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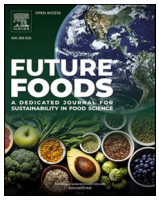

Consumers' capabilities, opportunities, and motivations to consume dairy and plant-based alternatives in a dairy-rich food culture

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ABSTRACT

Health, environmental and ethical reasons support reducing both meat and dairy consumption. However, so far more scholarly attention has been paid to the consumption of meat and its alternatives than to the consumption of animal-based dairy products (ABDPs) and plant-based dairy alternatives (PBDAs). This qualitative study employs the COM-B (Capability, Opportunity, Motivation, Behaviour) model to explore aspects related to the consumption of ABDPs and PBDAs in a Nordic food culture. In total 28 semi-structured interviews with consumers were analyzed by thematic analysis. The main results are presented as three themes. The theme "Convenience matters" demonstrates the role of product selection and availability, and consumers' cooking skills in relation to ABDPs and PBDAs. The second theme, "Socially influenced", shows how social relationships and marketing can affect dairy-related eating habits. The final theme, "Balancing between money, conscience and tastebuds", describes how ABDP and PBDA choices may be loaded with motivational conflicts. The findings are discussed using the COM-B framework with a focus on the interconnectedness of the COM-B elements in ABDP and PBDA consumption. The results offer insights into ABDP and PBDA consumption that need to be focused on in policies and other intervention measures to increase dairy alternative consumption.

1. Introduction

For several reasons related to healthiness, ethics and environmental sustainability, diets should contain more plant-based foods and considerably less animal-derived foods, especially red meat and dairy, than they currently do (e.g., Willett et al., 2019). There is evidence that plant-based diets have lower carbon footprint and are more environmentally friendly than diets rich in animal products (e.g. Poore and Nemecek, 2018; Xu et al., 2021). Moreover, concerns related to the ethicality of animal-based food production (e.g. Bolton et al., 2024a; Cook and von Keyserlingk, 2024; Croney and Swanson, 2023) have been raised, and research has showed that replacing animal-based foods with plant-based options often improves the quality of diets in terms of fat and fiber intake, for example (Berardy et al., 2022; Papanikolaou et al., 2024; Päivärinta et al., 2020). Thus, one solution to decrease animal-based meat and dairy in diets is to substitute them with what are often referred to as plant-based meat and dairy alternatives. In recent years, even though diet-related sustainability has attracted a considerable amount of research efforts, they have focused mainly on plant-based meat alternatives and reducing meat consumption (e.g. Graça et al., 2019; Koponen et al., 2023; Nevalainen et al., 2023; Onwezen and Dagevos, 2024; Onwezen et al., 2021), while decreasing the consumption of dairy and consumer perceptions of plant-based dairy alternatives (PBDAs) have received considerably less attention (e.g. Etter et al., 2024).

Although PBDAs can act as alternatives to animal-based dairy products (ABDPs), established consumer preferences and current food environments tend to reinforce the consumption of the latter. Studies in different theoretical traditions and disciplines have found that perceptions of taste (Bolton et al., 2024b; Collier et al., 2023; S.R. Jaeger, Giacalone, et al., 2023), price (Adamczyk et al., 2022; Hansen et al., 2023; Slade and Markevych, 2024), availability and social relationships (Autio et al., 2023; Collier et al., 2023) influence the consumption of dairy products and their plant-based alternatives. These, along with other factors, can help sustain dairy-intensive food cultures and hinder the consumption of PBDAs. Therefore, this paper aims to explore

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different kinds of capability, opportunity and motivation-related barriers and enablers related to PBDA and ABDP consumption in a dairy-rich food culture.

1.1. The theoretical framework

The social psychological Capability, Opportunity, Motivation, Behaviour (COM-B) model introduced by Michie et al. (2011) has been successfully applied as a theoretical framework in studying advancing plant-based diets (e.g. Graça et al., 2019; Kuosmanen et al., 2023, 2025; van den Berg et al., 2022) as well as reducing meat consumption and the acceptance of alternative proteins (Onwezen and Dagevos, 2024). The COM-B model has been applied more often in quantitative studies than in qualitative research, and to our knowledge no studies have combined qualitative data on (plant-based) dairy-related consumption and the COM-B model. To gain a deeper understanding of the capabilities, opportunities, and motivations related to the consumption of ABDPs and PBDAs, in this article we combine qualitative methods and the COM-B model to allow for a nuanced and comprehensive analysis.

The COM-B model is at the center of the Behaviour Change Wheel (BCW), which is a framework developed for planning and implementing effective behavioral interventions (Michie et al., 2011). The COM-B model and BCW together enable the identification of the behavioral elements that need to change to achieve the desired behavioral shift. According to Michie et al. (2011), for any behavior to be realized, each element of the COM, i.e., capability, opportunity and motivation, is needed. Furthermore, the elements consist of two dimensions. Capability is defined as psychological (e.g. knowledge) and physical (the ability to do something) capability. In the context of eating, recipe know-how and awareness of different ingredients are examples of psychological capabilities, while the bodily ability to perform the act of preparing, eating, and digesting food represent physical capabilities. Opportunity includes social opportunities (e.g. social relationships, social norms) and physical opportunities (e.g. physical environment, financial resources). From the perspective of eating these can translate into an environment where one's food choices are socially approved of (or not), and which offers a diverse and affordable (or vice versa) selection of food products. Motivation consists of reflective motivation (intention, deliberation) and automatic motivation (emotions, impulses). In terms of eating, a delicious smell or an appealing appearance of food can unconsciously trigger automatic motivation to take precedence over reflective motivation of healthy or ethical food choices, for instance.

