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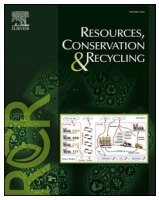

Walk a mile in someone's sweaty second-hand shoes: Differences in motivations and barriers for second-hand products

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ABSTRACT

This study explores the motivations and barriers influencing consumer decisions to purchase second-hand products across three key categories: fashion (sweaters, jeans, and shoes), furniture (dinner tables, armchairs, and bookcases), and electronics (smartphones, microwaves, and washing machines). While prior research has examined second-hand consumption broadly, this study identifies significant variations in consumer attitudes across product types. Using survey data from 864 participants, we analyse 18 motivations and barriers using ANOVA. Findings reveal that motivations such as economy and sustainability are prominent across all categories, while barriers vary by product type. Hygiene concerns are particularly relevant for shoes and microwaves, while issues of cluttered shopping environments primarily deter fashion purchases. Second-hand furniture emerges as the most positively perceived category, whereas electronics face the greatest scepticism due to concerns about obsolescence and warranties. This underscores the need for product-specific strategies in second-hand markets, informing policymakers, retailers, and designers seeking to promote sustainable consumption.

1. Introduction

A circular economy aims to close and slow down the consumption loops, minimizing Earth's resource use. The circular economy seeks to counteract the linear and wasteful consumption patterns with reuse loops, including preserving materials at their highest state of value (Bakker et al., 2019; Ellen MacArthur Foundation, 2013). Second-hand product consumption is a method of achieving the goal of reducing pollution and striving for more environmentally sustainable consumption patterns (Evans et al., 2022; Fortuna and Diyamandoglu, 2017; Medalla et al., 2020). Scholars have investigated second-hand consumption, containing topics such as second-hand contexts, location, and shopping experiences (Appelgren and Bohlin, 2015; Crewe and Gregson, 1998; Frahm et al., 2024b), the process and strategies of product re-valorisation (Frahm, Laursen, and Tollestrup, 2023; Herrmann, 1997; Parsons, 2005), and the second-hand consumer and their purchasing motivations and barriers (Frahm, Boks, et al., 2024; Herrmann and Soiffer, 1984). Several scholars argue that knowledge of consumers' second-hand purchase behavior and likeliness to accept second-hand consumption is essential to achieving a circular economy (Bhamra et al., 2011; Daae et al., 2018; Hobson and Lynch, 2016).

Hitherto, motivations and barriers to second-hand products have predominantly been studied with a focus on second-hand clothing as the overall product category (e.g., Gwozdz et al., 2017; Koay et al., 2024; Xu et al., 2014; Yan et al., 2015). However, a national survey from Denmark in 2022 shows that clothing only takes up 27 % of what is bought in the second-hand market (Jensen, 2022). Thus, large quantities of second-hand products are underrepresented in the current literature, leaving consumers' general perception of second-hand products uncovered (Frahm, Boks, et al., 2024; Moon et al., 2023). Furthermore, exploratory research suggests that the motivations and barriers to purchasing refurbished products differ depending on whether it is a hedonic or utility product or a low or high-involvement product (Mugge, Safari, et al., 2017). Other studies show contradicting findings. For example, by some scholars, sustainability and environmental considerations are considered one of the leading drivers for second-hand consumption (Edbring et al., 2016; Franklin, 2011; Waight, 2013), while others argue concerns about the environment only play a minor role (Niinimäki, 2010; Sandes and Leandro, 2019). Likewise, some studies find consumers are driven by saving money (Guiot and Roux, 2010; Steward, 2020), while others find the financial benefit is too limited (Henseling et al., 2010), or suggest that consumers purchase second-hand regardless

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Table 1
Motivations and barriers to second-hand consumption from literature. Adapted from Frahm, Boks, et al. (2024).

	Topics	Definitions	References
Motivations	Treasure hunting	The thrill caused by the process of looking for and finding second-hand items.	(Bardhi, 2003; Bardhi and Arnould, 2005; Cervellon et al., 2012; Crewe and Gregson, 1998; Ferraro et al., 2016; Frahm, Boks, et al., 2024, 2023; Guiot and Roux, 2010; Halicki et al., 2024; Roux and Guiot, 2008; Steward, 2020)
	Originality and uniqueness	Seeking second-hand products, as a way of differentiating aesthetically from mainstream products.	(Frahm, Boks, et al., 2024; Guiot and Roux, 2010; Jägel et al., 2012; Steward, 2020)
	Social interacting	The joy of having social interaction with strangers or familiar people in second-hand markets.	(Edbring et al., 2016; Frahm, Boks, et al., 2024, 2023; Guiot and Roux, 2010)
	Product quality	Expectations of higher quality in second-hand products due to craftsmanship and production methods used in the past.	(Berezyuk et al., 2024; Edbring et al., 2016; Frahm, Boks, et al., 2024, 2023; Henseling et al., 2010)
	Nostalgia	A positive feeling evoked by the aesthetic of older second-hand products.	(Banister et al., 2005; W. Baxter et al., 2017; Cervellon et al., 2012; Frahm, Boks, et al., 2024; Goulding, 2002; Gregson and Crewe, 2003; Guiot and Roux, 2010; Holak and Havlena, 1992; Phau and Marchegiani, 2009; Roux, 2008; Roux and Guiot, 2008; Stern, 1992)
	Distance from consumerism	Purchasing second-hand caused by a motivation to not participate in mainstream consumption channels.	(Bardhi and Arnould, 2005; Borusiak et al., 2020; Ferraro et al., 2016; Frahm, Boks, et al., 2024; Guiot and Roux, 2010; Parguel et al., 2017; Silva et al., 2021)
	Sustainability and ethics	Purchasing second-hand products based on the ideology, that it is better for the environment than first-cycle products.	(Edbring et al., 2016; Frahm, Boks, et al., 2024; Franklin, 2011; Halicki et al., 2024; Niinimäki, 2010; Sandes and Leandro, 2019; Slaton et al., 2024; Waight, 2013)
	Economy and frugality	Seeking second-hand purchases, as one can get more for the same amount of money.	(Edbring et al., 2016; Frahm, Boks, et al., 2024; Guiot and Roux, 2010; Halicki et al., 2024; Mugge, Safari, et al., 2017; Steward, 2020; Zaman et al., 2019)
Barriers	Hygiene	Concerns about pathogens left on the product from the previous user.	(W. Baxter et al., 2017; L. Baxter et al., 2016;, W. Baxter et al., 2017; Edbring et al., 2016; Frahm, Boks, et al., 2024, 2023, 2023; Mugge, Safari, et al., 2017; Silva et al., 2021)
	Negative utility	Concerns that the previous usage of second-hand products has left physical or digital traces that negatively influence the functionality of the product.	(W. Baxter et al., 2017; Baxter et al., 2016, W. Baxter et al., 2017; Calvo-Porral et al., 2023)
	Negative territory	Concerns about the person or environment the second-hand product used to belong to.	(Baxter et al., 2016, L. Baxter et al., 2017)
	Fear of stigmatization	A fear caused by the concern that second-hand shopping is unacceptable and is associated with poverty in one's social circles.	(Armstrong et al., 2015; Frahm, Laursen, and Boks, 2023; Habinc, 2018; Hur, 2020; Lang and Zhang, 2019; Sandes and Leandro, 2019; Silva et al., 2021; Valor et al., 2022)
	Foul smell	Concerns about the smell of second-hand products.	(Bardhi, 2003; de Groot, 2021; Frahm, Laursen, and Boks, 2023, 2024, 2024; Gregson and Crewe, 2003; Hur, 2020; Mitchell and Montgomery, 2010)
	Cluttered shops and markets	Frustration or confusion caused by the clutter, layout and number of products in second-hand markets.	(Bardhi, 2003; Frahm, Boks, et al., 2024, 2023, 2024; Gregson and Crewe, 2003; Hur, 2020)
	Time and effort	Negative attitude towards second-hand shopping, as it requires more time and effort compared to shopping in regular retail stores.	(Frahm, Laursen, and Boks, 2023; Henseling et al., 2010; Hur, 2020; Mugge, Safari, et al., 2017)
	Warranty and exchange services	Feeling that second-hand purchases are more risky, due to the lack of warranty and exchange services.	(Frahm, Laursen, and Boks, 2023; Guiot and Roux, 2010; Mugge, Safari, et al., 2017)
	Obsolescence	Concerns about whether a second-hand product will be obsolete shortly after purchase.	(Akerlof, 1978; Frahm, Laursen, and Boks, 2023; Guiot and Roux, 2010; Mugge, Safari, et al., 2017; Mugge et al., 2018; van den Berge et al., 2021)
	Wear and tear	Concerns about whether a second-hand product is aesthetically worn out.	(Edbring et al., 2016; Frahm, Boks, et al., 2024; Lilley et al., 2016)

of economic considerations (Cervellon et al., 2012; Steward, 2020). This could indicate that barriers and motivations to second-hand purchasing are a matter of which product is in question. Prior studies emphasize that research must be broadened to include more product categories and that the specific product type, e.g., chairs (rather than the broad product category "furniture") must be studied to gain further knowledge on supporting second-hand consumption and, hence, a circular economy (Frahm, Boks, et al., 2024).

To fill this research gap, this study focuses on three of the most wasteful product categories and how motivations and barriers differ across specific second-hand products within these categories: fashion items, furniture, and electronics (*National Circular Economy Programme 2023–2030*, 2023). Hence, we seek both depth and breadth to understand consumers' motivations and barriers toward second-hand products by answering the research questions:

1) *How do barriers and motivations for second-hand consumption differ across the product categories of fashion, furniture, and electronics?*
2) *How do barriers and motivations for second-hand consumption differ within product categories of fashion, furniture, and electronics?*

Thus, we contribute to the literature on second-hand consumption by offering systematic quantitative validation and comparative insights across product types and categories. Next to the theoretical contribution, this also provides concrete knowledge to second-hand retailers who seek to modify their sales strategies according to specific types of second-hand products, designers who seek to make long-lasting products supporting multiple owners, and policymakers who seek to promote circular consumption by addressing product-specific motivations and barriers. Our findings offer actionable insights for developing targeted interventions, incentives, and regulations that support a more sustainable and consumer-friendly second-hand market by identifying key factors that drive or hinder second-hand purchases across different categories.

2. Background literature

As highlighted by Frahm, Boks, et al. (2024): "…many terms are used to describe shopping channels for selling pre-used products. Some known terms are garage sales, thrift shops, non-profit charity shops, car-boot sales, nearly new sales, flea markets, retro shops, vintage shops, etc." (pp.3). In line with this, we use 'second-hand products' as a blanket term to cover pre-used products sold to new owners in exchange for an economic transaction. The following sections will outline the literature on motivations and barriers to second-hand consumption to create an overview of the topics relevant to investigate.

2.1. Motivations to second-hand consumption

One of the well-known phenomena of shopping second-hand is the thrill of ***treasure hunting***. That is the exciting feeling of looking for and finding 'treasures' in the irregular product portfolios of second-hand markets (Bardhi, 2003; Frahm, Boks, et al., 2024; Halicki et al., 2024). Finding these treasures can be used to position oneself, show cultural capital, and express and seek ***originality and uniqueness*** (Guiot and Roux, 2010; Steward, 2020), which is also highly motivating to some consumers. The activity of second-hand shopping may also be a way of ***socially interacting*** with either strangers or friends and family. These interactions are perceived as meaningful and sometimes as an alternative to other social activities, such as visiting a café (Frahm, Boks, et al., 2024; Guiot and Roux, 2010). Second-hand shopping can be motivated by the expectations of ***product quality*** and aesthetics. Some expect older products to be of better quality and higher material value, as they are associated with hand-made production methods, compared to modern mass production (Edbring et al., 2016; Henseling et al., 2010). These expectations may rely on specific visual attributes, which can be influenced by ***nostalgia***, that is, the pleasure or glorification of the past (Banister et al., 2005; Cervellon et al., 2012; Goulding, 2002). Literature suggests dividing nostalgia into two types: personal nostalgia, which is the pleasure of own memories of the past, and historical nostalgia, which is the longing for a time in the past, which may even be before one's birth (Holak and Havlena, 1992; Phau and Marchegiani, 2009; Stern, 1992). These positive connotations can also occur due to who the previous user or user environment was. For example, products owned by celebrities, or that belonged to a certain place, such as hotel furniture or theatre props (Baxter et al., 2016, W. Baxter et al., 2017). Consumers can also be driven by a desire to ***distance themselves from consumerism***. They strive to 'escape' the mainstream markets or use second-hand shopping as a way of 'punishing' it, by keeping functional products in use and living a less wasteful lifestyle (Borusiak et al., 2020; Parguel et al., 2017). Current literature disagrees on how big a role ***sustainability and ethical considerations*** play in consumers' purchasing intentions. Some studies find it to be one of the main motivations (Edbring et al., 2016; Franklin, 2011; Slaton et al., 2024; Waight, 2013), while others suggest it only plays a minor role (Niinimäki, 2010; Sandes and Leandro, 2019). A lowered upfront investment can drive second-hand shopping. In other words, purchasing second-hand products can be a matter of ***economy and frugality***, allowing consumers to get more for the same amount of money. This is not necessarily linked to consumers being poor, but can also be driven by a desire to spend their money more carefully (Guiot and Roux, 2010; Steward, 2020) (Table 1).

