organized the interview questions by following the “funnel” format [32], moving from broad to specific areas. Furthermore, the types of questions asked were based on the guidelines proposed by Billsups [43]. These questions include, for example, (a) what a person is doing/did done, (b) what a person thinks, (c) establishing the facts, and (d) how they feel [43]. With this as a guideline, the participants were instructed to describe (1) their daily eating practices, (2) their knowledge of a healthy diet, (3) identification factors in an olders person’s life that can affect food choices, and (4) self-efficacy in dietary behavior.

3.3. Sampling Method

Our initial recruitment strategy entailed placing flyers in the mailboxes of senior housing complexes. The gatekeepers were informed of the study, and interested participants were instructed to contact the researchers by phone. We were, however, unable to recruit enough participants within the expected time frame using only this strategy. To overcome this issue, we adopted a more proactive recruitment strategy, in which we recruited participants from senior activity centers in the district. This approach involved a 30-minute presentation of our project to the members of activity centers. Subsequently, those interested in participating were asked to set up a time and place for an interview. As time progressed, we employed street-interrupt recruitment strategies in public places, such as public libraries, coffee shops, and shopping centers, to increase the number of participants. Those who agreed to participate were given the option of an individual interview or to be paired up with someone else.

To gain as broad understanding as possible of older adults’ food choices and perceptions of a healthy diet, we deliberately sampled for heterogeneity [41]. We chose a sample of older adults who varied in age, gender, occupation, employment status, marital status, and living situation. In addition, for the dyadic interviews, the participants were paired together based on different types of relationships (see Table 1). We expected the variety of participants to enable us to capture varying perspectives on the phenomenon being studied [45].

<table>
<thead>
<tr>
<th>Dyad Pairs</th>
<th>Gender</th>
<th>Age</th>
<th>Occupation</th>
<th>Employment Status</th>
<th>Marital Status</th>
<th>Living Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married couple 1</td>
<td>Female</td>
<td>64</td>
<td>Teacher &amp; counselor</td>
<td>Full-time</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>66</td>
<td>Engineer</td>
<td>Retired</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married couple 2</td>
<td>Female</td>
<td>62</td>
<td>Manager at kindergarten</td>
<td>Retired</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>68</td>
<td>Substance abuse related</td>
<td>Full-time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher/Teacher</td>
<td>Male</td>
<td>60</td>
<td>Counselor</td>
<td>Full-time</td>
<td>Divorced</td>
<td>Living alone</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>28</td>
<td>Teacher</td>
<td>Full-time</td>
<td>In a relationship</td>
<td>Living with a partner</td>
</tr>
<tr>
<td>Mother-Daughter</td>
<td>Female</td>
<td>96</td>
<td>Stopkeeper</td>
<td>Retired</td>
<td>Widowed</td>
<td>Living alone</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>68</td>
<td>Teacher</td>
<td>Full-time</td>
<td>Divorced</td>
<td>Living alone</td>
</tr>
<tr>
<td>Friends pair 1</td>
<td>Female</td>
<td>88</td>
<td>Tour guide</td>
<td>Retired</td>
<td>Widowed</td>
<td>Living alone</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>83</td>
<td>Travel agency</td>
<td>Retired</td>
<td>Widowed</td>
<td>Living alone</td>
</tr>
<tr>
<td>Friends pair 2</td>
<td>Male</td>
<td>80</td>
<td>Engineer</td>
<td>Retired</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>76</td>
<td>Engineer</td>
<td>Retired</td>
<td>Divorced</td>
<td>Living alone</td>
</tr>
<tr>
<td>Strangers pair 1</td>
<td>Male</td>
<td>69</td>
<td>Engineer</td>
<td>Retired</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>68</td>
<td>Housewife</td>
<td>Unemployed</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td>Strangers pair 2</td>
<td>Female</td>
<td>60</td>
<td>Housewife</td>
<td>Full-time</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
</tbody>
</table>
As a result, we recruited 22 participants. Of those, 16 completed a dyadic interview and 6 completed an in-depth individual interview. Of the 16 participants in the dyadic group, the following 8 dyads were established: 2 married couple dyads, 2 parent-child dyads, 2 friend dyads, and 2 stranger dyads.

The participants’ characteristics are presented in Tables 1 and 2.

Table 2. Description of participant characteristics from in-depth individual interviews.

<table>
<thead>
<tr>
<th>Participant</th>
<th>Gender</th>
<th>Age</th>
<th>Occupation</th>
<th>Employment Status</th>
<th>Marital Status</th>
<th>Living Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant</td>
<td>Female</td>
<td>82</td>
<td>Housewife</td>
<td>Unemployed</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant</td>
<td>Female</td>
<td>58</td>
<td>Housewife</td>
<td>Unemployed</td>
<td>Married</td>
<td>With spouse</td>
</tr>
<tr>
<td>Participant</td>
<td>Female</td>
<td>92</td>
<td>Housekeeper</td>
<td>Retired</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant</td>
<td>Male</td>
<td>88</td>
<td>Businessman</td>
<td>Retired</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant</td>
<td>Male</td>
<td>71</td>
<td>Skipper</td>
<td>Retired</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant</td>
<td>Male</td>
<td>71</td>
<td>Petroleum engineer</td>
<td>Retired</td>
<td>Single</td>
<td>Alone</td>
</tr>
</tbody>
</table>

3.4. Data Collection

The data collection was carried out in a district of western Norway. The study was reviewed and approved by the Norwegian Centre for Research Data (2019/92206), and written informed consent was obtained from all the participants individually before the data collection was initiated. The interviews were held at a time and place of the participants’ choice, including participants’ homes, cafeterias at senior centers, libraries, and coffee shops.

3.4.1. Dyadic Interview Implementation

Each dyadic interview started with the participants introducing themselves and continued with a discussion of their favorite food. This eventually progressed into a dialogue around food choices and healthy diets. Each interview session lasted between 50 min and 1.5 h. Once the interview started flowing like a conversation, we focused on observation and taking field notes. This, however, was not the case with all the dyads in the study; some required more probing to keep the conversation flowing. All the interviews were audio-taped and subsequently transcribed verbatim.

3.4.2. In-Depth Individual Implementation

Participants in the in-depth individual interview started with the same study protocol as the dyadic interview did. After introducing themselves, participants were asked to describe their favorite food, “Tell me about your favorite food”. We continued the interview by asking participants open-ended questions and, depending on their response, we continued with questions that sought to obtain clarification. Each interview lasted between 40 min and 1 h. Field notes were taken while conducting the interviews. All the interviews were audio-taped and subsequently transcribed verbatim.

3.5. Data Analysis

Our data analysis of the studies consisted of three phases. First, we conducted a within-study content analysis for the dataset produced using each data collection method. Content analysis examines data in order to understand what it means to people [43]. Upon completion of each interview, the audio files were listened to several times, and verbatim transcriptions were prepared for each interview. To ensure the accuracy of the transcriptions, the same datasets were transcribed by a transcriber who was not involved in the data collection.

In an attempt to become familiar with the “voices” of participants, the transcript was read thoroughly several times by one or two authors, after which the units of meaning...
were identified. These units were then abstracted and labeled with a code separately by each author. Any disagreement in the code-description was resolved through discussions among the authors during project meetings.

The coding process was iterative, and the categories evolved as the analyses progressed. After careful analysis, the codes were then grouped into categories and subcategories [47].

In the second round of the analysis, we evaluated differences in the types of information elicited between the two data collection methods. We followed the deductive content analysis approach [47], where attributes were assessed based on the three key domains proposed by Hoet, McMahon, Walton and Charlton [22].

Third, a cross-study analysis was conducted to compare the responses elicited in the dyadic interviews and the in-depth individual interviews. The comparison of the two elicitation methods was divided into two parts. The first part included the result for the information elicited (number of attributes elicited and attribute variability), while the second part contained the result for the procedural dimensions (efficiency in data collection and participants’ feedback).

The number of attributes elicited was established through a simple count of the attributes elicited in each interview. The attribute variability was analyzed based on the type of information that was elicited across the two methods. With regard to the efficiency of data collection, we took the time spent on conducting the interviews, transcription, and analyzing the data into consideration. For the participants’ feedback on the methods applied, we ascertained this by asking the following questions after each interview: “How do you feel about our discussion?”, “How do you feel about this interview?”, “Do you have any other comments?”

3.6. Trustworthiness of Data

To verify the accuracy and trustworthiness of the present study, we used the criteria established by Lincoln and Guba [48], as follows: credibility, transferability, dependability, and confirmability. Credibility was achieved through prolonged engagement with the participants, field note writing, and the use of triangulation. For this study, we used the following three types of triangulation: (1) method triangulation, (2) investigator triangulation, and (3) data source triangulation [49,50].

With regard to transferability, the participants’ demographics and context were described in detail to allow the reader to decide whether the result was transferable. Furthermore, to improve the dependability and confirmability, a detailed description of the research procedure was provided, allowing others to conduct follow-up studies.

4. Results

The results are divided into three sections. We first present how each method elicited attributes within the three key domains that determine food choice (the changes associated with aging, psychosocial aspects, and personal resources). Comparisons are then made between the dyadic interviews and the in-depth individual interviews. Finally, we focus on the merits and drawbacks of each method.

4.1. Dyadic Interview

The dyadic interviews generated a rich and broad range of data, as it facilitated the participants to share their perspectives and experiences and allowed for comparisons to be made with the other participant in the dyad. Participants’ clarifications of their food choices and perceptions of a healthy diet in the discussion covered gender perspectives on food, food politics, and self-construal.

Furthermore, this approach allowed us to elicit factors within the three key domains identified as influencing home-living older adults in relation to food choices and a healthy diet.
When asked about everyday food choices, some participants reported that they had
changed their diet because of health-related issues, while others mentioned that their diet
had remained the same. This response implies that changes associated with the aging
domain can be captured using the dyadic interview method with home-living older adults.
An example is offered by the following comment:

Wife: “We mostly eat seafood, things that come from the ocean. In a period of our life,
we have a very different diet; we always have meat in the freezer (looking at her husband),
meat from the wild from hunting.”

Husband: “Yes, we have an issue with our stomach, so we go a bit from meat and eat
more seafood. We have a cabin next to the ocean, so we eat more fish. In addition, diabetes
in the family, so we need to be careful with sweet things”. (Married couple 2)

The dyadic interviews also captured psychosocial aspects, since all participants re-
ported that changes in their food choices were affected by life stages, for example, family
formation, children moving away, and spousal negotiations around food choice. A few
participants also attributed the changes in their food intake to living alone after separation
or the passing of a spouse. Despite this, all the participants reported feeling positive about
their health, and few had a personal interest in food and nutrition.

Father: “My diet is a bit different now that I live alone. I am divorced. Before I eat a
lot of pasta and salad. My ex-wife cook, so I eat whatever she puts on the table (laugh).”

Son: “My mom, she loves pasta. For me, I eat differently when my girlfriend is here;
she is vegetarian. I am not vegetarian when she is not here (laugh).”

Father: “I often eat green vegetables with my girlfriend.” (Father-son).

Regarding the domain of personal resources, the participants described family mem-
bers and friends as the primary source of support in food-related activities. Furthermore,
the participants generally believed that they have adequate nutrition-related knowledge
and are aware that certain foods are associated with a healthier diet. An example is offered
by the following comment:

Mother: “No sweet things. I need to be careful with milk, no lamb ribs. Lots of
vegetables and fruit is good for me.”

Daughter: “I’m very focused on getting enough nutritional things in me … that’s
the reason I don’t take any supplements, rather the thing that I get it naturally from food,
for example, the green in the green vegetable, like spinach, something like that iron.”
(Mother-daughter).

This articulation suggests that dyadic interviews can be used to capture the domain of
personal resources in older adults living at home.

4.2 In-Depth Individual Interview

The in-depth individual interviews captured an overall picture of older adults’ atti-
dudes towards healthy diet behavior and their food choice determinants. The participants
reflected on their food choices and diet through their own experiences by describing past
and present experiences related to food and a healthy diet in a home setting.