1.2. Context for the present study

Generally, the Nordic countries, consisting of Sweden, Denmark, Norway, Iceland, and Finland, are very dairy-rich food cultures, and produce and consume high amounts of dairy products (Harwatt et al., 2024). The nutritional value of dairy has been highlighted extensively through marketing for instance in Sweden (Martiin, 2010), Norway (Korsnes and Loeng, 2024), and Finland (Kaarlenkaski, 2024) starting as early as the beginning of the twentieth century. In this paper, we focus on one Nordic dairy-rich country, Finland, and explore Finnish consumers' perceptions of PBDAs and ABDPs. In the Nordic context, Finnish adults consume the highest amount of dairy products excluding cheese at almost 400 g per day, while the dairy consumption of adults in other Nordic countries ranges from 245 to 314 g per day (Harwatt et al., 2024). Moreover, globally the consumption of liquid milk in Finland has been among the highest for decades (Kaarlenkaski, 2024).

Historically, milk has been considered to be a staple food, a provider of important nutrients, and a considerable element of the Finnish food culture (Kaarlenkaski, 2024; Kylli, 2021). However, in recent decades the consumption of liquid milk has been steadily declining, while the consumption of other dairy products, such as cheese and yogurt, has increased (Natural Resources Institute Finland, 2024). For instance, the consumption of cheese was five times higher in 2023 (26 kg/person) than in 1973 (5.2 kg/person). From the sustainability perspective, this is not ideal, as producing one kilogram of hard cheese requires approximately ten liters of liquid milk. Overall, the production of milk has not markedly decreased (Natural Resources Institute Finland, 2024), and milk and other dairy products continue to hold a special place in the heart of the Finnish food culture. Plant-based dairy alternatives may face reluctance and prejudices, yet Finns' love for dairy may also facilitate PBDA consumption should the dairy alternatives fulfill consumers' expectations. In this regard, Finland provides a good example of a dairy-rich food culture, and the barriers and enablers related to PBDA consumption present in the Finnish context are likely similar in other dairy-rich cultures as well.

1.3. Earlier research on consumer perceptions of ABDPs and PBDAs

Consumers often have the expectation that a PBDA resembles closely that of their animal-based equivalent, and if it does not, that is a cause for disappointment (S.R. Jaeger, Cardello, et al., 2023). This relates especially to taste: PBDAs can be expected to taste the same as (Cardello et al., 2022) or too different from (Collier et al., 2023) their animal-based equivalents. Both of these expectations can have an impact on the *motivation* to consume PBDAs: the former may lead to disappointment, while the latter may discourage even tasting them. Moreover, the perceived inferior taste of PBDAs is highlighted when they are intended to act as substitutes rather than diet enrichments alongside ABDPs (Adamczyk et al., 2022). However, Autio et al. (2023) noticed that consumers who had reduced their dairy consumption had actually started to dislike the taste of dairy products, which highlights a change in deriving pleasure from ABDPs and thus a decreased motivation to consume them. In addition to taste, other sensory aspects, such as creaminess (Greis et al., 2023; S.R. Jaeger, Cardello, et al., 2023), color (Cardello et al., 2024), and texture (S.R. Jaeger, Cardello, et al., 2023) have been identified as factors in (not) being motivated to eat PBDAs. In addition, PBDAs' nutritional profiles differ from those of ABDPs in terms of protein and fat content as well as nutrients (Berardy et al., 2022). The perceptions of which ones are healthier vary among consumers (Adamczyk et al., 2022; Bolton et al., 2024b; Collier et al., 2023).

Moreover, hedonistic reasons, such as taste (Adamczyk et al., 2022) and pleasure (Autio et al., 2023), may override *motivations* related to environmental and animal welfare (ethical) concerns to consume PBDAs instead of ABDPs. In the COM-B model, this overriding is interpreted as *competing motivations* (West and Michie, 2020). Positive feelings, such as comfort and happiness, are often associated with ABDPs (Bolton et al., 2024b), which may be a motivation to consume them. However, dairy products can also evoke mixed feelings among consumers: on the other hand, dairy foods may have been associated with love and care throughout childhood, but later on in life their production methods may have raised ethical concerns (Bolton et al., 2024b), thus creating a situation of competing motivations. Büchs et al. (2023) noted that animal welfare and environmental reasons are motivations to consume plant-based milks, but despite awareness of these issues, they do not always provide enough incentive to change consumption habits (i.e., other motivations are stronger). When the unethicality of dairy has been acknowledged, but ABDPs are still consumed, consumers may experience guilt (Autio et al., 2023; Büchs et al., 2023) and mixed feelings (Bolton et al., 2024b).

Both Cardello et al. (2022) and Collier et al. (2023) argue that the consumption of PBDAs would likely increase if consumers were to taste PBDAs on a regular basis and thus get used to their taste. This, in turn, could advance the social normalization of PBDAs (Collier et al., 2023). Social normalization enhances *social opportunities* to consume PBDAs, as noted by Autio et al. (2023) and Hansen et al. (2023). Moreover, *physical opportunities*, such as price and availability, contribute to the (non-) consumption of PBDAs. Compared to ABDPs, PBDAs are often more expensive (Hansen et al., 2023; Slade and Markevych, 2024) or

perceived to be so (Adamczyk et al., 2022), which can be a barrier to their consumption. Autio et al. (2023) found that limited availability of PBDAs in cafes or at friends' homes, for instance, affected their consumption negatively.

The focus of prior studies on consumer perceptions of PBDAs has tended to center around the aspect of motivation, but as outlined by Michie et al. (2011), motivation alone is not enough to trigger a shift in behavior. Thus, drawing on the COM-B model and exploring consumers' existing capabilities, opportunities and motivations, the present study seeks to understand more comprehensively how different socio-cultural and infrastructural barriers and enablers relate to the consumption of ABDPs and PBDAs.

