Rotterdam Heat Plan:

The Role of Supermarket Managers in Enhancing Elderly Heat Resilience During Heatwaves

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Introduction

In collaboration with the GGD Rotterdam-Rijnmond and elderly care organisation Aafje, this research focuses on the neighbourhood of Ommoord, Rotterdam. These external partners had raised concerns about the well-being of the predominantly elderly (65+) population within Ommoord, particularly the health risks they face when visiting local supermarkets during summer heatwaves. These supermarkets maintain low indoor temperatures, which can negatively impact the health of elderly, especially when there is a significant difference between the indoor and outdoor temperatures.

Our study specifically examined the role of supermarket managers in this issue, while a parallel research group investigated the behaviour and experience of the elderly population. The aim of this research was to assess whether, and if so how, supermarket managers could make realistic adaptations to promote a healthier shopping environment for their elderly customers. By designing a practical and effective health intervention, this research seeks to contribute to a safe, healthy, and accessible shopping environment for the elderly population of Ommoord.

Methodology

To address the aim of this study, the behaviour change wheel (BCW)—a theoretical framework designed by Michie et al. (2014) as a guide to design interventions—was used. Part of this framework is the COM-B model, a theoretical framework to analyse the factors that determine behavioural changes: capability, opportunity, and motivation. To analyse the risk factors of the health problem, and the determinants affecting the risk factors, a systematic approach is used applying the framework logic model, which is completed and discussed later (Breuër & Hartman, 2025).

The development of this logic model was based on a qualitative approach, used to examine the perspectives from supermarket and department store managers in and around Ommoord on healthy shopping for elderly during heat waves. Although all relevant stores were contacted, due to lack of time or interest, only five managers participated. Four semi-structured interviews were completed, while the fifth manager participated in an unrecorded and unfinished interview.

The neighbourhood Ommoord was chosen to conduct our study due to its relatively large elderly population, which was reaffirmed during the interviews. One manager referred to a recently conducted internal research indicating that approximately 65% of the customers in their store are elderly. Verbal informed consent was obtained from all managers prior to the interviews (see Appendix A).

Guiding questions were used to guarantee all relevant subjects were covered, categorised into three themes: context, behaviour, and determinants (see Appendix B). Due to managers' preferences, interviews were conducted in Dutch. Consequently, all provided quotes have been translated into English.

Interviews were analysed to identify behavioural determinants, which were aligned with the COM-B model, which is explained in a later section. This analysis structured the development of the recommended health intervention.

Results

Health and Wellbeing

To establish what heat-related illnesses are, it is necessary to first establish what a heatwave is. A heatwave is defined by the Koninklijk Nederlands Meteorologisch Instituut (KNMI, n.d.) as a period of at least five consecutive days with temperatures reaching 25°C or higher, of which at least three days with temperatures of 30°C or higher, which have become

increasingly common due to global warming (Han et al., 2022). Moreover, the increasing frequency, duration, and intensity of heatwaves will require adaptive measures to address growing risks and strengthen our ability to respond efficiently (Han et al., 2022). Additionally, Weil (2006) labeled the demographic shift indicated by the aging population as the dominant demographic phenomenon of the 21st century. This is especially visible in Ommoord, where 42% of the population is aged 55 and older, with 30% classified as elderly (65+), which is significantly higher than Rotterdam's average elderly population of 16% (Gemeente Rotterdam, n.d.).

Health Problem: Heat-Related Illness

Heat related illness refers to a broader spectrum of health conditions that arise as a result from being exposed to moderately to extremely high environmental temperatures. The symptoms may range from mild (cramps and exhaustion) to more severe and even life threatening conditions (such as heatstroke), (John Hopkins Medicine, n.d.).This may occur when an individual's body is unable to adequately disperse heat which causes an elevated core body temperature and a dysfunction at organ level. According to Rijksinstituut voor Gezondheid en Milieu (RIVM), heat-related illnesses include overheating, heat exhaustion, and heat stroke. Symptoms of these illnesses are hindrance, fatigue, difficulty concentrating, headaches, dizziness, muscle aches, thirst, and extreme sweating. In the more extreme cases of heat exhaustion and heat stroke, heat can lead to nausea, exhaustion, red skin, loss of sweat, seizures, faintness and unconsciousness (RIVM, 2020).