The in-depth individual interview method captured the full range of changes associ-
ated with the aging domain. All of the participants reported that they experience one or
more challenges related to maintaining a “healthy” diet, such as compromised senses (taste
and/or smell), a reduced appetite, poor dentition, and digestive conditions. Additionally,
two of the participants reported problems with mobility. Consequently, the participants
choose to stick to their current diet. They felt that their everyday diet worked well for them
and, most importantly, was manageable.

“I am not sure, but I think it started when I started going to the senior activity center.
I have diarrhea every time I come home. I thought maybe is the bread, so I stop eating that.
I then started to eat different bread. It was better. I know it is not the food there; it is my
stomach. I can’t drink some of the juices in the store too; it is too strong for my stomach, so
it starts hurting.” (P3).
Concerning psychosocial aspects, participants reported that living alone after the loss of a spouse had a negative effect on their food intake. The examples given included not having a motivation to prepare food for one person, only eating pre-prepared food from a store, and skipping meals. Of these participants, one did actually live with a spouse but stated that they did not have any interest or the energy to prepare food. Despite the changes in food consumption, all the participants believed that their diet was healthy enough. This result suggests that in-depth individual interviews are well-suited for capturing the psychosocial aspects of older adults’ food choices.

“When my wife was still alive, it was me who made dinner sometimes. I like making dinner because she appreciates it, but now, nah... (thinking), I don’t want to stand in the kitchen to make food. I used to make cucumber salad; I make it for years but no, standing there and make dressing for one person. I don’t bother, and I just buy that ready-made food from the stores.” (F77).

With regard to the domain of personal resources, the participants expressed that a lack of access to personal support was due to families living far away and having almost no contact with relatives or friends. Collectively, the participants stated that access to the senior activity center has a positive effect on maintaining a healthy diet. Furthermore, participants reported a drop in income, expensive healthy food, and transport to be factors in their food choices. Thus, the domain of personal resources was captured using in-depth individual interviews.

“I’ve been here for two years. I’m here because if I am not here, I will be alone in my apartment staring out the window while my husband is at work. I need some social because I’m home, no job, so I have no contact with other people, no siblings, and very little contact with my family.” (F9).

4.3. Dyadic Interviews vs. In-Depth Individual Interviews Comparison

The performance of the two interviewing methods is compared in terms of the information elicited (the number of attributes elicited and the attribute variability) and the procedure dimensions (efficiency of data collection and participants’ feedback).

To address RQ2, we identified the number of attributes that each method elicited. Dyadic interviews generated a higher number of attributes (52 attributes) than the in-depth individual method (37 attributes). The dyadic method yielded data related to both the individual and the collective experience of the two members in the dyad, providing insight into why older adults choose or avoid certain foods. In contrast, the in-depth individual interviews only provided rich data on individuals’ views about what constitutes a healthy diet and how they maintain this in their daily lives.

In addition to eliciting a larger number of attributes, dyadic interviews generated a greater variability of themes. A possible explanation for this might be that more participants were involved in dyadic interviews. This probability, however, is difficult to determine as the equivalent comparison between dyadic and in-depth individual interviews is still unclear [21].

In contrast, in-depth individual interviews yielded fewer themes, but more “deep” personal information, such as health conditions, medical procedures, personal economy, and social isolation. This result helps answer RQ2. Figure 1 shows the extent to which the two methods tap into the specific themes and to what degree the content overlaps. The 52 and 37 attributes elicited in each method, respectively, resulted in a total of 58 different attributes. Of these, 31 emerged in both methods, while 21 were unique to the dyadic method and 6 to the in-depth individual method.


**Figure 1.** Overlap of attributes retrieved using each method.

To address RQ2b, we identified the attributes that were captured based on the three domains for the determinants of the food choice of older adults. These are discussed below and summarized in Table 3.

- **Changes Associated with Aging**
  
  The two methods captured age-related changes that influence the food choices of home-living older adults. The in-depth individual interviews yielded a different type of information than dyadic interviews. In the in-depth individual interviews, many of the participants disclosed that physiological changes have affected their past and current food choices. Meanwhile, the data collected from the dyadic interviews concentrated mainly on past challenges, providing little information on the current issues encountered by the participants.

- **Psychosocial Aspects**
  
  Life stage and living arrangement were recognized as the most important social determinants affecting home-living older adults' food consumption. Our data comparison indicates that the two methods yield generally comparable information. Thus, researchers can use either method to capture the psychosocial aspects.

- **Personal Resources**
  
  Both methods almost fully captured the personal variables that affect older adults' food choices. These variables are mostly related to the special challenges of maintaining a healthy diet. Participants in the in-depth individual method tend to be more focused on the challenges within themselves, while in the dyadic method, the challenges discussed were based on the participants' perspectives on understanding other people.

<table>
<thead>
<tr>
<th>Domains of Food Choice</th>
<th>Dyadic Interviews</th>
<th>In-Depth Individual Interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes associated with aging</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Poor dentition</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Low of appetite</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Mobility or functional limitations</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Illness or medical conditions</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Life-course</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Living arrangement</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Self-perception of health status</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Desire for independence</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Lack of motivation or energy</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Personal interest in health/nutrition</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Transportation issues</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Income/food costs</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Access to personal support</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Knowledge/skills in food preparation</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Access to quality products</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Dietary resilience to overcome barriers encountered</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
In response to RQ5, we took into account the time spent conducting the interviews, transcribing, and analyzing data. It took between 50 min and 1.5 h to complete a dyadic interview and between 80 min and 1 h to complete an in-depth individual interview.

What follows is the time it took to transcribe and analyze the data. The data collected from the in-depth individual interviews took less time to transcribe and analyze in comparison to the data from the dyadic interviews. Therefore, although there was no significant difference in the amount of time it took to complete interviews for both methods, the data collected from the in-depth individual interviews required much less time to transcribe and analyze.

We will now respond to RQ1 and RQ5. The participants' reactions to the elicitation method suggest that the dyadic interviews allowed participants to express their opinions with greater ease and to a greater extent than the in-depth individual interviews. It is likely that the broader discussion is a result of the interaction between two people having a shared conversation when responding to interview questions. In contrast, the in-depth individual interviews allowed the participants to open up and share deeper personal feelings. A possible explanation for this might be a reluctance to share their feelings to the fullest extent in the presence of another participant.

Overall, participants found dyadic and in-depth individual interviewing to be a positive experience; however, a few commented on the extensive time investment required by the researchers and the participants to complete the dyadic interviews. In this study, the dyadic interview was clearly not a well-known data collection method among older adults living at home.

4.4. Merits and Drawbacks of Using Each Method

In the following section, we will discuss the merits and drawbacks of each method.

4.4.1. Dyadic Interview

As mentioned earlier, it is the interaction in the dyadic interview that produces data [25]. Understanding a pair’s interaction can help us to identify potential merits and drawbacks of the dyadic method, and to further examine these, we include a brief discussion on some pairs’ interactions in our study.

Of the eight pairs of dyads in this study, six pairs shared a pre-existing relationship; thus, establishing pairwise rapport was not a challenge. However, when using the dyadic approach, we have little control over how the participant interaction plays out in the dyad and how the relationship in a dyad may influence the result.

It has been reported that within a dyad, one member of the dyad could dominate by constantly talking and dismissing other opinions [24]. In this study, the evidence of domination can be seen in a married couple and a friend pair. This point is clearly illustrated below:

- **Married Couple**
  - Of the two married couples we interviewed, domination occurred in one of the couples. Such was the case with Participant 5 (P5), who dismissed his wife’s (P4) statement and continued to cut her off repeatedly, eventually silencing her in the following:
    - (P4) “But cider is made of … (interrupted by P5)
    - (P5) “Yes, yes yes, yes, they make it from berries as well.”
    - (P4) “No, they add an extract” (P5 interrupted)
    - (P5) “Yes yes yes it’s not that but that’s fine”
    - (P4) “(taking a deep breath), sure?”

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- Friend Pair
  In some instances, domination may also operate in a friend pair. Here, one particip-
ant (P19) often interrupted and forbade his friend (P18) to disclose more information to the researcher:
  (P19) "We are elderly; we don’t need so much food."
  (P18) "I like a big variation, meat and fish, not fatty food and … (interrupted by P19)"
  (P19) "Ok, that is enough, I think. Can you just continue with your next question?"
  While domination tends to be a concern when conducting dyadic interviews [34], in
our case, it provided us with a richer background of how lifestyle and family affected
food choices.

What follows is a brief outline of the power relationships that might present between
two members of a dyad. It is widely acknowledged that one possible way to neutralize
the power dynamic is by asking the participant to identify and invite the person they
considered most helpful [12,20]. At the same time, power relationships within families
(parent and child) seem inevitable. Given the role that social relationships play in food
choice [31], we presume that a dyad between parents and children can provide researchers
with richer data.

- Parent-Child
  It was observed that (P12) seemed to be concerned with her self-image and searched
for the “right answer.” Such circumstances can lead to respondent bias, where participants
provide socially desirable answers. This can be illustrated briefly by a mother (P12) who is
trying to reassure her daughter (P11) that she does not skip her meals, as follows:
  (P11) "you eat dinner every day, right, mom (look concerned)"?
  (P12) “(look down … sigh) Yes, can’t be full before you eat, so it’s good with dinner."
  (P11) "It is good that you eat dinner, I was worried.”

Lastly, in a setting where two strangers were interviewed together, the participants
typically took turns in responding to the interview questions. Throughout the interview, the
participants seemed to focus much more on their differences rather than their similarities
when answering questions. Although this resulted in a more passive conversation, the stran-
ger “pairs” provided us with a valuable insight into the phenomenon.

When we review all of our dyad pairs, the married couples and friend (female) dyads
generated the broadest categories of information. This suggests that pairing a composition
with a prior relationship is the more effective form of pairing. Surprisingly, the stranger
pairs were found to produce more attributes than the father–son and friend (male) dyad.
A likely explanation is that the latter pair of dyads had less interest in the research topic.

Overall, the participants who participated in the homogeneous (two male or two
female) or heterogeneous dyad exhibited no meaningful differences. The results show,
however, that the female participants had a greater interest in the topic and gained more
self-confidence throughout the discussion than the male participants. It can be argued that
the positive result for the female participants was due to their higher level of interest in
the topic.

4.4.2. In-Depth Individual Interview
  The following section discusses the merits and drawbacks of the in-depth individual
interview method.

While the relationship between the two participants receives the most attention in
dyadic interviews, the researcher–participant relationship is vital in in-depth individual
interviews. Researchers using this method tend to establish a closer connection with the
participants, which fosters emotions that facilitate a rich interview experience [23]. Hence,
a participant’s willingness to share sensitive information is likely to happen in this type of
interview.

Furthermore, the participants in the in-depth individual method often took the inter-
view in a different direction [23]. In our case, we followed the participant out of concern
and interest. The following is an example:
"Some circumstances where I eat more than normal, of course, would be if I am at a restaurant and get good food. I eat more of course. So, then you get bone, now how much can you... But now Christmas is coming, so now..."

(Researcher): "Yes, any plans for Christmas?"

(P13) "We are going to the closet... the one out there. There will be a lot of ribs and stuff, so then I’ll bring home ribs that I can eat or Christmas Eve because I am alone."

Although the detailed information can sharpen our ability to understand the complexities of the phenomenon, participants’ privacy and confidentiality must be safeguarded and respected.

More to the point, it is not our intention in this study to probe for sensitive information but to demonstrate the usefulness of this interviewing method and what type of information can be elicited.

It is worth noting that many older adults who participated in the in-depth individual interview experienced loneliness and social isolation. These experiences may have led to a stronger urge to share and confide in others.

5. Discussion

Different methods of collecting data from a population of older adults have been used in the literature. However, the suitability of the methods used for this population is rarely studied. In some cases, the pressure to publish could be a reason why researchers tend to choose the most familiar method. In other cases, once the design is matched to the initial research question, the assumption is that the chosen method is flawless [8].

In this study, we examined whether the dyadic interview is a suitable method for use with home-living older adults and whether there are differences in eliciting information between a dyadic method and an in-depth individual method in the context of food choice and healthy diets.