2. Materials and methods

2.1. Participants and data collection

This study is based on 28 semi-structured individual interviews conducted N in early 2023 as part of the project entitled Climate Smart Dairy: Assessing Challenges, Innovations, and Solutions (SmartDairy). Due to our previous experiences in conducting interviews as well as practical (i.e., budgetary) reasons, the number of participants was predetermined to be 30. Thirty participants turned out to be sufficient: as the interviews progressed, we noticed that in the last interviews the participants did not bring out highly relevant new perspectives or topics, indicating that we had reached the point of saturation. The interviews of two participants were excluded from the final analysis due to technical issues during the interviews.

The participants were recruited by a Finnish company specializing in recruiting study participants. The company has a panel of volunteers. These volunteers received an e-mail inquiring about their potential interest to participate in the study, after which the company selected the participants best matching our predetermined selection criteria. As for the criteria, the main principle was to interview consumers living in various parts of Finland and representing a variety of social backgrounds and diets. The original gender distribution of the participants (before the exclusion of the interviews with technical issues) followed that of the Finnish adult population (Statistic Finland, 2025). Table 1 details how the backgrounds of the participants varied in terms of gender, education, age, place of living, and (self-reported) diet.

Prior to the interviews, the participants were provided with a privacy notice informing them of data protection and the purpose of the study as well as a consent form. The participants gave their informed consent in writing or orally. They had the right to withdraw from the study at any point during or after the interview, but before data analysis. For compensation, the participants received a gift card worth 40 euros for an online store of their choosing. Each interview lasted approximately one hour. In the section on results, the participants are referred to by their pseudonym followed by their gender (F/M) and age. The interviews included the following themes: 1) general views on food, dairy products and dairy alternatives, 2) usage of dairy products and dairy alternatives in everyday life, 3) sustainable and climate-friendly food culture and dairy culture (incl. dairy alternatives), 4) cheese and plant-based alternatives, and 5) dairy-related food waste. We developed two to six questions for each theme with some additional prompts if further clarification was needed.

Table 1
Descriptive characteristics of the participants in the order they were interviewed.

Pseudonym	Age	Gender (*F* = female, *M* = male)	Place of living	Education	Diet
Aurora	22	F	Countryside	Secondary	Omnivore
Petri	39	M	Countryside	Secondary	Omnivore
Moa	18	F	Capital area	Primary	Vegan
Tiina	68	F	Small city or other urban area	Secondary	Vegetarian (occasional meat)
Sven	40	M	Capital area	Tertiary	Vegan
Katri	53	F	Small city or other urban area	Secondary	Omnivore
Timo	28	M	Large city	Tertiary	Vegetarian
Kaisa	42	F	Small city or other urban area	Tertiary	Vegan
Liisa	74	F	Capital area	Secondary	Omnivore
Arttu	24	M	Large city	Secondary	Vegan
Pasi	57	M	Small city or other urban area	Secondary	Vegetarian (+chicken)
Milla	46	F	Capital area	Tertiary	Omnivore
Erik	55	M	Capital area	Tertiary	Vegetarian
Edvin	43	M	Capital area	Secondary	Lacto-ovo veg.
Jani	29	M	Large city	Secondary	Vegan
Laura	33	F	Countryside	Tertiary	Vegan
Sari	60	F	Countryside	Secondary	Lacto-ovo veg. (occasional fish)
Aino	25	F	Large city	Tertiary	Vegetarian
Kerttu	72	F	Small city or other urban area	Tertiary	Omnivore
Jonna	25	F	Countryside	Secondary	Vegan
Venla	30	F	Small city or other urban area	Secondary	Vegetarian
Jaakko	41	M	Small city or other urban area	Tertiary	Omnivore
Elina	54	F	Large city	Secondary	Vegetarian (+fish)
Markus	30	M	Small city or other urban area	Tertiary	Omnivore
Iisa	18	F	Large city	Secondary	Omnivore
Mimosa	25	F	Countryside	Secondary	Vegetarian (+fish)
Jori	35	M	Small city or other urban area	Secondary	Vegetarian (occasional meat)
Kristian	34	M	Countryside	Secondary	Omnivore

2.2. Analysis

The interviews were recorded and subsequently transcribed. The quotations presented in the result section have been translated by the authors from Finnish into English, maintaining their original colloquial tone. Thematic analysis (Braun and Clarke, 2013) was applied in the analysis. Excluding the initial reading of the transcripts, the first author was solely responsible for the analysis. First, the two first authors read through all transcripts to allow familiarization with and to obtain an overall sense of the data. During this phase, the multiple references to dairy-related marketing especially at schools as well as the all-encompassing nature of dairy in the Finnish food culture, but also the belief that PBDA consumption will increase, drew our attention. Second, the first author reviewed the transcripts in more depth, and excerpts associated with the consumption and non-consumption of either ABDPs or PBDAs were highlighted in the transcripts. The initial list of codes was formed based on these excerpts. The data was then re-reviewed, and new or modified codes were added as needed, amounting to a total of 39 codes. Third, after the completion of this inductive coding process, the transcripts were reassessed to check for coding consistency, and all codes along with their respective text excerpts were mapped into the COM-B model to check for compatibility with the elements. Fourth, the codes and text excerpts were collated into initial subthemes, after which they were carefully re-evaluated and refined through multiple rounds of

review. During this process, some subthemes were discarded due to inadequate support from the data and/or the COM-B model, while others were merged to enhance cohesion. Fifth, the subthemes were iteratively re-evaluated to form themes that represent the data accurately and align with the aim of understanding the capabilities, opportunities, and motivations related to ABDP and PBDA consumption. The final themes of "Convenience matters", "Socially influenced", and "Balancing between money, conscience and tastebuds", capture the multidimensional nature of the phenomenon as well as exemplify how each COM-B element influences (non-)consumption. The themes are by no means exhaustive in terms of capabilities, opportunities, and motivations in the consumption of dairy products and dairy alternatives, but thematic analysis provided support in finding coherence and capturing relevant aspects of consumers' reasonings related to consuming ABDPs and PBDAs in the Finnish dairy-rich context.