2.2. Barriers to second-hand consumption

Many studies of barriers to second-hand consumption mention contamination as a negative influence on the decision-making process (W. Baxter et al., 2017; Calvo-Porral et al., 2023). The negative contamination concerns different aspects, such as hygiene, negative utility, and negative territory. ***Hygiene*** issues concern the disgust or fear of contamination conjured by the thought of a previous user and their pathogens (Baxter et al., 2016, W. Baxter et al., 2017). Literature highlights, that this type of fear is especially present for products worn close to the body, such as clothing or jewellery, and for products that are in contact with food, e.g., cutlery or microwaves (Edbring et al., 2016; Frahm, Laursen, and Boks, 2023; Mugge, Safari, et al., 2017). The fear of bringing pests into one's home by purchasing second-hand products is also particular for clothing and other product categories containing fabrics, such as upholstered furniture (Edbring et al., 2016). The ***negative utility*** influences consumers' likelihood to purchase products with physical or digital traces of the previous user. For example, scratches or stains on a tabletop or files on a smartphone or computer can result in an expected decrease in the functional value of a product (Baxter et al., 2016, L. Baxter et al., 2017). ***Negative territory*** causes consumers to reject products that have previously been used in an undesired environment or by an unwanted previous user's personal space, which may or may not have left smell or marks (Baxter et al., 2016, W. Baxter et al., 2017). Second-hand shopping can also be rejected due to the (fear of) judgment of other people. Second-hand shopping may be associated with lousy product quality or being socially unacceptable in one's social circles due to an association with poverty. Hence, an identity discrepancy and ***fear of stigmatization*** are barriers to second-hand purchasing (Lang and Zhang, 2019; Valor et al., 2022). Other barriers concern the condition of second-hand products and the shopping experience. Studies elaborate on the prejudice about a ***foul smell*** and ***cluttered shops and markets***, that are hard to navigate (Frahm et al., 2024a,b; Gregson and Crewe, 2003), while other studies point out the evolution of second-hand markets and argue some of these issues belong mostly to the past (Mitchell and Montgomery, 2010). Scholars also emphasize, that prior knowledge and experience with second-hand markets limit the perceived risks (Silva et al., 2024). However, these differences in shopping experience compared to regular stores lead some consumers to avoid second-hand markets due to the requirement of ***time and effort*** in finding the desired alternative, which potentially only gives a minor financial benefit (e.g., Hur, 2020; Mugge, Safari, et al., 2017). Linked to this are the irregular product information and lack of ***warranty and exchange services,*** which also repel some, as the purchasing of second-hand products feels riskier (Frahm, Laursen, and Boks, 2023; Mugge, Safari, et al., 2017). In regular retail, consumers have several rights if the products do not live up to their expectations or have defects. As these services and rights are often non-existent in second-hand shops,

Table 2
Constructs for the online questionnaire.

Constructs for the online questionnaire			
Section 1:	Section 2: Motivations to second-hand purchasing	Section 3: Barriers to second-hand purchasing	Section 4: Demographics
General attitude	Treasure hunting Originality and uniqueness Social interaction Higher product quality Nostalgia Distance from the mainstream market Sustainability and ethics Economy and frugality	Hygiene Negative utility Negative territory Fear of stigmatization Time and effort Foul smell Cluttered shops Warranty and exchange services Obsolescence Wear and tear	Gender Age Educational level Frequency of second-hand shopping Country of residence

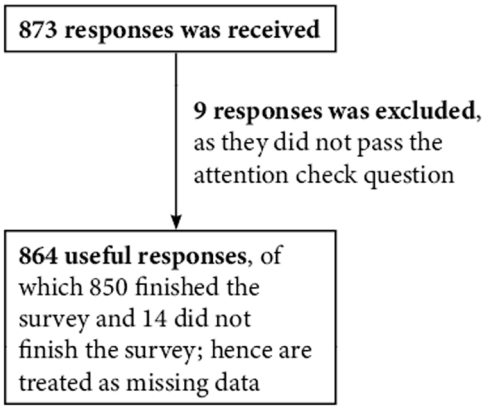


Fig. 1. Number of received, excluded, and used responses.

Table 3
Number of responses per product. Parentheses inform the number of responses with missing data.

Product categories	Specific second-hand products	N (# Participants with missing values)
Fashion	Sweater	121
	Jeans	97 (2)
	Shoes	106 (3)
Furniture	Dinner table	101 (1)
	Armchair	98 (2)
	Bookcase	88
Electronics	Smartphone	90 (3)
	Microwave	86
	Washing machine	91 (3)
Total number of accepted responses		864

this requires extra work from the consumer, who would have to examine every product more carefully before purchasing. This also includes concerns about ***obsolescence***, where consumers fear e.g., the products are outdated or only have a limited expected remaining lifespan (Mugge et al., 2018; van den Berge et al., 2021). Hence, second-hand shopping may give consumers the feeling, that they must have greater expertise in the products they want to purchase, as the seller does not provide this knowledge and safety. ***Wear and tear*** of second-hand products also play a role in this, as aesthetic changes in products may lead to a perceived decrease in product value, even though the functional properties may remain. However, the opposite may also apply; a product is aesthetically in great condition but has functional defects, leaving a great responsibility of product assessment on the shoulders of the consumer (Frahm, Boks, et al., 2024; Lilley et al., 2016) (Table 1).

2.3. Literature summary

From the literature on second-hand consumption, we distil the following topics of motivations and barriers relevant to second-hand products (Table 1):

3. Methodology

We collected data through an online survey building on existing literature to investigate consumers' motivations and barriers to second-hand products and product categories.

3.1. Selection of specific products and categories

This study investigates the importance of the motivations and barriers to second-hand shopping for different product categories. We focus on three different overarching categories: fashion products, furniture, and electronics, as these are among the most wasteful product categories (*National Circular Economy Programme 2023–2030*, 2023). Thus, these product categories are relevant to study in order to prolong their product lifespans and minimize waste. By uncovering the motivations and barriers to purchasing these specific second-hand products, we aim to understand how to increase their consumer adoption and thereby extend the product lifespans through multiple users.

The specific products were chosen based on a pre-test and had to meet the following selection criteria: Firstly, they should be reasonably familiar to ensure that all participants know them. Secondly, they should be relevant across different age groups and genders. Thirdly, they should be present in the current second-hand markets, meaning consumers can actively choose to purchase second-hand or not. This was ensured by visiting 30 second-hand shops in Denmark. Lastly, they should be different regarding usage and interaction, as this may affect the perceived motivations and barriers. The pre-test (n = 32, age range: 23–40 years old) was conducted to ensure various acceptance levels of the selected second-hand products. Participants were asked to consider whether they would purchase the proposed products second-hand. As we did not want to include unsuitable products for second-hand purchasing, we set a maximum boundary level of 2/3 (66 %) rejection rate. All selected categories passed this threshold (see Appendix 1 for detailed results). Based on this, the following specific second-hand products are, for fashion: sweaters, jeans, and shoes; for furniture: dinner tables, armchairs, and bookcases; and for consumer electronics: smartphones, microwaves, and washing machines.

3.2. Development of procedure and measures

A survey was developed that aimed to uncover consumers' motivations and barriers to purchasing specific second-hand products. The survey included different multi-item scales to measure all relevant motivations and barriers and was administered in English. All participants received one of the nine survey versions representing one of the selected products. The survey started with a multi-item scale to measure the participants' attitudes toward purchasing a specific second-hand product using a 7-point Likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". In sections 2 and 3, the participants were asked to indicate the extent to which they agreed with the eight motivational factors and ten barriers on multi-item scales on the same 7-point Likert scale. In cases where it was possible, the items of the scales were based on prior research. Lastly, the participants were asked about demographic details (Table 2). To increase the quality of the data, an attention check was included to ensure that participants were paying attention throughout the survey. All multi-item scales, references, and their Cronbach's alphas are included in Appendix 2.

Table 4
Mean values of the general attitude depending on gender. Means with the same superscript indicate that the general attitude did not significantly differ ($p > 0.05$) across genders.

	Women	Men	Other	Total
General attitude (α = 0.86)	4.94[a]	4.63[b]	5.14[ab]	4.79

The data was gathered in September 2024.

3.3. Participants

This study received 864 useful responses in total. The participants were compensated for their time with 1.05 GBP (equal to 9 GBP/hr), as suggested by the online survey platform Prolific.com, which was used for the data collection. Participants were only allowed to participate in the study with one of the specific products. Nine participants did not pass the attention check question (*"This question is here to test whether you still pay attention. Please press 'strongly disagree'"*), so they were excluded. 14 participants did not finish the survey, so they were treated as missing values (Fig. 1). The number of participants for each product type can be found in Table 3.

The participants included citizens from Western European countries. This was due to their high levels of first-cycle consumption and dominance in linear economies, necessitating a behavior change. The participants' countries of residence were randomly distributed as follows: UK=623, Germany=69, The Netherlands=63, Sweden=48, Finland=15, not answered=14, Denmark=12, Belgium=11, Norway=9. The participants' genders contained females=51.5 %, males=45.9 %, not answered=1.6 %, and other=0.8 %, with the age range 19–84 (M = 39.3, SD=12.8).

The participants' general second-hand shopping frequency (all product categories included) shows a mean value of 2.83 and a standard deviation of 0.86 on a 7-point Likert scale (1 = "I never purchase anything second-hand", 7 = "I purchase all my products second-hand").

4. Results and discussion

To uncover whether the motivations and barriers to purchasing second-hand products are more dominant for some product categories and specific products than for others, we conducted a series of analyses of variances (ANOVA) and calculated the mean values. Even though Likert scales are not pure continuous data, multi-item measures consisting of multiple Likert scales are generally treated as such in consumer studies (Chen et al., 2024; Ding et al., 2021; Magnier and Mugge, 2022) and therefore, the data is analysed via ANOVAs. The different motivations and barriers were included as dependent variables, and the product categories were included as independent variables. When the ANOVAs showed significant results, we used Tukey post-hoc tests to determine the differences between the conditions. We used a series of boxplots to check for outliers, showing only mild outliers concerning the 'social interaction' and 'fear of stigmatization'. Consequently, all responses were included in the results.

4.1. Variation of general attitude across gender and age groups

The results showed significant differences ($p < 0.05$) between women ($M = 4.94$) and men ($M = 4.63$) in the general attitude towards purchasing the three broad second-hand product categories. However, participants marking their gender as 'other' ($M = 5.14$) did not differ significantly from either men or women (Table 4). Moreover, results indicate a weak relationship between age and general attitude ($r = -0.08$, $p < 0.05$) towards purchasing second-hand products.

Table 5
Mean values of the three broad second-hand product categories. Means in bold indicate each product category's most influential motivations and barriers. Means in *italics* indicate the least influential motivations and barriers per category. Means with the same superscript indicate that the motivation or barrier did not significantly differ ($p > 0.05$) across categories.