The result of this study shows that more attributes were elicited from the dyadic interviews than the in-depth individual interviews. However, the result also indicated that the content of the two methods overlapped. When we compared the two methods with a specific focus on the type of information that emerged from the interviews, the in-depth individual interviews revealed more personal and sensitive data. In contrast, the dyadic interviews covered a broader area related to the topic of food and healthy diets. The results thus support the findings reported in a previous study [4].

While the study by Morgan, Attaie, Carder and Hoffman [7] was conducted to illustrate some methodological aspects of the dyadic interview, our study extends these findings by systematically comparing dyadic interviews with in-depth individual interviews. Contrary to findings in previous research [28], this study reveals that recruiting participants for dyadic interviews took as much time as recruiting participants for in-depth individual interviews. This rather contradictory result may be due to the gatekeeper permission required to access participants and the unique characteristics of an older population. However, it is worth noting that it took considerably longer to transcribe and analyze the dyadic interviews than the in-depth individual interviews.

When evaluating the participants’ reactions to the interview methods, both methods yielded positive feedback. The fact that participants expressed positive feelings suggests that the dyadic interview is a viable method for collecting qualitative data from a sample of older adults.

The findings also highlight the importance of participant selection when pairing a dyad, an area of inquiry that has been relatively un-studied in the qualitative literature. By pairing participants based on different relationships, we provide insight into selecting a dyad pair.

Regarding knowledge production, we initially thought that people would merely share information about their own food choices in the in-depth individual interviews. It turns out that the participants occasionally represent themselves and their partners even though they were interviewed alone. As such, the approach allows one voice to represent
two people. In contrast, the dyadic interviews allowed two participants to present their perspectives individually alongside the dyadic perspective created by the participants together. Thus, dyadic interviews open up for more voices to be heard in knowledge production [10].

Having applied the two interview methods, this study improved our understanding of choosing the “right” tools for data collection that enable researchers to find answers to research problems.

To the best of our knowledge, this is the first study that explicitly and empirically compares dyadic interviews and in-depth individual interviews using home-living older adults as a sample. Our findings suggest that the dyadic interview is an appropriate method for collecting data from home-living older adults. Therefore, we would encourage researchers in qualitative studies to adopt the dyadic method when interviewing older adults in a food-related context and beyond.

6. Limitations and Future Directions

Our research design enables us to evaluate two different methods of eliciting factors in food choice domains and to examine what information can be captured through deliberate heterogeneous sampling. Thus, this study went beyond simple method comparison to the higher research design level.

This being said, this study was an attempt to expand our understanding of data collection methods in qualitative research. The limitations of the study, which included sampling and inherent methodological issues, must be delineated.

The study involved only a small sample of older adults in one region of Norway who were native Norwegian. As such, the result of the study is limited to the selected participants and their experience related to food choices. To reduce this challenge, we applied deliberate sampling for heterogeneity. Deliberate sampling for heterogeneity is recommended as the best alternative when random sampling cannot be used [32,33]. As a result, it allowed us to look at sample members from all available angles, thereby achieving depth understanding of the phenomenon.

In addition, the setting, and the cultural and societal differences of the study may also limit the transferability of the results to other contexts and situations beyond the scope of this study. Therefore, the findings presented in this article should be interpreted with caution.

What follows is the influence of researcher bias. We sought to reduce these biases by actively thinking reflexively throughout the research process and adopting different types of triangulation (method triangulation, investigator triangulation, and data source triangulation).

Moreover, in terms of sample size, our intention was to have an adequate sample size. However, the adequate sample size needed for qualitative research findings to have some validity is difficult to estimate [34]. One way to increase the validity of our findings would have been to increase the number of participants to reach theoretical saturation [35]. In the case of the dyadic interviews, this would have involved arranging for more pairs to be interviewed.

However, due to limited resources and time, we chose to sample heterogeneity instead of increasing the sample size. We postulated that such sampling would yield a sufficient breadth and depth of the phenomenon being studied.

In spite of these limitations, this study does provide insights that can guide future exploration of the dyadic method. This study is a good starting point, but far more empirical research is needed on the dyadic method. Finally, we used food choice as a context in the present study. Further research in a different context is recommended as a means to determine the efficacy and efficiency of the dyadic method.
Author Contributions: Conceptualization, F.K. and T.D.S.; methodology, F.K. and T.D.S.; validation, T.D.S.; formal analysis, F.K. and T.D.S.; investigation, F.K. and T.D.S.; writing—original draft preparation, F.K. and T.D.S.; writing—review and editing, F.K.; supervision, T.D.S. All authors have read and agreed to the published version of the manuscript.

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Informed Consent Statement: Written informed consent was obtained from all participants involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy and ethical restrictions.

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Environmental factors that impact the eating behavior of home-living older adults.
Environmental factors that impact the eating behavior of home-living older adults

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ABSTRACT

Objective: To identify environmental factors that influence the eating behavior of home-living older adults.

Design: Qualitative study with two interview methods, dyadic and in-depth individual interviews.

Setting: The study was conducted in a western district of Norway.

Participants: A total of 15 participants. The study sample consisted of 9 dyads for the dyadic interviews and 6 participants for the in-depth individual interviews. The dyads were composed of pairs who share a pre-existing relationship as well as pairs of strangers.

Method: The qualitative study used deductive and inductive content analysis.

Results: Seven environmental factors that play a role in older adults’ eating behavior were organized into three levels of influence: interpersonal influence (food habits of significant others, household composition, and social relationships), community influence (senior centers and food access), and public policy influence (health information and transportation/mobility aids). 

Conclusions: Various environmental factors determine the eating behavior of older adults living at home. An approach is needed to address these factors in order to bring about change in the eating behavior of home-living older adults. The findings suggest that a social environment may be used to encourage healthy eating. Furthermore, increased participation in a senior center, ensuring access to food, reducing ambiguity in diet and nutrition information, and increasing mobility support can help older adults maintain or develop healthy eating behavior.

What is already known about the topic?

- An important factor in improving healthy aging is adequate food and a nutritionally sound diet.
- The aging population will increase the strain on public finances and the welfare system.

What this paper adds

- This study demonstrates that the social environment and community have the potential to change older adults’ eating behavior in a desirable direction.

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1. Introduction

Older adults constitute a growing proportion of the global population. There are about 1 billion people aged 60 and over today, and this will be doubled by 2050 (World Health Organization, 2018). The annual population statistics for 2016 show that in Norway, the number of people in the age group 65-79 years has increased by 4.2%, and for those aged 80 and older, the increase is 2.9% (The Norwegian Directorate of Health, 2018). Norway’s population is aging rapidly, and it is anticipated that there will be more older adults than children in 2050 (Statistics Norway, 2018). This demographic shift means a greater burden of chronic diseases, disabilities, and frailty for older people themselves, and also adds to the challenges in health care and other social resources (Osen et al., 2009; Fossen et al., 2015).

Given this situation, it is hardly surprising that a range of health promotion approaches are designed to support healthy eating in home-living older adults. Despite the importance of healthy eating and nutrition for aging adults, changes associated with aging and eating habits in everyday life (Elliot, 2002; Lambers and Bautz, 2005) may not be conducive to encouraging older adults to eat in a manner that meets the energy or protein requirements for older adults. Furthermore, most older adults consider their diet to be sufficiently healthy, and thus not requiring any changes (De-Alvaredo et al., 2002).

Although many older adults consume a nutritionally adequate diet, there is mounting evidence of malnutrition risk in home-living older adults (Eikemo and Zelenkov, 2014; Søderhjelms et al., 2012). The term “malnutrition” in this paper refers to insufficient dietary intake to meet energy or protein requirements in older age (Joy, 1998). Previous studies reported that the prevalence of malnutrition among European older adults living at home ranges from 13% to 30% (Eikemo and Zelenkov, 2014; Søderhjelms et al., 2012). The Norwegian Directorate of Health (2020) stated that in 2018, 15.2% of older adults receiving health care at home are at nutritional risk, compared to 10.2% in 2019 and 15% in 2020. With just a 1% decrease in the rate of nutritional risk, coupled with the current demographic transition, malnutrition can become a pressing concern for society (SNF, 2020).

Although nutrition and healthy diets for older adults are currently on the agenda of policymakers in Norway, a significant gap still exists between recommendations by healthcare professionals and the services offered to many older adults (Norwegian Ministry of Health and Care Services, 2018). One of the main challenges related to nutrition is the lack of systematic nutritional measures. Systematic nutritional measures refer to follow-up on individual nutritional needs in order to prevent malnutrition (Norwegian Ministry of Health and Care Services, 2018). In Norway, only 16% of older adults receive systemic nutritional screening, thereby, malnutrition is often both underdiagnosed and undertreated (Eikemo et al., 2013).

Malnutrition is a multifactorial problem, and effective intervention measures are needed (Eikemo et al., 2013). However, despite all efforts, interventions aimed at modifying older adults’ eating behavior have yielded little improvement in intervention results (Fossen et al., 2013). This may be partly due to an inadequate understanding of the factors associated with eating behavior among older adults that need to be addressed in the interventions. Research has been conducted to identify these factors, but such research often focuses solely on the individual determinants of eating behavior, such as attitudes, beliefs, and preferences (Goldsman et al., 2002; Renner et al., 2004). Furthermore, interventions to change eating behaviors also often focus on individual-level influences (Burry et al., 2000). The focus on changes at the individual level is an important step in changing behavior. However, eating behavior is not an individual choice that is disconnected from the environment in which an individual lives (Stoyu et al., 2008). Rather, the environment is a critical force that plays a role in enabling or limiting people’s ability to make dietary choices that support their health and well-being (Buly et al., 2016). Research on the complex dynamic of the environmental factors that impact eating behavior is therefore warranted (Buly et al., 2016).

The importance of environmental factors’ contribution to healthier eating behavior has been described in previous studies, such as the study on the total role family plays in eating behavior (Basnaw, 2013) and the study on health professionals’ role in guiding the eating behavior of their patients (Osen et al., 2017). With that said, findings from other sources can only be used at a starting point. When it comes to eating behavior, cultural background plays an important role; people tend to stick to what they know, and tradition rather than choice dominates a person’s food world (Buly, 2007).

Our study seeks to fill this knowledge gap by identifying environmental determinants of home-living older adults’ eating behavior. The term ‘environment’ describes a range of contextual factors influencing home-living older adults’ eating behavior (Buly, 2003). The aim is to identify the environmental factors that may have the greatest influence on the eating behavior of home-living older adults. This study contributes to the existing literature on the importance of healthy eating for older adults. The findings can also be used as a sound basis for public decision-making.

2. Conceptual framework

Research in this area has shown that multiple environmental and individual factors impact older adults’ eating behavior and, ultimately, health outcomes (Stoyu et al., 2002). In this study, we use the ecological model proposed by McIntyre et al. (1985) to highlight the environmental factors that may affect the eating behavior of home-living older adults.

This model suggests that appropriate changes in the environment will produce changes in individuals (McIntyre et al., 1985). Moreover, the ecological model has been used extensively to determine factors that influence eating and other food-related behaviors (Olsen et al., 2012; Stoyu et al., 2002). We therefore consider its suitability framework for exploring the environmental determinants of
the eating behavior of home-living older adults.

Based on this framework, five broad levels are considered to influence behavior: interpersonal (individual) factors, interpersonal (social) factors, institutional factors, community factors, and public policy factors (O’Malley, 1993).

Interpersonal factors refer to individual characteristics that influence behavior, such as knowledge, attitudes, skills, beliefs, and preferences, while interpersonal factors are related to formal and informal social networks, including family, friends, and peers. Institutional aspects include social institutions with organizational characteristics, and community factors concern relationships among organizations, institutions, and formal networks within defined boundaries. Finally, public policy refers to local, state, national laws, policies.

3. Methods

Eating behavior is often influenced by a complex interaction of different factors (O’Malley et al., 2009). To unlock the complexity of the eating behavior among home-living older adults, we chose to explore this phenomenon using two interview methods. The sections below present the data collection approaches.