3. Results

The first of the three themes is called *Convenience matters*, in which products, availability, and cooking skills contribute to the ABDP and PBDA consumption decisions. The second theme, *Socially influenced*, depicts the role of social environment in choosing ABDP and PBDA products. The third theme, *Balancing between money, conscience and tastebuds*, outlines how different motivations can compete against each other and thus affect the choice of ABDPs and PBDAs. The relationship between the themes and the COM-B model are depicted in Fig. 1.

3.1. Convenience matters

Overall, the participants deemed milk to be "*everywhere*", "*very Finnish*", and to have a "*very important role in the Finnish food culture*". These notions indicate that milk and other ABDPs are often perceived to be the standard, highlighting their convenience as the default option in different environments and situations. In general, convenience is a prominent criterion in food selection (Drewnowski and Monsivais, 2020). The (in)convenience aspects related to ABDPs and PBDAs included in this theme are the products, their availability, and adaptability to consumers' cooking skills. Within the framework of the COM-B model products and their availability are understood to represent *physical opportunities*, while cooking skills represent *physical and psychological capabilities*.

The notion of milk and other ABDPs being everywhere was elaborated by the participants when they described the broad selection of dairy products available in Finland. Such an environment has enabled the high consumption of ABDPs and made it convenient among Finnish consumers. However, PBDAs are also entering the market at such a fast pace that Jonna (F25) felt that there is not enough time to taste all the products she would like to. As the selection of PBDAs now mimics rather closely the selection of ABDPs, it is also becoming more convenient to adopt them as substitutes, as Sven (M40) described: "*At some point I became aware that […] I eat exactly like I used to, I just replace animal-based products with plant-based ones*".

Moreover, as with ABDPs, a large and diverse enough PBDA selection can attract consumers to try them. Edvin (M43) noted how the growing selection of PBDAs facilitated their adoption into his diet, while Erik (M55) described how a sparse selection does not necessarily encourage to buy PBDAs even if a person was otherwise interested in experimenting with plant-based alternatives:

> *"I've noticed that when there are options it's easier to become inspired to try them out. […] It can easily make you feel that there isn't anything, here's this one product which you're not interested in so you don't buy it either."*

In addition to offering a wider selection, the participants expressed how grocery stores could further advance the sales and make the consumption of PBDAs more convenient by placing them more visibly. Moreover, beautiful displays were recognized as being possible factors in advancing consumption, as Aino (F25) described her cheese-related experience in a hypermarket: "*They had put up a really beautiful and super good-looking cheese counter. I don't even eat cheese, but I felt like wow, I'd like to buy them all.*"

The growing selection of PBDAs had also been noted by interviewees who did not consume them at all or at least not regularly. They tended to distance themselves from being the kind of person consuming PBDAs and rather viewed them to be there for other consumers. They did not necessarily perceive PBDAs negatively per se, but maintained a personal

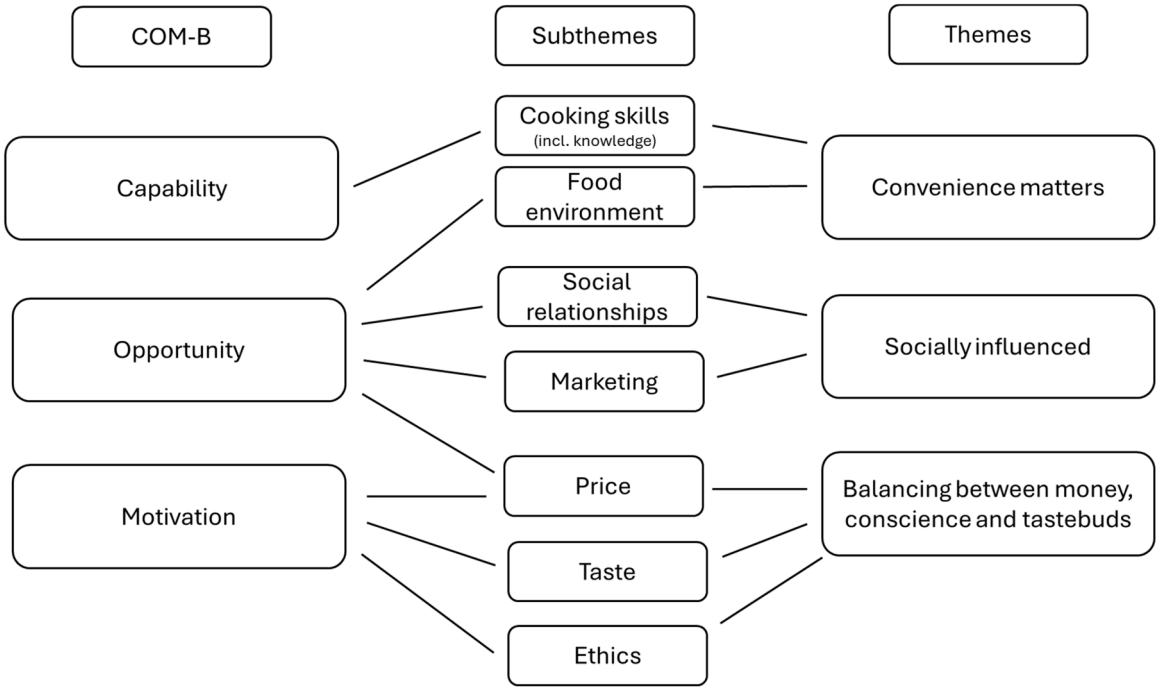

Fig. 1. Conceptualization of the theoretical background and results of the study.

preference for ABDPs. However, they liked that there were options for (other) people to choose from.