	Fashion	Furniture	Electronics	Total	Statistics
General attitude (α = 0.86)	4.77[a]	5.40[b]	4.15[c]	4.77	F(2861)= 41.26, $p < 0.001$ $\eta^2 = 0.087$
Motivations to purchase second-hand					
Treasure hunting (α = 0.89)	4.11[a]	4.63[b]	3.19[c]	3.98	F(2859)= 51.50, $p < 0.001$ $\eta^2 = 0.107$
Originality and uniqueness (α = 0.93)	3.60[a]	4.31[b]	2.30[c]	3.40	F(2859)= 105.93, $p < 0.001$ $\eta^2 = 0.198$
Social interaction (α = 0.97)	*2.14*[a]	*2.77*[b]	*1.99*[a]	2.30	F(2855)= 24.31, $p < 0.001$ $\eta^2 = 0.054$
Higher product quality (α = 0.92)	3.48[a]	4.34[b]	2.45[c]	3.42	F(2855)= 104.79, $p < 0.001$ $\eta^2 = 0.197$
Nostalgia (α = 0.98)	*2.70*[a]	3.81[b]	*2.07*[c]	2.86	F(2854)= 80.94, $p < 0.001$ $\eta^2 = 0.159$
Distance from the mainstream market (α = 0.94)	3.39[a]	*3.75*[b]	2.65[c]	3.26	F(2854)= 29.23, $p < 0.001$ $\eta^2 = 0.064$
Sustainability and ethics (α = 0.96)	**4.53**[a]	**4.70**[a]	**3.92**[b]	4.38	F(2853)= 15.37, $p < 0.001$ $\eta^2 = 0.035$
Economy and frugality (α = 0.93)	**5.16**[a]	**5.35**[a]	**4.75**[b]	5.09	F(2853)= 9.51, $p < 0.001$ $\eta^2 = 0.022$
Barriers to purchasing second-hand					
Hygiene (α = 0.91)	*2.86*[ab]	2.63[a]	3.16[b]	2.88	F(2853)= 6.75, $p < 0.05$ $\eta^2 = 0.16$
Negative utility (α = 0.91)	3.01[a]	*2.35*[b]	4.15[c]	3.17	F(2853)= 105.92, $p < 0.001$ $\eta^2 = 0.199$
Negative territory (α = 0.96)	2.96[a]	2.48[b]	3.42[c]	2.95	F(2852)= 19.40, $p < 0.001$ $\eta^2 = 0.044$
Fear of stigmatization (α = 0.93)	*1.94*[a]	*1.81*[a]	*2.32*[b]	2.02	F(2852)= 10.55, $p < 0.001$ $\eta^2 = 0.024$
Time and effort (α = 0.86)	**3.82**[ab]	**3.59**[a]	3.97[b]	3.79	F(2851)= 4.57, $p < 0.05$ $\eta^2 = 0.011$
Foul smell (α = 0.97)	3.33[a]	2.85[b]	*3.31*[a]	3.16	F(2851)= 6.14, $p < 0.01$ $\eta^2 = 0.014$
Cluttered shops (α = 0.92)	**4.02**[a]	**3.36**[b]	3.64[b]	3.67	F(2850)= 12.83, $p < 0.001$ $\eta^2 = 0.029$
Warranty and exchange service (α = 0.97)	3.01[a]	2.82[a]	**4.90**[b]	3.58	F(2850)= 123.53, $p < 0.001$ $\eta^2 = 0.225$

(*continued on next page*)

Table 5 (*continued*)

	Fashion	Furniture	Electronics	Total	Statistics
Obsolescence (α = 0.91)	3.14[a]	2.57[b]	**4.77[c]**	3.49	F(2850)= 147.26, $p <$ 0.001 $\eta^2 = 0.257$
Wear and tear (α = 0.89)	3.63[a]	3.24[b]	4.35[c]	3.74	F(2849)= 30.76, $p <$ 0.001 $\eta^2 = 0.068$

4.2. Variation of motivations and barriers across the three second-hand product categories

The results of the ANOVA tests revealed significant differences in the general consumer attitudes toward purchasing second-hand fashion, furniture and electronics ($p < 0.05$) (Table 5). Among the three categories, second-hand furniture received the most positive consumer perception ($M = 5.40$), whereas electronics were the least favourably ($M = 4.15$). This suggests that second-hand furniture may be more culturally acceptable and align better with consumer expectations compared to electronics, which may raise concerns about functionality and reliability. Furthermore, our analysis showed significant differences ($p < 0.05$) across all product categories for all motivational factors and barriers identified in prior literature (Table 1). This underscores that the consumer decision-making process in second-hand markets is highly product-specific, shaped by numerous factors. For a visual representation of the results, please see Appendix 3.

4.2.1. Motivations to purchase second-hand product categories

4.2.1.1. Financial incentives as a dominant driver. Our findings indicate that the most influential motivations for second-hand purchases across all three product categories are **'economy and frugality'**, **'sustainability and ethics'**, and **'treasure hunting'**. Notably, while existing literature discusses how big of a role sustainability has on the motivations to purchase products second-hand (Edbring et al., 2016; Guiot and Roux, 2010; Niinimäki, 2010; Sandes and Leandro, 2019), our results demonstrate consumers prioritise financial savings ($M = 5.09$) over sustainability ($M = 4.38$). This suggests that while environmental considerations remain relevant, economic practicality is the primary driver. Given that many of these selected products (e.g., smartphones, dinner tables, and washing machines) require a relatively high upfront economic investment when bought new, affordability may play a more critical role in shaping consumer behaviour. The motivation driven by **'treasure hunting'** ($M = 3.98$) – often associated with bargain-seeking and unexpected discoveries (Frahm, Boks, et al., 2024) – further reinforces the importance of cost considerations. This strongly suggests that second-hand retailers should emphasize competitive pricing strategies to attract budget-conscious consumers while still leveraging sustainability as a secondary but important selling point.

4.2.1.2. Category-specific motivations: originality and product quality. Beyond financial savings, our results demonstrated that the motivations differ across product categories. For second-hand fashion and furniture items, consumers were motivated more by **'originality and uniqueness'** compared to electronics. This aligns with current literature highlighting how second-hand markets offer distinctive styles and rare pieces not available in mainstream retail, which can be used as identity markers (Cervellon et al., 2012; Steward, 2020). Furthermore, the **'higher product quality'** is also more important for second-hand furniture ($M = 4.34$) than for either fashion or electronics, which could be linked to the more durable materials and superior craftsmanship that are used in some second-hand furniture, offering longevity and value in contrast to purchasing new mass-produced furniture (Frahm, Boks, et al., 2024).

4.2.1.3. The shifting role of social interaction. The least important motivational factor across the three product categories is **'social interaction'**. This could indicate that supporting the social interaction of second-hand markets, e.g., casual chatting and haggling (Crewe and Gregson, 1998; Gregson and Crewe, 2003; Herrmann, 2004), may not be seen as an advantage nowadays. The decreasing importance of social interaction may be linked to the rise of digital second-hand platforms (*Second Hand Trading Online Platform Market Size, Share, Growth, and Industry Analysis*, 2024), where consumers can purchase items with minimal or no personal interaction. This shift raises an interesting question: Is social interaction now perceived as a barrier rather than a benefit?

4.2.2. Barriers to purchasing second-hand product categories

4.2.2.1. Category-specific shopping barriers. Unlike motivational factors, which remain somewhat consistent across categories, barriers to second-hand shopping exhibit much greater variation. The primary barrier for fashion was **'cluttered shops'** ($M = 4.02$), which significantly differed from the furniture and electronic categories. Furthermore, the fashion items' second-highest barrier mean value was for **'time and effort'** ($M = 3.82$). These challenges may be interrelated, as disorganized shopping experiences can result in longer search times and greater effort compared to shopping in regular retail stores. Since there is limited knowledge in this area within current research, this study proposes that it is highly relevant to investigate the factors that contribute to ideal versus undesired second-hand shopping experiences. Additionally, as these barriers were less prominent in the electronics category, this study also suggests that these shopping experiences should be further studied in relation to specific products and categories rather than at an overall level.

4.2.2.2. Declining fear of stigmatization. The least dominant barrier across all three categories was the **'fear of stigmatization'**. Previous studies have found that this fear decreases consumers' likelihood to purchase second-hand items, as they worry about being seen as poor or being judged by their social circles (Armstrong et al., 2015; Frahm, Boks, et al., 2024; Valor et al., 2022). However, in line with Calvo-Porral et al. (2023), our study found the fear of stigmatization to be the least important barrier to second-hand consumption of fashion ($M = 1.94$), furniture ($M = 1.81$), and electronic products ($M = 2.32$). The diminishing influence of stigma suggests that second-hand shopping is increasingly viewed as a mainstream and even trendy consumer choice. The rise of influencers and fashion movements that promote thrifted clothing may contribute to this shift, positioning second-hand purchases as a sustainable and stylish alternative rather than a necessity driven by financial constraints. Future research could explore whether the mainstreaming of second-hand shopping affects different demographic groups differently and whether stigma remains a factor in specific cultural contexts.

4.3. Variation of motivations and barriers within a second-hand product category

The following three sections will elaborate on some variations of motivations and barriers within each product category: fashion, furniture, and electronics. They will investigate significant differences between specific products belonging to the same overall product category. For a visual representation of the results, see Appendices 4, 5, and 6.

4.3.1. Second-hand fashion

Our findings reveal significant variations in consumer attitudes toward second-hand shoes compared to sweaters and jeans ($p < 0.001$). However, only few significant differences were observed between second-hand sweaters and jeans, indicating that footwear stands apart as

Table 6
Mean values of the second-hand products sweaters, jeans, and shoes. Means in bold indicate each product's most influential motivations and barriers. Means in italics indicate the least influential motivations and barriers per product. Means with the same superscript indicate that the motivation or barrier did not significantly differ ($p > 0.05$) across categories.

	Sweater	Jeans	Shoes	Total	Statistics
General attitude	5.14[a]	5.02[a]	4.09[b]	4.75	$F(2316)=14.50$, $p<0.001$ $\eta^2=0.84$
Motivations to purchase second-hand					
Treasure hunting	4.48[a]	4.05[ab]	3.73[a]	4.09	$F(2314)=5.34$, $p<0.01$ $\eta^2=0.33$
Originality and uniqueness	3.99[a]	3.32[b]	3.39[b]	3.57	$F(2314)=5.05$, $p<0.01$ $\eta^2=0.031$
Social interaction	*2.23*[a]	*1.94*[a]	*2.22*[a]	2.13	$F(2313)=1.49$, $p>0.20$ $\eta^2=0.009$
Higher product quality	3.75[a]	3.68[a]	2.97[b]	3.47	$F(2313)=8.36$, $p<0.001$ $\eta^2=0.051$
Nostalgia	*2.95*[a]	*2.64*[a]	*2.45*[a]	2.68	$F(2313)=2.78$, $p>0.05$ $\eta^2=0.017$
Distance from the mainstream market	3.63[a]	3.37[a]	3.11[a]	3.37	$F(2313)=2.57$, $p>0.05$ $\eta^2=0.016$
Sustainability and ethics	**4.89**[a]	**4.66**[a]	**3.97**[b]	4.51	$F(2312)=8.98$, $p<0.001$ $\eta^2=0.054$
Economy and frugality	**5.41**[a]	**5.27**[ab]	**4.76**[b]	5.15	$F(2312)=4.97$, $p<0.01$ $\eta^2=0.031$
Barriers to purchasing second-hand					
Hygiene	*2.52*[a]	*2.50*[a]	3.61[b]	2.88	$F(2312)=17.32$, $p<0.001$ $\eta^2=0.100$
Negative utility	2.64[a]	2.78[a]	3.65[b]	3.02	$F(2312)=14.29$, $p<0.001$ $\eta^2=0.084$
Negative territory	2.64[a]	2.64[a]	3.64[b]	2.97	$F(2312)=11.28$, $p<0.001$ $\eta^2=0.067$
Fear of stigmatization	*1.84*[a]	*1.76*[a]	*2.24*[b]	1.95	$F(2312)=4.27$, $p<0.05$ $\eta^2=0.027$
Time and effort	**3.67**[a]	**3.90**[a]	3.91[a]	3.83	$F(2311)=0.94$, $p>0.30$ $\eta^2=0.006$
Foul smell	2.92[a]	2.86[a]	**4.25**[b]	3.34	$F(2311)=20.59$, $p<0.001$ $\eta^2=0.117$
Cluttered shops	**3.83**[a]	**4.16**[a]	4.11[a]	4.03	$F(2311)=1.36$, $p>0.20$ $\eta^2=0.009$
Warranty and exchange service	2.61[a]	3.11[ab]	*3.40*[b]	3.04	$F(2311)=6.15$, $p<0.05$ $\eta^2=0.038$
Obsolescence	2.76[a]	2.93[a]	3.80[b]	3.16	$F(2311)=13.70$, $p<0.001$ $\eta^2=0.081$
Wear and tear	3.50[a]	3.25[a]	**4.12**[b]	3.62	$F(2310)=7.60$, $p<0.001$ $\eta^2=0.047$

a distinct category in second-hand fashion consumption. Consumers were most positive about purchasing second-hand sweaters ($M = 5.14$) and least positive about shoes ($M = 4.09$), suggesting that footwear carries unique concerns that may not apply to other clothing items. From a theoretical perspective, this suggests that motivations for second-hand shopping are not universally applicable across all fashion categories. While previous research highlights sustainability and affordability as primary drivers of second-hand purchases (Edbring et al., 2016; Guiot and Roux, 2010), our findings suggest that certain products, such as shoes, may be more strongly influenced by practical concerns than by ideological ones.

The ANOVA test showed significant differences across five of the motivational factors and eight of the barriers (Table 6 and Appendix 4), emphasizing that consumer motivations and barriers vary considerably based on the type of second-hand garment. Below, we explore these distinctions in greater depth.

4.3.1.1. Similar motivations for sweaters and jeans. Our results indicate that motivations for purchasing second-hand sweaters and jeans are largely similar, with only one significant difference: purchasing second-hand sweaters was driven more by **'originality and uniqueness'** than jeans. This suggests that sweaters may offer consumers a sense of exclusivity and distinctiveness not as commonly associated with jeans. Our results suggest that factors such as **'economy and frugality'** and **'sustainability and ethics'** were the most influential in shaping consumer attitudes in a positive manner.