Risk Factors

A risk factor is any condition, behaviour or characteristic that increases the likelihood of developing a certain disease, injury, or other forms of negative health outcomes. Risk factors can include, but are not limited to age, underlying medical conditions, or exposure to

extreme temperatures (American Psychological Association, n.d.). Identifying such risk factors is important for creating targeted prevention and intervention strategies to protect vulnerable population groups and improve public health.

Biological Risk Factors

Research shows that age, a biological risk factor, causes a reduced ability to dissipate heat and physically respond to extreme temperatures effectively (World Health Organization: WHO, 2024). Older adults are at an increased risk during heat waves, due to physiological changes that are associated with aging, such as a diminished sweat production, reduced skin blood flow, a decreased ability to perceive thirst (RIVM, 2019), and a decreased perception of temperature changes (Schellen et al., 2010). These factors impair the body's natural capacity of regulating body temperature effectively (Millyard et al., 2020). Additionally, older adults are more likely to have multimorbidity or to be taking medications - such as diuretics or beta blockers- which may further interfere with the body's ability to respond to heat and stress (Bouchama & Knochel, 2002). This is especially relevant given the abrupt transition from higher outdoor temperatures to the lower indoor temperature of shops, which may have adverse health effects in the elderly population.

Bunker et al. (2016) found that even an increase of 1°C in temperature was linked to higher mortality rates from cardiovascular, respiratory, and cerebrovascular causes among older adults. On the other hand, a 1°C decrease in temperature was associated with increased mortality from respiratory and cardiovascular problems, such as pneumonia (Bunker et al., 2016).

Behavioural Risk Factors

It was mentioned by the interviewed managers that the cooler in-store temperature was generally perceived as pleasant and positive by customers during summer. Several managers did observe specifically that elderly customers tend to adapt their shopping routines in response to warmer temperatures. For example, during heatwaves, they often choose to shop early in the morning (around 8 a.m.) or later in the evening, indicating a conscious and deliberate decision to avoid peak daytime heat. One manager remarked: "The moment they [the elderly] know that there could be a heat wave, they do try to avoid having to go to a store." This comment indicates the awareness among elderly with regards to the health risks associated with extreme heat and possibly the rapid temperature changes. Another manager also suggested that it may be related to "not drinking enough when it is that warm," a behavioural risk factor of heat-related illness that, as previously mentioned, overlaps with the physiological risk factors related to aging, as elderly have a decreased ability to perceive thirst (RIVM, 2019).

Environmental Risk Factors

Biological and behavioural causes are not the only risk factors influencing the health problem of heat-related illnesses. This study focuses on the environmental risk factors causing heat-related illnesses. It is important to note that the risk factor of heat-related illness in this case is not the actual outside or inside air temperature. Instead, the focus is on the sudden shift between outdoor heat and cold indoor environments, particularly the indoor-outdoor temperature difference that emerges during periods of extreme heat.

One environmental risk factor of heat-related illness is that of temperature fluctuations throughout the day, which continuously change the indoor-outdoor temperature difference. During summer heatwaves in the Netherlands, early morning temperatures can be

around 20 degrees Celsius, while afternoon temperatures may rise to over 35 degrees (KNMI, 2020). Given that supermarkets typically maintain a constant indoor temperature of around 18-20 degrees Celsius for food safety and customer comfort (RIVM, 2019), this results in a relatively small temperature difference in the early morning, but a much larger contrast in the afternoon. Research shows that such abrupt thermal transitions may increase cardiovascular strain in vulnerable populations, particularly the elderly (Kenny et al., 2010).

As opposed to behavioural risk factors, environmental risk factors cannot be directly changed by those affected. However, the environment can be changed using an environmental change agent. In this case, the supermarket manager is hypothesised to be the environmental change agent, as they could possibly have an influence on the in-store temperature.