3.1. Data collection approach

The first approach is the dyadic interview (Morgan et al., 2012). The term “dyadic interview” refers to interviewing two participants together to collect valuable data for a research project (Morgan et al., 2012). We chose the dyadic method for two reasons. First, it takes into account the characteristics of old age that could threaten the validity of the data. A classic example of such characteristics is normal cognitive changes (Vowels et al., 2015). As a result of changes in cognition, older adults may have a decline in processing speed, memory, and attention span (Vowels et al., 2013). Dyadic interviews allow participants to have more time to process what has been said and formulate their responses (Morgan et al., 2012).

The second reason we chose the dyadic method was the nature of the research topic. Eating behavior is viewed as a complex phenomenon influenced by social context (Gibbs and Randles, 2020). What we decide to eat and how we arrive at a decision is often a form of collaboration with others connected to us (O’Malley et al., 2009; Higgs and Randles, 2020). Using dyadic interviews to explore a research topic related to collaboration can therefore contribute to the co-creation of new knowledge (O’Malley et al., 2012). In other words, using dyadic interviews allows the concept to be extended beyond what might have been possible in individual interviews (Morgan, 2012). Thus, the dyadic interview is likely a suitable method for collecting data from home-living older adults.

The second approach is the in-depth individual interview. The in-depth individual interview was selected because it represented the most widely used data collection method in qualitative studies (Wilke et al., 2016). The in-depth individual interview allows researchers to explore a phenomenon from an individualistic perspective (Ryan et al., 2009). Moreover, it has often been argued that in-depth individual interviews tend to reveal more detailed information than other methods (Age and Maclellan, 1992).

3.2. Participants

Definitions of the term “older adult” differ in the literature. One way of measuring old age is using a fixed chronological age without regarding how healthy a person is, how a person functions, or whether a person is actively working or retired (Hickey and Maclean, 2018). For the purpose of this study, we defined an older adult as a person aged 60 and over. Although we agree that chronological age is not the best predictor variable, it is the most common way to measure age (Bártok et al., 2019).

With that said, the older population comprises older adults with considerable different characteristics, so it is likely that people with certain characteristics, for example in relation to health and physical strength, are being excluded from research. People with a

<p>| Table 1 |
| Description of participant characteristics from dyadic interviews. |</p>
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Gender</th>
<th>Age</th>
<th>Occupation</th>
<th>Employment status</th>
<th>Marital status</th>
<th>Living situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married couple 1</td>
<td>Female</td>
<td>64</td>
<td>Teacher and counselor</td>
<td>Full-time</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td>Male</td>
<td>66</td>
<td>Engager</td>
<td>Retired</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married couple 2</td>
<td>Female</td>
<td>62</td>
<td>Manager at a hospital</td>
<td>Full-time</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td>Male</td>
<td>63</td>
<td>Banker</td>
<td>Retired</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father Son</td>
<td>Female</td>
<td>60</td>
<td>Caregiver in an office</td>
<td>Full-time</td>
<td>Divorced</td>
<td>Living alone</td>
</tr>
<tr>
<td>Male</td>
<td>65</td>
<td>Teacher</td>
<td>Full-time</td>
<td>In a relationship</td>
<td>Living with a partner</td>
<td></td>
</tr>
<tr>
<td>Mother Daughter</td>
<td>Female</td>
<td>60</td>
<td>Social worker</td>
<td>Full-time</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td>Male</td>
<td>63</td>
<td>Teacher</td>
<td>Full-time</td>
<td>Divorced</td>
<td>Living alone</td>
<td></td>
</tr>
<tr>
<td>Friends pair 1</td>
<td>Female</td>
<td>60</td>
<td>Your guide</td>
<td>Full-time</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td>Male</td>
<td>68</td>
<td>Engager</td>
<td>Retired</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends pair 2</td>
<td>Female</td>
<td>70</td>
<td>Teacher</td>
<td>Full-time</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td>Male</td>
<td>72</td>
<td>Government</td>
<td>Retired</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skagen pair 1</td>
<td>Female</td>
<td>63</td>
<td>Housewife</td>
<td>Unemployed</td>
<td>Married</td>
<td>Living with a spouse</td>
</tr>
<tr>
<td>Male</td>
<td>65</td>
<td>Teacher</td>
<td>Full-time</td>
<td>Living alone</td>
<td>Living with a spouse</td>
<td></td>
</tr>
</tbody>
</table>
specific characteristics; however, we often use the cases in most need of research to improve their conditions (Bon, 2005). On this basis, we included a wheelchair user (50 years old) who is a member of a senior center in the study sample.

What follows is the nature of the research topic. Food choice is a complex construct that often involves other people connected to us (Eden and Bredeli, 2013). To examine food choice as a construct and its variations, we therefore included younger participants in our parent-child dyad.

3.3 Sampling method

Our initial recruitment strategy entailed placing flyers in the mailboxes at senior housing complexes. The gardeners were informed of the study, and interested participants were instructed to contact the researchers by phone. We were, however, unable to recruit enough participants within the expected time frame using only this strategy. To overcome this issue, we adopted a more proactive recruitment strategy, in which we recruited participants from senior centers in the district. This approach involved a 30-minute presentation of our project to the members of activity centers. Subsequently, those interested in participating were asked to arrange a time and place for an interview. At time progression, we employed street-intercept recruitment strategies in public places such as public libraries, coffee shops, and shopping centers to increase the number of participants. Those who agreed to participate were given the option of an individual interview or to be paired up with someone else.

To gain a broad understanding of possible house-living older adults’ eating behavior, we chose a sample of older adults who varied in age, gender, occupation, employment status, marital status, and living situation. In addition, for dyadic interviews, participants were paired together based on different types of relationships (see Table 1). We expected the variety of participants to enable us to capture variable perspectives of the phenomenon being studied (Guba, 2011).

As a result, we recruited 22 participants, all of whom were Norwegian. Of these, 16 completed a dyadic interview, and 6 completed an in-depth individual interview. Of the 16 participants in the dyadic group, 8 dyads were established: 2 married couple dyads, 2 parent-child dyads, 2 friend dyads, and 2 stranger dyads.

The participants’ characteristics are presented in Table 1 and 3.

3.4 Data collection

The data collection took place between October 2019 and January 2020 in a district of Western Norway with approximately 402,000 inhabitants, including 108,400 older adults aged 60 and over (Census Norway, 2000). The study was reviewed and approved by the Norwegian centre for Research Data (2018/565166), and written informed consent was obtained from all the participants individually before initiating the data collection. The interviews were held at a time and place of the participants’ choice, including participants’ house, coffee shop at senior center, library, and coffee shop. Each dyadic interview session lasted between 30 min to 1.5 h, while each session in an in-depth individual interview lasted about 40 min to 1 hour. Field notes were taken while conducting the interviews and all the interviews were audio-taped.

3.5 Data analysis

Upon completion of each interview, the audio files were listened to several times, and verbatim transcriptions were prepared for each interview. To ensure the accuracy of the transcriptions, the same contents were also transcribed by a transcriber who was not involved in the data collection.

The data collected were analyzed using content analysis. Content analysis examines data with a view to understanding the meaning behind it (Krippendorff, 2015). As a research technique, it enables researchers to organize and depict meanings from the data collected and shows a realistic pattern (Bogdan, 2005). Furthermore, content analysis offers the potential for making replicable and valid inferences of the data based on the overall context (Krippendorff, 2015).

The content analysis was conducted by method descriptions, primarily that of Ho and Kynig (2006) but also Briks and Shamon (2006). The data analysis was conducted in two distinct phases: deductive and inductive. This integrative, methodological approach has so far not been extensively described in the nursing literature (Bogdan et al., 2005). However, this approach is useful when a prior theory exists (here the ecological model) about a phenomenon (Briks and Shamon, 2006) and when knowledge about the phenomenon is still fragmented (Ho and Kynig, 2009).

Table 1

<table>
<thead>
<tr>
<th>Participant</th>
<th>Gender</th>
<th>Age</th>
<th>Occupation</th>
<th>Employment status</th>
<th>Marital status</th>
<th>Living situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1</td>
<td>Female</td>
<td>82</td>
<td>Housewife</td>
<td>Unemployed</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant 2</td>
<td>Female</td>
<td>50</td>
<td>Housewife</td>
<td>Unemployed</td>
<td>Married</td>
<td>With spouse</td>
</tr>
<tr>
<td>Participant 3</td>
<td>Female</td>
<td>92</td>
<td>Housekeeper</td>
<td>Retired</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant 4</td>
<td>Male</td>
<td>61</td>
<td>Construction worker</td>
<td>Retired</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant 5</td>
<td>Male</td>
<td>71</td>
<td>Skilled worker</td>
<td>Retired</td>
<td>Widow</td>
<td>Alone</td>
</tr>
<tr>
<td>Participant 6</td>
<td>Male</td>
<td>71</td>
<td>Production engineer</td>
<td>Retired</td>
<td>Single</td>
<td>Alone</td>
</tr>
</tbody>
</table>

86
3.3.1. The deductive content analysis

We started this phase by selecting the unit of analysis. The unit of analysis in this study was a sentence that could be used to answer the research question (“what environmental factors may have the greatest influence on the eating behaviors of horse-keeping older adults?”). The next step in the analytical process was to make sense of the data collected. Here, each transcript was read several times thoroughly. Our aim is to become immersed in the data (Polit and Beck, 2004) and obtain a sense of whole (Stedman, 1991).

In the next phase, we developed a structured categorization matrix (Edwards and Sturgis, 2008) based on the ecological framework for health promotion (Day-Lewis et al., 1993). This categorization matrix was structured according to the different levels of influence considered to impact eating behavior. The categorization matrix was then used as a lens to analyze the data when we read through it.

Table 3

<table>
<thead>
<tr>
<th>Rigor criteria</th>
<th>Purpose</th>
<th>Original strategies</th>
<th>Strategies applied in our study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>To establish confidence that the results from the perspective of the participants are true, credible, and believable.</td>
<td>Prolonged engagement; lengthy and interactive contact with the phenomenon (impossible)</td>
<td>• We defined the interview, we met or called all of our participants (except street intercepts) to introduce ourselves and engage participants in an informal conversation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Validity</td>
<td>To ensure the findings of this qualitative inquiry can be replicated or the same occurred similarly under similar conditions, settings, or cases. To increase the confidence that the results would be confirmed or confirmed by other researchers.</td>
<td>Rich description of the study methods; establishing an audit trail; negative case analysis</td>
<td>• We conducted follow-up interviews with street adults from a different region of Norway.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dependability</td>
<td>To review the findings of this qualitative inquiry can be replicated or the same occurred similarly under similar conditions, settings, or cases. To increase the confidence that the results would be confirmed or confirmed by other researchers.</td>
<td>Establishing an audit trail</td>
<td>• We analyzed a spreadsheet and managed data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transferability</td>
<td>The degree to which the results can be generalized or transferred to other contexts or settings.</td>
<td>Sampling; Data saturation</td>
<td>• We used maximum variation sampling in terms of participants’ characteristics (see Table 1, p. 2).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
again. The text corresponding to the categorization matrix was highlighted, coded, and transferred into the relevant categories in the matrix by the first author. The codes and their definitions were derived from previous qualitative food studies conducted with older adults, for example, food-related habits, food environment, and health information-seeking behavior (Hoorn et al., 2017; Slim et al., 2019; Turner et al., 2019).

The texts that were considered not to fit in the matrix were saved in a separate document. Finally, when this was done for all the transcripts, the co-authors appraised the matrix, and all three authors appraised the document containing the "not-fitting" texts. This approach involved excluding the "not-fitting" texts that were deemed not relevant to the study (e.g., a participant's holiday plans) and transferring the remaining undecided texts to the matching category.

3.5.2. Inductive content analysis

The aim in this phase is to gain a comprehensive understanding beyond the earlier categorization. To allow the participants' perspectives, experiences, and interpretations to emerge, we employed a qualitative approach inspired by grounded theory (Braun and Clarke, 2006). With this said, the present study does not follow the pure inductive form as it begins with a pre-determined category derived from existing theory.