The role of restaurants, cafes, and other such outlets in encouraging ABDP and/or PBDA consumption was also reflected upon during the interviews. What kind of milk was offered as a default for coffee was raised as an example: when visiting a café and finding the animal-based milk as the default option, Erik (M55) felt it would be inconvenient for the café if he asked plant-based milk for his coffee:

> "*When you have to ask for something different, it always highlights your own difference and then you may not want to, like sorry, if there's a line, where can I get oat milk for this coffee. […] Then I have gone back to the old behavior model [of using milk]*".

Yet another convenience-related aspect is cooking skills and the ability to adjust recipes and/or the composition of dishes. Since PBDAs are still rather new for Finnish consumers, it was regarded as natural that dairy products are the default in both recipes and cooking. For instance, Liisa (F74) felt uncertain about PBDAs: "*If you think about those vegan dairy products, I think you should really familiarize yourself with them so you'd know how to use them*." Aino (F25) remarked that PBDAs can be introduced as alternatives in dairy-based recipes, which could increase their familiarity (see also Gravely and Fraser, 2018). However, it was also recognized that sometimes cooking or baking with PBDAs can require knowing "*tricks*" to be able to utilize them as ABDP substitutes, and this may require some experimenting, as stated by Aurora (F22): "*you've got to try what works*".

3.2. Socially influenced

The interviewees had vivid memories of animal-based milk marketing, mostly from their childhood and how it influenced their milk drinking habits. Research has shown that children are particularly susceptible to influences from food marketing (Norman et al., 2016; Smith et al., 2019). Moreover, many participants described how their social relationships affect their ABDP and/or PBDA consumption. It is common that social relationships, such as family and friends, affect eating habits (e.g. Graça et al., 2019; Renner et al., 2012). Marketing as well as social relationships are interpreted as *social opportunities* in the COM-B model.

Marketing can create images of socially acceptable and desirable eating habits. Many interviewees had distinct memories of dairy-related marketing in elementary schools. Some participants criticized the prominent visibility of milk marketing in schools and described it as "*propaganda*" and wondered "*whose interests are driven here*", especially as a large Finnish dairy co-operative used to be one of the main marketers. The benefits of drinking milk were displayed in posters, of which Jani (M29) gave an example:

> "*I also remember the posters in which there's a skeleton not drinking milk and it's been shattered into pieces. Then there's the other skeleton drinking milk, that one's doing great.*"

In addition, milk was promoted by school nurses as well as by "milk girls" from a milk promoting non-profit organization visiting schools. Marketing made drinking milk seem so desirable that even those who did not drink it, either due to intolerance or not liking it, felt pressured to do so: "*Back then I never liked milk as a drink at meals, but then I taught myself to drink it, because one must drink milk*" (Jani, M29). In addition, drinking milk at school lunches was the default and Timo (M28) described how one needed a special permission from parents to not drink milk at school. As the extensive promoting of milk at school dates back decades (Kaarlenkaski, 2024), it was unsurprising that the participants had vivid memories of it. The importance of milk had been ingrained into the minds of children, like Elina (F54) elaborated:

> "*I do remember in my childhood you always had to drink milk at meals or at least one glass of milk per day, as if the child would die if they don't get milk*."

The marketing of PBDAs was discussed considerably less than the (by-gone) efforts to promote milk. However, the participants were of the opinion that advertising could be influential in strengthening the position of PBDAs in Finnish diets, and that it should show their "*positive sides*" rather than to try to trump ABDPs.

Alongside the promotion of milk at school, the childhood family, i.e., parents, had often contributed to the consumption of milk. Parents could "*press*" milk on their children, but then "*after being able to make my own decisions, it was left out*" (Jori, M35). However, sometimes childhood family relationships were seen as a limiting factor to PBDA consumption even after growing up. Aino (F25) described how her father perceived oat cream as "*horror cream*" (oat in is Finnish "kaura" and horror is "kauhu") and how it is not easy to change his attitude. On the other hand, it is not always only the parents making the food choices in the family, and sometimes the children may want to consume dairy even if the parent is pro-PBDAs. For instance, Erik (M55) externalized himself from his decision to buy dairy, because of his child's wants: "*Okay, there's milk in the fridge now because my kid wants it with their cereal, but I don't make those choices myself*". Alongside family, other close relationships may also be a barrier for PBDA use, as told by Venla (F30):

> "*I've usually used normal cream, especially if someone else is eating [laughs] than myself, because the people close to me are not necessarily enthusiastic to even try*".

Conversely, family ties and other social relationships can also enable and encourage the consumption of PBDAs. Sometimes the consumption decision can materialize out of necessity. Milla (F46) described how her child's milk allergy was the reason the family had started to consume PBDAs. Over time PBDAs gradually became an accustomed part of their eating habits, even though the child no longer needed a dairy-free diet. Likewise, social support can be very significant when embarking on a voluntary dietary shift, such as transitioning into veganism (and thus to PBDAs) as narrated by Sven (M40): "*peer support there, that I didn't have to do it alone, that we started to try it out with my partner*". Furthermore, it was recognized that the social environment has an impact on familiarizing oneself with new food items, as Timo (M28) had experienced:

> "*But then about ten years ago, when I moved out to live on my own and started studying, my diet went through quite a significant change when I got into a pretty good group in which many were vegetarians and vegans, and through that I got to acquaint myself with what plant milks or vegan food are all about.*"