Target Behaviour

After establishing the risk factors of the health problem Our chosen target behavior focuses on supermarket managers in the Ommoord neighbourhood of Rotterdam, aimed at reducing health risks for elderly customers during high outside air temperatures. Specifically, the behaviour involves store managers acknowledging the potential impact of indoor temperature conditions during heatwaves and supporting practical solutions that help elderly customers avoid these harmful temperature shifts. This could include communication efforts about environmental risks as well as implementing or promoting services. The behaviour is expected to occur within the store environment, especially during heatwaves, in collaboration with internal staff and possibly external stakeholders such as central office, the GGD and Aafje.

This target behaviour was selected because while the health issue primarily affects elderly clients, they do not have the power to modify the store environment. Supermarket managers, on the other hand, are in a key position to recognize environmental risks and

either take action themselves or advocate for changes through the organizational communication channels. Their engagement is therefore essential for initiating and supporting feasible interventions. Additionally, managers act as a bridge between daily operations and larger structures in the organization, making them important environmental change agents in recognizing and responding to the specific needs of vulnerable customer groups like the elderly. Practical considerations also affected our choice as we wanted to identify a behaviour that was realistically changeable in the context of the store. By focusing on the role of store managers, we allow for realistic and context-sensitive target behaviours within the boundaries of what is actually possible within their jurisdiction.

Behavioural Determinants

Given that this research focuses on environmental risk factors affecting healthy shopping behaviour among older adults, the identified determinants demonstrate what influences these environmental factors. The behavioural determinants of the target behaviour were categorised according to the COM-B Model of behaviour, which divides determinants into three categories: capability, opportunity, and motivation (West & Michie, 2020).

Capability

Capability refers to whether one possesses the required skills, knowledge, and abilities in order to perform a certain behaviour (West & Michie, 2020). It is further divided into psychological capability—encompassing one's mental functioning such as knowledge and memory—and physical capability, encompassing one's physical functioning, such as strength and stamina.

Since all managers were physically capable of adjusting the temperature settings, either by contacting an external company or by simply "turning on the heater," this section focuses mostly on psychological capability. Most managers were unable to provide the exact store temperature, instead presenting a range as an approximation, such as: "It often

fluctuates around 17, 18, 19, 20 degrees [Celsius] with peaks up and down." Additionally, several managers mentioned being unaware of the specific reasons behind their store's temperature settings, as this is regulated by an external company and "not our decision." Furthermore, most managers agreed that these temperatures were chosen because they are "standard" and "generally acceptable," indicating limited knowledge.

Opportunity

Opportunity refers to external environmental factors which enable or hinder one's possibility to engage in a specific behaviour (West & Michie, 2020). It consists of both social opportunity, which includes interpersonal and organisational influences, such as social norms, and physical opportunity, encompassing inanimate objects and time, such as (financial) resources.

In the context of changing temperature settings, managers indicated that the system controlling those settings "regulates itself," and is "completely automatic," limiting physical opportunity. Moreover, temperature settings are decided and adjusted by either an external company or the supermarket's central office. One manager specifically mentioned that temperature regulation "is centrally arranged" and "not our decision," which restricts social opportunity.

While the managers mentioned the physical opportunity to change temperature settings by approaching these external parties, this was not used during heatwaves. Some indicated the possibility of making manual adjustments to the store temperature, such as "turning on the heater," although this opportunity was never used. Others mentioned that the central office does not allow them to change the store temperature, as it is the same across all stores.

Another constraint within their social opportunity was the influence of product suppliers, who partly determine store temperatures by providing guidelines for the

recommended preservation of products. These usually do not exceed 20 degrees Celsius, something for which "there is no perspective taken into account when an elderly person comes into the store."

Motivation

Motivation refers to the mental processes which govern and stimulate behaviour, containing both automatic motivation—referring to instinctive, habitual, and drive-related processes—and reflective motivation, which refers to deliberate thought processes (West & Michie, 2020).

Managers mentioned that temperature settings do not really change throughout the year, referring to them as "a standard thing," and that temperature only fluctuates due to weather conditions. This habitual approach demonstrates automatic motivation.