4.3.1.2. Limited concerns about hygiene. Interestingly, the second-least influential barrier to purchasing second-hand sweaters ($M = 2.52$) and jeans ($M = 2.50$) is **'hygiene'**, which is also significantly lower compared to shoes ($M = 3.61$). While other studies found hygienic concerns to be a great barrier (W. Baxter et al., 2017; de Groot, 2021), our results did not replicate this pattern to the same extent, as hygiene was not the dominant concern among participants. Several possible explanations exist for this discrepancy, such as the relative importance of other barriers, changing consumer perceptions, sample and context differences, and the measurement approach. While we included **'hygiene'** as a factor in our study, it is possible that prior research framed it differently or measured it in a way that emphasized its influence more strongly. This does not necessarily contradict previous research but rather suggests a shifting prioritization of concerns (e.g., **'time and effort'** and **'cluttered shops'**) within our sample. While contamination concerns undoubtedly exist (W. Baxter et al., 2017), our study suggests that consumers weigh multiple factors in their decision-making, and **'hygiene'** may not always be the deciding factor.

4.3.1.3. Shoes elicit fewer motivations. In contrast, second-hand shoes were associated with fewer motivations overall (Table 6). Unlike sweaters and jeans, which benefit from several motivations, shoes appear to lack the same appeal in the second-hand market. Based on the mean values, the most noticeable differences between shoes and the two other products were the significantly higher concerns about the **'foul smell'** ($M = 4.25$) and **'hygiene'** ($M = 3.61$), which may be because shoes come into direct contact with feet, which can sweat and harbor bacteria, leading to potential issues with cleanliness and odor. Footwear also molds to the shape of the previous wearer's feet, raising concerns about comfort. In contrast, second-hand jeans and sweaters, while also worn close to the body, can be washed and sanitized easily, and they are less likely to absorb as much odor as shoes, making **'hygiene'** concerns (sweater $M = 2.52$, jeans $M = 2.50$) significantly less prominent. This contradicts the current literature (Baxter et al., 2016, L. Baxter et al., 2017; Edbring et al., 2016), which states clothing is highly negatively influenced by concerns about hygiene. To overcome this barrier and fit shoes better into second-hand economies, designers must consider how these issues can be handled. Solutions might include materials that can

Table 7
Mean values of the second-hand products sweaters, jeans, and shoes. Means in bold indicate each product's most influential motivations and barriers. Means in *italics* indicate the least influential motivations and barriers per product. Means with the same superscript indicate that the motivation or barrier did not significantly differ ($p > 0.05$) across categories.

	Dinner table	Armchair	Bookcase	Total	Statistics
General attitude	5.65[a]	4.87[b]	5.70[a]	5.41	F(2281)= 12.45, $p < 0.001$ $\eta^2 = 0.081$
Motivations to purchase second-hand					
Treasure hunting	**4.91[a]**	4.32[b]	4.64[ab]	4.62	F(2281)= 3.70, $p < 0.05$ $\eta^2 = 0.026$
Originality and uniqueness	4.64[a]	3.72[b]	4.58[a]	4.31	F(2281)= 9.29, $p < 0.001$ $\eta^2 = 0.062$
Social interaction	*2.87*[a]	*2.47*[a]	*2.98*[a]	2.77	F(2280)= 2.82, $p > 0.05$ $\eta^2 = 0.020$
Higher product quality	4.55[a]	3.95[b]	4.51[a]	4.34	F(2280)= 4.68, $p < 0.05$ $\eta^2 = 0.032$
Nostalgia	4.18[a]	*3.22*[b]	4.04[a]	3.81	F(2280)= 8.24, $p < 0.001$ $\eta^2 = 0.056$
Distance from the mainstream market	*3.91*[a]	3.38[a]	*3.96*[a]	3.75	F(2280)= 3.42, $p < 0.05$ $\eta^2 = 0.024$
Sustainability and ethics	4.70[ab]	**4.35[a]**	**5.08[b]**	4.71	F(2280)= 4.44, $p < 0.05$ $\eta^2 = 0.031$
Economy and frugality	**5.63[a]**	**5.06[b]**	**5.36[ab]**	5.35	F(2280)= 3.47, $p < 0.05$ $\eta^2 = 0.024$
Barriers to purchasing second-hand					
Hygiene	2.12[a]	3.52[b]	2.25[a]	2.63	F(2280)= 26.63, $p < 0.001$ $\eta^2 = 0.160$
Negative utility	*2.05*[a]	*2.96*[b]	*2.01*[a]	2.34	F(2280)= 19.02, $p < 0.001$ $\eta^2 = 0.120$
Negative territory	2.13[a]	3.17[b]	2.11[a]	2.47	F(2280)= 17.16, $p < 0.001$ $\eta^2 = 0.109$
Fear of stigmatization	*1.76*[a]	*2.02*[a]	*1.63*[a]	1.80	F(2280)= 2.84, $p > 0.05$ $\eta^2 = 0.020$
Time and effort	**3.79[a]**	3.65[ab]	**3.30[b]**	3.58	F(2280)= 3.04, $p < 0.05$ $\eta^2 = 0.021$
Foul smell	2.39[a]	**3.66[b]**	2.49[a]	2.85	F(2280)= 19.37, $p < 0.001$ $\eta^2 = 0.122$
Cluttered shops	**3.58[a]**	3.33[a]	**3.14[a]**	3.35	F(2279)= 2.00, $p > 0.10$ $\eta^2 = 0.014$
Warranty and exchange service	2.98[ab]	3.01[a]	2.45[b]	2.81	F(2279)= 3.46, $p <$
Obsolescence	2.41[a]	3.08[b]	2.19[a]	2.56	0.05 $\eta^2 = 0.024$ F(2279)= 9.82, $p < 0.001$
Wear and tear	3.25[a]	**3.77[a]**	2.66[b]	3.23	$\eta^2 = 0.066$ F(2279)= 10.96, $p < 0.001$ $\eta^2 = 0.073$

be washed in a washing machine to visually signalize a neutralization of the footwear and a simple and affordable way to re-sole shoes to avoid discomfort.

4.3.2. Second-hand furniture

The results showed significant differences in the general attitude toward purchasing a second-hand armchair and dinner table, and armchair and bookcase ($p < 0.001$). However, no significant differences were observed between the bookcase and the dinner table, suggesting that certain types of furniture elicit stronger psychological and practical concerns than others. Participants showed the most positive attitude towards purchasing a second-hand bookcase ($M = 5.70$), while they were least positive about the second-hand armchair ($M = 4.87$). The ANOVA and post hoc tests revealed significant differences across six motivational factors and eight barriers (Table 7 and Appendix 5). Notably, second-hand armchairs were associated with fewer motivational benefits and heightened concerns, positioning them as a less desirable option in the second-hand furniture market.

4.3.2.1. Bookcases and dinner tables as preferred second-hand items. Consumers rated second-hand bookcases and dinner tables higher in motivational factors compared to armchairs. This suggests that certain furniture types are perceived as more functional and aesthetically valuable in a second-hand context. For example, bookcases can offer **nostalgic** charm ($M = 4.04$) and **'higher product quality'** ($M = 4.51$), making them desirable for those seeking unique home décor at a lower cost. Similarly, dinner tables, often made of sturdy materials like wood, retain their usability over time, making them a practical second-hand purchase.

4.3.2.2. Armchairs face lower motivational appeal. Based on the post hoc tests of these factors, we can conclude that participants associated second-hand armchairs with significantly lower scores for the motivational factors and significantly higher scores for the barriers. In comparison to second-hand dinner tables and bookcases, the participants reported significantly lower means when rating a second-hand armchair for the following three motivational factors: **'originality and uniqueness'** ($M = 3.72$), **'higher product quality'** ($M = 3.95$), and **'nostalgia'** ($M = 3.22$). This indicates that consumers may not perceive second-hand armchairs as possessing the same aesthetic or sentimental value as other furniture pieces. Results also showed significantly greater concerns about **'hygiene'** ($M = 3.52$), **'negative territory'** ($M = 3.17$), and **'foul smell'** ($M = 3.66$) for second-hand armchairs compared to dinner tables and bookcases. One possible explanation is that armchairs are seen as highly personal furniture pieces - armchairs can absorb body oils, sweat, and odors that can be difficult to clean. They may experience physical wear, such as sagging cushions or worn fabric, affecting both appearance and comfort. In contrast, dinner tables and armchairs are generally less exposed to such direct contact and wear, as these items are typically used to hold objects, not bodies, and do not experience the same physical interaction, making them less prone to smell and visible deterioration. To improve this, furniture designers could take into

Table 8
Mean values of the second-hand products sweaters, jeans, and shoes. Means in bold indicate each product's most influential motivations and barriers. Means in *italics* indicate the least influential motivations and barriers per product. Means with the same superscript indicate that the motivation or barrier did not significantly differ ($p > 0.05$) across categories.

	Smartphone	Microwave	Washing machine	Total	Statistics
General attitude	4.69^{a}	3.57^{b}	4.19^{ab}	4.15	$F(2258)=8.66$, $p < 0.001$ $\eta^2 = 0.063$
Motivations to purchase second-hand					
Treasure hunting	3.66^{a}	2.53^{b}	3.38^{a}	3.19	$F(2258)=11.17$, $p < 0.001$ $\eta^2 = 0.080$
Originality and uniqueness	2.47^{a}	2.05^{a}	2.38^{a}	2.30	$F(2258)=2.28$, $p > 0.10$ $\eta^2 = 0.017$
Social interaction	*2.03*^{a}	*1.86*^{a}	*2.08*^{a}	1.99	$F(2256)=0.73$, $p > 0.40$ $\eta^2 = 0.006$
Higher product quality	*2.28*^{a}	2.34^{a}	2.75^{a}	2.46	$F(2256)=2.88$, $p > 0.05$ $\eta^2 = 0.022$
Nostalgia	2.32^{a}	*1.93*^{a}	*1.96*^{a}	2.07	$F(2255)=2.15$, $p > 0.10$ $\eta^2 = 0.017$
Distance from the mainstream market	2.87^{a}	2.28^{b}	2.80^{ab}	2.65	$F(2255)=3.49$, $p < 0.05$ $\eta^2 = 0.027$
Sustainability and ethics	**4.24**^{a}	**3.47**^{b}	**4.05**^{ab}	3.92	$F(2255)=4.34$, $p < 0.05$ $\eta^2 = 0.033$
Economy and frugality	**5.40**^{a}	**4.09**^{b}	**4.78**^{c}	4.76	$F(2255)=12.79$, $p < 0.001$ $\eta^2 = 0.091$
Barriers to purchasing second-hand					
Hygiene	2.40^{a}	3.78^{b}	3.28^{b}	3.15	$F(2255)=15.78$, $p < 0.001$ $\eta^2 = 0.110$
Negative utility	4.16^{a}	3.99^{a}	4.31^{a}	4.15	$F(2255)=0.96$, $p > 0.30$ $\eta^2 = 0.007$
Negative territory	2.98^{a}	4.05^{b}	*3.21*^{a}	3.41	$F(2254)=7.65$, $p < 0.001$ $\eta^2 = 0.057$
Fear of stigmatization	*2.19*^{a}	*2.41*^{a}	*2.34*^{a}	2.31	$F(2254)=0.46$, $p > 0.60$ $\eta^2 = 0.004$
Time and effort	3.75^{a}	3.95^{a}	4.20^{a}	3.97	$F(2254)=1.87$, $p > 0.10$ $\eta^2 = 0.014$
Foul smell	*1.92*^{a}	4.19^{b}	3.77^{b}	3.29	$F(2254)=40.17$, $p < 0.001$ $\eta^2 = 0.240$
Cluttered shops	3.50^{a}	*3.75*^{a}	3.68^{a}	3.64	$F(2254)=0.49$, $p > 0.60$ $\eta^2 = 0.004$
Warranty and exchange service	**5.00**^{ab}	**4.52**^{a}	**5.16**^{b}	4.89	$F(2254)=3.34$, $p < 0.05$ $\eta^2 = 0.026$
Obsolescence	**4.90**^{a}	**4.45**^{a}	**4.95**^{a}	4.77	$F(2254)=2.89$, $p > 0.05$ $\eta^2 = 0.022$
Wear and tear	4.38^{a}	4.43^{a}	4.26^{a}	4.36	$F(2254)=0.23$, $p > 0.70$ $\eta^2 = 0.002$

consideration how upholstered furniture, such as armchairs, can be designed more modular for easier re-upholstering and change of padding.

4.3.3. Second-hand electronics

The general attitude toward purchasing a smartphone and a microwave differed significantly ($p < 0.001$), while no significant differences were found between washing machines and the two aforementioned products. The general attitude toward purchasing a smartphone second-hand was the most positive ($M = 4.69$), while participants were the least positive towards purchasing a microwave second-hand ($M = 3.57$). The ANOVA test showed significant differences across four motivational factors and four barriers, making second-hand electronics the category with the fewest significant differences (Table 8 and Appendix 6). This may suggest that electronics, unlike other second-hand goods, is judged based on practical considerations rather than emotional or aesthetic motivations. Below, we explore the underlying motivations and barriers shaping these perceptions.