The transcripts were read, and then texts were abstracted into codes. We used in vivo codes as much as possible to highlight the voices of our participants (Munneke, 2017). The codes were developed separately by two authors to increase the comprehensivity and enhance sound interpretation (Charmaz, 2012). Any disagreements on code descriptions were resolved through discussions among the authors during project meetings. Thereafter, the codes were structured into sub-categories based on their similarities and differences. Through the identification and interpretation of similarities and differences, further abstraction was achieved, resulting in 3 main categories and 7 sub-categories. While presenting here sequentially, the coding process was circular, and emergent codes and sub-categories were employed in order to refine and re-code existing codes, in line with the principles of grounded theory analysis (Braun and Clarke, 2009).

Two of the authors took the lead in the analysis (FK, Ø3), while the other author (Ø1) acted a co-analyst of the coding and abstractions.

3.6. Strategies to achieve rigor in the study

We are aware of the potential researcher bias that could influence data collection and interpretation. We sought to reduce this bias by actively thinking reflectively throughout the research process and adopting different types of triangulation (method triangulation, investigator triangulation, and data source triangulation) (Denzin, 2011; Patton, 1999). To establish trustworthiness, we adopted the criteria created by Lincoln and Guba (1986). These criteria are credibility, transferability, dependability, and confirmability (Lincoln and Guba, 1986). Table 3 illustrates the strategies that were adopted in our study.

![Fig. 3. Environmental influences of eating behavior in home-living older adults. The ecological framework was adapted from McKinley et al., 2000. This study focuses on identifying specific environmental factors as depicted in the colored oval figure.](image-url)
4. Results

The content analysis process described above resulted in three categories and seven sub-categories that play roles in older adults’ eating behaviors. Each of these categories and sub-categories is presented in more detail in the following section. An overview of the different categories and sub-categories is presented in Fig. 1, and examples of participants’ quotes under each sub-category are given in Table 4.

Category 1: Interpersonal influences (social environment)

In terms of interpersonal factors, participants considered significant others’ food habits and household size to be factors that affect the type and quantity of food they eat. Furthermore, support from relatives improves access to healthy food, and the interaction with their friends influences their eating habits when they are together.

4.1. Food habits of significant others

Most participants said they eat what they eat because of the people in their lives, and some discussed how they modified their diets in response to changes in the family.

"When the kids moved out, we never again ate tacos, pizza, tomato soup, fish sticks, or hamburgers. We’d had enough of those diets. When you have kids, you have little time available, so you tend to choose the same choice so everyone can eat. But when they move out, we can choose freely. It becomes more varied and healthier.” (P1)

One participant mentioned that they connected to a vegan diet because of their daughter.

"What has affected our diet most in recent years is our daughter. Over the last few years, she has changed to a vegan diet, and that has affected me. Her partner is a vegan cook in a restaurant, so we learn a lot from them.” (P9)

Others claimed that they have a vegetarian diet only when they are together with their partner.

"My girlfriend is vegetarian, but I don’t eat vegetarian when she is not here. When she is here, we make dinner together.” (P7)

4.2. Household composition

Participants talked about household composition as one factor that affects the portion size of food purchased and prepared at home.

Table 4. Example of supporting quotes.

<table>
<thead>
<tr>
<th>Category</th>
<th>Sub-category</th>
<th>Examples of quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpersonal influences</td>
<td>Food habits of significant others</td>
<td>&quot;It’s just the two of us now, so we decide what we want to eat by looking in the fridge or freezer. My wife has always said that she only eats what I want to eat, and then she says it is already decided, so I have to eat the same thing.” (P1)</td>
</tr>
<tr>
<td></td>
<td>Household size</td>
<td>&quot;It’s always the same, but don’t lie to me! I know what’s in my family.” (P14)</td>
</tr>
<tr>
<td></td>
<td>Social relationship (friends and other relatives)</td>
<td>&quot;I have almost no contact, but I have some friends. We meet once a month at my place, and have dinner to an Italian restaurant, or a neighbor. I don’t go to the city center.” (P19)</td>
</tr>
<tr>
<td></td>
<td>Community influences</td>
<td>&quot;I have been here for two years. I am here because I am not. I will be alone in my apartment looking at the wall. I find social interaction with other people, I have a job, I have no contact with other people. I have no children and very little contact with my family. Then, I find it quite lonely here. But I don’t want to be because the people here are nice.” (P9)</td>
</tr>
<tr>
<td></td>
<td>Food access</td>
<td>&quot;I am having Sunday lunch today, I made my food at home.” (P11)</td>
</tr>
<tr>
<td></td>
<td>Health information</td>
<td>&quot;You cannot forget the food habits you have, apparently it is okay. I used to be a surfer, but now I am definitely okay. It’s confusing.” (P15)</td>
</tr>
<tr>
<td></td>
<td>Transport and mobility skills</td>
<td>&quot;There is so much information about food and nutrition, but no one explains what information is relevant.” (P9)</td>
</tr>
</tbody>
</table>
For participants living alone, they prefer to buy single-serving packages and smaller portions. In contrast, participants with two or more people in their households do not seem concerned with the portion size of food purchased or prepared at home.

“I chose the single-serving food because I am single. If I buy something with a bigger portion, I tend to eat more than I should.” (P15)

“We bought so much food; one forever is full. We haven’t bought any food since Christmas.” (P22)

Others living alone also mentioned preparing single-serving dinners because they don’t like to eat the same leftovers for a few days.

“I only make my dinner for the day, one portion. I don’t like to eat the same thing every day.” (P12)

One other participant mentioned that he prefers to buy one portion at a time to avoid food waste.

“I used to make cucumber salad, but now if I make it, the rest goes in the garbage. I buy one portion if I want it instead.” (P17)

4.3 Social relationship (Friends and other relatives)

Social relationships are another essential factor that can influence the eating behavior of participants. Two social relationships that participants identified as conducive to a good diet were the relationships with friends and relatives. Participants reported that eating together with friends helps them establish connections and gives them a chance to learn more about food, and support from relatives ensures access to healthy food.

“Every week for almost 40 years, we have had a dinner club with the same people. It started before I had children, focus on good food. When the kid was small it was once a week. Lots of good food and exciting, we became very familiar with Italian cuisine.”

(P4)

Other participants mentioned how relatives help them with the grocery shopping make sure they have the food they need to stay well, and offer companionship regularly.

“Every Friday, me, my son, and his son have coffee together, and then we shop for groceries. We buy enough food to set me up for one week, maybe even a little longer.” (P10)

4.4 Community influences (physical environment)

The community where people live affects their access to healthy food and opportunities for engaging in healthy behaviors (Burg et al., 2003). Participants described senior centers as a place that provides access to social interaction and nutritious food. Access to food is also considered to be an important contributor to maintaining a healthy diet.

4.5 Food access

Participants reported that their food choices are often dependent on what is available in the season and the grocery store in their immediate neighborhood.

“What we eat is dependent a lot on the time of year, for example, haddock in the summer. We eat lint food (a seafood dish) when it’s that time of year. So, we eat according to the season.” (P2)

“This time of year, my favorite is always with cabbage because I can eat the cabbage at this time of year. Good food is available from the store nearby.” (P10)

Others stated that they eat what they have grown in their gardens due to convenient access and taste.

“We go out our vegetables in the garden, for example, Brussels sprouts. We can pick this up even in the winter when we want to cook dinner. Also, tomatoes, compared to the ones in the stores, they taste better.” (P9)

Another participant mentioned that he has a farm, so he has access to meat.

“We have a farm, and we keep sheep, so we use lamb meat and don’t have to buy it.” (P14)

Furthermore, a few participants described how proximity to the sea allows them to enjoy more seafood.

“We have a cabin next to the sea, so we eat more fish and other seafood. We don’t catch it ourselves, we buy it from the nearby fishermen.” (P4)

Category 3: Public policy (societal influences)

When the participants were asked about government measures to support healthy eating among older people, most commented on health information while others discussed transport and mobility aids.

4.6 Health information

In all interviews, the participants were unanimous in the view that they were benched with health information. Participants reported confusion about what foods are healthy or what foods they should not eat, and anticipate that health advice will change.

“We need a lot. For example, we learn to eat out better, then coffee is dangerous, and then coffee is no longer dangerous (laughs). We don’t take it very seriously.” (P2)

“Too much information and alternative this and that, if you don’t know what you need, how can you eat healthier, and why do you need to eat better.” (P3)

4.7 Transport and mobility aids

One participant who has access to a facilitated transport card subsidized by the government raised an issue about the limited sum available on the card. The participant described difficulty getting to food shops and medical appointments due to transportation. Participants also expressed concern about mobility aids that help them move from place to place, such as from home to the grocery store or home to a canteen.

“We get very little on the transport card. You have to think about what you have to do all the time, like if you need to go to the shops to buy food, to the doctor, you have to use it. I have to go to the eye-specialist sometimes, so I have to use that too. I have to calculate the little I have for transport, so I can’t go out as much. It just doesn’t help, you know.” (P10)

“I try to pull myself together and walk down to the grocery store. Occasionally, the weather is awful, so you can’t go. Going back home is even harder, up the hill. Soon I will have a heavy-duty行走 so that I can walk around. They have ordered it from the state welfare service, but I don’t know when it will get here.” (P3)

5. Discussion

The objective of this study was to explore environmental factors that influence home-living older adults’ eating behaviors. Discussions with participants led to the identification of environmental factors that facilitate and hinder healthy eating. Participants identified their significant others and the community where they live as the factors that have the greatest impact on their eating behavior and, to a lesser extent, their friends.

When asked about selecting what to eat, participants reported that their eating choices are often influenced by their significant others or people connected to them. In other words, who they dine with affects how they choose what to eat. This finding is supported by existing literature on the importance of social influences on eating behaviors (Higgs and Radloff, 2020). Participants also reported helping with food shopping from their relatives as an important aspect of healthy eating. As reported elsewhere, the household composition also affects older adults’ food selection and purchasing decisions (Lashbrook, 2016). For participants living alone, a smaller portion or single-serving packed food products are the preferred choice.

Outside of family, friends have some influence on the older adults’ eating behavior. Although participants discussed their friends’ role in impacting their eating behavior, it was not discussed as deeply as family influences. This finding likely reflects the study sample, which included older adults living alone with a smaller social network than those living with a spouse, who have a more extensive social network. An older person’s social network generally declines with age; this alteration could be because of the loss of a partner, retirement, failing health, cognitive impairments, or family members moving away or passing away (Milan, 2010). Having a good time and eating good food together was expected as the main reason for older adults having meals with friends.

Quite clearly, social aspects have a positive impact on eating behavior in older adults. Unfortunately, social contact and engagement often become less frequent with age (Gillespie-Scott et al., 2014). Social facilitation of eating, such as having meals with others, may help older adults increase food intake and eat healthier.

In terms of the community where the participants live, senior centers emerged as an important physical environment that offers older adults’ eating behavior. Participants described the senior center as a place where they can meet others to socialize, carry out some activities, and have a meal. As discussed above, older adults tend to have less social interaction than others. By offering opportunities for social interaction, senior centers can help reduce loneliness among older adults (Moxley et al., 2010). Participants also discussed how senior centers allow them to maintain their independence by providing food a few days a week. This finding would suggest that senior centers are one of the most important resources for the aging community. However, it is not necessarily the case that giving two senior centers has positive benefits for all older adults. Senior centers serve diverse populations of older adults, which vary in age, health, and support needs. Also, the services offered at senior centers differ greatly, from social events to health services, so some
programs are likely to only appeal to certain groups of the local older adults. One potential strategy to increase participation in senior centers is to offer a wide variety of leisure and social activities, as well as programs and services that promote healthy eating.

An additional factor influencing the food choice of older adults is access to food. For some participants, this includes convenient access to a grocery store, growing produce in the garden, foraging, and being near the ocean. This finding suggests that food accessibility is a fundamental element of older adult’s health (Garreight and Wakefiel, 2011). Based on this, a community-driven program aimed at increasing access to affordable and nutritious food may help older adults improve their diet. Such programs can include special financing or tax incentives for grocery stores in rural areas, establishing farmer’s markets, food pantries, or meals on wheels.

What follows are the societal factors that influence the eating behavior of older adults. Societal influences seem to be more distal to older adults but can substantially affect them, their significant others, friends, and the community where they live. Factors within the societal level that can affect older adults’ eating behavior are health information, transport support, and mobility aids.