However, most motivational determinants indicated reflective motivation. One manager mentioned that changing the temperature would "not be too complicated," but recognised that "it does affect the shelf life indeed." Shell life was mentioned as a determinant by more managers as "products stay fresh for much longer" at low temperatures. This is closely connected with a consideration of profit and competition, as their "products could spoil much faster than theirs [other supermarkets], so they would benefit from that." While it is supported by research that fresh products have an increased shelf life when stored at lower temperatures (Hossain et al., 2024; Moreira et al., 2023), managers did mention that the products which needed to be cooled were stored within refrigerated compartments or freezers. One manager said specifically that, because of this, it should not matter if the store temperature would increase, since they are "shielded from the heat."

Another key determinant is customer satisfaction. All managers mentioned positive customer feedback regarding their store temperature, especially during summer, mentioning that customers tell them that because of the temperature "it is really nice in the store."

Because of this, managers did not see the temperature as a pressing concern, saying that they "don't think it's too cold, no." When asked about the outside and inside temperature fluctuation in relation to elderly, managers mentioned their elderly customers to be aware of this, stating that elderly come almost exclusively during mornings and evenings. Customer satisfaction was also explicitly linked to profit, as customers tended to stay in the supermarket longer and might buy more products when it was cooler in the store. As one manager mentioned, "the moment you walk into a supermarket and you experience the same heat [as outside] you want to get out of there as quickly as possible."

This is supported by research, which suggests that customers' perception of the in-store environment, including temperature, significantly predicted both the time they spend in the store and the tendency to spend more money than they initially intended (Donovan et al., 1994; Turley & Milliman, 2000).

Lastly, energy costs were identified as a possible determinant, explaining that "when it is warmer in the store, the cooling units work against the temperature and that costs more energy." However, maintaining lower in-store temperature also requires increased usage of air conditioning during heatwaves, which may similarly result in higher energy costs. This second point is supported by research, indicating that increasing in-store temperatures to reduce the difference between inside and outside temperatures actually leads to significantly lower energy costs (Xiong et al., 2023).

Health Intervention

To address the risk of heat-related illness in elderly customers due to the temperature differences, we developed two complementary health interventions targeted at supermarket managers. From the interviews it was concluded that most determinants were not changeable and therefore many health intervention ideas were not feasible. Drawing on the determinants,

we identified the relevant intervention functions and selected behaviour change techniques (BCTs) that aligned with them.

The first intervention we developed is an organisational diagnosis and feedback process, which targets both the psychological capability and reflective motivation of managers. Our findings showed that many managers were unaware of how cold indoor air can trigger health problems in the elderly when contrasted with extreme outdoor heat. Moreover, in most instances they were unable to restructure the environment or change the temperature themselves, because of policies from higher up in the organisation. The overall consensus was that this issue was not under their control. In response to this, we propose a series of structured interviews or focus groups with organisational consultants, store managers, and decision-makers at the central office to assess organisational structures and employee's beliefs, attitudes, and their readiness to take action. The intervention function of education is addressed here, as these sessions would explore how temperature regulation currently operates within the store and would offer tailored feedback to raise awareness of the potential health risks involved.

To implement this intervention, we selected the behavioural change technique "feedback on behaviour" (BCT 2.2). This technique involves making individuals aware of the unintended consequences of their current behaviour, which in this case was maintaining low temperatures in the store during heatwaves. The goal is to increase reflective engagement with the issue and encourage managers to explore alternative actions they can take, even within policy and system constraints. In practice, these sessions will involve gathering information from those who are more in control of environmental restructuring policies as well as presenting real-life scenarios and health information in an accessible format. This will essentially reframe the role of store managers from passive to active environmental change agents. Rather than pressuring managers to make changes they cannot control, the

intervention focuses on feasible alternatives like monitoring stores, raising the issue with the supermarkets' central offices or introducing small-scale measures to enhance health protection.

The second intervention was suggested by several store managers we interviewed. They stated that ordering online was rarely used by the elderly, yet this could be a simple solution. This way, fresher groceries can be stored in the fridge during delivery, and since many elderly live within residential complexes it will be easy to carry out and raise awareness. Therefore, we propose a phone-based grocery ordering service that is accessible to elderly customers. Unlike apps, which many elderly people find difficult to use, a dedicated phone line would allow them to order groceries easily while avoiding heat exposure altogether. This can be promoted through flyers in the store as well as cashiers who the elderly regularly chat to.