4.3.3.1. Dominance of 'Economy and frugality' in second-hand electronics. Among all motivational factors, **'economy and frugality'** emerged as the strongest driver of second-hand electronics purchases. Notably, it was the only factor where smartphones ($M = 5.40$), microwaves ($M = 4.09$), and washing machines ($M = 4.78$) differed significantly from each other. This suggests that, while cost savings are a primary motivation across all categories, the perceived value-for-money varies depending on the electronic device. Smartphones received the highest mean scores for **'economy and frugality'**, reflecting that consumers may see significant financial benefits in purchasing used smartphones, likely due to their high new-market price and shorter lifespans.

4.3.3.2. Sustainability considerations for microwaves take a backseat. Another key finding was that **'sustainability and ethics'** were significantly lower for microwaves ($M = 3.47$) than for smartphones ($M = 4.24$) and washing machines ($M = 4.05$). This suggests consumers may

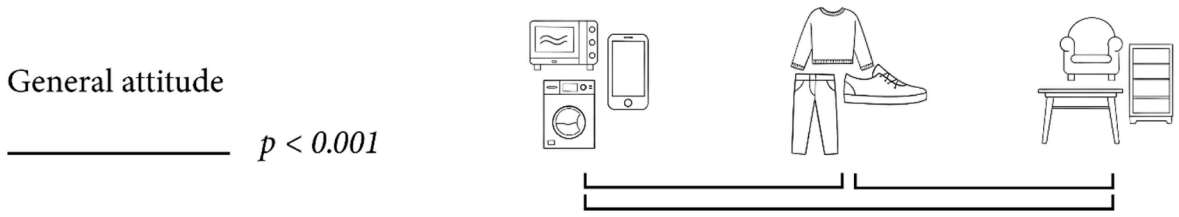


Fig. 3.a. Significant differences in the general attitude toward purchasing second-hand product categories: fashion, furniture, and electronics. The relative importance of the general attitude is shown in the horizontal positioning of the product category icon; the rightmost icon shows the product category to which the general attitude is most positive relative to the others. The distance between the icons does not represent the distance between mean values.

associate sustainability more strongly with high-value products (e.g., smartphones and washing machines) than lower-cost, easily replaceable items like microwaves.

Meanwhile, our results showed no significant differences in the motivational factors **'originality and uniqueness'** ($M = 2.30$), **'social interaction'** ($M = 1.99$), **'higher product quality'** ($M = 2.46$), and **'nostalgia'** ($M = 2.07$), which were the four motivational factors with the lowest mean values. These low mean values suggest that consumers view second-hand electronics primarily through a functional and economic lens rather than an emotional or social one, contrasting with second-hand fashion or furniture, where originality and nostalgia often play a role (Cervellon et al., 2012).

4.3.3.3. Hygiene concerns are product-specific. Smartphones scored significantly lower mean values for **'hygiene'** ($M = 2.40$) and **'foul smell'** ($M = 1.92$) than the two other electronics, indicating these concerns are primarily relevant for second-hand microwaves and washing machines, likely because these products are related to food and cleaning. Even though smartphones are personal devices, they may be perceived as more hygienic as they can be wiped clean easily, unlike household appliances that interact with food, water, or detergent. In contrast, second-hand microwaves raised greater hygiene-related concerns, likely due to food residue, grease accumulation, and potential lingering odors from previous use. Similarly, washing machines, despite their cleaning function, may raise concerns about prior detergent use, mold buildup, or mechanical wear.

4.3.3.4. The psychological barrier of 'Negative territory'. Second-hand microwaves score a significantly higher mean value for **'negative territory'** ($M = 4.05$) than smartphones and washing machines. This suggests that consumers experience psychological discomfort when considering a second-hand microwave, perceiving it as too intimately linked to its previous owner's habits and hygiene. Hence, the idea of taking over a pre-used microwave might invoke a sense of discomfort, despite the frequent exposure to similar shared-use environments (e.g., microwaves in office settings), where individuals frequently use communal appliances without the same level of hesitation. One possible explanation is that in shared spaces, the appliance is viewed as belonging to a neutral environment rather than carrying the "imprint" of a specific previous owner. However, when purchasing a second-hand microwave, the mental association with another household's cooking habits may invoke feelings of unease or contamination. Providing clear information about the microwave's condition (e.g., safety checks and odor-neutralization procedures) may ease the consumer's concerns. Additionally, designers could consider designing removable, washable microwave components.

5. Conclusion

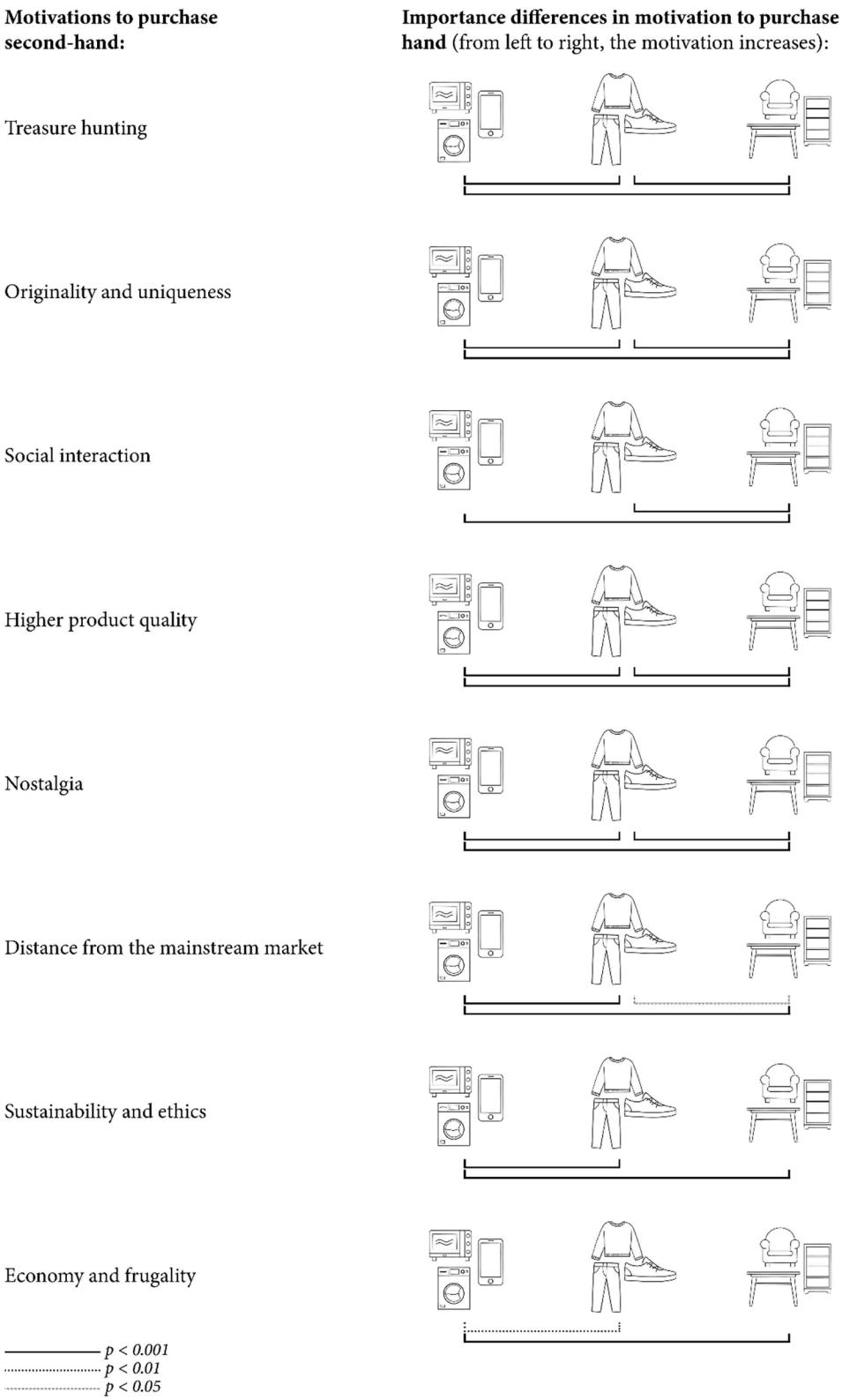
In conclusion, this research finds significant differences in several motivations and barriers to purchasing second-hand products within and across the three categories: fashion items, furniture, and electronics. Thus, the results of this study suggest that research and the general perspective on motivations and barriers to second-hand shopping must be redirected to a more nuanced approach. Based on these results, the following sections will provide suggestions for policies and practices, limitations, and further research.

Even though our findings provide interesting insights concerning the relative importance of motivators and barriers for second-hand consumption across categories, we acknowledge that we must also approach our findings with some caution as these are based on self-reports. The Theory of Planned Behavior (Ajzen, 1991; Ajzen and Madden, 1986) theorizes that while consumers may express positive intentions toward purchasing second-hand products, various situational and psychological factors can hinder actual behaviour. The intention-behavior gap (Pedersén et al., 2021) suggests that stated motivations do not always translate into action, as purchasing decisions are influenced by habits, perceived social norms, and implicit associations (Grimmer et al., 2016; Papies, 2017). For example, while respondents may not explicitly report hygiene concerns as a primary barrier, subconscious associations with cleanliness or contamination (Baxter et al., 2016, L. Baxter et al., 2017) could still impact purchasing behaviour. Future research could explore interventions that bridge this gap, such as sensory cues or behavioural nudges, to facilitate second-hand consumption.

5.1. Suggestions for policies

Current EU legislation considers fashion products as one broad category and treats all the underlying products equally (*How Is the EU Making Fashion Sustainable?*, n.d.; New Proposals to Make Sustainable Products the Norm, 2022). Our research indicates that fashion products vary significantly in several aspects regarding consumers' willingness to extend product lifetimes through second-hand purchases. Hence, we propose that a detailed approach is necessary to implement effective legislation, which would require more research into each of the specific products in question. This fine-grained approach is already seen regarding some electronics, where the EU legislation differentiated between washing machines, mobile phones, and vacuum cleaners, among other things (*'Right to Repair'*, 2023). Alongside this, our results showed that the barriers to purchasing different second-hand electronics differed significantly across parameters, such as hygiene; thus, we suggest that such matters should be considered in the EU legislation as well.

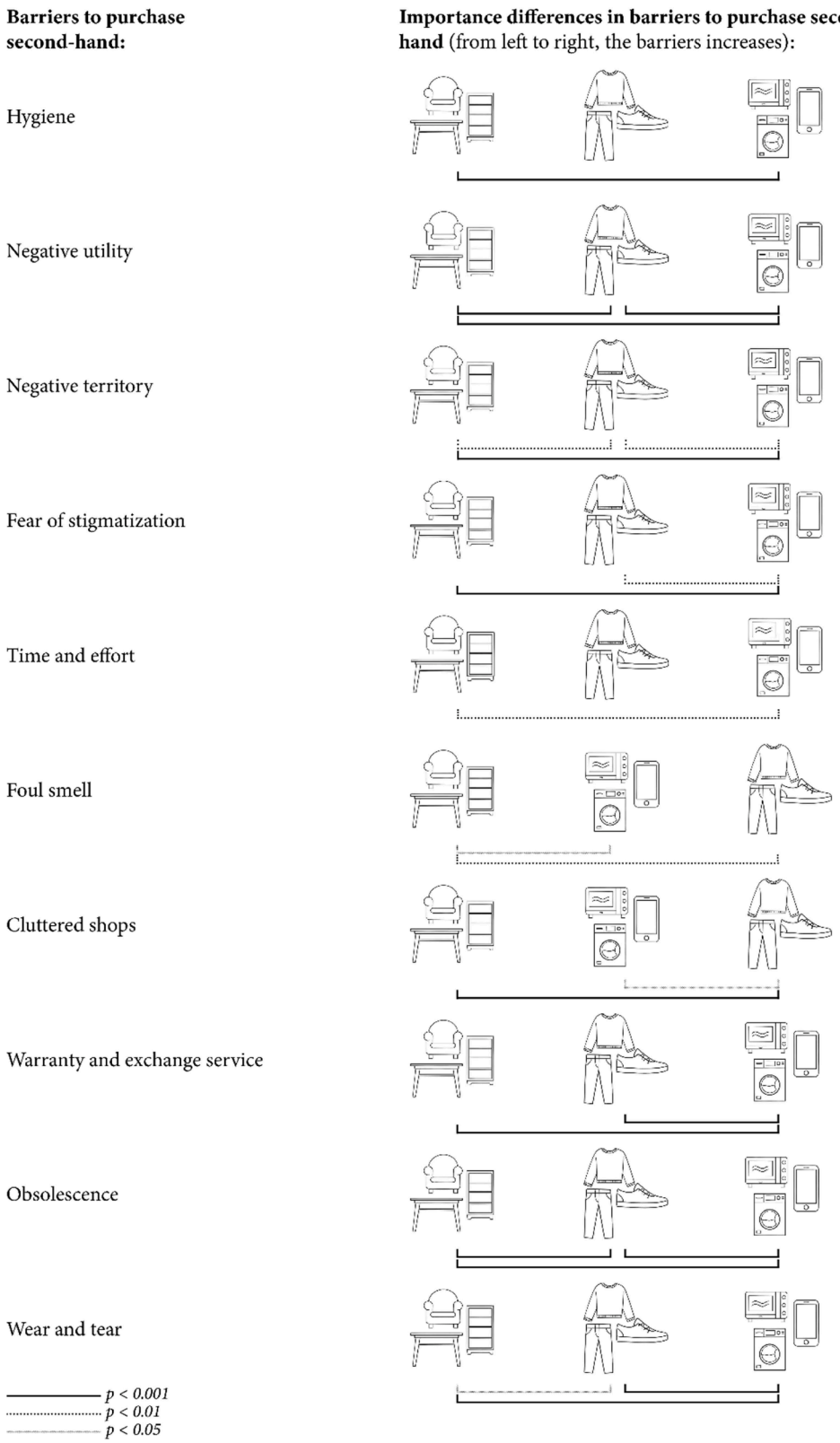
Our results showed consumers were most positive toward purchasing second-hand furniture. This category has great potential for extended lifetimes, as the products are static and functionally hardly obsolete. As wear and tear is a significant barrier for second-hand furniture, certain parameters should be considered in the newly introduced Digital Product Passports (*EU's Digital Product Passport*, 2024), which currently focuses on backward-looking information such as materials and their origins, lifecycle environmental impacts, and technical performance (*Ecodesign for Sustainable Products Regulation - European Commission*, 2024). We suggest including information relevant to minimizing the barriers of wear and tear, such as maintenance and expected material ageing, which would support consumers purchasing (especially textile) second-hand furniture.