Moreover, social opportunity (e.g. a group of friends) can reinforce physical opportunities (see Isbanner et al., 2024). For instance, Arttu (M24) had noted this in his social environment:

> "*Especially in my own circles it's a default that milk-free vegan products are on offer. That has increased my own options with food.*"

3.3. Balancing between money, conscience and tastebuds

Trade-offs between price, taste, and ethical matters are not uncommon when sustainable and/or animal- and plant-based food choices are considered (Allès et al., 2017; Hentilä et al., 2023; Marty et al., 2022). In the context of the COM-B model, price can be interpreted both as *physical opportunity* (i.e. money as a limited resource) or as *reflective motivation* (i.e. which properties of a product are worth paying for). Taste at its core is understood to be *automatic motivation,* but when a consumer chooses a food over another based on taste, it can be interpreted to be *reflective motivation.* Ethical matters represent *reflective motivation*, which is preceded by *psychological capability* in the form of knowledge.

Price as physical opportunity was addressed during the interviews rather extensively. The participants shared a unanimous perception that ABDPs are more affordable than PBDAs. However, sometimes the price difference was only a supposition without actual knowledge, but others

were very aware and had experiences of the existing price discrepancy, which Laura (F33), who used PBDAs exclusively, summed up by saying how she wishes that PBDAs "*were not so outrageously expensive compared to the milk-based options*". PBDAs' higher prices were also recognized to limit consumers' opportunity to adopt them into their diet, as elaborated by Edvin (M43): "*Maybe the price has affected a bit, maybe it has made it more difficult, slowed down a little the transition to a more plant-based direction*".

The relative cheapness of ABDPs was observed to steer the consumption decisions away from one's own values, at least to some extent. Erik (M55) described how price can overrule other motivations:

> "*You go look, that [ABDP] is on sale, I'm buying that and it's cheap. It's not easy to stick with the ethical choices either.*"

In relation to the ethicality of ABDP and PBDA consumption, the interviewees reflected on environmental matters, climate change, and animal welfare. For some participants, concern for the environment and/or climate change as well as reluctance to support cow milk production were reasons for having reduced or given up the consumption of ABDPs. For instance, Sari (F60) illustrated her decision to give up liquid milk as a consequence of learning how the dairy cow industry operates:

> "*Before I didn't even know how milking cows, how it works and how they are used and how the calves are separated and everything. And when it dawned upon me I pretty much instantly transitioned away from it [milk].*"

Even if the negative ethical aspects related to ABDPs were recognized, the decision to decrease or exclude them altogether from one's own diet was acknowledged to require mental resources, i.e., psychological capability and reflective motivation. For Erik (M55), abandoning ABDPs and consuming only PBDAs was "*the ideal situation*" and "*ethically correct*", but he also reflected on the discrepancy between his ideals and his choices. Mimosa (F25) described how she was still processing the negative aspects of intensive milk production and did not want to support it, but still consumed ABDPs due to other motivations:

> "*To some extent I feel that I have a kind of value conflict in it [the consumption of ABDPs], because if I could just rationally decide and act I'd leave them [ABDPs] out, because I wouldn't want to support that kind of animal use, especially not in intensive production. […] I often think why do I use them [ABDPs]. […] Above all it could be summed up that I have not found a replacement for them [ABDPs].*"

For some, the environmental friendliness of PBDAs over ABDPs was rather ambiguous. PBDAs were criticized for long-distance transportation and resource, such as water, use. Uncertainty in such matters is likely to be confusing for consumers and can lead them to question the need to deviate from their accustomed (dairy) consumption habits. However, if certain conditions were met, a PBDA could be chosen over an ABDP. Jaakko (M41), who preferred ABDPs, shared his perspective:

> "*Let's just say that if there was the same product with let's say equal price and similar taste. The other one is animal produced or cow's milk, and the other is something else, let's say oat. I find environmental matters kind of important, so in that kind of a situation I could choose the oat one. If I wouldn't have to compromise too much on taste and price.*"

Jaakko's description highlights the rivaling nature of environmental matters, price, and taste often associated with plant-based alternatives. In the COM-B model this is interpreted as *competing motivations* (West and Michie, 2020). In Jaakko's case, his motivation of environmental values was overruled by other motivations, namely ABDPs' better taste and more affordable price, but he reckoned he could change his habits if PBDAs tasted better and were less expensive compared to ABDPs.

Among the participants, taste was highly valued when discussing the choice between ABDPs and PBDAs. Generally, the taste of ABDPs was perceived to be traditional and consuming them was something that the participants had gotten used to since childhood. For instance, Venla (F30) tended to prefer PBDAs, but she explained she always buys milk when preparing dishes from her childhood, because they taste better when prepared with milk than with a plant-based alternative. Katri (F53) strongly preferred ABDPs over PBDAs, and she ascribed this largely to taste: "*I've wanted to stick to real dairy products, because I've enjoyed them more*".

The participants who consumed PBDAs readily acknowledged that there is a taste difference between them and ABDPs, and that when switching to PBDAs it can take some time to adapt to their taste. Jonna (F25) highlighted how after getting used to the taste, PBDAs "*really are good*", and Jani (F29) expressed his preference by stating that "*I downright like these plant milks more*". Thus, after taste adaptation, choosing a PBDA over an ABDP no longer felt like compromising on taste.

4. Discussion

This study drew on the COM-B model to explore the (non-)consumption of ABDPs and PBDAs in a dairy-intensive food culture. Three key themes were identified through thematic analysis. The theme "Convenience matters" highlights the roles of physical opportunity and psychological capability in terms of physical food environment and cooking skills. "Socially influenced" emphasizes the importance of social opportunity by focusing on social relationships and the influence of marketing. "Balancing between money, conscience and tastebuds" underlines the complexity of making food choices in relation to price (physical opportunity and reflective motivation), ethics (psychological capability and reflective motivation), and taste (automatic motivation and reflective motivation) (Fig. 1). In this section, we reflect on our findings from the COM-B perspective and discuss the relationships between the COM elements.