This intervention complements the first by expanding the physical opportunity for elderly customers to avoid high-risk behaviours, such as visiting the store during the hottest parts of the day. However, the behaviour change it requires is implemented by store managers. The intervention addresses the function of enablement and environmental restructuring. Enablement helps overcome barriers by offering an easy alternative to in-person shopping during heatwaves, especially for elderly customers who may not be comfortable with digital platforms. Environmental restructuring is relevant, as the phone line creates a new and more accessible pathway in the store's services.

The behavioural change technique in this intervention is "Adding objects to the environment" (BCT 12.5). This refers to the introduction of new tools or physical components that make health-promoting behaviours easier to perform. In this case, the object is the phone-based ordering system which, in practice, can be established using current staff and minimal technological investment. Store managers would oversee the system's

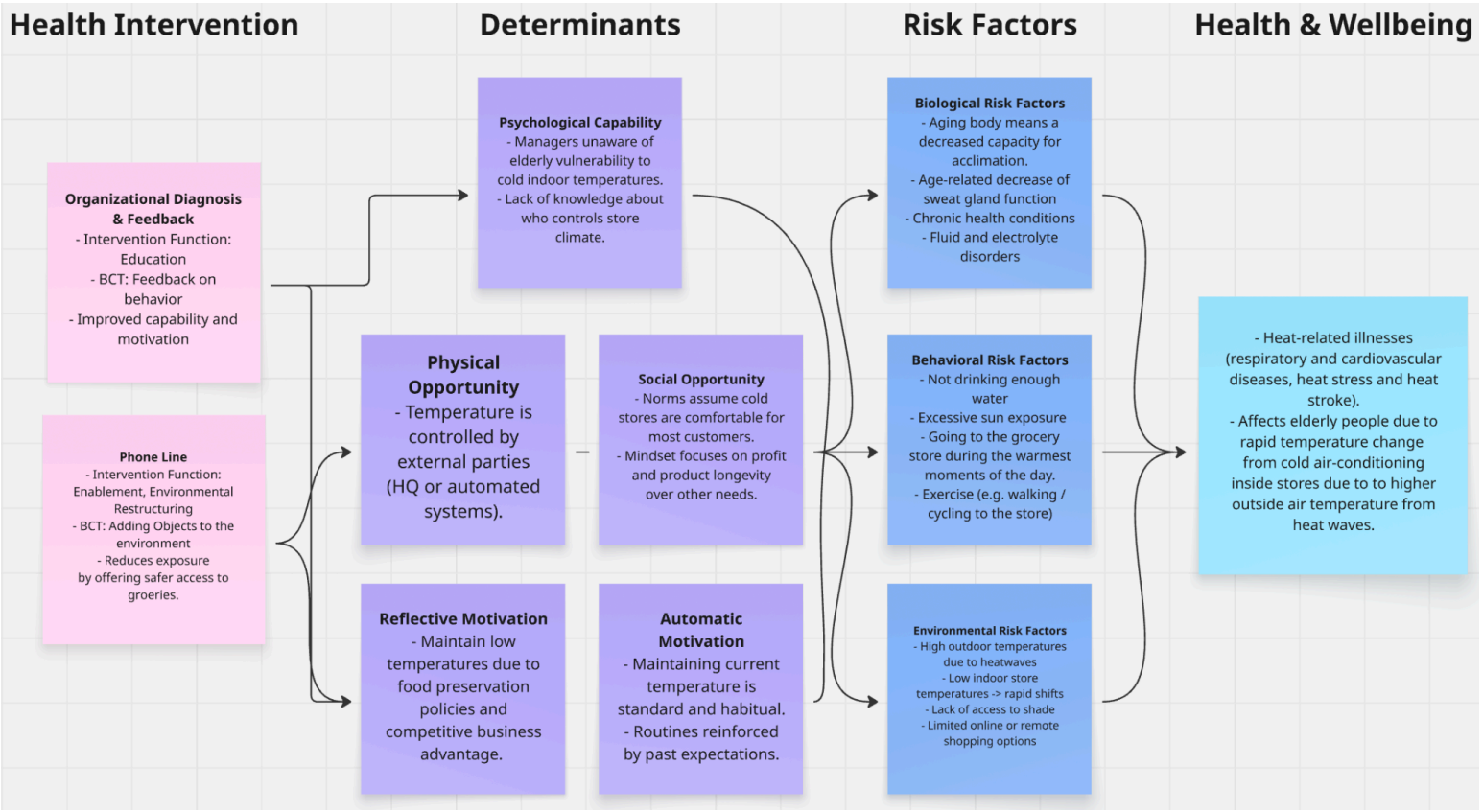
promotion within the store to ensure elderly customers are aware of the service, and can be coordinated with partners like Aafje to reach the target audience effectively.