Overall, our findings show that most older adults in this study reported confusion about health information and coming across conflicting information about proper diet and nutrition from different sources. This finding is consistent with the finding of Liu et al. (2021), which showed that a significant proportion of the Norwegian population have various challenges in dealing with health information. Furthermore, contradictory diet and nutrition information can undermine the success of the healthy eating promotion (Togner, 2014). Thus, serious consideration should be given to reducing the ambiguity of diet and nutrition information. Ideally, scientists should create quality information, and the media disseminate it accurately to the public (Odein-Anderson and Lars, 2020). Unfortunately, as well as providing opportunities for people to improve their eating behavior, the media also allows misinformation to flourish (Cheng et al., 2019). Conflicting health information is a growing problem worldwide, and we are not well-positioned to help information seekers and healthcare professionals to manage this growing problem (Coupares et al., 2016).

Moving forward, we believe more research is needed to develop effective strategies to deal with conflicting health information. As indicated previously, access to food is essential for older adults minimizing a healthy diet. Lack of access to transportation and mobility aids can turn limit older adults’ access to healthy food (Wallace et al., 2010). Based on this finding, government support to increase subsidized transport and mobility aids can help improve older adults’ dietary behavior. That said, this approach is likely to become more effective when integrated with other measures designed to promote healthy eating.

The environmental factors that affect the eating behavior of home-living older adults can be categorized into various levels of influence, as conceptualized by the ecological model: interpersonal (food habits of significant others, household composition, social relationships, community (senior centers and food sources), and public policy (health information and transportation/mobility aids). The ecological model provides a useful framework for better understanding the multiple environmental factors that impact the eating behavior of home-living older adults. This model can therefore be used to guide research and can be applied in a study that focuses on modifying eating behavior. While the ecological model makes it possible to categorize the environmental factors that influence older adults’ eating behavior, it lacks integration within and between the different levels of influence (Kolits et al., 2018). Nevertheless, application of the ecological model looks promising for moving the field of health promotion closer to attaining the goal of improving the eating behavior of home-living older adults.

6. Limitations and future direction

Our study has successfully explored the influence of environmental factors on the eating behavior of home-living older adults. However, the limitations of the study, which included sample, findings, and scope, must be delineated.

The study involved a small sample of Norwegian older adults. As such, the result of the study is limited to the selected participants and their eating behavior experiences. To enhance this challenge, we applied deliberate sampling for heterogeneity (dichotomous sampling for heterogeneity is recommended as the best alternative when random sampling cannot be used) (Campbell, 1979; Shadish, 1998). This allowed us to look at sample numbers from all available angles, thereby achieving in-depth understanding of the phenomena. Additionally, the setting and cultural differences may also limit the transferability of the findings to a different context.

In terms of sample size, our intention was to have an adequate sample size. However, the adequate sample size needed for qualitative research findings to have some validity is difficult to estimate (Creswell et al., 2018). One way to improve the validity of our findings would be to increase the number of participants. In the case of the dyadic interviews, this would involve arranging more pairs to be interviewed. However, due to limited resources and time, we chose to sample heterogeneity instead of increasing the sample size. We postulated that such sampling would yield sufficient breadth and depth of the phenomenon being studied.

What follows is a description of the scope of this study. The study is limited in scope as the data were collected before the COVID-19 pandemic and does not therefore reflect the eating behaviors of the participants during the pandemic. Prior to the pandemic, the vast majority of home-living older adults participated in social activities, such as attending senior centers and other community programs. However, all these services and programs were curtailed due to lockdowns, quarantines, and social distancing measures. These public health measures related to COVID-19 are essential; however, these restrictions increase social isolation and the feeling of loneliness among older adults, which negatively impacts on the eating behavior of many older adults (Oka, 2020).

Despite these limitations, this study helps us understand the environmental factors that impact on home-living elderly adults’ eating behavior and thus contribute to the existing literature on eating behavior. This research has thrown up many questions awaiting further investigations. Further research should be undertaken to explore how COVID-19 has affected home-living elderly adults’ eating behavior and the role of environmental factors in promoting or blinding healthy eating.
7. Conclusion

Improving dietary behavior and promoting healthy eating practices among home-living older adults will require a prolonged and more sustained effort that addresses not only individual influences but also environmental factors. The findings suggest that multiple social relationships influence older adults’ eating behavior. Thus, the social environment of eating is likely an important factor in promoting healthy eating among home-living older adults. This study has also shown that several aspects of the local community need to be considered to improve the eating behavior of home-living older adults. Senior centers and accessibility to food are the main aspects of community influence that can affect home-living older adults’ eating behavior. Continued efforts are needed to maintain well-being and promote eating among the home-living older adults. At the societal level, strategies are required to reduce ambiquity in diet and nutrition information for older adults. There is also a need to ensure adequate mobility support for older adults living at home in order for them to maintain their independence and a healthy diet. Finally, adopting a single model as a basis for study and for developing strategies in promoting healthy eating is not considered optimal. Further research should incorporate ecological models with other modeling or theories.

Declaration of Competing Interest

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References

[List of references]


Paper 2
Paper 3

Understanding the role of situational factors on online grocery shopping among older adults.
Understanding the role of situational factors on online grocery shopping among older adults

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ABSTRACT

This paper seeks to identify the situational factors that affect the adoption of online grocery shopping among older adults. A survey and qualitative research is employed. The research consists of a survey among a sample of older adults. The survey was designed to identify situational factors that influence the decision to shop online for groceries. The study uses a mixed-method approach to gather data from the respondents. The findings indicate that health, mobility issues, and distance to a store are the most important situational factors driving older adults to buy groceries online. Moreover, the findings confirm that the adoption of online grocery shopping among older adults is a result of a combination of situational factors that influence their decision to shop online. The findings contribute to managerial practice by providing online grocery retailers with insights that can be applied when designing promotional programs targeted at older adults.

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1. Introduction

Advancing age brings about changes in people's needs, wants, and abilities (Menard et al., 2009). One basic need that is common to everyone regardless of age is food. The importance of food is evident at any age but becomes even more so as people get older. Food has been identified as an important factor in healthy aging (Despres and Mann, 2013). Easy access to food that contributes to a healthy diet among older adults is therefore crucial (Chung et al., 2012; Wilkerson et al., 2015). Food access refers to the location of the food supply (e.g., grocery stores) and the ease of getting to that location (Ong et al., 2012).

While many older adults continue to visit grocery stores, those in poorer health may experience difficulties accessing grocery stores with a car or meeting their nutritional needs. Age-related physiological changes and declining health (e.g., walking difficulties, poor sight) make grocery shopping more challenging for some older adults (Ong et al., 2012; Thompson et al., 2011). In addition to these obstacles, the store environment may also create barriers to older adults' ability to access food (Klopp, 2011; Yeh et al., 2012). Some of the barriers in the store environment that have been reported are a large shopping cart, small label displays, shelf height (too high or too low), and carrying a heavy basket (Klopp, 2011; Yeh et al., 2012). Furthermore, not having a car, distance from home to a grocery store, and not having anyone to help with food shopping are also reported as challenges among older adults (Wilkerson et al., 2015). A combination of these barriers can create a negative impact on the dietary and health of older adults. Hence, older adults who experience the greatest difficulties in grocery shopping are more prone to nutritional risk (Nance, 1993).

Alternatives to in-store grocery shopping are clearly needed to improve food access among older adults. One of the alternatives is online grocery shopping. Online grocery shopping requires a consumer to select grocery purchases via a retailer's website and the purchased goods being delivered directly to the buyer's home (Sheng et al., 2013). This enables older adults to shop at any time without leaving their homes and have the groceries delivered to their door. Online grocery shopping can therefore overcome the barriers that exist; it eliminates or reduces the physical effort that is often associated with in-store shopping (Velea et al., 2017).

The online grocery market in European countries continues to grow (Sheng et al., 2013). Nevertheless, the market share of online grocery shopping in Norway is limited. A survey from 2012 to 2013 showed that...
only 1.4% of Norwegians purchased groceries online (Vestrum, 2021a).

Furthermore, the online grocery figure for 2020 shows substantial differences across age groups. The most active online grocery buyers are those aged 25-34 (26%), followed by the age group 35-44 (19%), while older adults make up a relatively smaller market, aged 55-64 (7%), followed by age group 65-74 (4%) (Vestrum, 2021a).

Given that online grocery shopping can reduce food access barriers for older adults, it would be commendable to expand older adults' access to online grocery shopping. Unfortunately, only a small percentage of Norwegian older adults buy groceries online. To increase online grocery shopping among older adults, it is important for online grocers to understand in which situations older adults buy their groceries online.

Previous research shows that the factors influencing the adoption and use of online grocery shopping are related to perceived benefits, barriers, risks, and trust (Steenbeek and Lefebvre, 2020b; Martinez, Penal-Duran, Arciñiega, & Martin, 2019; Verheijen and Lefebvre, 2019). While these factors can help explain why consumers are buying or not buying groceries online, they do not explain variations in consumer behavior (sometimes buying in-store, other times online groceries). One type of factor that can explain variations in consumer behavior is situational factors (Bell, 1975).

Situational factors are highly relevant in shopping as buying behavior occurs within a specific context (Ekstrand, 2010). The importance of situational factors in the decision to buy groceries online has been described in previous studies (Brand et al., 2009; Robinson et al., 2007), but findings in other contexts can only be used as a starting point. As with any other type of behavior, shopping behavior can be influenced by social norms and cultural background (Ekstrand and Tellus, 2011).

Based on the aforementioned reasons, the purpose of this paper is to address the gap in the literature by exploring older adults’ online grocery shopping behavior. Specifically, we focus on situational factors. The objective of this study was: (1) to identify situational factors that drive older adults to buy groceries online, (2) to determine which situational factors are considered important when older adults are deciding whether to buy groceries online.

The paper is structured as follows. First, I present the conceptual framework. In the next section, I describe the methods and findings of the exploratory study (qualitative), followed by the method and results of the confirmatory study. Finally, I present the main findings, discussion, limitations, and implications of the study.

2. Conceptual Framework

Research in this area has shown that situational factors may be important in shopping and influencing online shopping motivations (Brand et al., 2009). This study uses the taxonomy of situational change factors proposed by Bell (1975) to highlight situational factors that may explain older adults’ online grocery shopping behavior. Situational factors refer to all those factors pertinent to a time and place of decision-making which do not follow from a knowledge of personal characteristics (individual and situational) and stimulus-choice alternatives (Bell, 1975).

Based on this framework, situational factors can be categorized into five distinct groups: physical surroundings, social surroundings, temporal perspectives, task definitions, and convenience stores (Bell, 1973). The physical surroundings include geographical and institutional locations in which the consumer makes decisions. These include elements to access to grocery websites,weaknesses, weather, and time constraints available (the prices of a nearby store,illness,lighting, etc.). The factors related to social surroundings include the presence or absence of others at the time of the decision-making and the opportunity for social interaction. The temporal perspective refers to the time of day or day of the week, the urgency of purchase, product availability, and time pressure. Task definitions variables are related to cognitive and institutional elements of the shopping situation. For example, whether consumers are shopping for personal use or buying a gift for someone else.

Deteriorating states are temporary conditions such as physical or mental stress, mood, and attention. Situational factors at the adoption of online grocery shopping in elderly to older adults.

3. Methodology

This study was conducted in two phases. In phase 1, I used a qualitative semi-structured interview to identify situational factors considered by older adults when deciding whether to buy groceries online. Following the qualitative research, I designed and executed a conjoint experiment (phase 2) to evaluate the value that older adults place on the situational factors based on findings from phase 1 that drive the adoption of online grocery shopping.

3.1. Phase 1: Qualitative study (what situational factors drive the adoption of online grocery shopping among older adults)

3.1.1. Participants

The term “older adult” is used consistently in the literature since this group is made up of individuals with different characteristics and preferences. Generally, the older adult has been defined by chronological age, but there is no clear consensus on the age range (Aguado, 2002; Medina and Gordillo, 1997). In this paper, an older adult is defined based on the retirement age in Spain. The retirement age is defined here as the minimum age for claiming a state pension (age 67) (Government, 2002). This study eligibility criteria were participants who had to be aged 62 or older and capable of making decisions related to grocery shopping.