According to the COM-B model, for a behavior to occur, capability, opportunity, and motivation are all required (Michie et al., 2011). Moreover, the model recognizes that in addition to behavior itself, both capability and opportunity have an influence on motivation as well (Michie et al., 2011), meaning that they can either strengthen or weaken the motivation to behave in a certain manner (see Hansen et al., 2023). In relation to (healthy) eating, Isbanner et al. (2024) and Willmott et al. (2021) found that neither capability nor opportunity influenced behavior directly but rather impacted behavior through motivation. This implies that motivation is the primary element in realizing a behavior. Nevertheless, while motivation markedly contributes to behavior, without sufficient capabilities and particularly opportunities certain behaviors are impossible to enact. For instance, in terms of realizing a certain eating behavior, physical opportunities are essential. For an individual to be able to eat anything at all, food items need to be available and sufficient resources (i.e. money) are required to acquire those food items. Based on the results of this study, the existing physical environment generally tends to favor ABDPs in terms of product selection and availability in grocery stores, restaurants and cafes, as well as pricing. This suggests that, today, the physical opportunities can further strengthen the motivation to maintain the habit of consuming ABDPs and concurrently weaken the motivation to select PBDAs.

As observed in the results section, the increasingly varied selection of PBDAs has made it more convenient to include them in diets. However, to further increase the consumption of PBDAs, the participants noted that grocery stores should enhance physical opportunities by offering wider selections as well as better PBDA placements (see also Gravely and Fraser, 2018). Moreover, even if PBDAs are preferred, but the physical opportunities for consuming them are insufficient, it is easy to revert to the norm of consuming ABDPs. Autio et al. (2023) had similar results: if people need to specifically ask for a PBDA, it is likely that they will not do so to avoid causing inconvenience to others. In addition, requesting something that is not mainstream may draw unwanted attention. Correspondingly, social environments in which PBDAs are perceived positively increase the probability of their regular consumption (Hansen et al., 2023), which was also reflected in our results. The same

relationship was observed in relation to ABDPs: the marketing of milk made it very desirable and its consumption the social norm, the effects of which were strengthened by a wide selection of products and easy availability. These notions imply a two-way relationship between physical and social opportunities.

Price as physical opportunity is a rather tangible factor affecting food choice (Renner et al., 2012). Earlier research has found that consumers perceive plant-based dairy alternatives (Adamczyk et al., 2022; Hansen et al., 2023) to be more expensive than animal-based dairy, which may hinder their consumption, especially among consumers whose financial resources are very limited. We also observed this price gap, the consensus in our data being that ABDPs are more affordable than PBDAs. This tipped some consumers towards ABDPs. PBDA consumers were unhappy about the price difference, but for them, other food choice motivations, such as ethical concerns, weighed more than the price. Thus, these consumers literally pay the price to make choices that are better for the environment and the animals. However, we propose that the choices of dedicated PBDA consumers have turned into routines. Büchs et al. (2023) noted that even if consumers are aware of environmental and/or animal welfare matters related to dairy, this knowledge alone is not always enough to trigger a behavioral change. For instance, even those with sufficient financial resources may value cheap price more than ethics. These observations demonstrate how motivations compete (West and Michie, 2020) as well as the dual nature of price as physical opportunity and reflective motivation.

In addition to price and ethical concerns, sensory aspects, particularly taste, are an important layer in the competing motivations related to ABDP/PBDA consumption. Earlier research has consistently concluded that good taste and the pleasure it brings is one of the most significant factors in food choice (Konttinen et al., 2021; Renner et al., 2012; Steptoe et al., 1995). According to our results, especially ABDP consumers prioritized taste over ethical motivations, echoing the findings by Adamczyk et al. (2022) and Autio et al. (2023). The taste of dairy is a source of comfort and pleasure for many, but it can also evoke conflicting feelings among those who are conscious of the ethical and ecological problems of dairy production (Autio et al., 2023; Bolton et al., 2024b). Our results show that some consumers justify these pleasures for themselves despite being aware of the problems of dairy production (see also Autio et al., 2023), while others change their dairy-related behavior to alleviate their feelings of guilt (see also Bolton et al., 2024b; Davies and Stanley, 2024).

Likely due to the cherished status of ABDPs, PBDAs face high expectations: consumers expect them to taste as good or even better than their ABDP equivalents (S.R. Jaeger, Giacalone, et al., 2023), and PBDAs should thus satisfy the quest for pleasure. As our results indicate, apart from vegans/dedicated PBDA consumers, it is evident that ABDPs currently better fulfill many consumers' hedonistic needs, and that the taste of PBDAs is often perceived to be inferior compared to ABDPs. Even PBDA consumers acknowledged that it takes a while to get used to the taste of PBDAs, but after enough tastings, their taste can even be favored over that of ABDPs. Cardello et al. (2022) and Collier et al. (2023) suggested that PBDA exposure, namely tasting and finding them likable, would influence their consumption positively. However, if PBDA taste is not liked despite exposure, it seems unlikely that those enjoying ABDPs would change their dairy consumption habits. Thus, for PBDA consumption to become more widespread, their taste (and other sensory aspects) needs improvement (Ammann et al., 2023; Etter et al., 2024). With improved taste, PBDA consumption has potential to increase, and in turn, the increased consumption could advance social normalization, i.e., social opportunities (Collier et al., 2023). Moreover, social normalization can spark an increase in demand, thus over time enhancing physical opportunities in terms of product selection and availability, and due to economies of scale, potentially pricing as well.