Together, these two interventions work by enhancing different aspects of the COM-B model. The first builds awareness and reflective motivation, while the second removes structural barriers and provides an opportunity to take action. Rather than demanding large-scale policy change, they empower store managers to take local and therefore feasible action to protect elderly customers during heatwaves.

Logic Model

The logic model below illustrates the pathways from the health and well-being issue and the risk factors associated with it to the behavioural and environmental determinants identified in our interviews. It also shows how our two health interventions target specific determinants to ultimately improve health and well-being.

Figure 1 *Logic Model*



Stress and Coping

Stress and coping mechanisms did not appear to play a meaningful role in the behaviour of supermarket managers in this context. Stress was only really related to concerns about profit, but even in these cases managers did not appear to experience significant stress. Moreover, coping was largely absent as the temperature settings were part of routine operations and because of logistical constraints were outside managers' physical and psychological capability. Coping strategies were therefore not a relevant determinant of their actions or attitudes towards elderly health risks.

Final Reflection

This project targeted the behaviour of supermarket managers in Ommoord, Rotterdam as environmental change agents who can influence the health and safety of elderly customers during heatwaves. Although the health risk of rapid transitions from outdoor heat to cold indoor environments affects the elderly, we focused on the behaviour of store managers and so the environmental factors. However, through our interviews we found that store managers had very limited control over the store temperature itself. Most were unaware of how temperature was regulated, explaining that decisions were made by external companies or supermarkets' central offices. In the end, the behaviour we aimed to influence was their ability and willingness to recognise the health risks and take feasible, indirect action through alternative solutions like supporting safer shopping options for elderly customers.

The most relevant and changeable determinants were low psychological capability, such as a lack of awareness about the issue, limited physical opportunity due to the absence of control over the air conditioning, and a lack of reflective motivation as many managers didn't perceive the elderly vulnerability as a pressing concern. While physical opportunity could not easily be changed due to corporate constraints, psychological capability and reflective motivation were modifiable through our interventions. The behavioural change technique of providing feedback on behaviour was chosen to address these determinants through organisational diagnosis sessions. Additionally, the BCT of adding objects to the environment, implemented as a phone line for elderly customers to place orders, offered a low-tech solution that store managers could support even within their constraints.

One of the strengths of our logic model and assessment was that it stayed grounded in the real-world limitations of supermarket operations. We adapted our interventions to fit what store managers could actually influence, rather than designing unrealistic changes such as temperature regulation, earlier open hours, or hanging out jackets.

Nonetheless, there were clear limitations and challenges we faced. It was difficult to get access to store managers, especially since many stores do not provide contact details publicly. We had to physically visit locations multiple times, and even then not all managers were willing or available to participate. Through our research, we uncovered a major gap: store managers themselves often had limited knowledge or authority over environmental factors that directly affect public health. It was also challenging to identify interventions that target store managers specifically, given that the health issue affects elderly customers and the managers did not always recognise the problem. Interestingly, some managers told us that elderly customers prefer cooler store environments or already adjust their shopping habits by coming in early. This revealed a potential mismatch between assumptions made in public health planning and how the target population actually experiences and navigates the issue.

For future research and practice, we recommend involving both local store managers and corporate-level decision makers in this research. Central offices might have more influence over technical and structural policies like temperature regulation, but managers can play a critical role in advocating for change and implementing practical, low-cost services like the phone ordering system. Also, other neighbourhoods with a high population of senior citizens could be researched to see if supermarkets have more knowledge on the issue or new ideas on how they deal with it.