Appendix 3.b. Significant differences in motivations to purchase second-hand product categories. The distance between the product category icons does not represent the distance between mean values.

5.2. Suggestions for practice

For designers, we suggest a careful consideration of components critical to second-hand consumption. That is not only products and components that will be obsolete due to rapid advancement and development of new technologies, but also parts that become aesthetically obsolete or are especially sensitive in terms of, e.g., hygiene and comfort. As this study indicates, products like shoes, armchairs, and microwaves would be beneficial to design with this in mind. These are current products that consumers hesitate to purchase second-hand due



Appendix 3.c. Significant differences in barriers to purchasing second-hand product categories. The distance between the product category icons does not represent the distance between mean values.

to, for example, concerns about hygiene, smell, and traces of the previous user. Hence, one could imagine future shoes that were designed for resoling and upgrading worn-out areas, microwaves being designed with detachable interiors that allow for extensive washing and cleaning in a washing machine, and modular armchairs that were designed to easily get a new cushion and upholstery when needed.

Our research also indicates that second-hand shops could enhance their performance by understanding consumers' motivations and

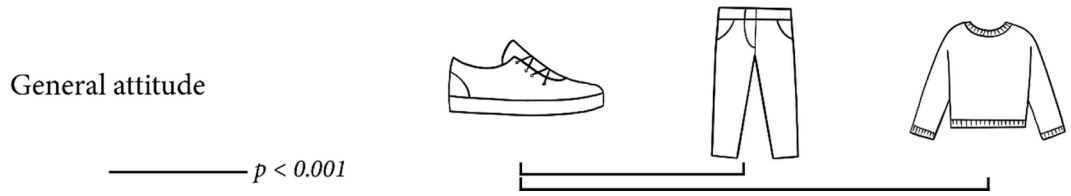
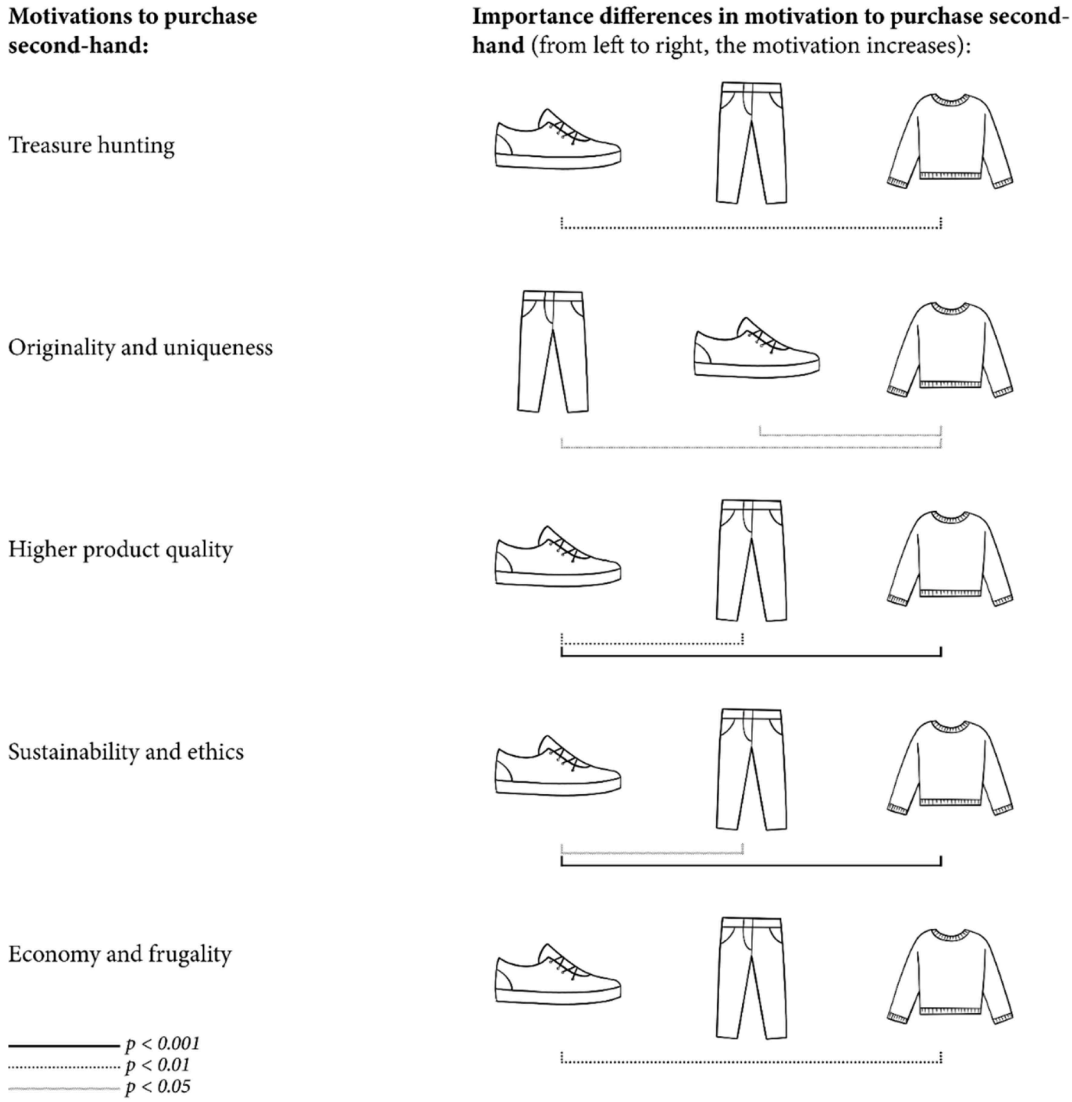
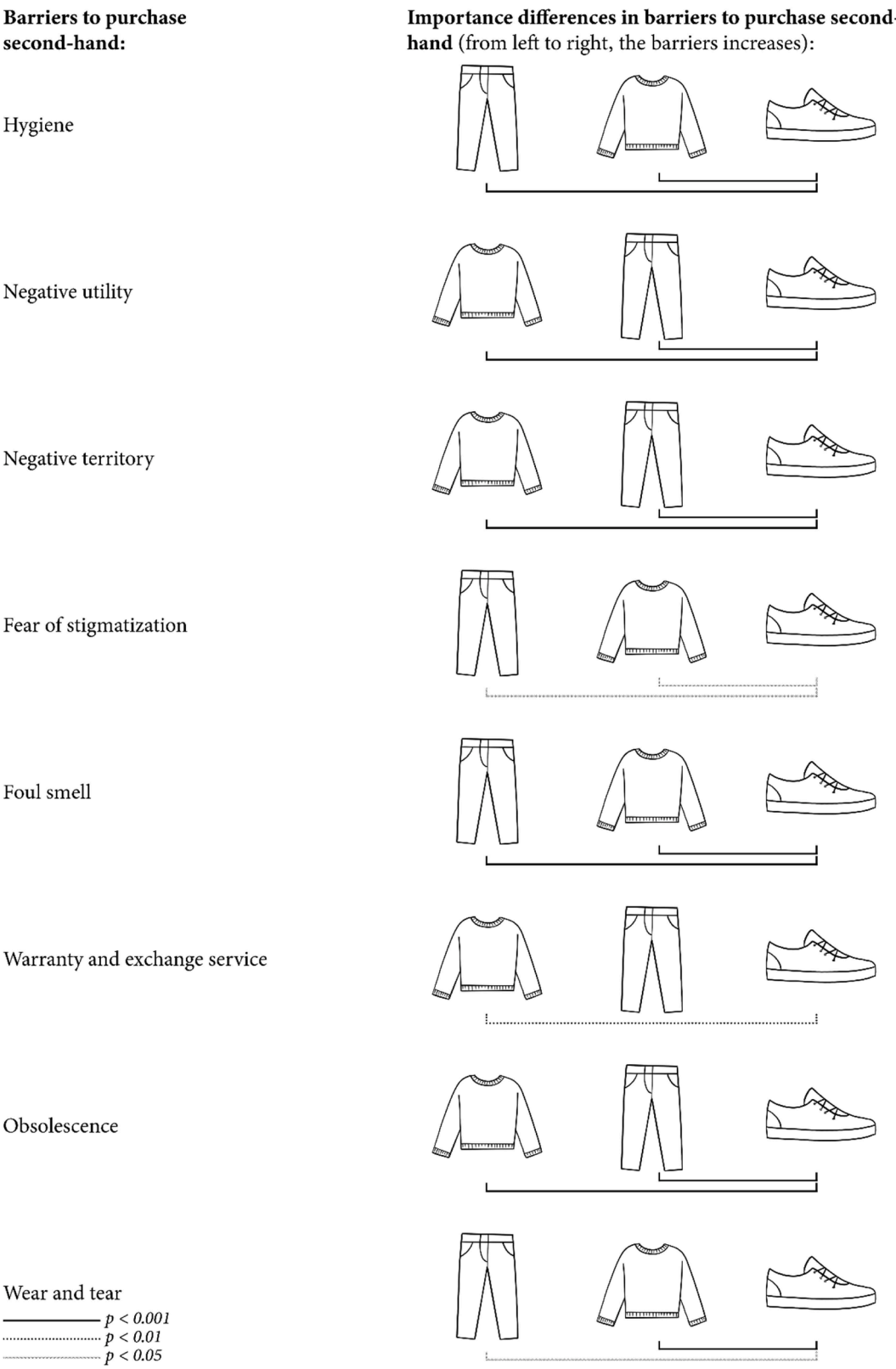


Fig. 4.a. Significant differences in the general attitude toward purchasing second-hand fashion products: sweaters, jeans, and shoes. The relative importance of the general attitude is shown in the horizontal positioning of the product icon; the rightmost icon shows the product to which the general attitude is most positive relative to the others. The distance between the icons does not represent the distance between mean values.



Appendix 4.b. Significant differences in motivations to purchase second-hand fashion products: sweaters, jeans, and shoes. The distance between the icons does not represent the distance between mean values.

barriers in various ways. Overall, we found that frugality and sustainability are strong drivers for all products. This suggests that second-hand shops should promote the economic and environmental advantages of buying second-hand items while ensuring that prices remain low and attractive. Additionally, our findings reveal that cluttered store layouts are a major barrier to fashion items. This suggests that a different layout is necessary for selling these products effectively. Moreover, to accommodate the hesitation to purchase critical items, such as the aforementioned shoes, armchairs, and microwaves, second-hand shops may benefit from intensifying the cleaning of these products and informing customers about the thorough cleaning processes these items undergo. This could be expressed via a cleaning certificate or label attached to the products, similar to what dry cleaners provide. Research also suggests that sensory interventions, such as the use of fresh laundry scents, can positively influence consumer perceptions by mitigating concerns about hygiene and contamination (de Groot et al., 2022). Incorporating such strategies in second-hand retail environments could make products more appealing and help overcome psychological barriers to purchase.



Appendix 4.c. Significant differences in barriers to purchasing second-hand fashion products: sweaters, jeans, and shoes. The distance between the icons does not represent the distance between mean values.