3.1.2. Sampling method

Participants were recruited through a snowball sampling, starting with a participant close to the researcher in terms of age and gender. Participants began with a set of seven volunteers, and following this rationale, I recruited 9 older adults who varied in age, gender, living situation, and geographical area (urban, rural, and suburban). The nine depth interviews produced an adequate amount of data to study older adults’ online grocery shopping behavior in depth. It can thus be suggested that the sample is sufficient to study a phenomenon (online grocery shopping) (Vestrum, 2021b). The participants’ characteristics are presented in Table 1.

3.1.3. Data collection

Due to the COVID-19 pandemic, I used remote data collection instead of in-person face-to-face interviews. Remote data collection is defined as Table 1.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Age</th>
<th>Gender</th>
<th>Living situation</th>
<th>Geographical area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1</td>
<td>74</td>
<td>Female</td>
<td>Alone</td>
<td>Urban</td>
</tr>
<tr>
<td>Participant 2</td>
<td>72</td>
<td>Male</td>
<td>Alone</td>
<td>Rural</td>
</tr>
<tr>
<td>Participant 3</td>
<td>72</td>
<td>Female</td>
<td>With a spouse</td>
<td>Urban</td>
</tr>
<tr>
<td>Participant 4</td>
<td>78</td>
<td>Female</td>
<td>Alone</td>
<td>Rural</td>
</tr>
<tr>
<td>Participant 5</td>
<td>73</td>
<td>Female</td>
<td>With a spouse</td>
<td>Urban</td>
</tr>
<tr>
<td>Participant 6</td>
<td>68</td>
<td>Male</td>
<td>Alone</td>
<td>Urban</td>
</tr>
<tr>
<td>Participant 7</td>
<td>76</td>
<td>Female</td>
<td>Alone</td>
<td>Rural</td>
</tr>
<tr>
<td>Participant 8</td>
<td>70</td>
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<td>With a spouse</td>
<td>Urban</td>
</tr>
<tr>
<td>Participant 9</td>
<td>65</td>
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<td>Urban</td>
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</tbody>
</table>
data collection via telephone, online, or other virtual platforms where participants and researchers are physically distant (Kim et al., 2021). For this study, we conducted semi-structured, in-depth individual interviews using telephone and video calls in June 2021. The study was reviewed and approved by the Norwegian Centre for Research Data (2019/550166), and verbal informed consent was obtained from all participants before the interviews. The grooming of consent was audio-taped as part of the interview process. On average, the interviews lasted approximately 30-40 min. Notes were taken during the interviews, and all the interviews were audio-taped.

3.1.4 Data analysis

The audio files from the interviews were listened to several times, and all interviews were transcribed verbatim. The data collected were analyzed using content analysis. Content analysis examines data with a view to understanding the meaning behind it (Krippendorff, 2004). A cut research technique, it enables researchers to organize and clump meanings from the data collected and draw a realistic conclusion (Berg, 2002).

The content analysis employed in this study was directed content analysis, inspired by Elo and Kyngas (2008). Directed content analysis starts with an existing theory or prior research about a phenomenon (Elo and Kyngas, 2008). With this approach, codes are developed from relevant theory, and defined before and during data analysis (Elo and Kyngas, 2008). I stored the coding process by thoroughly reading the transcripts several times. The aim is to become immersed in the data (Elo and Kyngas, 2008) and obtain a sense of the whole (Berg, 2002).

In the next step of the analysis, all the textual data that represent situational factors were highlighted (Kim 2016) and all the highlighted text was pasted into separate files. The codes were discussed during joint meetings. Thereafter, the codes were transformed into relevant categories (Berg 2002) in a matrix of situational contexts.

3.2 Study 1 Findings

The content analysis process described above resulted in a number of unique situational factors. Each of the situational factors was organized based on Bühler’s taxonomy (1975).

3.1.5.1 Category 1: Antecedent states. Participants’ conditions such as health, physical states, and fatigue appeared to be the key triggers for initiating online grocery shopping. Two included being sick, not being able to walk, or needing a ride, and having trouble cooking breakfast or lunch because of illness.

“...there was a snack I could eat on the go...”

3.1.5.2 Category 2: physical surroundings. In terms of physical surroundings, participants considered price, distance to the grocery stores, and tidiness to be factors that affect their decision on where to shop.

“...I go to the new store in the neighborhood, they have lower prices compared to others.” (P4)

“...we go to the store nearby because I like their brand and they are cheaper than other stores.” (P9)

One participant mentioned that they have to buy their groceries in an expensive store because it is the only option available to them. They like going out but not often. They also discussed their habits of shopping during the week.

“...i buy my groceries at the local grocery store because we only have one store here (downstairs). It’s very expensive, but it’s the only store, so sometimes there’s no choice. But I prefer to travel into town when I feel well.” (P9)

Others claimed that weather also impacts their ability to shop for groceries.

“...I buy my groceries in the nearby store, but it depends on the weather. If the weather is nice, I can walk a little bit harder, and if the weather is bad, I’ll stick to a local delivery.” (P7)

“If the weather is good, we drive to the grocery store. But when it’s bad weather, I just send my wife. She’s healthy.” (P9)

3.2.5.3 Category 3: person perspective. The interviews showed that delivery time is one of the main reasons for ordering groceries online. For example:

“I tried to order the groceries from a website before. It’s not good. I ordered on Monday, and I was a little bit late until Wednesday. I can’t wait that long without food. Now I order my groceries from a different website. I order today, and I get my groceries tomorrow.” (P2)

3.2.5.4 Category 4: social surrounding. One participant mentioned that in-store shopping provides them with an opportunity for social interaction, while another participant prefers to shop online and isolate himself after becoming a ‘singles.

“We shop at different grocery stores. One of the stores has a nice shop next to it. We stop to have ice cream when we can. We can go there.” (P6)

“I used to walk or drive to the grocery store when my wife was still alive. But now I’m in the new house, with no car, and I like going out without her. Now I ask the taxi drivers to stop at the grocery store when they drive back from my doctor’s office. But most of the time, I order my groceries from a website.” (P2)

The findings of the qualitative study indicate that the situational factors driving the adoption of online grocery shopping among older adults in age, disability, price, distance to stores, delivery time, and social interaction. The section below examines the importance of those situational factors when older adults are deciding whether to buy groceries online.

3.2.5.5 Category 5: demographic profile. One participant mentioned the importance of social isolation and how it impacts their ability to shop for groceries online.

We shop at different grocery stores. One of the stores has a nice shop next to it. We stop to have ice cream when we can. We can go there.” (P6)

“I used to walk or drive to the grocery store when my wife was still alive. But now I’m in the new house, with no car, and I like going out without her. Now I ask the taxi drivers to stop at the grocery store when they drive back from my doctor’s office. But most of the time, I order my groceries from a website.” (P2)

The findings of the qualitative study indicate that the situational factors driving the adoption of online grocery shopping among older adults in age, disability, price, distance to stores, delivery time, and social interaction. The section below examines the importance of those situational factors when older adults are deciding whether to buy groceries online.
3.2.1. Selection of attributes
Based on the literature review on the role of situational variables in online grocery shopping, e.g., Hurl et al. (2003), Schröder et al. (2005) and the findings of study 1, I selected six situational variables that can influence online store decision on whether to purchase groceries online. The six variables selected included two respondents' factors: health and mobility, two physical factors: price and distance to a nearby store, one temporal factor: delivery time and one social factor: social interaction.

3.2.2. Hypothesis development
3.2.2.1. Situational variables in the scenarios
Physical constraints such as poor health and lack of mobility are among the primary reasons for frequent groceries online (Obermeyer and Coile, 2009). A similar finding was also confirmed by Hurl et al. (2003). This leads to the following hypothesis:
H1: Individually poor health increases the probability of online grocery shopping.

H2: Older adults who have trouble walking and carrying groceries have a higher probability of purchasing groceries online.

3.2.2.2. Situational variables in the physical environment
3.2.2.2.1. Price. Price is unquestionably one of the most important influences on purchasing groceries (Dijkstra et al., 2010). The price of groceries may affect online decision making regardless of whether they buy in store or online (Lehman et al., 2003). This hypothesis leads to the following hypothesis:
H2: Higher prices in the nearby grocery store increase the probability of online grocery shopping.

3.2.2.2.2. Distance. Distance is a nearby store. This variable is traditionally linked to in-store shopping; however, geographical distance from the nearby store can be a relevant factor affecting online decisions (Dijkstra et al., 2010). The easy accessibility of online grocery shopping can make the issues related to difficulties of reaching stores that are too far away from consumers (Dijkstra et al., 2010). This leads to the following hypothesis:
H3: The distance to a nearby store increases, so does the probability of online purchasing.

3.2.2.2.3. Time-related situation variable.
3.2.2.2.3.1. Delivery time. Delivery time is another important attribute in online grocery shopping. Typically, consumers are not willing to wait for a significant amount of time to receive their groceries (de Magalhães, 2010). It is reasonable to assume that if one option increases the delivery time, older adults may be more likely to buy their groceries online. Therefore:
H4: The shorter the delivery time, the higher the probability of online grocery shopping.

3.2.2.2.4. Social interaction. Another important aspect that has been highlighted for grocery shopping online is social interaction. It is widely held view that social interaction is absent when shopping for groceries online (Brouwer and Nielen, 2003). Furthermore, consumers who satisfy their personal and social need by shopping in grocery store are likely to consider online grocery shopping as a loss of shopping enjoyment (Brouwer and Nielen, 2003). Although I acknowledge that online grocery shopping may provide a collaborative experience, based on the literature on traditional in-store shopping with the following hypothesis:
H5: The greater the opportunity for social interaction during in-store shopping, the lower the probability of online grocery shopping.

3.2.3. Determinants of attributes level
To test the above hypotheses in a conjoint experiment, I defined levels for the six attributes selected. I used two levels for each attribute in order to limit the possible number of scenarios and reduce cognitive demand from the respondents (Higg and Loh, 2003). I thereby improving the validity of the data (Görg and Lü, 2003). The summary of the attributes and attributes levels is presented in Table 2.

3.2.4. Conjoint experiment design
A straightforward way of organizing stimuli in a conjoint experiment is with full factorial design, which generates all possible combinations of attributes and levels (Gürtler-Gardt et al., 2010). However, such a design will typically result in an unreasonably high number of profiles (Green and Srinivasan, 1990). For example, in this study, a full factorial design for six attributes with two different levels generates a total of 64 scenarios (2^6). This number of alternatives can overwhelm the cognitive ability of any respondent (Green and Srinivasan, 1990). I therefore use an orthogonal design, which contains a fraction of full factorial design (Green and Srinivasan, 1990). This design enables the analyst to reduce the number of scenarios that each participant has to assess. In this case, I use the statistical package SPSS 26.0 (conjunct module) to generate the orthogonal design. As a result, eight choice scenarios were generated. A within subject design was used for investigating the situational factors. The eight choice scenarios is shown in Table 3.

3.2.5. Data collection
The data presented in the conjoint experiment were collected from 206 older adults throughout Norway. The respondents were recruited using an online panel administered by a market research firm in August 2019, and the questionnaire was distributed to respondents via the firm’s digital distribution system. Table 2 presents the characteristics of survey respondents.

3.2.6. Data analysis
Before the questionnaire was launched, benchmarked a pilot study with 15 respondents. This led to some minor changes to the layout of the scenario. The questionnaire begins with a statement followed by an explanation of what respondents could expect and an assurance of confidentiality. Each respondent was then presented with all six scenarios (S) and asked to select their preference by buying groceries online or in-store. After finishing the choice task, respondents were asked if they had purchased groceries online and performed other things online. They were also asked to provide more descriptive data. To avoid data being mixed, ensuring every question was a condition of submitting the questionnaire.

3.2.7. Data analysis
I used the statistical package SPSS 26.0 (conjunct module) for all analysis. Based on the completed choice rules (whether buy groceries in-store or online), I can estimate each situational factor level’s part-worth (utilities). The part-worth reflects the attractiveness of an attribute or attribute levels.