References

American Psychological Association (n.d.). *APA Dictionary of Psychology*. https://dictionary.apa.org/risk-factor

Breuër, S., & Hartman, M. (2025). *Framework logic model* [Unpublished figure]. Health Psychology, Erasmus University College.

Bunker, A., Wildenhain, J., Vandenbergh, A., Henschke, N., Rocklöv, J., Hajat, S., & Sauerborn, R. (2016). Effects of air temperature on climate-sensitive mortality and morbidity outcomes in the elderly; A systematic review and meta-analysis of epidemiological evidence. *EBioMedicine*, *6*, 258–268. https://doi.org/10.1016/j.ebiom.2016.02.034

Bouchama, A., & Knochel, J. P. (2002). Heat stroke. *New England Journal of Medicine*, *346*(25), 1978–1988. https://doi.org/10.1056/nejmra011089

Donovan, R. J., Rossister, J. R., Marcoolyn, G., & Nesdale, A. (1994). Store atmosphere and purchasing behaviour. *Journal of Retailing*, *70*(3), 283–294. https://doi.org/10.1016/0022-4359(94)90037-x

Government of the Netherlands. (2020, October 28). *Tijdelijke regeling maatregelen COVID-19: Artikel 4.6. Venstertijd supermarkten* [Regulation]. https://open.overheid.nl/documenten/ronl-e7bd32ea-5975-447f-b841-acf69e90f78e/pdf

Han, Q., Sun, S., Liu, Z., Xu, W., & Shi, P. (2022). Accelerated exacerbation of global extreme heatwaves under warming scenarios. *International Journal of Climatology*, *42*(11), 5430–5441. https://doi.org/10.1002/joc.7541

Hossain, A., Akhtaruzzaman, M., Mondal, M. H. T., Islam, M. R., Roy, J., Hasan, S. M. K., & Sarker, M. S. H. (2024). Development and performance evaluation of a refrigerated

storage structure for preserving fresh fruits and vegetables. *Discover Food*, *4*(1). https://doi.org/10.1007/s44187-024-00156-x

Johns Hopkins Medicine (2024). *Heat Related Illnesses.* https://www.hopkinsmedicine.org/health/conditions-and-diseases/heatrelated-illnesses-heat-cramps-heat-exhaustion-heat-stroke

Kenny, G. P., et al. (2010). Heat stress in older individuals and patients with common chronic diseases. *CMAJ*, 182(10), 1053–1060.

KNMI (2020). *Klimaatscenario's voor Nederland*.

Koninklijk Nederlands Meteorologisch Instituut. (n.d.). *Hittegolf*. https://www.knmi.nl/kennis-en-datacentrum/uitleg/hittegolf

Michie, S., Atkins, L., & West, R. (2014). *The behaviour change wheel: A guide to designing Interventions*. https://openlibrary.org/books/OL32259087M/The_Behaviour_Change_Wheel

Millyard, A., Layden, J. D., Pyne, D. B., Edwards, A. M., & Bloxham, S. R. (2020). Impairments to thermoregulation in the elderly during heat exposure events. *Gerontology and Geriatric Medicine*, *6*. https://doi.org/10.1177/2333721420932432

Moreira, J., Mera, E., Chhetri, V. S., King, J. M., Gentimis, T., & Adhikari, A. (2023). Effect of storage temperature and produce type on the survival or growth of Listeria monocytogenes on peeled rinds and fresh-cut produce. *Frontiers in Microbiology*, *14*. https://doi.org/10.3389/fmicb.2023.1151819

RIVM. (2019). *Higher mortality during heatwave in July in the Netherlands*. National Institute for Public Health and the Environment. https://www.rivm.nl/en/news/higher-mortality-during-heatwave-in-july-in-netherlands

RIVM. (2020, August 7). *Hitte en gezondheid: herken de klachten en weet wat je moet doen*. https://www.rivm.nl/hitte/documenten/hitte-herken-klachten

Schellen, L., Van Marken Lichtenbelt, W. D., Loomans, M. G. L. C., Toftum, J., & De Wit, M. H. (2010). Differences between young adults and elderly in thermal comfort, productivity, and thermal physiology in response to a moderate temperature drift and a steady-state condition. *Indoor Air*, *20*(4), 273–283. https://doi.org/10.1111/j.1600-0668.2010.00657.x