5.3. Limitations and suggestions for further research

This study highlights several important areas for further exploration. Firstly, the impact of cluttered second-hand stores on consumers' perceptions and purchasing behaviour requires a more detailed investigation, especially for product categories such as fashion and furniture. Store layout and presentation may directly influence consumers' willingness to browse, potentially affecting sales. While current research on

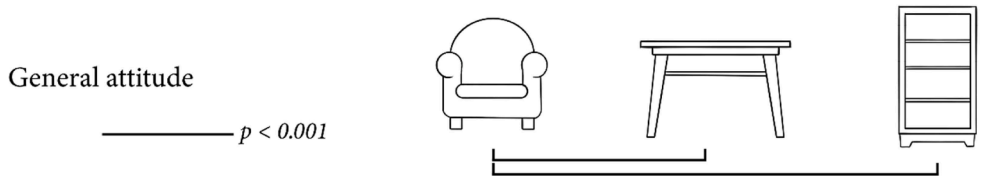
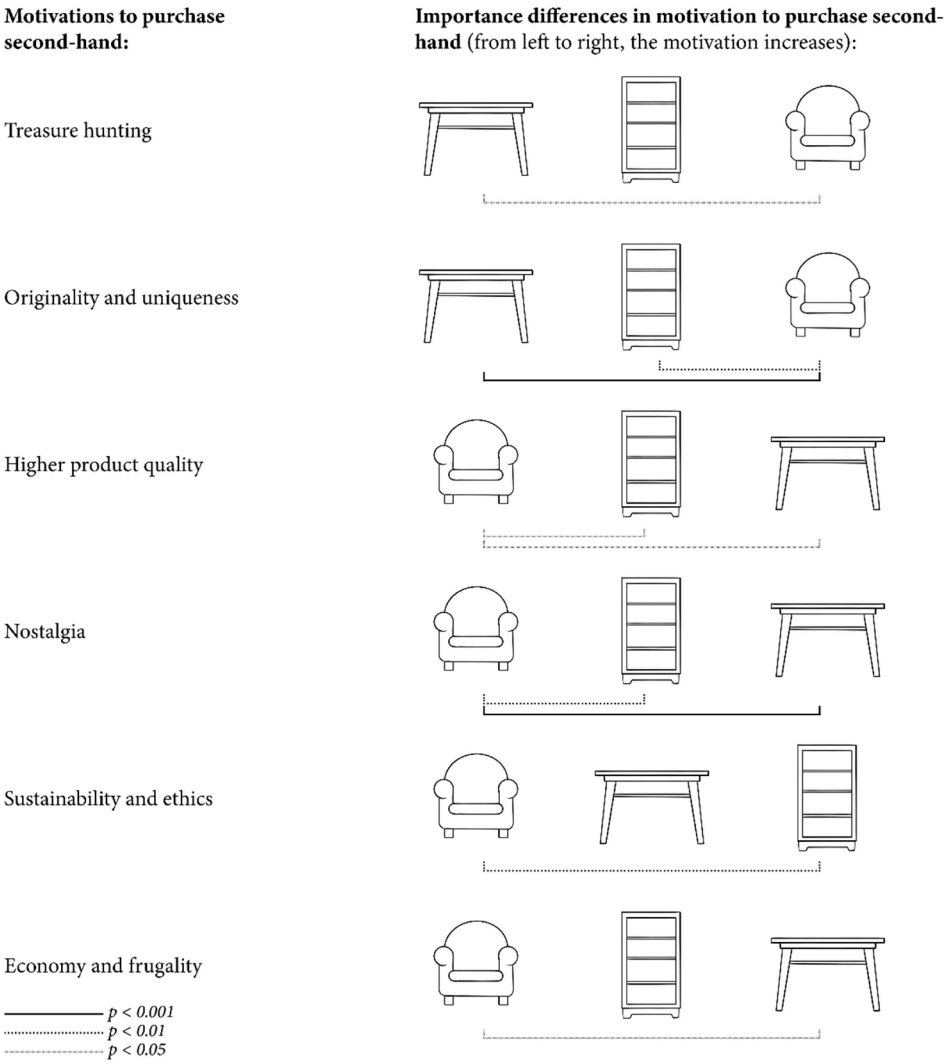


Fig. 5.a. Significant differences in the general attitude toward purchasing second-hand furniture products: dinner tables, armchairs, and bookcases. The relative importance of the general attitude is shown in the horizontal positioning of the product icon; hence, the rightmost icon shows the product to which the general attitude is most positive relative to the others. The distance between the icons does not represent the distance between mean values.

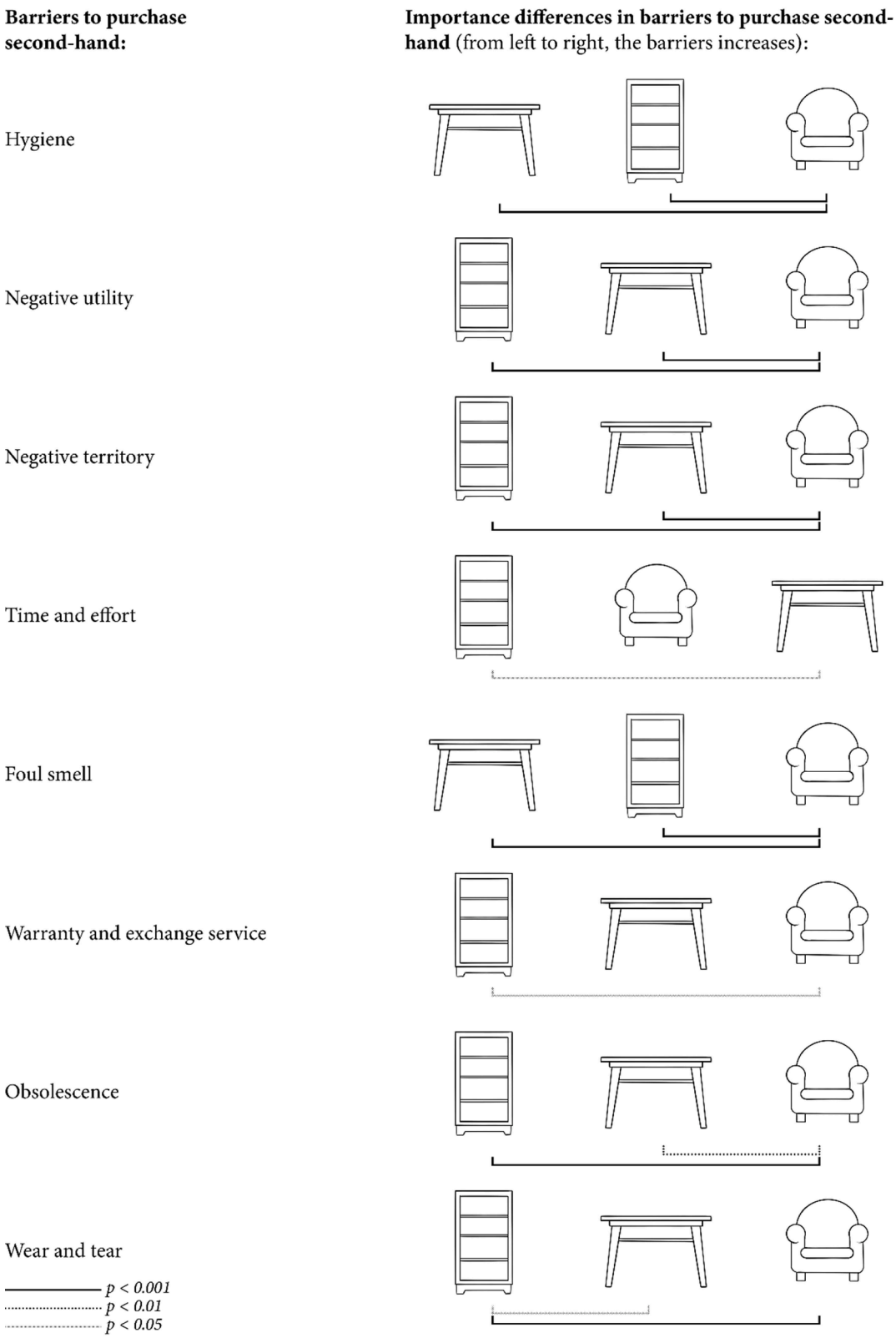


Appendix 5.b. Significant differences in motivations to purchase second-hand furniture products: dinner tables, armchairs, and bookcases. The distance between the icons does not represent the distance between mean values.

second-hand fashion has a product- and consumer focus, we suggest that more research on the shopping experience is needed, as cluttered shops are found to be a significant barrier to second-hand fashion items.

Secondly, prior research provides insights into product life-extending strategies such as designing for disassembly and repair (Ackermann, 2018; Desai and Mital, 2005; Huang et al., 2016). We suggest research is needed to uncover how to design for second-hand. Our results showed that wear and tear is the largest barrier to second-hand armchairs. Hence, this would provide valuable insights into which parameters can be adjusted to enhance second-hand purchases.

Thirdly, while our study focuses on nine specific products within three categories, new products across each category, as well as new product categories, may likely yield different results. For instance, given the more intimate nature of underwear, we would anticipate greater differentiation between jeans and underwear. Future research should also compare similar products like swimwear and underwear, as qualitative studies suggest differences in consumer attitudes towards these two products (Frahm, Boks, et al., 2024). This distinction could offer further insights into how product intimacy influences second-hand purchasing decisions and help to understand how hygiene concerns affect products differently. Our study provides a foundation for future research to hypothesize and test such specific relationships for second-hand consumption. Also, such studies could explore if different



Appendix 5.c. Significant differences in barriers to purchasing second-hand furniture products: dinner tables, armchairs, and bookcases. The distance between the icons does not represent the distance between mean values.

consumer segments (e.g., based on age, gender, income) will differ in the importance of certain barriers for second-hand consumption.

A limitation of our study is that the participants were not provided with visualizations or context of the products, making their responses based on associations of a prototypical product. Future research could also include (design) interventions to investigate how to tackle the different barriers and positively influence the perception of purchasing second-hand products. Moreover, this study builds on self-reported data, which may limit knowledge of the potential impact of unconscious processes. Thus, we suggest that future research conduct field

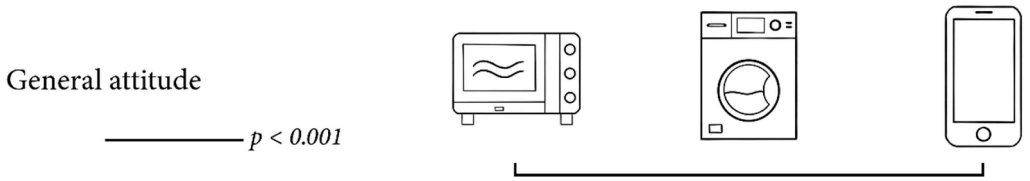
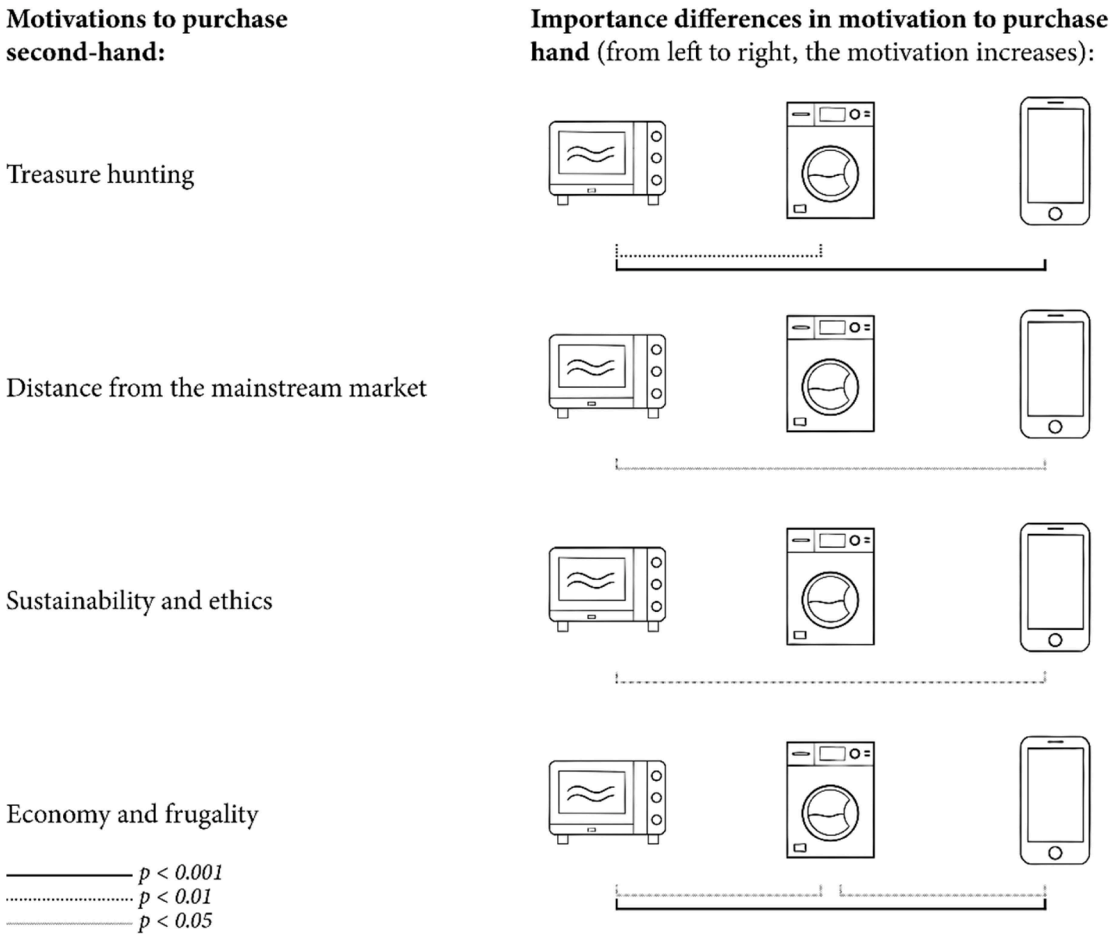


Fig. 6.a. Significant differences in the general attitude toward purchasing second-hand furniture products: dinner tables, armchairs, and bookcases. The relative importance of the general attitude is shown in the horizontal positioning of the product icon; the rightmost icon shows the product to which the general attitude is most positive relative to the others. The distance between the icons does not represent the distance between mean values.