Table 2
| Attributes and attribute levels for shopping channel decision |
|------------------|------------------|
| Attribute | Level 1 | Level 2 |
| Health | Good health | Poor health |
| Mobility | Walking easy | Walking difficult |
| Price of the nearby store | £5 | £10 |
| Distance to a nearby store | 1 mile walk | 5 mile walk |
| Delivery time for a traditional shopping | Less than 1 hour | More than 1 hour |
| Social interaction | Talking with others in store | Talking with others online |
| 1.2 years | Time spent waiting to receive order |
attribute level and predicted direction of a particular factor for supporting online grocery shopping (Pavlov and Boulding, 2004). Higher part-worth values indicate a greater preference, and positive part-worths increase the probability of online grocery shopping.

In addition, the utility scores can be used to find the relative importance of such factors. The relative importance values of factors refer to the extent to which the part-worths play a role in the set of buying groceries online (Pavlov and Boulding, 2004). Thus, a high value means that the variable is important for determining whether an older adult will buy groceries online or not. In contrast, a low value indicates the least important variable.

In terms of the ‘goodness of fit’ test, Poisson’s R and Kendall’s tau values provide an indication of how well the model predicts.

### 6. Results

In total, 206 respondents completed questionnaires. However, 95 (46.40%) questionnaires were not included in the conjoint analysis because their responses formed a nonmonotonic pattern (choosing in-store shopping in all scenarios). After this elimination, the number of questionnaires included in the conjoint analysis was 111 (54.60%).

Table 3 shows the utility estimates for every level of each structural factor. The positive or negative directions of the utility estimates were consistent with the author’s prior hypothesis (Pavlov and Boulding, 2004) and therefore showed discriminant validity. As noted earlier, the positive part-worths increase the probability of online grocery shopping. Looking at Table 4, it is suggested that poor health and trouble walking and carrying groceries increase the probability of online grocery shopping (Pavlov and Boulding, 2004).

Furthermore, increased distance to a nearby store means that older adults are more likely to select online grocery shopping (Pavlov and Boulding, 2004). When it comes to price, if the price at a nearby store is high, this increases the probability of online grocery shopping (Pavlov and Boulding, 2004). Therefore, in a preferred option in terms of delivery time, and this increases the likelihood of buying groceries online (Pavlov and Boulding, 2004). As far as social interaction is concerned, an opportunity for interaction in a store increases the probability of online grocery shopping (Pavlov and Boulding, 2004). With that said, the utility estimate for social interaction in the lowest and is close to zero. This result makes the interpretation more complex. To a certain degree, it is plausible to assume that the less social interaction an older adult has at a store, the greater the probability of online grocery shopping. However, since the utility estimate is close to zero, it is uncertain that one factor is less preferred over the other.

Regarding the relative importance values, the result from the analysis shows that three situational factors are considered most important when older adults make a decision about online grocery shopping. Those factors are health, ability, and distance to a nearby store. The relative importance values are presented in Table 5.

The goodness of fit measures in Table 7 display Poisson’s R and Kendall’s tau, which consider the observed and estimated preferences. In this study, the Poisson’s R value is 0.909, indicating a high correlation level between observed preferences and estimated preferences. Similarly, high values of Kendall’s tau (0.60) also demonstrate the model’s goodness of fit. What follows is the description of the estimated probability of shopping online per scenario (Table 6).

### 5. Discussion

This study set out to examine the structural factors that drive older adults to buy groceries online. The results show that nearly half of the respondents were reluctant to buy groceries online despite their situation. On the other hand, some were open to the idea of buying groceries online or were already incorporating online grocery shopping into their regular shopping routines. Furthermore, those who consider online grocery shopping stated that they had never shopped for groceries online before. This finding is in line with previous studies where in-store grocery shopping is preferable to online shopping (O’Malley and Lee, 2002; Rust, 2001; Rust et al., 2004).

### Table 3

<table>
<thead>
<tr>
<th>Utilities</th>
<th>Utility estimate</th>
<th>Std. error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
<td>5 minutes</td>
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</tr>
<tr>
<td></td>
<td>15 minutes</td>
<td>-0.30</td>
</tr>
<tr>
<td>Price</td>
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<td>-0.30</td>
</tr>
<tr>
<td></td>
<td>Not Reasonable</td>
<td>-0.30</td>
</tr>
<tr>
<td>Health</td>
<td>Good health</td>
<td>-0.30</td>
</tr>
<tr>
<td></td>
<td>Poor health</td>
<td>-0.30</td>
</tr>
<tr>
<td>Mobility</td>
<td>Reasonable</td>
<td>-0.30</td>
</tr>
<tr>
<td></td>
<td>Not Reasonable</td>
<td>-0.30</td>
</tr>
</tbody>
</table>

### Table 4

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Importance</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance</td>
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<td>-0.30</td>
</tr>
<tr>
<td></td>
<td>15 minutes</td>
<td>-0.30</td>
</tr>
<tr>
<td>Price</td>
<td>Reasonable</td>
<td>-0.30</td>
</tr>
<tr>
<td></td>
<td>Not Reasonable</td>
<td>-0.30</td>
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<tr>
<td>Health</td>
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</tr>
<tr>
<td></td>
<td>Not Reasonable</td>
<td>-0.30</td>
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</tbody>
</table>
Table 7

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Value</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>Pearson’s r</td>
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<td>0.000</td>
</tr>
<tr>
<td>Kendall’s tau</td>
<td>0.800</td>
<td>0.000</td>
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</table>

Table 8

<table>
<thead>
<tr>
<th>Estimated probability of shopping online</th>
</tr>
</thead>
<tbody>
<tr>
<td>Omega-1</td>
</tr>
<tr>
<td>Omega-2</td>
</tr>
<tr>
<td>Omega-3</td>
</tr>
<tr>
<td>Omega-4</td>
</tr>
</tbody>
</table>

Van Drenth, B. and Van den Hoven, A. (2001). With that said, we propose to evaluate online shopping as a potential opportunity for grocery retailers to engage older adults in online grocery shopping. It is therefore crucial for grocery retailers to understand to which extent older adults are engaged in online grocery shopping. Based on the conjunctive analysis, the three most important situational factors determining older adults’ decisions to buy groceries online are related to the convenience status (health and declining mobility) and physical surroundings (inconvenience to store). While proximity to a nearby store plays an important role, distance alone is not enough to encourage older adults to adopt online grocery shopping. Older adults are more likely to use online grocery shopping when they have health problems, and their ability to walk to a store or share groceries is impaired. This finding was also reported by Beerli, A. and Serafinelli, C. (2012). Van Drenth and Van den Hoven (2001). Van Drenth, B. and Van den Hoven, A. (2001).

In terms of delivery time, the result revealed that older adults prefer shorter delivery times. For that reason, more and more online grocery retailers are trying to offer faster delivery time, believing that this is the key factor influencing older adults’ decisions to buy groceries online. Meanwhile, previous research shows that 64.9% of customers were not concerned by delivery times of longer than 14h, but 79% of customers would be discouraged from buying online if the delivery time was more than three days (Rosenberry, 2018). Designing an optimal delivery time is essential, but speed itself may not be enough to encourage older adults to buy groceries online. Other factors also come into play, for example, the delivery quality and quality of food (Lee, M. and Maguire, M. 2021). This reveals that the food being delivered is a second good condition as the customer had to be the store and have been able to see, touch, and smell for products themselves.

With regard to price, as we expected, the perceived channel (store) influences older adults’ decisions on online grocery shopping. The higher the perceived price of a nearby store, the higher the probability of older adults resorting to the online channel. This result is consistent with the findings in a study by Vermeulen, D. and Vermeulen, D. (2015). However, it is not necessarily the case that higher prices at a nearby store lead to online grocery shopping. Price may influence when people shop, but whether they rely on other options available (e.g., other stores), what they use to pay and what they view as a reasonable price should also be taken into consideration (Vermeulen, D. and Vermeulen, D. 2015).

One unexpected result was that after rating internet plays the least important role among situational variables when older adults make decisions about buying groceries online. This result is contrary to previous studies, as discussed in Leonforte, F. and Banerji, N. (2016). However, it is not unexpected because many marketers believe that the most important factor for older adults adopting online grocery shopping relate to circumstantial circumstances that are beyond the control of retailers. Nevertheless, retailers can take situational factors into consideration when designing promotional programs targeted at older adults.
Declaration of competing interest
The authors declare no potential conflicts of interest with respect to the research, the authorship, and publication of this article.

Appendix A. Supplementary data
Supplementary data to this article can be found online at https://doi.org/10.1016/j.jornem.2022.100909.

References
Appendix A

Dato
17.10.2019

Type
Standard

Referansenummer
502106

Prosjekttittel
Elderly food consumers: Factors that may affect their food-related decisions

Behandlingsansvarlig institusjon
Universitetet i Stavanger / Det samfunnsvitenskapelige fakultet / Norsk hotellhøgskole

Prosjektansvarlig
Fifi Kvalsvik

Prosjektperiode
30.05.2019 - 30.08.2021

Kommentar
NSD has assessed the change registered on 14.10.2019. The project will now also process special categories of personal data about health. This Assessment replaces the previous one.

Our assessment is that the processing of personal data in this project will comply with data protection legislation, presupposing that it is carried out in accordance with the information given in the Notification Form and attachments dated 17.10.2019, as well as in dialogue with NSD. Everything is in place for the processing to begin.

NOTIFY CHANGES

If you intend to make changes to the processing of personal data in this project it may be necessary to notify NSD. This is done by updating the Notification Form. On our website we explain which changes must be notified. Wait until you receive an answer from us before you carry out the changes.
Appendix A

TYPE OF DATA AND DURATION

The project will be processing special categories of personal data about health, and general categories of personal data, until 30.08.2021. Collected personal data will be stored internal to the data controller for research until 30.08.2022.

LEGAL BASIS

The project will gain consent from data subjects to process their personal data. We find that consent will meet the necessary requirements under art. 4 (11) and 7, in that it will be a freely given, specific, informed and unambiguous statement or action, which will be documented and can be withdrawn.

The legal basis for processing special categories of personal data is therefore explicit consent given by the data subject, cf. the General Data Protection Regulation art. 6.1 a), cf. art. 9.2 a), cf. the Personal Data Act § 10, cf. § 9 (2).

PRINCIPLES RELATING TO PROCESSING PERSONAL DATA

NSD finds that the planned processing of personal data will be in accordance with the principles under the General Data Protection Regulation regarding:

- lawfulness, fairness and transparency (art. 5.1 a), in that data subjects will receive sufficient information about the processing and will give their consent

- purpose limitation (art. 5.1 b), in that personal data will be collected for specified, explicit and legitimate purposes, and will not be processed for new, incompatible purposes

- data minimisation (art. 5.1 c), in that only personal data which are adequate, relevant and necessary for the purpose of the project will be processed

- storage limitation (art. 5.1 e), in that personal data will not be stored for longer than is necessary to fulfil the project’s purpose

THE RIGHTS OF DATA SUBJECTS

Data subjects will have the following rights in this project: transparency (art. 12), information (art. 13), access (art. 15), rectification (art. 16), erasure (art. 17), restriction of processing (art. 18), notification (art. 19), data portability (art. 20). These rights apply so long as the data subject can be identified in the collected data. NSD finds that the information that will be given to data subjects about the processing of their personal data will meet the legal requirements for form and content, cf. art. 12.1 and art. 13.
Appendix A

We remind you that if a data subject contacts you about their rights, the data controller has a duty to reply within a month.

FOLLOW YOUR INSTITUTION’S GUIDELINES

NSD presupposes that the project will meet the requirements of accuracy (art. 5.1 d), integrity and confidentiality (art. 5.1 f) and security (art. 32) when processing personal data.

To ensure that these requirements are met you must follow your institution’s internal guidelines and/or consult with your institution (i.e. the institution responsible for the project).

FOLLOW-UP OF THE PROJECT

NSD will follow up the progress of the project underway (every other year) and at the planned end date in order to determine whether the processing of personal data has been concluded/is being carried out in accordance with what is documented.

Good luck with the project!

Contact person at NSD: Karin Lillevold

Data Protection Services for Research: +47 55 58 21 17 (press 1)