Turley, L., & Milliman, R. E. (2000). Atmospheric effects on shopping behaviour: A review of the experimental evidence. *Journal of Business Research*, *49*(2), 193–211. https://doi.org/10.1016/s0148-2963(99)00010-7

West, R., & Michie, S. (2020). A brief introduction to the COM-B model of behaviour and the PRIME theory of motivation. *Qeios*, 1–6. https://doi.org/10.32388/ww04e6.2

Weil, D. N. (2006). Population aging. *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.893608

World Health Organization: WHO. (2024, May 28). *Heat and health*. https://www.who.int/news-room/fact-sheets/detail/climate-change-heat-and-health

Xiong, J., Chen, L., & Zhang, Y. (2023). Building energy saving for indoor cooling and heating: Mechanism and comparison on temperature difference. *Sustainability*, *15*(14), 11241. https://doi.org/10.3390/su151411241

Appendix A

Verbal Informed Consent

We are Yorrick Bronsgeest, Isabel Sanz Lara, Riya Krahenbuhl, and Kee Nollet and we are students at the Erasmus University College. Thank you for taking the time to speak with us today. We are partnering with the GGD and elderly care organisation Aafje to conduct research on how healthy shopping can be promoted among the elderly during hot days. For this we are particularly interested in the perspective of the shop owners.

The interview will take approximately 30 minutes. During this time, we will ask you around 8-10 questions related to the topic described above. You are free to share as much or as little as you feel comfortable with.

Your participation is entirely voluntary. You have the right to decline to answer any question or to withdraw from the interview at any time without any consequences.

All information you provide will be treated with strict confidentiality. Your responses will be anonymised and stored securely. No identifying information, such as name or store, will be used in any reports from this research.

There are no known risks associated with this interview. While you may not benefit directly, your insights may help improve understanding of this topic and contribute to creating healthy shopping experiences for elderly.

With your permission, we would like to audio-record this interview to ensure the accuracy of the data. The recording will be stored securely and only used for the purposes of this study. It will be deleted within 2 weeks. Do we have your permission to record this interview?

Before we begin, do you have any questions for us? Do you understand the information we've shared, and do you voluntarily agree to participate in this interview?

Appendix B

Interview Questions

Context

1. How many/what percentage of your customers are elderly people?
    a. How often do they shop and at what times?
    b. Awareness of the health risk of elderly
2. Are you aware of any specific needs or vulnerabilities of elderly customers during heatwaves? In terms of health risks.
    a. Have you or your team received any communication/training about this?
3. What is your current store temperature?
    a. Does it have the same temperature year round, or does this depend on the outside temperature?
    b. Are there different temperatures in different areas of the store?
    c. Do you use any other cooling strategies besides air conditioning, such as fans, open doors, or shading?
4. Have you received any feedback on the store temperature, especially during heat waves? If so, from whom did the feedback come from (customers, employees)?
    a. How do you usually respond to that feedback?

Behaviour

1. Do you notice any changes in customer behaviour during heatwaves? (e.g., staying longer, leaving quickly, coming at different times)
2. Has the store made any changes over time in response to extreme weather events like heatwaves? If so, what kind?

Determinants: Capability, Opportunity, Motivation

1. Who decides and who influences the temperature settings of the air conditioners?

   a. What are the policies/guidelines on what temperature the store should be?

2. What determines/influences the temperature settings of the air conditioners? (we need at least 3 determinants) (specifically on hot days)
   a. prompt if they don't say much: e.g energy costs, customer comfort, employee comfort, food safety, technical limitations.
3. What is the procedure to change temperature? Is it decided per store or throughout the whole supermarket chain?
   a. Do you see advantages or disadvantages of changing store temperature or taking other measures during heatwaves?
4. If you were asked to make the store more comfortable for elderly during heat waves, how would you do this?
5. Do you feel like store managers have enough autonomy and tools to create a comfortable climate for both staff and customers?
6. What are challenges or barriers that make it hard to change temperature settings?