Furthermore, consumers need psychological capabilities to be able to cook and prepare tasty PBDA dishes. PBDAs are unfamiliar to many consumers, which can impose barriers to their use. Recipes either introducing PBDAs as alternatives or solely using PBDAs can be a useful tool in incorporating them into (familiar) dishes, as suggested by Gravely and Fraser (2018). Additionally, as reflected in our results, PBDAs can have their own quirks when used in cooking and baking. Thus preparing food with PBDAs may require some time and effort as well as understanding their properties (see also Büchs et al., 2023). We suggest that in relation to PBDAs, capability to prepare appealing dishes can influence motivation, which in turn can increase PBDA consumption. Moreover, Isbanner et al. (2024) noted that people who deem themselves capable recognize opportunities better – thus being familiar with PBDAs can aid in finding suitable or new products, for instance.

4.1. Practical implications

Our findings indicate that the COM-B model is a fruitful framework for understanding the different factors affecting ABDP and PBDA consumption. Together with the Behaviour Change Wheel (BCW) (Michie et al., 2011), the COM-B model enables the planning of effective interventions to increase the consumption of PBDAs and reduce the consumption of ABDPs, as the model helps to identify which elements and factors need improvement to achieve the desired behavioral change. Even though our results show the relevance of all COM elements, we propose that due to the prominence of availability, price, and taste, the aspects related to opportunities and motivations are particularly vital in designing practical solutions to increase PBDA consumption.

First, although PBDA-related physical opportunities in terms of product selection and availability have improved in recent years, it is essential for the food industry to keep monitoring consumer needs as well as innovating new PBDAs. Moreover, grocery stores, restaurants, and other such outlets play an important role: visible and easy-to-reach placements can advance PBDA consumption (Piernas et al., 2021; Shaw et al., 2020). The role of price as physical opportunity should also be considered. PBDA prices should match closely those of ABDPs for them to be noteworthy alternatives for the less dedicated PBDA consumers. For instance, the VAT of PBDAs could be lower than that of ABDPs. Second, consumers need to be motivated to buy and consume PBDAs. Lower price of PBDAs can certainly be a motivation to buy them, but our results and earlier research both imply that taste is a major motivational factor in PBDA/ABDP consumption. Hence, in addition to innovating new, tasty PBDAs, the food industry should focus on enhancing the taste (and other sensory qualities) of existing PBDAs. Moreover, grocery stores and food marketers can arrange PBDA samplings (see Gravely and Fraser, 2018); this way, consumers would not have to buy them without prior knowledge of the taste, and many might find that they like the taste of PBDAs (Cardello et al., 2022; Collier et al., 2023).

4.2. Strengths and limitations

This paper has several notable strengths. First, our participants had diverse backgrounds and followed different diets, and the currently understudied topic of ABDP and PBDA consumption inspired a lot of reflection in the interviews. The discussions with the participants were reflective and rich in experience-related aspects, which enabled us to explore the topic comprehensively. Moreover, by combining the COM-B model and qualitative methods, we have demonstrated that this kind of approach is fruitful in understanding not only eating habits in general, but also its more specific nuances, such as the consumption of ABDPs and PBDAs.

One limitation of this study is that the interview design was not guided by the COM-B model. Moreover, the research was conducted in only one country. However, this is typical in qualitative research and enables context and culture-bound analysis. Since the Finnish dairy culture resembles closely at least that of other Nordic countries, we believe that the results should be applicable in other food cultures as well.

5. Conclusion

This study suggests that to increase the consumption of PBDAs and reduce the consumption of ABDPs, consumer capabilities, opportunities, and motivations need to be taken into account in policies, education and product development and marketing. The identified key themes are related to product selection and availability and consumers' cooking skills (convenience), social relationships and marketing (social influence), and taste, price, and environmental and animal welfare concerns (motivational aspects). Based on the findings it is evident that these aspects are connected to each other, and focusing on only some of them is likely insufficient to spark long-term behavioral changes. In terms of the COM-B model, capability is needed in relation to cooking skills and knowledge, opportunity is relevant to product selection and availability, price, social relationships and marketing, and motivation is associated with taste, ethical concerns, and price. In relation to dairy alternatives we argue that the physical opportunity of product existence and availability precede motivation. After this condition is met, the motivation to consume them can either be strengthened or weakened by other opportunities and/or capabilities. Furthermore, different motivations often compete against one another. Currently, the existing infrastructures as well as socio-cultural aspects tend to support ABDP consumption, but as elaborated in the results of this paper, a shift towards PBDA consumption is underway. Moreover, as taste is a major motivation in PBDA/ABDP choice, it is essential that efforts are made in the food industry to improve the taste of PBDAs. By ensuring accessibility, sufficient skills, and palatable taste profiles, the consumption of PBDAs has the potential to increase further.

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Ethical statement

The participants were provided with a privacy notice informing them of data protection and the purpose of the study as well as a consent form. The participants participated voluntarily, gave their informed written or oral consent and had the right to withdraw from the study at any point during or after the interview, but before data analysis. For compensation, the participants received a gift card worth 40 euros for an online store of their choosing.

This study and its protocol were non-interventional and thus following the guidelines of the Finnish National Board on Research Integrity (TENK) and the Research Ethics Committee in Humanities and Social and Behavioural Sciences of the University of Helsinki no ethical review was required.

CRediT authorship contribution statement

Sini Kuosmanen: Writing – review & editing, Writing – original draft, Visualization, Investigation, Formal analysis, Conceptualization. **Sami Koponen:** Writing – review & editing, Investigation, Conceptualization. **Hanna Konttinen:** Writing – review & editing, Supervision. **Mari Niva:** Writing – review & editing, Supervision, Funding acquisition, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Data availability

The authors do not have permission to share data.

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