Appendix 6.b. Significant differences in motivations to purchase second-hand electronic products: smartphone, microwave, and washing machine. The distance between the icons does not represent the distance between mean values.

experiments with systematic manipulations of specific interventions and actual behavioural responses as measurements.

Altogether, our research results showed significant differences in consumers' motivations and barriers to purchasing second-hand products across the categories of fashion, furniture, and electronic items. This contributes to broadening the perspective of the circular economy by highlighting the complexity of consumer behaviour in the context of second-hand purchasing and, hence, the circular economy adoption. It shows that a deep, category-sensitive understanding of consumers' motivations and barriers is essential and contributes directly to more effective strategies for a circular economy, providing suggestions for policymakers, designers, and second-hand businesses in crafting solutions that resonate with consumers.

Ethical approval

The AAU Research Ethics Committee considers the research activity to be ethically justifiable.

Declaration of generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the author(s) used Grammarly Pro in order to improve language, grammar, and readability. After using this tool/service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the published article.

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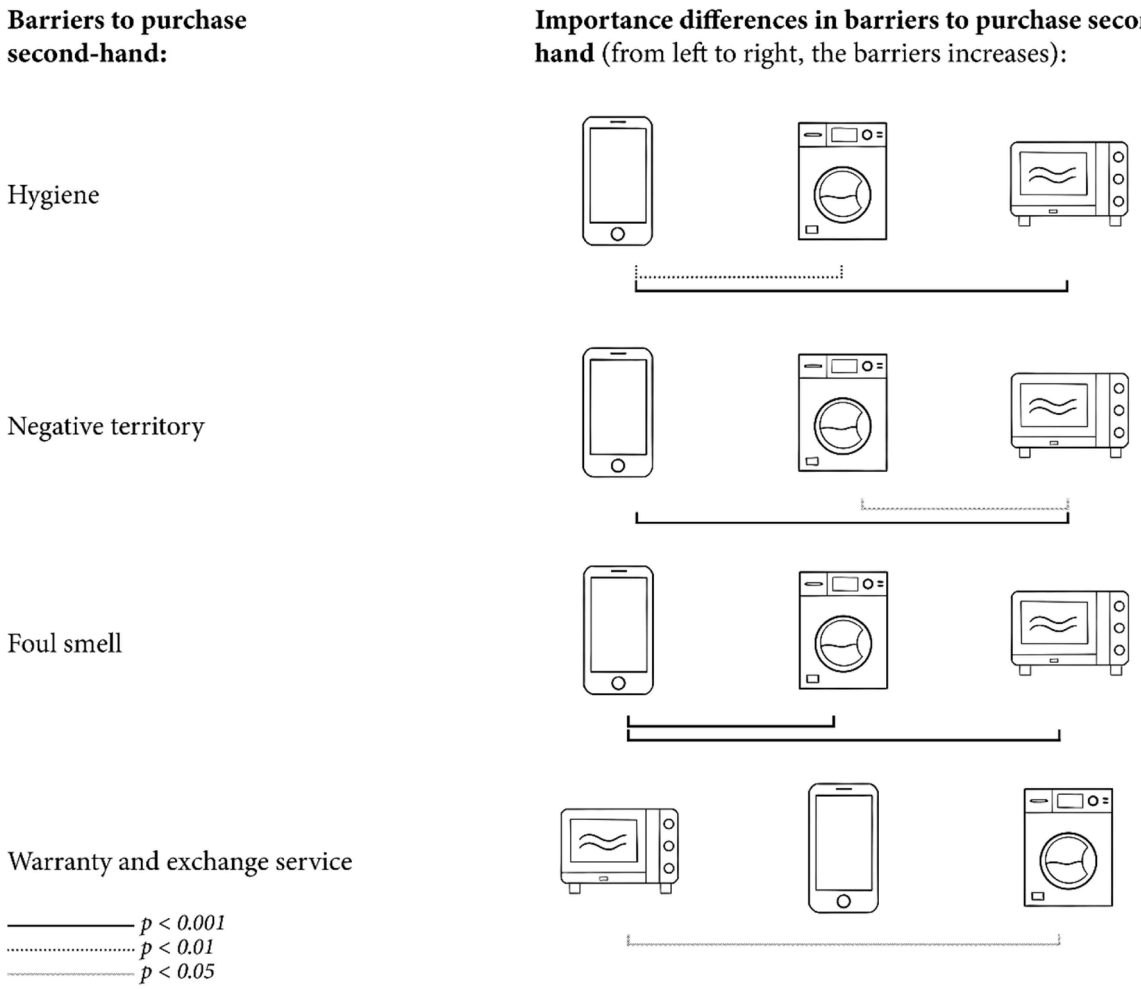
CRediT authorship contribution statement

Lea Becker Frahm: Writing – original draft, Visualization, Software, Resources, Project administration, Methodology, Formal analysis, Data



Appendix 6.c. Significant differences in barriers to purchasing second-hand electronic products: smartphone, microwave, and washing machine. The distance between the icons does not represent the distance between mean values.

curation, Conceptualization. **Ruth Mugge:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization. **Linda Nhu Laursen:** Writing – review & editing, Supervision, 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.

Appendix 1. Results of pre-test

Product categories	Specific second-hand product	No. of "Yes"	No. of "No"
Fashion	Sweater	28 (88 %)	4 (12 %)
	Jeans	23 (72 %)	9 (28 %)
	Shoes	18 (56 %)	14 (44 %)
Furniture	Dinner table	29 (91 %)	3 (9 %)
	Armchair	29 (91 %)	3 (9 %)
	Bookcase	32 (100 %)	0 (0 %)
Electronics	Smartphone	16 (50 %)	16 (50 %)
	Microwave	15 (47 %)	17 (53 %)
	Washing machine	22 (69 %)	10 (31 %)

Appendix 2. Survey questions

Please note that "[product]" is replaced with one of the specific second-hand products (sweater, jeans, shoes, dinner tables, armchairs, bookcases, smartphones, microwaves, or washing machines) in the survey received by the participants.

Survey questions
General attitude, α = 0.86
I would never buy a [product] second-hand. (r)
I would consider buying a [product] second-hand.
I am more likely to purchase a second-hand [product] than a new one.
Treasure hunting (motivation), α = 0.89 (based on (Guiot and Roux, 2010))
I like shopping for second-hand [products] because I always hope I'll come across a real find (in online or physical stores).
When looking for a second-hand [product], I check our certain second-hand retailers (online and physical stores) and enjoy the search.
I would feel like a treasure hunter looking for second-hand [product].
Originality and uniqueness (motivation), α = 0.93 (based on (Lynn and Harris, 1997))
To me, an essential benefit of second-hand [products] is their uniqueness.
I like second-hand [products] that are scarce.
I like second-hand [products] that others do not have.
Social interaction (motivation), α = 0.97 (based on (Guiot and Roux, 2010))
What I like about shopping for second-hand [products] is the pleasure of meeting and talking to people.
I like shopping for second-hand [products] because I can have contact with people and talk to them.
I enjoy the social interaction you find when shopping for second-hand [products].
Higher product quality (motivation), α = 0.92
I believe an essential benefit of second-hand [products] is that they are better quality.
Things were of better quality in the old days, which is why I like second-hand [products].
I like second-hand sweaters because new [products] lack quality.
Nostalgia (motivation), α = 0.98 (based on (Guiot and Roux, 2010))
I like second-hand [products] because they have a history and trigger nostalgic thoughts.
I like second-hand [products] because they evoke nostalgic feelings of the past.
I like second-hand [products] because they make me feel nostalgic.
Distance from the mainstream market (motivation), α = 0.94 (based on (Guiot and Roux, 2010))
I like second-hand [products] because they make me feel like I'm escaping the (consumption) system.
I like second-hand [products] as they are a revenge on the mainstream consumption system.
I like second-hand [products] as they enable me to distance myself from the consumer society.
Sustainability and ethics (motivation), α = 0.96 (based on (Chang, 2011))
I like second-hand [products] because they are better for the environment.
I like second-hand [products] because they help slow down the deterioration of the environment.
I like second-hand [products] because they can effectively reduce pollution.
Economy and frugality (motivation), α = 0.93 (based on (Mugge, Jockin, et al., 2017))
I believe there is a substantial financial benefit when purchasing a second-hand [products] instead of a new one.
I believe the cost of a second-hand [product] is low compared to the price of a new [product], making it an enticing offer.
I like second-hand [products] because they are priced significantly lower than new [products].
Hygiene (barrier), α = 0.91 (based on (W. L. Baxter et al., 2016))
I feel that second-hand [products] are unhygienic to use.
With a second-hand [product], I would fear bringing pests into my home.
I fear second-hand [products] contain bacteria from previous users.
Negative utility (barrier), α = 0.91
I fear second-hand [products] have less functional value than new ones.
I would expect second-hand [products] to have less functional quality because they have been used before.
I fear second-hand [products] are not as good as new ones.
Negative territory (barrier), α = 0.96 (based on (W. L. Baxter et al., 2016))
Using second-hand [products], I would always think about the fact that they had belonged to somebody else.
With a second-hand [product], I would always worry that someone else had owned and used it.
I am concerned about second-hand [products] because someone else has been using the product.
Fear of stigmatization (barrier), α = 0.93 (based on (Fenigstein et al., 1975))
I would worry about being stigmatized if I had a second-hand [product].
With a second-hand [product], I would worry I did not make a good impression.
I would be concerned about what others think of me if I bought a second-hand [product].
Time and effort (barrier), α = 0.86
To me, a downside of purchasing second-hand [products] is the time-consuming process of finding the right one.
I dislike second-hand [products] as purchasing one requires more effort than purchasing a new one.
I think shopping for second-hand [products] is too time-consuming.
Foul smell (barrier), α = 0.97
I worry that second-hand [products] smell bad.
I would fear purchasing second-hand [products] because they have a foul smell.
To me, a disadvantage of second-hand [products] is their unpleasant smell.
Cluttered shops (barrier), α = 0.92
To me, cluttered shops and markets are problematic when looking for a second-hand [product].
I would find searching for a second-hand [product] challenging because of the disorganised shops and markets.
I am concerned about second-hand [products], because of messy shopping experiences.
Warranty and exchange services (barrier), α = 0.97
I would find purchasing a second-hand [product] without a warranty period or exchange service risky.
I dislike second-hand [products] due to the lack of a warranty period or exchange service.
To me, it is a disadvantage if second-hand [products] are not sold with a warranty period or exchange service.
Obsolescence (barrier), α = 0.91 (based on (Grewal et al., 1998; Wallner et al., 2021))
I fear that second-hand [products] do not last as long as new ones.
With a second-hand [product], I would worry that it would be outdated soon after the purchase.
The lifespan of a second-hand [product] concerns me.

(*continued on next page*)

(*continued*)

Survey questions
Wear and tear (barrier), α = 0.89 (based on (Wallner et al., 2021))
I am concerned that second-hand [products] show signs of use, which I do not find aesthetically pleasing.
With a second-hand [product], I would miss the feeling of a 'new product'.
I fear that second-hand [products] will show signs of previous usage.

Appendix 3. Motivations and barriers to the overall product categories

Appendices 3 and 4 visually demonstrate the difference in motivational factors and barriers between the product categories. The relative importance of each motivation is shown in the horizontal positioning of the product category icon: hence, the rightmost icons show the product category to which the motivational factor is highest relative to the others. The significant differences between the second-hand product categories are indicated by the different lines. The absence of a line informs that no significant difference is found between product categories for this specific motivational factor.

Fig. 3.a, Appendix 3.b, Appendix 3.c

Appendix 4. Motivations and barriers to fashion products

Fig. 4.a, Appendix 4.b, Appendix 4.c

Appendix 5. Motivations and barriers to furniture products

Fig. 5.a, Appendix 5.b, Appendix 5.c

Appendix 6. Motivations and barriers to electronic products

Fig. 6.a, Appendix 6.b, Appendix 6.c

Data availability

Data will be made available on request.

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